# Role of Self-efficacy, Outcome Expectancy, Perceived Health Competence in Coping and Self-management of Diabetes Patients

A thesis submitted during 2019 to the
University of Hyderabad in partial fulfilment of the award of a
Ph.D. degree in Psychology in the Centre for Health Psychology

by

**R.LALNUNTLUANGI**
Registration No. 14CPPH01
ICSSR Research Fellow

Supervisor
**Dr. Meera Padhy**


**Centre for Health Psychology**

**School of Medical Sciences**

**University of Hyderabad**
Central University Campus P.O.
Gachibowli, Prof. C.R. Rao Road
Hyderabad-500046,Telangana, India

## DECLARATION

I, R. Lalnuntluangi, hereby declare that this thesis entitled "*Role of self-efficacy, Outcome Expectancy, Perceived Health Competence in Coping and Self-management of Diabetes Patients*" submitted by me under the guidance and supervision of Dr. Meera Padhy is a bonafide research work which is free from plagiarism. I also declare that it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in Shodganga/ INFLIBNET.

A report on plagiarism statistics from the University Librarian is enclosed.

Date: / 05/ 2019 (R. Lalnuntluangi)

Registration No. 14CPPH01

//Countersigned //

(Dr. Meera Padhy)
Supervisor


## CERTIFICATE

This is to certify that the thesis entitled "*Role of self-efficacy, Outcome Expectancy, Perceived Health Competence in Coping and Self-management of Diabetes Patients*" submitted by R. Lalnuntluangi, ICSSR Research Fellow, bearing Registration Number 14CPPH01 in partial fulfilment of the requirements for award of Doctor of Philosophy in Psychology in the Centre of Health Psychology under School of Medical Sciences is a bonafide work carried out by her under my supervision and guidance.

This thesis is free from plagiarism and has not been submitted previously in part or in full to this or any other University or Institution for award of any degree or diploma.

Further, the student has the following publications before submission of the thesis for adjudication and has produced evidence for the same in the form of the reprint in the relevant area of her research.

1. **Lalnuntluangi, R**., Chelli, K., & Padhy, M. (2017). Self-efficacy, outcome expectancy and self-management of type 2 diabetes patients. *Indian Journal of Health and Well-being, 8* (9), 1040-1043
2. Chelli, K., **Lalnuntluangi, R**., & Padhy, M. (2017). Health hardiness and illness perceptions in type 2 diabetes patients. *Journal of Indian Health Psychology, 12* (1), 24-35
3. Padhy, M., Chottai, P., & **Lalnuntluangi, R.** (2017). Well-being of patients with type 2 diabetes: Role of self-efficacy and outcome expectancy. *International Journal of Social and Allied Research, 6* (1), 9-16

4. Padhy, M., **Lalnuntluangi, R.,** Chelli, K., Hariharan, M., & Rao., C.R. (2018). Conceptual complexity in children's understanding of diabetes. *Indian Journal of Health and Well-being, 9* (3), 392-396.
5. Padhy, M., Krishnakumar, N., Chelli, .K., & **Lalnuntluangi, R.** (2017). Self-efficacy and health locus of control in primary hypertensive patients. *Recent Advances in Psychology : An International Journal, 4* (1), 18-29.
6. Padhy, M., **Lalnuntluangi, R.,** Chelli, K., & Padiri, R.A. (2016). Social support and adherence among hypertensive patients. *Amity Journal of Healthcare Management, 1* (1), 33-40.

and

has presented in the following conferences and workshop:

1. National Seminar on *Wellbeing across lifespan*. Held on 25$^{th}$–27$^{th}$ October 2017 at University of Hyderabad, Hyderabad, India. (National)
2. National Seminar on *Health Psychology: Contribution to Health and Well-being.* Held on 4$^{th}$-6$^{th}$ August 2016 at University of Hyderabad, Hyderabad, India. (National)
3. 51$^{th}$ National and 20$^{th}$ International Conference of the Indian Academy of Applied *Psychology on Psychology for Achieving Human Excellence*. Held on 6$^{th}$ - 8$^{th}$ May 2016 at Bangalore, India. (National & International)
4. National Conference on *Caring the Elderly: Psycho-social Perspectives.* Held on 23$^{rd}$ 24$^{th}$ March 2016 at Pondicherry University, Tamil Nadu, India. (National)
5. 50$^{th}$ National & International Conference of the Indian Academy of Applied Psychology on *Applied Psychology and Spirituality- Contribution to Health, Happiness, Professions and leadership*. Held on 23$^{rd}$ - 25$^{th}$ January 2015 at Tirupati, India. (National & International)

6. Research Methodology Course for Social Sciences (Psychology). Held at Department of Psychology, S.V. University, Tirupati, India. (ICSSR Sponsored) from 17th- 26th March, 2017

Further, the student has passed the following courses towards fulfilment of coursework requirement for Ph.D.

| Course Code | Name of the Course | Credits | Pass/Fail |
|---|---|---|---|
| 1. HP 826 | Research Methodology and Advanced Statistics (Theory Paper I) | 4 | Pass |
| 2. HP 827 | Book Review (Paper II) | 4 | Pass |
| 3. HP 828 | Review Paper (Paper III) | 4 | Pass |
| 4. HP 829 | Empirical Paper (Paper IV) | 4 | Pass |

Supervisor Head of the Centre Dean of the School

## ACKNOWLEDGEMENTS

First and foremost I would like to thank God for being the unconditional guiding light throughout my endeavour and showering me with eternal blessings. Without him, this thesis would not have been possible.

To my supervisor, Dr Meera Padhy, whose expertise, understanding, generous guidance, motivation and support made it possible for me to complete my PhD thesis that is of great interest to me. It was a pleasure working with you ma'am.

I am highly indebted to the faculty members of our department - Prof. Meena Hariharan for always providing insightful inputs, Dr. G. Padmaja, Dr. Suvashisha Rana, Dr. N.D.S. Naga Seema, Dr. C. V. Usha and Dr. C Vanlalhruaii for showing interest in my research and giving scholarly advices, immense encouragement and endless support. I would also like to express my gratitude to Dr Sesikeran for being my Research Advisory Committee member throughout my PhD journey.

I owe a deep sense of gratitude to my mom, dad, sister and brothers who always love, support and encourage me unconditionally and helped me throughout my journey. I would like to express my eternal appreciation to my grandparents and other family members for their constant prayers and concerns. My sincere thanks to Hannah, Samuel, Lalzarzoa and Lalromawia for their valuable support.

I am extremely thankful to Sandra, Aarti Rajendran, Aarti Nagpal, Swarajya, Kavya, Ruth, for their invaluable support- both emotionally and academically. I profusely thank all my fellow research scholars of Centre for Health Psychology for providing me necessary suggestions and support during my research pursuit. To office staffs Ms. D. Sucharita, Mr.

Shyam Sunder, Mr. Vara Prasad, and Mr. Nagaraju, for being there whenever I need help and assistance.

I would like to extend my heartfelt gratitude to the doctors and receptionists of VR Healthcare Clinic and Sweetlife Medicare for their assistance during my data collection. To all the participants for making this thesis a success by taking their time out and participate in my study. I would also like to acknowledge ICSSR for providing financial support for my research work.

(R. LALNUNTLUANGI)

## ABSTRACT

Diabetes is a chronic disease associated with high rates of morbidity and mortality, as well as increased health care costs that require multitude of daily self-management decisions and self-care activities. Management of diabetes encompasses maintaining normal blood glucose level and thus prevent the likelihood of long term complications. This includes self management activities like oral medications, insulin injections, blood glucose monitoring, following prescribed diet and exercise regime. Patients understand that these self-management activities are essential elements for improvement of their health status as a result of which they use different coping strategies to deal with these activities. In addition to coping, different psychological factors such as self-efficacy, outcome expectancy and perceived health competence also have significant influence on self-management of illness. Taking all the above factors into consideration the study used a mixed methods sequential explanatory design to assess the following objectives: (i) to examine the difference in the level of self-efficacy, outcome expectancy, perceived health competence among three groups of Type II diabetes patients categorized on the basis of duration of disease (ii) to examine the relationship between self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of type 2 diabetes patients (iii) to understand the role of self-efficacy, outcome expectancy, perceived health competence in coping of illness of Type 2 diabetes patients (iv) to understand the role of self-efficacy, outcome expectancy, perceived health competence and coping in self-management of illness of Type 2 diabetes patients (v) to explore the lived experiences of Type 2 diabetes patients regarding their coping strategies to diabetes. The study included two phases: in phase I, a total of 295 (147 men and 148 women) patients age range from 30-73 years from the state of Mizoram participated and completed the measures namely, Multidimensional Diabetes Questionnaire, Perceived Health Competence, Diabetes Coping Measure and Diabetes Self-management Questionnaire. In

phase II, Interpretative Phenomenological Analysis was employed to explore the coping strategies of 11 patients with type 2 diabetes (34-67 years) who were randomly selected from phase I. The data collected in phase 1 were analyzed using descriptive (frequencies and percentages) and inferential statistics (ANOVA, Pearson Correlation and Hierarchical Multiple Regression). The results of the study showed that the three groups categorized on the basis of duration of disease differed in the level of self-efficacy, coping and self-management. After ascertaining that the significant relationships between the variables under study, subsequent analyses were conducted to assess the role of predictor variables on criterion variables. Self-efficacy, outcome expectancy, perceived health competence and demographic variables explained significant proportion of variance in overall diabetes coping. In addition to the above predictors, coping was added, which explained significant proportion of variance in overall diabetes self-management. Using thematic analysis, results of phase 2 identified five (5) coping strategies along with eight (8) themes and sixteen (16) sub-themes. The identified coping strategies were - planful problem solving, seeking social support, shifting burden to supernatural power, distancing and escape -avoidance. The limitations and implications of the study are also discussed.

## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## ABBREVIATIONS

| | |
|---|---|
| AADE | American Association of Diabetes Educator |
| ADA | American Diabetes Association |
| ANOVA | Analysis of Variance |
| DCHS | Derbyshire Community Health Services |
| FPG | Fasting Plasma Glucose |
| IDF | International Diabetes Federation |
| IPA | Interpretative Phenomenological Analysis |
| NCD | Non-communicable disease |
| SRM | Self-Regulatory Model |
| WHO | World Health Organisation |

# CHAPTER I

# INTRODUCTION

Recent advances in modern technology have brought about a drastic development in medical health care. With this, the prevalence of acute diseases has declined. However, this does not hold true for chronic diseases. Chronic diseases and conditions are on the rise worldwide. World Health Organization (n.d) predicted that the prevalence of chronic diseases will rise to 57% by the year 2020. Chronic diseases also known as non-communicable diseases (NCD's) are highly linked with exposure to unhealthy lifestyle such as having sedentary patterns, use of tobacco, following an unhealthy diet and so on. Chronic diseases such as cardiovascular diseases, cancer, and diabetes are among the most widely spread health problems globally (WHO, 2018) and are highly intrusive causing inconveniences to the life of the patients as they are uncertain, lifelong diseases.

## Diabetes

Diabetes is considered as one of the four chronic diseases to be targeted for action by leaders across the globe and a growing threat to global health (Adeghate, Schattner& Dunn,2006). The prevalence rate, as well as the number of cases of diabetes, has been invariably increasing since the past few years. Currently being the fifth cause of death throughout the world, diabetes affects 200 million people (WHO, 2016). When compared with high income countries, the rise of diabetes was faster in low and middle income countries (WHO, 2016).According to the latest record of International Diabetes Federation (n.d), India is among the leading countries of diabetes with over 72 million recorded cases in 2017. In the recent past, it has increased at an alarming rate and there is a need to manage and prevent this illness

from its widespread. This highlights the need to attend to diabetes in India, globally known for “capital of diabetes”.

Diabetes or diabetes mellitus is a serious chronic multisystem disorder that occurs either when the body fails to use the insulin effectively (a hormone that regulates glucose or blood sugar) produced or when the pancreas fails to secrete enough insulin.

**Types of Diabetes**

Diabetes is categorised into three types- type 1 (insulin-dependent diabetes mellitus), type 2 (non-insulin-dependent diabetes mellitus) and gestational diabetes (diabetes during pregnancy). Gestational diabetes is a temporary condition which is marked by the occurrence of only during pregnancy but carries a risk of developing type 2 diabetes. Moreover, women with gestational diabetes are more susceptible to complications during pregnancy and delivery.

Type 1 diabetes is the condition where pancreas produces little or no insulin and this led the patient to depend on insulin injections. This condition is rare and it accounts for only 5% of people with diabetes. Development of type 1 diabetes can occur at any age but usually manifests prior to 30 years and reaches its peak during adolescence. The onset of type 1 is usually rapid and symptoms are acute due to severe hyperglycaemia (high blood sugar). Even though the cause of type 1 diabetes is inconclusive, genetic and auto-immune factors are considered to be involved in its development (Wållberg & Cooke, 2013).

Type 2 diabetes is characterized by dysfunction of blood glucose level known as hyperglycemia which resulted from the combination of inappropriate or excessive

glucagon secretion, inadequate secretion of insulin and resistance to insulin actions. Patients of type 2 diabetes need not completely depend on insulin as is seen in type 1 diabetes patients. This is the basis for the distinction of the terms- insulin dependent (type 1 diabetes) and non-insulin dependent (type 2 diabetes).

Development of type 2 diabetes usually occurs over the age of 45 years and it accounts for 90-95 % of all diagnosed cases of diabetes (Centers for Disease Control and Prevention, 2018). Family history/ genetic predisposition, sedentary lifestyle/ physical inactivity and poor/unhealthy diet are key contributors to the progression and development of preventable type 2 diabetes mellitus. Type 2 diabetes is highly associated with lifestyle risk factors which are by and large modifiable.

**Risk factors of diabetes**

There can be various risk factors (both biological as well as environmental factors) that cause the development of different types of diabetes. Although the exact causes of type 1 diabetes are unknown, it is believed to be contributed by different factors such as viruses or autoimmune disorder or genetic. During pregnancy, the placenta produces hormones which build up glucose in the blood and this resulted in a high blood sugar level causing gestational diabetes. Unhealthy or imprudent lifestyle is considered the chief risk factor of type 2 diabetes. Apart from this, genetics interplay and metabolic factors, overweight and obesity, unhealthy diet and smoking make one susceptible to develop type 2 diabetes.

**Symptoms of diabetes**

Diabetes is labelled as “emerging silent killer” (Nath,2016) mutely causing a problem to eyes, skin, kidney, heart, legs and even to the brain. A quarter of people

who meet the criteria for diabetes mellitus are unaware of their diabetic condition because of its asymptomatic infection or mild symptoms that goes unnoticed. This highlights being cautious with the symptoms of diabetes is the need of the hour to delay and prevent the development of diabetes and its complications.

All types of diabetes show symptoms which are fairly similar. The most common symptoms of diabetes include dry mouth, thirst, extreme hunger and unusual headache, increased fatigue, blurred vision, itchy skin and yeast infection, frequent urination, slow healing of the wounds- particularly on feet, numbness or tingling of hands and feet, unexplained weight gain or weight loss.

**Consequences and complications of diabetes**

The complications and financial burden of diabetes are enormous and growing (Yach, Gould & Hofman, 2004). Diabetes is related to increased risk of cardiovascular disease and premature death (La Monte, Blair & Church, 2005).Diabetes patients are more vulnerable to developing infections and various serious health issues. Consistent high blood sugar level usually leads to complicated health diseases such as problems in nerves, teeth and gums, kidneys, eyes, blood vessels and heart. Type 1 diabetes increases blood glucose level and produces acids causing nausea and vomiting, loss of consciousness and abdominal pain and even death.

Across the globe, type 2 diabetes is considered the leading cause of cardiovascular disease, kidney failure, lower limb amputation and blindness (IDF, n.d.). Diabetes patients have a higher risk of developing cardiovascular diseases such as heart attack, coronary artery diseases, stroke and narrowing of arteries (atherosclerosis). The tingling and numbness felt if untreated, can spread throughout

the body and lead to loss of sense of feeling in the affected area. Damaging of nerves related to digestion can cause nausea, diarrhoea or constipation and vomiting; whereas damaging the nerve in feet can result in serious infection which ultimately may require leg, foot or toe amputation. Kidney disease is also found to be more prevalent among diabetics and severe kidney failure may require kidney transplant or dialysis. Diabetic retinopathy is another serious condition faced by diabetics. Here the patient develops a form of eye disease such as blurry vision and in worst case scenario can lead to complete blindness, cataracts and glaucoma.

Apart from these, type 2 diabetes patients have higher risk of developing Alzheimer's disease, hearing problems, skin problems such as bacterial and fungal infection, and mental disorder such as depression.

**Screening for diabetes**

American Diabetes Association suggests routine screening for type 2 diabetes once the patient reached the age of 45,especially when a person is overweight. People who lead a sedentary lifestyle and has a family history of diabetes, or who has heart diseases or high blood pressure are also recommended for screening of diabetes.

Early diagnosis of diabetes paves a long way in delay, treatment and prevention of diabetes complications (Ambady & Chamukuttan, 2008). Early detection of diabetes through screening for diabetes and pre-diabetes will also help in reducing the burden of the disease economically, clinically and socially.

Presently, there are two preferred reliable methods of screening diabetes-fasting plasma glucose test (FPG test) and glycosylated haemoglobin A1c test. In FPG test, the blood glucose level is measured before eating or fasting for at least 8 hours. A diagnosis of pre-diabetes is made when the test result is between 100–125 milligrams

per decilitre or mg/dL and if the blood glucose level is over 126 milligrams per decilitre or mg/ dL, a person is diagnosed as having diabetes.

Glycosylated haemoglobin, or simply A1c is another method of blood to measure the amount of glycosated haemoglobin in the blood. This test not only shows a snapshot of a blood glucose level of an individual over the past three months but also has the capacity to diagnose diabetes or pre-diabetes. An A1c of 6.5% or above implies the diagnosis of diabetes whereas 5.7-6.4% marks the diagnosis of pre-diabetes. This plays a pivotal role in determining a person's effort to control his/her diabetes over time.

It is advisable that a person with body mass index higher than 23 (regardless of age), a person older than 45 years, a woman who is/was diagnosed with gestational diabetes and pre-diabetics patients should go for screening every year.

**Prevention of diabetes**

Considering its global widespread and as one of biggest health problems to date, there is a dire need to prevent the incidence of diabetes. Diabetes can become a fortuitous condition if prevention starts at an early stage. Effective prevention requires taking necessary precautions by vulnerable individuals.

Type 2 diabetes is a disease of lifestyle or environmental factors can be prevented in numerous ways. Research found that lifestyle modification such as doing physical activities and/or following a healthy diet play a crucial role to prevent type 2 diabetes complications (Colberg et al., 2010). Modern lifestyles are highly characterised by long sedentary periods and physical inactivity. Karbon (2017) suggested that engaging in any kind of physical activities for at least 30-45 minutes per day for 5 days a week can reduce the risk of serious diabetes complications.

## Diabetes treatment and management

Diabetes is a lifelong condition and effective treatment of this disease is important. Regular monitoring of blood sugar level is the core of diabetes treatment. Basic management of type 1 diabetes entails regular insulin injection. The treatment of type 2 diabetes involves following healthy lifestyle, strict diet, regular exercise, and a strict medical regimen which falls under the broader term “management”.

### *Treatment of diabetes*

Type 1 and type 2 diabetes treatments aimed at randomizing blood sugar levels and managing cardiovascular risk factors by symptoms monitoring, changing life style and following medications. In addition to this, treatment entails helping individuals cope with the emotional and physical changes concomitant to diabetes. Healthy diet and physical activity are the core elements of the treatment plan in type 2 diabetes in addition to foot care inspection, self monitoring of glycemic level, and taking prescribed medications.

### *Diabetes Management*

Unlike other medical conditions, management of diabetes requires more of the patient and family support, adherence to medical regimen regarding medical administrations, diet composition, or symptom monitoring. Effective diabetes management requires active problem solving and self-regulation of the basic elements of the treatment regimen by patients. It requires continuous and timely monitoring, evaluation and self-regulation of every aspect of the regimen.

## Coping with diabetes

Following medical diagnosis of diabetes, patients confronted new situations that catalyse challenges to daily activities. This resulted in trying to find new ways to cope with their altered condition. Here coping plays a pivotal role in effectively

dealing with various complications that comes along with the illness. Coping with illness can be operationally defined as the tendency to alter different dimensions of one's life like physical, psychological and future orientation to suit the natural consequences and procedures involved with the illness. Psychological coping to diabetes is beneficial to having a good health outcome.

**Health Behaviour Change in Diabetes**

Shaping or forming new behaviours, eliminating unhealthy behaviours and maintaining existing healthy behaviours are the most common forms of health behaviour change (Davis, Campbell, Hildon, Hobbs & Michie, 2015). Health behaviour change can be defined as any activities taken by a group or an individual to prevent injury or illness or maintain or change their health status (Institute of Medicine, & Institute of Medicine, 2001). Health behaviour change integrates a biopsychosocial model where psychological factors play an equally significant role as biological and social factors in influencing the nature and severity of illness of an individual as well as the capacity of an individual in maintaining or undertaking health behaviour change (Browning & Thomas, 2005). Health behaviour change interventions are reported to have a positive outcome in treating chronic medical conditions, injuries and diseases effectively (Lindner & Sciacchitano, 2013).

With the aim to delay, prevent and manage of the onset of chronic disease such as type 2 diabetes, it is essential to incorporate different aspects of health behaviour change. The maintenance and adoption of health behaviours are essential to treat and reduce the complications of chronic illness patients (Rotheram-Borus, Ingram, Swendeman & Lee,2012).When behavioural component like physical activity and diet regimen are included as part of an intervention, it produces better positive

outcomes such as reduction in diabetes incidence (Vermunt et.al., 2013). Engaging in healthy promoting behaviours helps the patients in maintaining optimal level of health that reduces their risk of developing secondary complications and improves their quality of life and productivity.

## Theoretical Perspective on Coping and Management

Understanding the motive behind people's engagement and disengagement in recommended behaviour is associated with theories of health and behaviour. These theories have explained the reasons why individuals behave in certain ways in relation to their health (Presseau et al.,2014). Few theories are highlighted below. The present study includes different concepts based upon different social cognitive theories- Social Cognitive Theory, Social Determination Theory and Self Regulatory Model.

## Social Cognitive Theory

Social cognitive theory is the essence of health psychology as it has formed the basis from which models of health behaviour, health behaviour change and general social cognition models applied to health-related decision making have been derived. This theory focuses on the reciprocal relationships between behaviour, cognition and social processes (Bandura, 1986). Social cognitive theory explains how self-efficacy and outcome expectancy are essential for behavioural change and their maintenance. They are considered important protective factors against chronic non-communicable diseases (Olsen, Bertollini, Victora & Saracci,2012). Self-efficacy and outcome expectancies are believed to have a direct impact on the behaviour of a person.

***Self- efficacy***

Diabetes, as discussed, is a long-term incurable disease which has potential to create difficulties for patient in their self-management and coping with diabetes. Results of a study showed that effective diabetes self-management (Lalnuntluangi, Chelli & Padhy, 2017) and coping (Gandhi et al., 2014) were influenced by various individual factors. One such factor includes self-efficacy, which is a person's belief or confidence in his/her ability to successfully execute behaviours for achieving desired goals or outcomes (Bandura, 1977).

Self-efficacy, a concept which derived from Social Cognitive theory was used to describe the relationship between personal and behavioural factors in general health or chronic illness since it involves individual's confidence to perform health behaviours (Lorig & Holman, 2003). Self-efficacy involves regulation of affective states, motivation, thought processes, behaviour, or changing environmental conditions. These beliefs are essential in adopting a strenuous self-regimen or in approaching difficult and novel situations. It has emerged as one of the powerful predictors of whether an individual actually engages in certain behaviour. Individuals possessing greater sense of self-efficacy to initiate certain health behaviours or reach some goals are likely to put forth effort to perform the behaviours. Self-efficacy is a belief that not only focuses on behavioural accomplishment but also on the strength of individuals to govern their cognitive, emotional, motivational and social elements. The different tasks people perform, the persistence of the task, and the level of distress or satisfaction they achieve after carrying out the task depend upon how capable they feel of themselves. Therefore, self-efficacy can be defined as the confidence of an individual to undertake necessary behaviour.

An ample amount of research done in the field of self-efficacy helps to understand, predict and change a vast range of human behaviour- including health and illness related behaviours. Psychological adjustment, physical health as well as self-guided and professionally guided behaviour modification techniques are all essential to the beliefs of self-efficacy.

Self-efficacy, being considered a behaviour-specific construct is essential for the process of changing behaviour. A patient's engagement in handling several behavioural challenges in future depends on the perceptions of an individual in his/her confidence or capability to overcome certain difficulties. The effort given to reach target behaviour is influenced by self-efficacy level which impacted the individual's persistence while facing failure or obstacles. Self-efficacy can either become an inhibitor or inducer of desired actions and it can predict future behaviour.

Self-efficacy or being confident in one's performance of management activities is considered an important aspect for successful self-management. Enhancing patient self-efficacy is considered an important pathway to better self-management. When an individual faces problem, self-efficacy takes place and instigates a coping strategy suitable for that particular situation. If the perceived self-efficacy is strong, the effort an individual put into coping will be equally strong (Bandura, 1977). Self-efficacy, on the one hand, enhanced this coping style by making the individual believe that she/he can successfully carry out the required tasks with little or no external assistance (Hsieh & Schallert, 2008). High self-efficacy level is essential to master challenges inherent in these activities. Increased self-efficacy can promote positive coping styles and help chronic patients to endure difficulties.

A person who shows high self-efficacy gives more effort in trying to overcome barriers and tends to be stronger when facing problems. A study among diabetes patients found that patients with high self-efficacy cope better with their disease and report lesser emotional issues and are more adaptive to the required changes recommended (Tareen & Tareen, 2017). Bandura (1986, 1997) suggested that individual's initiation and sustenance of coping behaviours, as well as the amount of coping effort that they are willing put forth, are determined by their sense of self-efficacy.

According to Singh and Udainiya (2009), peoples' thought, feelings and actions are influenced by their self-efficacy and individuals with high self-efficacy perform more challenging and difficult tasks. On the whole, self-efficacy anticipates the motives of an individual to engage in activities that promote health and prevent illness such as implementing a routine with physical activity and healthy diet intake, maintaining a healthy lifestyle, and adherence to the treatment in order to manage and cope with chronic illness effectively (Luszczynska & Schwarzer, 2005).

**Outcome Expectancy**

Outcome expectancy is an extent to which a person believes in the occurrence of a particular outcome while self-efficacy is the degree of confidence that one has for successfully executing a particular behaviour to produce an outcome. A persons' expectation of outcomes largely depends on the how well he/she expects to perform the activities (Bandura, 1986). In the context of treatment, outcome expectancy can be explained as a person's belief in a particular treatment for improving their condition or reducing the symptom levels whereas self-efficacy is a person's conviction in their capability to successfully participate in executing the required treatment.

Even though these two concepts are closely related, they can be differentiated in the ground that individuals may believe in their capacity to execute the treatment effectively but might not believe in the effectiveness of treatment in reducing negative outcomes, and vice versa. Both self-efficacy and outcome expectancy theorized on enhancing intention and task motivation of a person in completing the desired behaviour, and also determine the amount of effort and persistence shown by the individual in times of unpleasant and aversive situations.

According to Bandura (2001), there are three types of outcome expectancies that are interrelated but conceptually different. Physical outcome expectancy refers to the belief in occurrence of certain physical outcomes after engaging in physical activities (e.g. weight lost to prevent chronic diseases). Social outcome expectancy reflects the belief in gaining social approval after performing desirable behaviours (e.g. response of significant others to changed behaviour). Self-evaluative outcome expectancy is the belief in oneself to behave in a certain way (e.g. increased in self-worth or self-esteem).

Outcome expectancy requires a person to understand the association between the actions taken and the subsequent outcome of the actions. Apart from being aware of their health threat, people also need to have a sufficient knowledge on how to control their behaviour. Outcome expectancy also influences behavioural intention such as taking up physical exercise, improving diet, managing stress, and adhering to medication. Social Cognitive theory posits that outcome expectancy plays a major role in helping individuals initiate a novel behaviour and maintain the existing behaviour.

Outcome expectancy plays a fundamental role in the motivation to change of behaviour. For instance, a diabetes patient may find better reasons to take physical

activities than living a sedentary lifestyle, although this might not have direct effect on actions, it contributed in generating the intention to take up physical activities. The contingencies between actions and outcomes may not be necessarily evaluated and worded; they can rather be loaded with emotions or diffused mental representations. Outcome expectancy is also a mean-end relationship or method which indicated that people are aware of strategies that produce the desired outcomes.

Social Cognitive Theory states the usefulness of outcome expectancy in the initial development of intention to carry out a particular behaviour. When individuals advance from considering behaving in a certain way to actually behaving in that particular behaviour, they build up expectations about the potential outcomes of that behaviour and their capabilities to perform that particular behaviour. An ample amount of contribution by outcome expectancy and self-efficacy was seen in intention formation and behavioural enactment. Self-efficacy and outcome expectancy are postulated to increase better self-management and coping among chronic illness patients (Karl et al., 2018; Brown et al., 2014). Studies have suggested that self-efficacy and outcome expectancy have directly impacted the intention to act towards a particular behavioural goal (Rodgers & Brawley, 1996). With a belief of producing positive outcomes, these individuals have an incentive to act or to persevere in difficult situations. Hence, on the basis of these beliefs, people determine what kind of challenges to take up, judging if the failures would be motivating or intimidating and thereby choose the amount of efforts to expend in the health promoting venture.

**Self- determination Theory**

Self-determination theory focuses on the belief that people have inherent growth tendencies to behave in effective healthy ways. Autonomy, competence and relatedness in social setting will predict their creativity, persistence and performance.

Competence of self-determination theory is considered as a significant factor of psychological needs. The perception of competence in relation to domain or activity is believed to be important as it helps people attain goals and provides a sense of need satisfaction by engaging them in activities which make them feel efficient. Perceived competence is the extent to which individuals feel capable of bringing about a change in their health behaviour by carrying out treatment regimens and participate in several health-care activities. People who feel confident in carrying out these changes are found to be more likely to make and maintain the changes and this result in positive health outcomes.

**Perceived Health Competence**

Perceived health competence can be defined as the ability to master health related activities which in turn yield positive outcomes. To manage the burden and massive demands of self-management and coping among diabetes patients, individual's perceived health competence is of great importance. When an individual feels competent, he/she feels more confident in attaining relevant outcomes. According to Self- Determination Theory, diabetes patients have a sense of competence when they are confident of controlling their health outcomes like their blood glucose level. Autonomy, the belief that one has in controlling and initiating a particular behaviour is one of the basis in perceived health competence.

Many a time literature used perceived health competence and self-efficacy interchangeably. Perceived health competence is conceptualized under Self-Determination Theory (Deci & Ryan, 2002) while self-efficacy is theorized in Bandura's Social Cognitive Theory (1986). Self-efficacy defined as individuals' beliefs in their capabilities to execute an action to reach a certain goal is different from perceived health competence, which is more than just having an ability to

execute tasks and excelled in performing the tasks. Self-Determination Theory suggested that people will choose relationships, behavioural domains and goals that satisfy the psychological needs. In this theory, competence plays a significant role, which is the tendency to master any challenging task faced by an individual. The perception of competence with respect to any domain or activity is thought to be imperative as it gives individuals a sense of satisfaction when engaging in activities that makes them feel efficient. This facilitates people's goal attainment.

**Self Regulatory Model**

Self- regulatory model (SRM) also known as Common sense model was propounded by Leventhal and colleagues (1992) which helps individuals in managing and coping with their illnesses. This model is an illness behaviour model that views the chronic illness patients as active self-managers in taking care of their illnesses. This model accentuates the importance of emotional and cognitive processes in influencing self-management and coping strategies (Leventhal et al., 1992).The important aspect of this model is illness representation where individuals develop their own views of their condition. Individuals are active problem solvers and they adopt different coping behaviour to improve their condition with regard to illness representations.

The SRM proposes three stages for individual's health behaviour change- first stage involves interpretation of patient's emotional and cognitive illness perceptions (Leventhal et al.,1992; Hagger & Orbell, 2003). The second stage involves the other important factor i.e, coping, where patients utilize coping strategy such as adherence to medical and behavioural regimes for managing their chronic diseases. The final stage involves assessment of the strategies employed by the patients themselves for evaluating the effectiveness and for enhancing positive illness management. The

framework of SRM has been functional for several chronic conditions in terms of effectively managing health behaviour for treatment, delay and prevention of the condition and this is significantly relevant in the case of type 2 diabetes.

Self- management and coping are two important components of self-regulatory model that play important role in long-term sustenance of maintaining physical activities and following a healthy diet which are considered crucial to diabetes care. A study has found that one-third of reported diabetes patients led a complete sedentary lifestyle and only a few of them exercise regularly (Thomas, Alder & Leese, 2004). This highlights the need to change unhealthy lifestyle behaviour alongside medical and pharmacological interventions to reduce the burden of diabetes mellitus.

**Self-management**

Self-management refers to performance of daily activities undertaken by individuals with chronic illness to better their conditions, keep illness under control and reduce illness consequences on health and functioning in order to deal with psychosocial repercussions (Clark et al., 1991;Lorig& Holman, 2003). Self-management is somewhat distinct from adherence to a prescribed behavioural regimen because it entails a more proactive role in which the patient has a greater level of control and autonomy for regimen adjustment as necessary, deliberate decision making and problem solving. It includes 3 types of activities: disease management related to regimen adjustment, communication with health-care providers, and psychosocial coping activities (Clark et al., 1991). Self-management is a broader construct that includes the interaction of related behaviours and processes that patients and their families carry out to manage the illness (Modi et al.,2012). The

failure of individuals to enact, and persist in essential health habits such as eating a nutritious diet, exercising for strength and fitness, and dutifully taking medication appears to be a widespread and serious problem, with non-adherence rates at or above 50% in many disease condition (Laufs et al., 2011).

Increased mortality rate and costs in treatment, the accompanying consequences of diabetes, and the resultant social and individual loads bring to light the immediate need to help diabetes patients in controlling and managing their chronic diseases. To control diabetes effectively, patients need to persevere in self-management activities with the intention of prolonging their lifespan and lessen complications. Self-management is a crucial factor for treatment of diabetes.

Self-management is integral to good diabetes care. The fundamental role of self-management or self-care in controlling and treating diabetes is known and acknowledged worldwide. It is essential for type 2 diabetes patients to manage different aspects of diabetes themselves on a life-long basis. “Self-management refers to individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition”(Barlow, Wright, Sheasby, Turner & Hainsworth,2002). Since 1930’s, the process individuals use in managing their diabetes has been known to be an important component of clinical management (Norris et al., 2002).

Diabetes self-management entails learning to survive or live with all the complexities and predicaments that come along with diabetes mellitus. In type 2 diabetes, self-management ranges from simple tasks like diet and exercise to more complex ones such as lifestyle modification, regular use of medical care, regular exercise, dietary control and self-monitoring of glycemic level. Patients with type 2 diabetes across all age groups often face difficulties with regard to self-management

tasks and changing of behaviour in relation to food and exercise becomes a huge challenge for them. It also brings about a huge burden to some patients as it includes complex tasks like taking regular exercise and medicines, following a strict diet, insulin administration, maintaining normal blood sugar level and visiting doctors frequently.

Self-management helps diabetes patients in actively managing their chronic condition on a long-term basis and is considered the cornerstone to diabetes care. Individuals with diabetes who have low self-management are more susceptible to complications. With the aim to prevent diabetes-related morbidity and mortality, diabetes patients are required to execute daily self-management activities dutifully. Abotalebi (2009) found that lack of self-management behaviour is one of the key reasons for increased mortality among diabetes patients. Poor adherence to self-management activities are widely recognized as a chief threat to achieve positive outcomes among diabetes patients; medical ignorance and/or wilful uncooperativeness are the main factors contributing to poor adherence. Self-management activities are requisite to prevent chronic or acute complications, optimize metabolic control, and optimize better quality of life.

Diabetes self-management refers to activities or behaviours undertaken by an individual with diabetes or who are at the risk of diabetes in order to successfully control and monitor the disease by themselves. Failure to attain successful and desirable outcomes in diabetes care is the result of lack of patients' participation in the treatment process. Hence, the disease demands diabetes patients to sustain self-management activities or behaviours throughout their lifetime. Self-management involves patient's active participation in activities such as physical activity, regular use of medicines, blood glucose monitoring, diet and foot care. Patient's lack of

proper practice of self-management is linked to the reason for increased severity of diabetes annually. Self-management is a prerequisite to follow all these lifestyle modifications.

*Barriers and facilitators of diabetes self-management*

Identifying the barriers and facilitators of diabetes self-management are crucial for attaining optimal health outcomes. The barriers included difficulty incorporating exercise, diet and medical adherence in their existing schedule; various psychological issues (depression, stress, lack of support) that prevent patient from performing self-care activities; financial constraint to pay for medical facilities; and health concepts misunderstanding (low health literacy, language barrier). Demographic variables like increase in age and duration of diabetes are associated with low diabetes self-management, whereas married patients (marital status) practise better self-management activities. Apart from this social support from spouse, relatives, friends and health care providers help in adhering to self-management activities like adherence to diet, medicine and physical activities.

**Coping**

Coping, operationally define as a person's cognitive and behavioural efforts to manage the stress producing aspects of one's circumstances, including those that are illness-related- is central in the study of how individuals adjust, or fail to adjust, to chronic illnesses. According to Lazarus and Folkman (1984), coping is a person's ability to continuously adjust his/her behavioural and cognitive efforts in handling stressful situations and is closely related to self-management of diabetes. Coping allows people to utilize multiple skills for managing the difficulties they face in daily life. Coping is equally important as self-management among diabetes patients. When

the stressor is diabetes, elimination of the condition is not an option, thus people with diabetes need techniques to make the condition less troublesome. Hence, coping and self-management becomes a full-time job among diabetes patients. Productive coping, an approach where one utilizes available resources to deal with physical and psychological challenges to increase the likelihood of positive outcomes in the future, is vital for effective treatment of diabetes (Kent et al., 2010).

An emotional crisis hit a person when he/she is diagnosed with an incurable chronic condition. When people are diagnosed with diabetes, they face continuous challenges of having to deal with the stressing demands of the condition and to employ several approaches to cope with the disease. Psychological adjustment and acceptance to the diagnosis can be a stressor for some people and the way in which people cope with this stress can be quite different.

Coping is a complex phenomenon which comes into play when an individual faces stressor and this coping resulted in some outcome. Coping behaviours can either be productive or unproductive in nature. The strategies that enhance better management of disease are considered as productive coping whereas those which hinder management are regarded as unproductive coping. Hariharan and Rath, (2008) categorised coping as productive or unproductive depending on the outcome that it produced. In addition to Lazarus and Folkman (1984), eight coping strategies, Hariharan and Rath (2008) added one coping strategy, viz., ‘shifting burden to supernatural power’ and presented nine coping strategies- shifting burden to supernatural power, planful problem solving, positive re-appraisal, accepting responsibility, distancing, escape-avoidance, seeking social support, self-controlling and confrontive coping strategy.

Planful problem solving involves careful analysis and planning to resolve the problems/ stressors in the most logical way. When the patient is aware of the problems, he/she chalks out the probable solution to rectify the barriers. Seeking social support entails tapping any kind of required resources from others to cope with the stressors. Positive reappraisal involves using conscious effort to view things in a positive manner. This is a technique where the previous decisions are reconsidered as having positive outcomes. In shifting burden to supernatural power, individuals shift their stressors or burdens to God or any other external power as a way of managing one's emotional turmoil. Distancing coping strategy involves detachment of oneself from the main problem in trying to minimize the problem. This involved refusing to accept the severity and seriousness of the situation Escape avoidance coping strategy entails consciously shifting attention from the main problem to periphery in trying to cope with the issue or condition. Accepting responsibility involves a component of self-blame with a positive attitude. Self-controlling involves deliberate regulation of one's feelings, emotions and actions to facilitate or alleviate stressful situation. In confrontive coping individual gives aggressive effort while directly confronting with the stressor with the intention to reduce the problem.

Productive coping behaviour will help a person solve psychosocial difficulties and restore emotional equilibrium. The outcome depends on the coping strategies that an individual adopts. Understanding the type of coping strategy that a person employs in times of stress enables one to position the coping strategy towards a positive outcome (Hudson, 2016). Among diabetes patients, taking insulin regularly, testing blood glucose level and following dietary recommendations can be regarded as productive coping behaviours. On the other hand, non-acceptance of the diagnosis or severity of the condition, reacting with gestures of anger, or turning to smoke or

drinking alcohol would be considered unproductive coping. Some coping behaviours intend to manage the emotional response and others to control the medical condition. Patient's adherence to the recommended regimen is largely determined by the pattern of coping behaviours.

In order to cope well with diabetes, several studies have suggested that learning coping strategies can give a huge benefit to diabetes patients. Learning problem-solving techniques can be useful for diabetes patients in managing complicated situations such as having pressure to overact. Among many things, this technique can help those who are struggling to control their weight by identifying the situations that can potentially trigger their difficulty; it also identifies problem-solving approaches which is helpful for that person.

Lazarus and Folkman (1984) discussed two types of coping, viz., problem-focused and emotion-focused, which serves a dominant role in monitoring and treating diabetes. Problem-oriented coping aims at solving the problems that faced by the individuals. This coping strategy is used when the individuals perceived the stressors as amenable to change. For instance, a diabetes patient uses this coping strategy when he/she has difficulty managing diet. When the patients employ the problem-focused strategy, they strongly believe that they can affect the resources for managing the disease as well as the unpleasant situation caused by the disease (Tuncay, MusabakGok & Kutlu, 2008). In general, problem-oriented coping strategy significantly correlates with better self-care, metabolic control and psychosocial well-being among children and adults with different chronic illnesses (Ismail, Awad & El-Nady, 2009). With regard to medical outcomes alone, this coping strategy is found to

have a successful outcome as compared to emotion-focused coping strategy (Ryan, 2013).

Problem –focused coping entails individual efforts to change the actual situation in order to alleviate the stressors, are context or task specific. This problem focused coping can include proactive and preventive coping in which people try to anticipate the problems and then act to prevent their occurrence (Aspinwall & Taylor, 1997). Combative coping is another type of coping which is utilized when individuals face unavoidable stressors.

Emotion-focused coping strategy is usually employed when people believe they have little or no ability to effectively reduce or avoid the stressors (Rafati, Nouhi, Sabzevari & Dehghan-Nayeri, 2017).This type of coping focuses on managing the reaction to stress, although not the cause of stress itself. Emotion-focused coping include escape-avoidance (trying to avoid the situation) and distancing (trying to stop thinking about the problem). Emotion-focused can also include positive reappraisal or social support.

Emotion-focused coping aims at regulating our emotional response towards problems. (Ben-Zur, 2017). An emotion-focused strategy accentuates the effort that patients make in trying to control their emotion by thinking and acting. Emotion-focused coping is suitable for situation where the individuals appraise their conditions as irreparable or hopeless events, or see the conditions as transitory and will rectify itself. This coping strategy contributed to improved medical outcomes by eliminating the frustration that can disrupt the functioning of self-care among diabetes patients.

Several similar coping strategies such as distancing, avoidance, finding positive worth in negative event and minimization- most of these include cognitive

processes and focus on lessening emotional distress. A study among adolescent diabetes patients found that avoidance in diabetes management (avoid testing of blood glucose level and taking injections) paves a way in coping with their emotional distress by making them feel less indifferent from their peers (Jasser et al., 2012). This coping strategy is highly associated with poor psychological well-being and low metabolic control. Another coping strategy known as palliative coping (the use of passive approaches to solving the situation such as resignation) among adults also shows a negative contribution on diabetes-related outcomes, including poor metabolic control and weight loss. This highlights that not all coping strategies have a fruitful outcome in terms of medical and psychological outcome.

*Barriers and facilitators of diabetes coping*

Coping is central to diabetes care and treatment in type 2 diabetes mellitus. An individual's tendency to cope with the fundamental realities of the condition effectively is the essential ingredient to better metabolic outcome (Matthew, 2010). Few of the barriers included financial instability or constraint, low support system, lack of access to providers and health physicians and low problem-solving ability. Coping with diabetes regimen was also affected by patients who have negative beliefs regarding their illness. These patients usually have trouble adjusting to necessary regimens while patients with positive beliefs on their disease and its treatment are found to cope and control their conditions effectively. In diabetes mellitus, maintaining a consistent balance between diet, medication, and exercise in order to achieve desirable blood glucose level is an ongoing challenge and executing appropriate coping strategies will help the patient adjust to the new situation/condition.

**Self-management and coping**

Self-management and coping are two of the most important factors in diabetes control and treatment. According to the US Department of Health and Human Services (2010), self-management is one of the four factors which improve the health status of chronic illness patients. Self-management instils in an individual a sense of responsibility and acts as a tool in taking care of their chronic illness. For any individual to effectively manage their illness, regardless of their chronic condition, generic skills have proven to be successful to a large extent. Self-management acts as a mediator between metabolic control and coping, as well as between quality of life and coping. A significant association was noted between self-management and greater use of coping strategies (Jasser at al, 2012).According to De Ridder, Geenen, Kuijer and van Middendor (2008), psychological adjustment, one of the components of coping helps patients to adapt to the new conditions imposed by their illness. Coping helps individuals to grapple with the difficult situation and resolve the negative feelings induced by illness; thereby facilitating engagement to demanding self-management behaviours which subsequently better their conditions.

# CHAPTER II

# REVIEW OF LITERATURE

A plethora of comprehensive reviews was conducted to identify concepts and theories pertinent to diabetes self-management and coping. This chapter encompasses review of articles relevant to the variables under study, in a systematic manner. A rigorous investigation on multiple databases was initially carried out to identify the appropriate literature. The selected articles were then summarized in detail to provide insight regarding the impact of diabetes and the probable psychological factors which could enhance diabetes self-management and coping.

## Diabetes Self-management

Diabetes is a lifelong chronic disease which necessitates self-management for care and treatment (Schechter & Walker, 2002). Diabetes is a chronic condition that demands its patients to carry out multitude of self-management activities and decisions which include performance of complex care activities (Powers et al., 2017). Diabetes self-management activities focuses on regular exercise, dietary planning, blood glucose monitoring, and where applicable, appropriate use of oral hypoglycaemic or insulin medication (American Diabetes Association, 2014). According Jordan and Jordan (2010) 98% of diabetes care includes self-management. Since diabetes has gradual progression and long duration, self-management offers those living with the condition the means to improve health outcomes and maintain an ability to live in good health for a long period of time (Grady & Gough, 2014).

Diabetes self-management will help patients grapple with several environmental risk factors to which they are daily exposed (Ershow,2009). Shrivastava, Shrivastava and Ramasamy (2013) suggested that patients' participation

in self-management activities have dramatic influence on development and progression of the disease. A combination of traditional medical care and practice of self-management skills are the best treatment for chronic disease (Bodenheimer ,Lorig , Holman & Grumbach, 2002).

**Components of Self-management**

Self-management in chronic diseases is augmented by the amalgamation of different factors. Self-management characterizes a collaborative work between patients, their family and friends as well as the health practitioners where all mutually work in managing the patient's illness by facilitating comprehensive care (Carryer, Budge, Hansen & Gibbs, 2010). Diabetes self-management is the foundation for diabetes patients to better their health outcomes (Powers et al.,2017). Diabetes Control and Complications Trial Research Group (1993) suggested the importance of adhering to self- management activities to prevent potential diabetes related complications and to have a sense of control over diabetes.

Successful diabetes management largely depends on patient's ability to reach goals, taking into consideration several psychological and physiological factors (Funnel & Anderson, 2004). Physical activity, healthy eating pattern, compliant with medical regimens and practising risk-reduction behaviours are some of the important essentials to diabetes self-management (Shrivastava, Shrivastava & Ramasamy, 2013).

*Lifestyle modification*

Self-management activities may be quite troubling and might even require basic changes in one's lifestyle (Mohebi et al., 2013). Global incidence of type 2

diabetes has been increasing since the past few years at an alarming rate and this is by and large driven unhealthy lifestyle practice (Liu, Silvestre, & Poppitt, 2015). Even though lifestyle changes are problematic to adhere to on a regular basis, it is very beneficial for diabetes evolution (Fowler, 2010). Changes in lifestyle pattern can have a favourable impact on health at the individual level as most chronic conditions are associated with lifestyle (Grady & Gough, 2014). Many studies have investigated the contribution of lifestyle modification in delaying the progression from pre-diabetes to diabetes (Kanat, DeFronzo, & Abdul-Ghani, 2015). Fortunately lifestyle is a modifiable cause and changing of undesirable lifestyles resulted in healthy outcomes. Mozzilloet al.(2017) found that promoting health behaviour changes helps in improving health status among diabetes patients. They also suggested that patients with diabetes are advised to change their unhealthy lifestyles for optimization of their health.

*Physical activities*

Engaging in physical activity is considered beneficial to control and treat of type 2 diabetes mellitus (Li et al.,2008). A comprehensive research by Thomas, Elliot and Naughton (2006) suggested the significance of physical activity or exercise as part of non-pharmacological means for improving blood glucose level. Physical activity is considered one of the most beneficial aspects for preventing progression of type 2 diabetes especially in the initial stage where insulin is not yet required (Colberg et al., 2010). Taking regular physical exercise controls blood glucose level and prevents or delays diabetes complications as well as the potential comorbid conditions such as high blood pressure, cardiovascular diseases and even mortality (Colberg et al., 2010). Much of the research done in the field of type 2 diabetes has focused on controlling of blood glucose level, however it is worth noting that psychological well-

being of the patients were improved by physical activities (Abbas et al.,2011). Physical exercises such as aerobic exercise, resistance exercise, endurance exercise and passive exercise are alternative therapeutic regimen for type 2 diabetes patients (Thent, Das & Hanry, 2013). The result of a study showed that lower glucose level can be explained by physical activity like habitual aerobic fitness (Sigal et al., 2004). A study by Bird andHawley (2017) showed that physical exercises reduces sugar level in the blood, thereby reduces the level of insulin required and increases insulin sensitivity.

*Diet*

For decades, diet plays a crucial role in management of diabetes, along with medication and physical activities. A combination of diet and physical exercise has been recognized as the most effective preventive strategy for reducing the incidence of diabetes (Balk et al., 2015). Adherence to recommended diet for diabetes patients contributes to effective diabetes management (Jaworski, Panczyk, Cedro & Kucharska, 2018). Following a healthy diet pattern such as minimizing intake of food that are high in fats and carbohydrates as well as high glycemic foods resulted in decrease of blood glucose level which directly reduce the amount of required insulin of the body (Asif, 2014). Self-dietary management is considered the key step in performing diabetes-related treatment skills and minimizing the disease related complications (American Diabetes Association, 2013). Dietary management helps in treating and preventing organ complications among diabetes patients. Emphasis should be given on adherence to diet so as to control and minimize the symptoms of the disease and to reduce the complications (Sami, Ansari, Butt & Ab Hamid, 2017).

*Medical Adherence*

Diabetes patients have to live with the burden of having to adhere to medications which is a part of their daily self-management routine (Zugravu, Stoian & Patrascu, 2014). Medical adherence is a flexible instrument accessible to the patient in his/her chronic disease trajectory (Debussche, 2014). Medical adherence has considerable influence on the outcome of patient with different chronic diseases. A study by Kirkman et al. (2015) suggested a positive relationship between medical adherence and improved health outcomes, reduced hospitalization and mortality rate. Adherence to recommended medications among diabetes resulted in desired blood glucose level (Wabe, Angamo & Hussein, 2011). Another study also found the significance of following strict medical regimen for enhancement of type 2 diabetes management and correct adherence to prescribed medication for control of related comorbidities (Barba et al., 2017). Adherence to medical regimen serves as a link between treatment of diabetes and the outcome of that medical care (Inamdar et al.,2013). Poor adherence to recommended medical regimen is considered a critical health care concern for the doctors and physicians as much as for the patients (Martin, Williams, Haskard & DiMatteo, 2005). Giving attention to medical adherence is obligatory for managing diabetes and much impetus is required for diabetes self-management (Inamdar et al.,2013).

*Regular check-up*

Regular check-up is another significant tool in diabetes self-management. Whether a diabetes patient feels sick or healthy, he/she has to follow a strict check up routine to control blood sugar level (Manzella, 2018). Check-ups, to a large extent help in prevention and treatment of diabetes complications, provides guidance on diabetes self-care and enhance overall health (Asif,2014). A diabetes patient is expected to go for check-up at least twice a year or even more frequently if the patient

is experiencing complications (Manzella, 2018). Diabetes puts individuals at risk for many other chronic conditions such as stroke, heart disease and hypertension (American Heart Association, 2018). Hence frequent or routine check-up of blood sugar level is crucial for positive health outcome (Nathan, 2014).

*Physician involvement*

Diabetes demands patients to perform multifaceted self-management activities like taking insulin and oral medications, undertaking physical exercises, blood glucose monitoring, weight reduction, and attending clinic appointments (Powers et al., 2017) which positively resulted in improved glycemic level (Bloomgarden, 2006). Physicians provided help to diabetes patients in performing these regimens as integrating these into patient's daily routine can be quite challenging (Asif,2014). They assisted diabetes patients in scheduling their frequent clinic visits and also discussed the challenges faced by patients in diabetes management (Chase et al., 2006). The quality of relationship between patient and physician has direct link with patient's functional status and health outcomes (Heisler et al.,2002).

Successful diabetes management involves teamwork between patients and physicians (Neumark-Sztainer et al., 2002). In a study by Libman and Becker (2003), physician-patients communication improved patients' adherence to treatment regimens, increased their satisfaction which in turn led to better health outcomes. Shared decision-making is a component of physician-patient communication where the physician and patient share about medical information (Medtronic MiniMed, 2006). The physician provided multiple treatment options to the patient where he/she expressed the treatment preference to ensure better clinical outcomes (Bloomgarden,

2006). The consistency in the findings of these studies showed the relevance of physician-patient communication in diabetes management.

**Self-efficacy and Self-management**

Self-management involves personal and behavioural factors into daily functioning and it is believed that self-efficacy plays a fundamental role in enhancing diabetes self-management. The study by Mishali, Omer and Heymann (2010) found the effective role of self-efficacy on diabetes management activities such as physical activity, diet and medication intake. Self-efficacy also correlated with self-management behaviours such as self-monitoring of glucose level in the blood, exercise, and foot care (Sarkar, Fisher & Schillinger, 2006). Self-efficacy also contributed to successful management of illness among chronically ill patients, especially among diabetes patients (Shortridge-Baggett,2002; Bazargani, Besharat, Ehsan, Nejatian & Hosseini, 2011). Similarly, studies conducted on type 2 diabetes patients showed that low self-efficacy resulted in non-adherence to medication and higher self-efficacy promoted adherence (Griva, Myers & Newman, 2000).

Many researchers believed that self-efficacy provides a proper framework which helps in predicting and understanding the behaviours and commitments of patients with respect to self-care of diabetes (Sarkar, Fisher & Schillinger, 2006). Increased self-management activities and self-care behaviours were positively associated with high self-efficacy (Curtin et al., 2008). A significant association between self-efficacy and self-management behaviours was found among type 2 diabetes mellitus patients who belong to various socio-economic statuses (Sarkar, Fisher & Schillinger, 2006). Study among diabetes patients found a correlation between increased adherence to medication and high self-efficacy (Sacco et al., 2005).

Patients with high self-efficacy reported improved self-management behaviours in glucose level testing, taking medication, exercise and diet (Al-Khawaldeh, Al-Hassan & Froelicher, 2012).

**Outcome expectancy and Self- Management**

Outcome expectancy is another factor which contributed to enhancement of diabetes self-management. Outcome expectancy impacted behaviour by serving as incentives which resulted in positive outcomes or as disincentives which led to negative outcomes (Bandura, 1986). While outcome expectancy offers motivation, self-efficacy is believed to provide confidence for overcoming barriers (Bandura, 1995). The study by Williams and Bond (2002) involving diabetic patients revealed significant positive relationship between outcome expectancies and self-care regimen such as exercise and glucose testing. The results of several studies found a significant relationship between outcome expectancy and self-care behaviour in type 2 diabetes patients (Williams & Bond, 2002; Chlebowy & Gravin 2006; Wu et al.,2007; Reisi et al., 2016).

Outcome expectancies positively correlated diabetes self-management which include blood glucose testing and exercise and also moderated the association between self-efficacy and blood glucose testing. The role of self-efficacy on self-management was greater when combined with positive outcome expectancies (Williams & Bond, 2002). A study among chronic disease also found that engagement in physical activities is positively associated with positive outcome expectancies (Morrison & Stuifbergen, 2014).

A study done by Iannoti et al. (2006) investigated that individuals were more motivated to engage in behaviours which they feel have beneficial outcomes (fewer negative outcomes and more positive outcomes). Further, they found that an association between self-efficacy and positive outcome expectancy led to better diabetes self-management such as glycemic control among older adolescents and better adherence. This belief in getting beneficial outcomes and simultaneously having a sense of self-efficacy could result in improving patients' adherence (Reisi et al.,2016).

A study among diabetes showed the influence of both self-efficacy and behavioural outcome expectancy in diabetes self-care (Didarloo et al., 2012). The association between self-efficacy and blood glucose level among diabetics was moderated by outcome expectancies; and the effect of combination of self-efficacy and outcome expectancy was found to be more effective (William & Bond, 2002). The findings of a study showed that combined effects of outcome expectancy and self-efficacy explained the greater variance in self-management (Reisi et al., 2016). The same study also found positive relationship between outcome expectancy and improved self-care activities as well as self-efficacy and self-care. A study carried out in Taiwan found that self-care activities were positively and significantly associated with outcome expectancy and self-efficacy (Wu et al., 2007).

**Perceived Health Competence and Self-Management**

Apart from these two factors is another construct, perceived health competence which plays a major role in managing diabetes (Mohn et al., 2015). A study conducted on perceived health competence and management found a positive correlation between these two variables (Mohnet al., 2015). A study among

chronically ill patients found that perceived health competence correlated with better adherence (Christense, Benotsch & Lawton, 1996; Huckell, 2016). Perceived health competence had direct association with positive health behaviours and was also associated with performance of physical activities (Bachmann et al., 2018). Perceived health competence was strongly related to self-efficacy and decline in health status was suggested by patient with low perceived health competence (Bachmann et al., 2016). This study also found that high perceived health competence was correlated with better healthcare activities.

Perceived health competence was found to correlate with self-management behaviours such as decreased drinking and smoking, increased exercise and health-related information seeking behaviour and better dietary habits (Marks & Lutgendorf, 1999; Arora et al., 2002; Tromp et al., 2005). Evidences suggested that perceived health competence also impacted a variety of health behaviours and health outcomes (Bachmann et al., 2016; Gandhi et al., 2014).

Enhancing perceived health competence among diabetes patients contributed to effective treatment of glycemic level (Mohn et al, 2015) while low perceived competence level resulted in low physical activities (Bachmann et al., 2018). Additionally, chronic patients with low level of perceived health competence were found to exhibit difficulty in coping with the condition (Gandhi et al., 2014). Reesor et al. (2017) found that individuals with high perceived health competence were more likely to undertake treatment plans as they tend to presume it would produce desirable outcomes which outweigh the benefits of practising unhealthy behaviours. They also suggested that this made patients less resistant towards changing problematic behaviours. Diabetes management activities like better dietary habits and taking

exercises was seen to correlate with high perceived health competence (Bachmann et al., 2016).

**Demographic variables and Self-management**

*Age*

Many studies have illuminated that diabetes self-management and control of sugar level were higher among youth with type 1 diabetes mellitus (Silverstein et al., 2005; Guo, Whittemore & He, 2011). However, other studies have demonstrated the achievement of low blood pressure through self-management among older hypertensive patients (Douglas & Howard, 2015). Studies have also highlighted the association between age and self-management among chronically ill patients (Glasgow, Toobert, Hampson, Strycker, 2002; Schreurs et al., 2003)

*Gender*

An extensive review of literature showed gender differences in diabetes self-management (McCollum, Hansen, Lu & Sullivan, 2005; Chlebowy, Hood & LaJoie, 2013; Burner, Menchine, Taylor & Arora, 2013; Hornung-Prähauser et al. 2016). Women were reported to have lower physical activities and were more inclined towards following diet regimens whereas men preferred sports and needed encouragement to follow a strict dietary pattern (Hornung-Prähauser et al. 2016; Chelli, 2018). Adherence to diabetes medication among men was found to be higher when compared with women counterparts (Chen, Lee, Liang & Liao, 2014). Contrary to this Raum et al. (2012) found that women had better glycemic control and better adherence as compared to men.

*Duration of disease*

Review of studies on duration of illness among chronic illness patients related to management provided mixed results. Sparring et al. (2013) suggested that shorter duration of illness, or newly diagnosed diabetes patients had better management. In her study, Angiel (2016) found that increase in duration of illness was positively correlated with adherence to medications among type 2 diabetes patients. Studies on chronic illness patients found that longer duration of illness was positively related with self-efficacy which impacted patients' general management of the disease such as taking regular exercise (Padhy, Krishnakumar, Chelli, & Lalnuntluangi, 2017; Padhy, Chottai & Lalnuntluangi, 2018). Duration of illness among diabetes patients also impacted their dietary control, glucose management and health care use (Chelli, 2018). On the contrary, study found that increase in duration of illness resulted in decrease in glycemic control and adherence to self-care activities (Ko et al., 2012). Patients with longerduration of diabetes reported bad cholesterol (Thoolen et al., 2007).

*Comorbidity*

Comorbidity demands additional attention and care aside already complex diabetes care. It was found that the presence of comorbid condition had an impact on the management of diabetes such as glycemic control (Magnan et al., 2015; Luijks et al., 2015). Studies revealed that self management played a considerable role in controlling multiple chronic conditions and attaining desired outcome (Bayliss, Ellis & Steiner, 2007; Garnett, Ploeg, Markle-Reid & Strachan 2018). A study by Chelli (2018) among type 2 diabetes patients found that patients with comorbid conditions had better glucose management and dietary care management.

*Marital Status*

Marriage, in particular, has consistently been found to have positive health outcomes evidenced by several studies. Married persons had lower health issues and longer survival report as compared to unmarried persons (Johnson, Backlund, Sorlie, & Loveless, 2000; Robards, Evandrou, Falkingham & Vlachantoni, 2012). Self-management was also found to be lower among chronically ill patients who were unmarried (Cramm & Nieboer, 2015). Spouse support played a key role in adherence to self-management (Rosland et al.,2010).

## Diabetes Coping

When individuals are diagnosed with chronic disease like diabetes, they have to face the harsh reality of having to live with an incurable condition (Pera, 2011). An ample amount of research was done in trying to comprehend diabetes and improve its treatment options, yet it has not been a success till date (Hieronymus & Humphries, 2012). When diabetes is the stressor itself, patients are left with no alternatives but to find ways to cope with the disease (Grey, 2000). This led to the conclusion that coping is the key to adjust to their illness for the rest of their lives (Bialo, 2018). Additionally, coping with diabetes is a full time job like self-management (Grey, 2000). Since living with stress can increase the blood glucose level and lead to negative psychological issues, utilizing healthy coping strategies were used to enhance the health outcome (American Association of Diabetes Educator, 2018).

In numerous research, an association was seen between coping and metabolic outcomes (Grey, 2000) as well as psychosocial outcomes such as quality of life and depression (Jasser et al.,2016). Dealing with diabetes for a long period of time requires employing a wide range of coping strategies and skills, which include

pacifying the emotional burden that accompany diabetes or having to care for the disease and learning to perform daily self-management on a regular basis (Hieronymus & Humphries, 2012).

As mentioned earlier, adjustment to diabetes is one of the most important components of coping and is even used interchangeably in medical setting. Patient's adjustment to diabetes such as taking frequent and continuous treatment is as important as it is in any other chronic diseases (Birol & Akdeir, 2005). In their study, Turten Kaymaz and Akdemir (2016) found that diabetes coping was influenced by different factors specific to the individual, disease and its treatment. These factors comprised of duration of diabetes, the age at which diabetes was diagnosed, gender, age, profession of the patient, personal characteristics such as patient's perception of the disease and so on. It was found that increased adjustment and better management was observed among older diabetes patients while younger diabetes patients were incompliant to diet and insulin used (Whittemore, D'Eramo& Grey, 2005; Jordan & Jordan, 2010). Ashraf, Ambreen and Shah (2018) on their study on cancer patients reported that due to psychosocial adjustment, illness was integrated into patient's daily activity and helped them to cope with undesirable body image issue which further improved self-image and self-identity.

**Coping strategies**

Coping entails employing of emotional, behavioural and cognitive strategies by patients in their daily life in an attempt to manage the outcome of the disease. Employing productive coping is the essence of successful diabetes care whereas adopting unproductive coping worsens the condition. Patients used several coping strategies to cope with their stressors and management activities.

Study among chronic illness patients found significant positive relationship between positive appraisal coping and better coping (Bertolin, Pace, Kusumota & Haas, 2011). Significant negative relationship was found between distance coping strategy and chronically ill patients with regard to coping with illness (Özkan & Kutlu, 2010). A study among post-traumatic patients found that seeking social support and positive appraisal coping strategies enhanced posttraumatic growth (Prati & Pietrantoni, 2009).

Zoellner and Maercker(2006) study showed that positive re-appraisal and acceptance of situation that cannot be altered is crucial for better adaptation. Pargament,Koenig andPerez (2000) found that people cope with unpleasant events by means of spirituality and religion (shifting burden to supernatural power). Many studies showed correlation between health and religious indices such as church attendance, reading bible and chanting prayers (Koenig, McCullough, & Larson, 2001). A meta-analysis done by Helgeson et al. (2006) noted a significant relationship between posttraumatic growth and positive re-appraisal, shifting burden to supernatural power and acceptance.

A study among lung transplant patients showed impact of escape-avoidance, self-controlling and planful problem solving coping strategies on post transplant regimen (Soyseth et al., 2018). In times of stressful even, women employed positive re-appraisal more frequently while men used self-controlling coping strategies and kept their emotions to themselves (SmrtnikVitulić & Prosen, 2016).Increased use of avoidance coping strategy resulted in ultimately poor psychological adjustment (Voth & Sirois, 2009). The study also stated that use of accepting responsibility coping

strategy was associated with decreased use of avoidance coping which subsequently resulted in better psychological adjustment.

**Self-efficacy and Coping**

The problems and complexities of diabetes surface when patients and their families adjust to the condition resulted in negative diabetes control (Yazdi-Ravandi, Taslimi, Ahmadpanah & Ghaleiha, 2016). These factors contributed to barriers of coping and are usually faced by patients (Worthington, 2008). A study by Hattori-Hara and González-Celis (2013) found an association between self-efficacy and productive coping in diabetes management. Social support and self-efficacy were significant predictors of adjustment level among diabetes patients (Yazdi-Ravandi, Taslimi, Ahmadpanah & Ghaleiha, 2016). Results indicated that patients' belief regarding their capability to perform certain tasks were related to specific coping strategies (D'Amico, Marano, Geraci & Legge, 2013) and that these strategies could be enhanced by self-efficacy (Krein, Heisler, Piette, Butchart, & Kerr, 2007).

Coping was essential for attaining control over the disease (Thoolen et al., 2009) while self-efficacy was essential to cope with stressful situation in management of diabetes (Gillibrand & Stevenson, 2006; Wagner & Tennen, 2007). Self-efficacy (Mohebi et al., 2013) and coping (Macrodimitris & Endler, 2001) were both important factors in controlling type 2 diabetes mellitus. The finding of a study found that self-efficacy and coping facilitated diabetes control for the patients (Hattori-Hara & González-Celis, 2013). Students with high self- efficacy level had lower stress and better adjustment towards college life (Sim & Moon, 2015). High self-efficacy level was also found to promote productive coping behaviour and alleviate stress (Toshuku, Hironori & Yuji, 1996). Patients' belief about their capabilities (i.e self-efficacy) was

reported to have strong relation with coping efforts (Jensen, Turner & Romano, 1991).

**Outcome Expectancy and Coping**

According to Jensen et al. (1991), self-efficacy and outcome expectancies were the major determinants of coping behaviour. A study on chronic lower back pain patients showed the impact of self-efficacy on pain outcome which was mediated by perseverance coping. This signified that outcome expectancies and coping were correlated (Lin & Ward, 1996). A person's expectancies for favourable outcomes also augment the probability of a particular behaviour to be performed (Reesor, Vaughan, Hernandez, & Johnston,2017).

A variance was noted in the choices of coping strategies individuals employed when encountered with stressors and the reason could be explained by the level of outcome expectancies they possess (Friedman-Wheeler,Pederson, Rizzo-Busack & Haaga, 2016). Fundamental contributory cause for choosing several coping strategies could be attributed to varying beliefs on efficiency of the strategies i.e. outcome expectancy. These choices had an important impact on mental and physical outcomes (Franken et al., 2001; Vandervoort2006). Friedman-Wheeler et al. (2008) found that smokers utilized the coping strategy which they expected would have better outcome and in turn increased the likelihood of performing a desirable behaviour.

**Perceived Health Competence and Coping**

Perceived health competence or belief in effective management of health outcomes is linked with coping. Bachmann et al. (2016) found a significant relationship between perceived health competence and coping with health behaviour.

Study on chronic patients showed a relationship between coping style and level of perceived health competence (Gandhi et al., 2014). Perceived health competence was correlated with favourable health behaviours and better psychological coping (Janowski, Kurpas, Kusz, Mroczek & Jedynak, 2013).

**Demographic variables and Coping**

*Age*

Concerning age, older patients were reported to use confrontive coping strategy, distancing and escape-avoidance more frequently compared with younger patients (Bertolin, Pace, Kusumota & Haas, 2011). A study among chronic illness patients showed that avoidance coping strategy positively correlated with increased age where use of avoidance coping strategy resulted in lower depression score among elderly patients (Takaki et al., 2005).

*Gender*

Several studies have reported gender differences in coping with diabetes and other chronic illness. Men were found to cope effectively with diabetes regimens as compared to their women counterparts (Siddiqui, Khan & Carline, 2013).Study by Frey (2000) on chronic obstructive pulmonary disease patients found a significant gender difference with regards to coping strategies and their effectiveness. Women were found to employ seeking social support coping strategies more frequently as compared to men (Bertolin, Pace, Kusumota & Haas, 2011).Another study also found that women were more likely to utilize those strategies which involve verbal expressions to others like seeking social support (Lisa, Denise & Vicki, 2002). Study among hemodialysis patients reported that men have lower mean score on confrontive

coping strategy which indicated that they seldom used this coping strategy (Cormier Daigle & Stewart, 1997).

*Duration of disease*

Very limited studies have been done in the field of duration of illness and coping, especially among diabetes patients. Brown, Brown and Jason (2010) suggested that patients with different duration of illness employed different coping styles. Boonen et al. (2004) study among spondylitis patients found that with the increase in disease duration, patients utilized avoidant coping which resulted in decreased activities and induced harmful long-term effects.

*Comorbidity*

Adherence, which is one way of coping with illness, is found to be lower among patients with comorbid conditions (Lugtenberg, Burgers, Clancy, Westert & Schneider, 2011; AtienoJalang'o, Tsolekile & Puoane, 2014). Comorbid conditions among diabetes patients could result in worsening of coping ability by affecting their financial resources through medical costs (Piette & Kerr, 2006). Another study also found that comorbidities had profound negative effect on patient's coping ability and thus led to poor quality of life (Eapen, Cavanna & Robertson, 2016).

*Marital Status*

Coping with diabetes is more effective among married patients as compared to single status patients as they received constant emotional support from spouse (Ramkisson, Pillay & Sibanda, 2017). Coping with diabetes requires having to deal with insulin adjustment, frequent testing and hypervigilance against hypoglycaemia

on a regular basis; partner support is highly significant for maintenance (Trief, Ploutz-Snyder, Britton & Weinstock, 2004). A study on chronic illness patients reported that married individuals shared supportive environment than unmarried individuals (Miller & DiMatteo, 2013). Hemodialysis patients living with partners have better treatment as compared to unmarried patients (Bertolin, Pace, Kusumota & Haas, 2011).

**Self-management and Coping**

Management and coping of insulin among type 1 diabetes is demanding and complex and it requires their family to help them monitor food intake, exercise and blood glucose level (American Diabetes Association, 2014). Living with diabetes requires self-management and coping process related to the illness. Coping has direct impact on metabolic control by decreasing stress level and indirectly influence metabolic control and quality of life by improving self-management activities (Helgeson, Escobar, Siminerio & Becker, 2010). A study among diabetes patients found that acceptance coping and problem focused coping are highly linked with better self-management (Jasser et al.,2012).

**Summary**

Diabetes as mentioned is associated with long-term complications, damages, dysfunctions, and failure of different organs (American Diabetes Association, 2014). The review of studies done in this chapter has highlighted the significance of different psychological factors in prevention and delay of onset of diabetes complications. Given that diabetes is a lifelong condition, adoption of self-management behaviours is fundamental in dealing with the disease which includes adherence to medications, diet, physical activities, blood glucose monitoring, and regular visit to doctors.

Coping with diabetes is an important component that helps individuals get habituated with treatment regimen and healthy lifestyle whereas poor coping is a major threat to achieve optimal outcomes for diabetes patients. Studies have found that productive coping, characterized as utilizing available resources to enhance the possibility of desirable outcomes is crucial for diabetes patients to effectively self-manage their conditions. Productive coping is highly associated with better and effective diabetes self-management. Diabetes patients fare better when they efficiently cope with the psychological issues of diabetes care regimen. On the contrary, unproductive coping which entails the use of strategies that result in failure to cope with stressors, leads to decrease in diabetes care and in turn adversely affect the metabolic control.

The studies reviewed have emphasized that self-efficacy, outcome expectancy and perceived health competency are some of the psychological factors that play a considerable role in coping and diabetes management. In social learning theory, self-efficacy and outcome expectancy are considered major determinants of coping with illness. Many studies have stated that patients who have the conviction of effectively dealing with potential stressors can cope efficaciously with the disease. Outcome expectancy has been found to be positively correlated with better coping. The literature review also suggests that feeling confident in carrying out necessary activities to control diabetes is the basic to successful diabetes self-management. Most of the studies reviewed have emphasized the impact of outcome expectancy on better self-management activities such as medication, diet, exercise, and foot care. To cope with the demands of diabetes self-management, one’s perceived health competence has great significance. As explained in self- determination theory, individuals perceive themselves as competent when they feel they are capable to control health outcomes, e.g. maintaining optimal blood sugar level. Numerous studies have also

supported the fact that perceived health competence helps in enhancing individuals' health status by improving their coping strategies. Having greater perceived health competence is correlated with a variety of self-management behaviours, including health information seeking behaviour, better dietary habits, increased exercise, and most importantly, lower rates of drinking and smoking. Taking all the above into consideration it can be summarised that self-efficacy, outcome expectancy, perceived health competence have major role in coping and self-management of diabetes.

**Rationale**

The rapid growth in prevalence of diabetes in urban India and specifically in the North-eastern region of the country highlights the need for effective health care practices to prevent high morbidity and mortality rate caused by the illness. In recent years healthcare field is growing enormously with new and sophisticated technologies. However, successful integration of these practices into one's daily routine rests in the hands of patients, who have to cope with the new physical and emotional demands of the chronic illness and make changes to their lifestyle accordingly. Research evidence also strongly emphasizes the importance of psychosocial factors in the process of delivering medical care as well as patient-centered approach to help individuals manage and cope with their illness.

As discussed, successful self-management and appropriate coping strategies are related to better psychological and physical health outcomes. The constant worry of adhering to medical regimen and adjusting to daily activities drastically affect one's quality of life and health status. The burden and demand of having to live with diabetes is extremely painful. These require different activities such as monitoring one's diet, regulating physical activity, testing of blood sugar level and adhering to

the medication regime as well as monitoring of symptoms. In such a scenario of daily care and monitoring, the patients do require to use their psychological resources in order to cope with the disease and manage it well. From the review of literature done so far, it was understood that among many psychological aspects, factors such as self-efficacy, outcome expectancy, and perceived health competence are few of the important factors in dealing with illness. Self-efficacy is one of the elements that play a fundamental role in adherence and coping with illness. Outcome expectancy helps the patient in coping with the different obstacles related to the illness thereby increases their self-management activities. In addition, the factor of health competence, which is effective handling of one's health condition, also contributes to management and coping of illness. The process of coping and management of illness is complex one, and research suggests that the strategies used by people diagnosed with illness are wide-ranging. Research done in the area of coping and management of diabetes, specifically considering the above mentioned variables, have not been robust. Therefore, conducting a study may facilitate one's understanding of how people are affected by this illness. The prime focus of conducting this study was to identify the factors that play a significant role in self-management and coping by diabetes patients. The aim of the qualitative aspect of this study was to identify self-initiated coping strategies reported by patients with diabetes. Coping in this present study was operationally defined as any psychological (cognitive and affective) strategy intended to deal both internally and externally, with the difficulties related to illness. Identifying the appropriate strategies would provide an insight and contribute to developing an intervention that would help patients suffering not only from diabetes, but from different chronic illnesses, to help them manage their illness and cope with the situation accordingly.

**Research Questions**

The main research questions of this study were:

1) Does the duration of disease play a role in determining the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of Type2 diabetes patients?
2) Does a relationship exist between self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of Type2 diabetes patients?
3) Do self-efficacy, outcome expectancy, and perceived health competence play a role in coping of Type2 diabetes patients?
4) Do self-efficacy, outcome expectancy, perceived health competence and coping play a role in self management of illness of Type2 diabetes patients?
5) What are the lived experiences of Type 2 diabetes patients regarding their coping strategies to diabetes?

**Objectives**

On the basis of the above research questions, following objectives were outlined:

1) To find out the difference in the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type II diabetes patients categorized on the basis of duration of disease.
2) To examine the relationship between self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of Type2 diabetes patients.

3) To assess the role of self-efficacy, outcome expectancy, and perceived health competence in coping of Type2 diabetes patients
4) To assess the role of self-efficacy, outcome expectancy, perceived health competence, and coping in self management of illness of Type2 diabetes patients
5) To explore the lived experiences of Type 2 diabetes patients regarding their coping strategies to diabetes.

**Hypotheses**

It was hypothesized that:

1) There would be a difference in the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type II diabetes patients categorized on the basis of duration of disease.
2) There would be a relationship between self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of Type2 diabetes patients.
3) Self-efficacy, outcome expectancy, and perceived health competence would play a role in coping of Type2 diabetes patients.
4) Self-efficacy, outcome expectancy, perceived health competence, and coping would play a role in self management of illness of Type2 diabetes patients.

# CHAPTER III

# METHOD

This chapter presents the plan and design of the study along with demographic details of the participants, a detailed description of research instruments and the procedure followed for obtaining data for the study.

## Plan and design

The objectives of the study were to find out the difference in the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of type2 diabetes patients; to assess the role of self-efficacy, outcome expectancy, perceived health competence, and coping in self management of illness of type 2 diabetes patients and to explore the lived experiences of type 2 diabetes patients regarding their coping strategies to diabetes. In order to reach the objectives, the study employed a sequential explanatory mixed methods design (Creswell et al., 2003, p. 211). Therefore, the study was carried out in two phases- the first phase was based on quantitative research approach, i.e. the assessment of variables (self-efficacy, outcome expectancy and perceived health competence, coping, and self-management of illness ) using research measures; the second phase focused on qualitative approach (Interpretative Phenomenological Analysis).

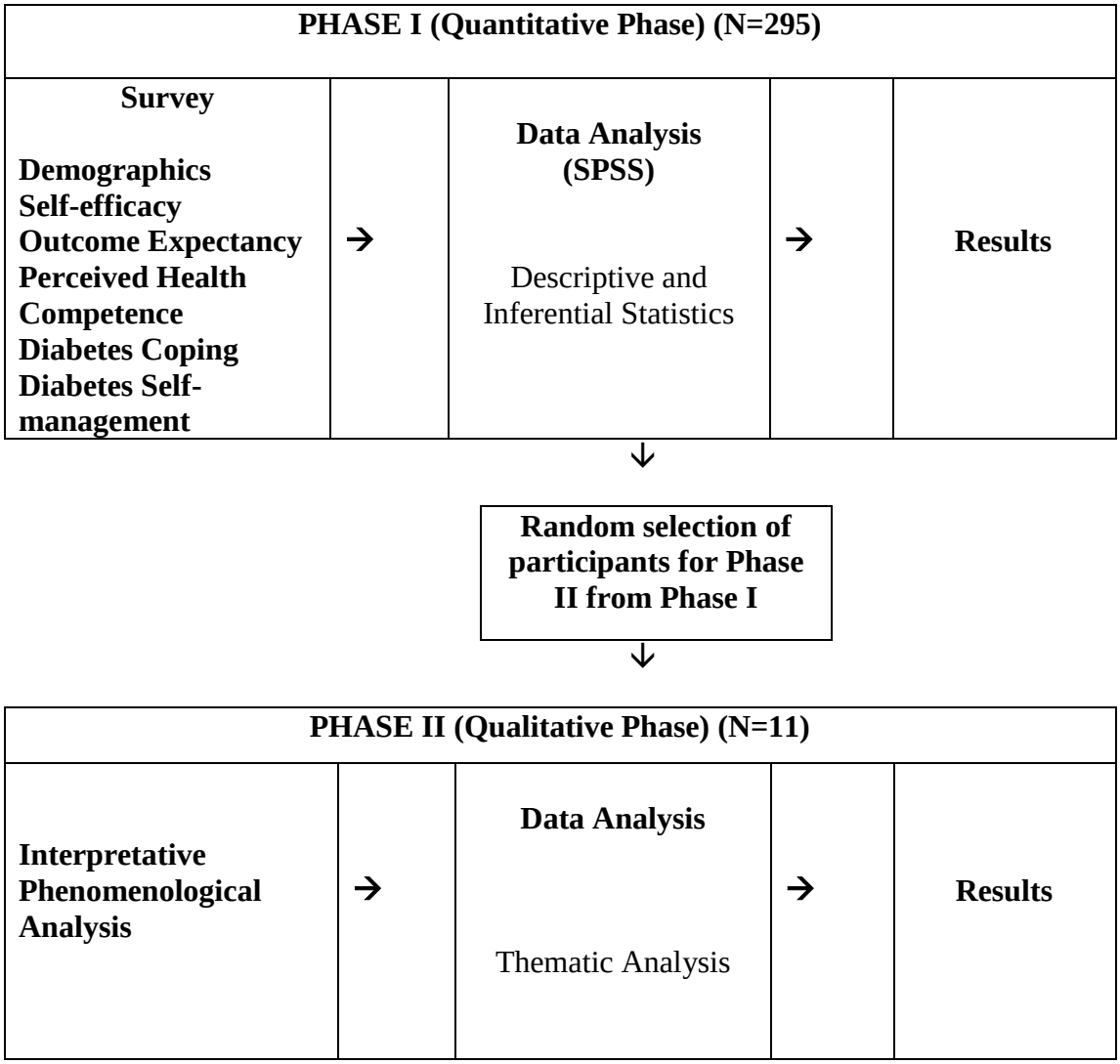


*Figure 1.* Schematic presentation of the plan and design of the study

*Phase I*

This phase utilized correlation design with the cross-sectional approach under the framework of quantitative research. The study was conducted on type 2 diabetes patients, age range of 30- 73 years. The main variables under the study included self-efficacy, outcome expectancy, perceived health competence as predictor variables, while coping and self-management of illness were considered as the criterion variables. And to find out the difference in the level of the variables under study, the total sample was divided into three groups:- group I consisting of patients with duration of disease below five years; group II consisting of those with duration of

disease above 5 years to10 years; group III consisting of patients with duration of disease of more than 10 years. The groups were compared to find out the changing pattern of the variables under study. Data were collected from diabetic patients from different clinics in Mizoram, India.

*Phase II*

The second phase of the study employed Interpretative Phenomenological Analysis (IPA) under the framework of qualitative analysis in order to investigate and provide insights into the underlying factors of coping strategies among type 2 diabetes patients. According to Smith (1996), IPA is an approach to qualitative research that sets out to understand an individual's experience of phenomena within a particular context from a particular perspective. It also seeks to understand how people make sense of their experience and gives meaning to it (Smith, 1996). Phenomenology is a method and approach based on philosophy that focuses upon respondents' 'lived experiences'.

Semi-structured interviews were employed to address one of the objectives of the study and gather an ample amount of information. Semi-structured interviews are more flexible and allow the investigator for new questions to be put forth during the interview process. Here the interviewer prepares a list of open-ended questions that allow the participants to freely express their thoughts and feelings with regards to the topic being asked. Consequently, the interview will have an element of dynamism for which the interviewer needs to improvise the questions carefully whilst respecting the core research question they sought to explore. For the second phase of the study, a small sample of 11 participants participated and an in-depth interview was taken from them in order to elicit their experiences in abundance. In the present study, an effort

was made to explore the lived experiences of patients with type 2 diabetes to understand their coping strategies for illness. The interviews were audio-taped and transcribed. Interviews taken in Mizo language were translated into English.

**Pilot Study**

A pilot study was conducted to examine the feasibility and efficacy of selected instruments and to check the accessibility and feasibility of data collection in the selected place (Mizoram, India). After verification of all these, the main study was conducted.

**Participants**

Data were collected from different clinics in Mizoram, India- which is the native place of the investigator. Despite having a large proportion of diabetes patients, this particular region has limited research done in the field of diabetes; hence the place was selected for this research.

Initially, different hospitals and diabetes clinics were identified for collection of data and permission was sought from the respective authorities. From the identified hospitals and clinics, only few diabetic clinics gave the permission to conduct the study. After this, data collection was carried out by meeting diabetes patients on a regular basis where the following inclusion and exclusion criteria were considered:

Individuals with type 2 diabetes in the age range of 30-73 years were included for the study whereas individuals diagnosed with either psychiatric problems or terminal illness were excluded from the study.

In the first phase of the study through purposive sampling method, 304 diabetes patients were selected and completed filling out the questionnaire. After

eliminating multivariate outliers (*n*=9) using Mahalanobis distance, 295 patients were retained for the main study. The sample consisted of 147 men and 148 women in the age range of 30-73 years (*M*= 53.79; *SD*=11.13). The range of duration of disease was from 6 months to 40 years (*M*=11.91; *SD*=11.49).

In the second phase, an in-depth interview was taken using Interpretative Phenomenological Analysis approach. Initially 32 participants agreed to take part in the interview, and 15 participants were randomly selected by the investigator on the basis of duration of disease .However, 4 participants could not attend all the interview sessions. Hence, 11 participants were retained for the main study.

Table 1
*Summary of Participants' Characteristics* (*N=295*)

| | **Below 5 years (*n=94*)** | **5 to 10 years (*n=96*)** | **Above 10 years (*n=105*)** |
|---|---|---|---|
| **Age (Years)** | 30-56 years | 37-68years | 46-73years |
| *M(SD)* | 44.98 (6.44) | 50.46 (8.27) | 56.10 (7.09) |
| Range | 26 | 31 | 28 |
| **Gender** | | | |
| Male | 36 (38.3%) | 50 (52.1%) | 61 (58.1%) |
| Female | 58 (61.7%) | 46 (47.9%) | 44 (41.9 %) |
| **Comorbidity** | | | |
| Present | 41 (43.6%) | 35 (36.5%) | 47 (44.8%) |
| Absent | 53 (56.4%) | 61 (63.5%) | 58 (55.29%) |
| **Marital Status** | | | |
| Married | 57 (60.6%) | 69 (71.9 %) | 71 (67.6%) |
| Single / Widowed | 37 (39.4) | 27 (28.1%) | 34 (32.4%) |

Note. *M*= mean; *SD*= Standard deviation; Frequency (Percentage)

## Measures

### *Multidimensional Diabetes Questionnaire*

The scale was developed by Talbot, Nowen, Gingras, Gosseilin and Audit (1997). The scale comprises of 41 items and is divided into 3 sections which have 7 sub-scales which were designed to measure diabetes-related social and cognitive factors. Theoretically, this scale has a link with the social learning perspective of diabetes and the three sections have different constructs. The first section of the scale deals with perceptions related to diabetes and related social support; the second section concentrates on misguided reinforcing and positive behaviours related to activities of self-care which includes frequency of social incentives related to self-care activities; and lastly the third section focuses on self-efficacy and outcome expectancies. This study utilized only the third section of the questionnaire which consists of two sub-scales- Self-efficacy (7 items) and outcome expectancies (6 items). Self-efficacy sub-scales measure the confidence of the patient in their ability to perform certain activities related to diabetes self-care such as general diabetes management, diet, medication, exercise and glucose level. This section has 11 point rating scale ranging from "not at all confident" (0) to "very confident" (100). On the other hand, outcome expectancies sub-scale measures the perception of the patient with regard to the impact of diabetes self-care behaviours on the prevention of complications and metabolic control. This section also has 11 point rating scale which ranges from "not at all important" (0) to "very important" (100) respectively. The scores range from 0- 1300 for both and higher scores indicate higher self-efficacy and outcome expectancies accordingly. The Cronbach's α for self-efficacy is 0.89 and 0.90 for outcome expectancies. The Cronbach's α for this study sample on self-efficacy is 0.75 and 0.60 for outcome expectancies.

*Perceived Health Competence Scale*

This scale was developed by Smith, Wallston and Smith (1995) to assess a person's sense of competence with regard to their health behaviour. It measures the degree to which an individual feels capable of effectively managing his or her health outcomes. The scale consists of 8 items with 2 sub-scales – outcome and behavioural expectancies. It consists of 4 positive items and 4 negative items, measured on a 5 point Likert scale ranging from strongly agree (5) to strongly disagree (1). Scorings are revered for these negative items. The scores range between 1- 40 where higher scores indicate a higher perception of health competence. The Cronbach's α for this scale ranges from 0.82 to 0.90. The Cronbach's α for this study sample ranges from 0.54 to 0.62.

*Diabetes Coping Measure*

This scale was developed by Huang, Courtney, Edwards and McDowell (2009) .It is a diabetic specific scale which has 21 items and four sub-scales namely-tackling spirit, avoidance, passive resignation, diabetes integration. Items are scored using a 5 point Likert scale which ranges from "agree strongly" (5) to "disagree strongly" (1). Except for the items in tackling spirit sub-scale, the statements are formulated negatively. Scorings are revered for these negative items and the score ranges from 1-105. Higher scores are indicative of better usage of coping strategies. The Cronbach's α for this scale is 0.78. The Cronbach's α for this study sample is 0.81.

*Diabetes Self-Management Questionnaire*

The scale was developed by Schmitt,Gahr, Hermanns, Kulzer, Huber and Haak, (2013) at Research Institute of the Diabetes Academy Mergentheim. The scale was designed to assess levels of diabetes self-care and the behaviours associated with metabolic control among type 1 and 2 diabetes patients who have common treatment regimen. The scale has 4 sub-scales namely, glucose management, dietary control, physical activity and health care use which sums up to 15 items altogether. Addition to this, there is one item ($16^{th}$ item) which addresses overall 'self-care' whose score has to be included only in the sum scale but not in any of the four sub-scales. Hence, the scale has 16 items. Each statement in the scale was formulated as a behavioural description of personal self-management. The patient has to rate the degree to which each statement is applicable to them bearing in mind the previous eight weeks. Seven of the items are formulated positively while nine items are negative statements. In order to avoid force specific and neutral response, the scale was designed to have 4 point Likert scale with response options like- "applies to me very much" (3), "applies to me to a considerable degree" (2), "applies to me to some degree" (1) and "does not apply to me" (0). Scorings are reversed for the negative statements such that higher scores are indicative of more effective self-care. Sum scores were calculated as sums of item scores and then transformed to a scale ranging from 0 to 10 (raw score/transformed maximum score*10). A transformed score of ten represented the highest self-rating of the assessed behaviour. If "not required as a part of treatment" had been marked in an item, it should not be used and computation of the scale score should be adapted accordingly (by reducing three points from the theoretical maximum score). The Cronbach's α for this scale is 0.84. The Cronbach's α for this study sample is 0.61.

**Procedure**

The study was conducted after obtaining approval from the Institutional Ethics Committee (IEC) of University of Hyderabad. All study procedures were in accordance with the research ethics board of the University of Hyderabad. Several hospitals and diabetes clinics in Mizoram, India were identified for collection of data and permission was sought from the authorities respectively. Permissions were granted by few diabetes clinics to conduct the study.

As mentioned, the study employed a sequential explanatory mixed methods design. Quantitative approach was followed by qualitative approach. The first phase included administration of selected questionnaires on the participants individually. In the second phase, qualitative data were collected using an in-depth interview from participants who were willing to participate in the interview.

In quantitative phase, participants who fulfilled the mentioned criteria were asked to occupy a seat in the lounge of the clinics. After establishing the rapport, the investigator explained the purpose and nature of the study for which informed consent was taken. Participants were also informed that their participation in the study was voluntary and they have the right to withdraw at any point in time during the administration. They were also informed that any information they provide would be kept confidential. Once the patient agreed and signed the consent form, questionnaires with instructions in regional language (Mizo language) were administered. Approximately 40 minutes time was taken by each participant to complete the scales. Patients were requested to answer each question honestly and clarify their doubts immediately, if any. After administering the questionnaires, the investigator debriefed the relevance of the study and responded to patients' queries regarding the

study. Data were entered and analysed systematically using Statistical Package for Social Sciences (SPSS, Version 20.0).

After completion of qualitative phase on 295 participants, the investigator collected 32 participants who were willing to participate in phase II. On the basis of duration of disease, 15 participants were randomly selected for an in-depth interview. However 4 participants could not turn up for the interview. As a result of which the final sample for qualitative study was 11.

After taking permission from the patients, the investigator visited the home of the patients in order to take an interview. The purpose of the interview as well as the possible duration of the interview was communicated to the selected patients individually. Interpretative Phenomenological Analysis (IPA) was utilized where patients were interviewed about their lived experiences with type 2 diabetes in relation to their coping with diabetes. A face to face in-depth open-ended interview was taken for a duration of 30-45 minutes where the investigator considered the following themes while taking interviews - i) identification of diabetes experiences ii) barriers to coping with diabetes iii) coping method iv) behavioural changes during coping. Data which were collected by in-depth interview were audio-recorded and transcribed. Patients were debriefed by the investigator after the completion of each interview.

# CHAPTER IV

# RESULTS

This chapter entails the results obtained from the analysis of the data that were collected in two phases: Phase I (quantitative) and phase II (qualitative). Phase I explains the results of descriptive and inferential statistics on a sample of 295. Phase II presents the findings of analysis of semi-structured interviews of the 11 participants regarding their coping strategies to illness.

## Phase I: Quantitative Data Analysis

The quantitative data were analyzed using IBM SPSS Statistics 20.0. The results analyzed the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type 2 diabetes patients categorized on the basis of duration of illness. Here duration of illness was considered as independent variable whereas self efficacy, out come expectancy, perceived health competence (dimensions namely outcome expectancies and behavioural expectancies), coping (dimensions namely tackling spirit, avoidance, passive resignation and diabetes integration), and self management (dimensions namely glucose management, dietary control, physical activity and health care use) were considered as dependent variables. In order to find out the empirical evidence for the objective, the data were analyzed using descriptive statistics (Mean and Standard deviation) and inferential statistics (One-Way Analysis of Variance and Tukey's HSD). Further analysis was done to find out the correlation between the variables under study and to assess the impact of the predictor variables on criterion variable. In the analysis, the predictors were broadly classified into two-psychological constructs (self-efficacy, outcome expectancy, and perceived health

competence) and demographic variables (age, gender, marital status, comorbidity and duration of disease). The criterions were coping and self management. In addition to this, each of the dimensions of coping and self management was considered as criterions. However, coping and its dimensions were considered as predictors when self management was taken as criterion. The empirical evidence for the objectives was found out by analyzing the data using hierarchical regression analysis. Prior to this, Pearson's *r* was computed to find a linear relationship between the predictors and criterions, and to identify the suitable predictors to be entered into the model.

Descriptive Statistics, Score Range, and Reliability for all Variables The mean scores(M), standard deviation values (SD), 95% confidence intervals (CI), score range and Cronbach's alpha for self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness and its subscales for the study sample (N = 295) are presented in Table 2.

Table 2

*Summary of Means (M), Standard Deviation (SD), 95% CI, Score Range and Cronbach's Alpha for Self-efficacy, Outcome Expectancy, Perceived Health Competence, Diabetes Self-Management and Diabetes Coping Measures*

| **Variables** | ***M (SD)*** | ***95% CI*** | | **Score Range** | **Cronbach's Alpha** |
|---|---|---|---|---|---|
| | | ***LL*** | ***UL*** | | |
| Self-efficacy | 557.59 (121.38) | 543.68 | 571.50 | 0-700 | 0.75 |
| Outcome Expectancy | 528.71 (71.04) | 520.57 | 536.85 | 0-600 | 0.60 |
| Perceived Health Competence (PHC) | | | | | |
| Outcome Expectancies | 13.50 (3.29) | 13.12 | 13.88 | 1-20 | 0.54 |
| Behavioural Expectancies | 13.52(3.38) | 13.13 | 13.91 | 1-20 | 0.62 |
| Diabetes Coping Measure (DCM) | 78.81 (11.45) | 77.44 | 80.12 | 1-105 | 0.81 |
| Diabetes Self Management Questionnaire (DSMQ) | 25.88 (5.90) | 25.21 | 26.56 | 0-48 | 0.61 |

From Table 2, it was found that the *M* and *SD* values of self-efficacy and outcome expectancy were (*M* = 557.59; *SD*= 121.38), (*M* = 528.71; *SD* = 71.04) respectively. The Cronbach's alpha value for self-efficacy was 0.75 and outcome expectancy was 0.60 indicating that the values are in acceptable range.

The *M* and *SD* values of two dimensions of perceived health competence for the sample were – outcome expectancies (*M* = 13.50; *SD*= 3.29), behavioural expectancies (*M* = 13.52; *SD*= 3.38). The Cronbach's alpha values for the perceived health competence scales ranged from 0.54- 0.62 indicating that all the values are in acceptable range. The *M* and *SD* values of overall diabetes coping measure was (*M* =78.81; *SD*=11.45), The Cronbach's alpha values for overall diabetes coping measure was 0.81 indicating that all the values are in acceptable range. Similarly, the *M* and *SD* values of the sum scale (overall diabetes self-management) was (*M* = 25.88; *SD* = 5.90). The Cronbach's alpha values for the sum scale (overall diabetes self-management) was 0.61 indicating that all the values are in acceptable range. The score range for all the variables and 95% CI are also displayed in Table 2.

**The level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type II diabetes patients with different disease duration**

The sample consisted of three groups of diabetes patients belonging to the different disease duration. Group I consisted of diabetes patients whose duration of disease was less than 5 year, group II consisted of diabetes patients who were above 5 years to 10 years of duration of disease, group III consisted of those diabetes patients whose duration of disease was 10 years and above.

Table 3 describes the mean scores (*M*), standard deviation (*SD*) and summary of one way ANOVA for self-efficacy, outcome expectancy, perceived health competence, coping and self-management of disease among the three groups.

Table 3.

*Table showing Mean, Standard deviation and summary of one-way ANOVA for the three groups*

| Variables | Group I ($n$ = 94) | | Group II ($n$ = 96) | | Group III ($n$ = 105) | | One way ANOVA Mean Square | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | Between | Error | *F*(2,293,) | $\eta^2$ |
| **Diabetes Self-efficacy** | **458.62** | **119.57** | **566.77** | **88.31** | **637.81** | **79.46** | **8073.43** | **7.067** | **85.90*** ** | **.37** |
| Diabetes Outcome Expectancy | 524.47 | 64.60 | 538.75 | 51.18 | 523.33 | 89.46 | 22.09 | 4.14 | 1.43 | - |
| Outcome Expectancies | 13.32 | 3.42 | 14.08 | 3.17 | 13.13 | 3.23 | .14 | .191 | 2.33 | - |
| Behavioural Expectancies | 13.10 | 3.60 | 14.14 | 3.30 | 13.34 | 3.20 | .173 | .197 | 2.50 | - |
| **Tackling Spirit** | **18.44** | **4.49** | **20.76** | **3.75** | **18.44** | **5.17** | **1.25** | **.269** | **6.98**** | **.05** |
| **Avoidance** | **18.53** | **3.79** | **18.35** | **3.43** | **19.77** | **3.07** | **.496** | **.203** | **5.14**** | **.03** |
| **Passive Resignation** | **16.14** | **4.04** | **17.70** | **3.94** | **18.51** | **3.80** | **1.30** | **.235** | **9.28**** | **.06** |
| **Diabetes Integration** | **21.99** | **5.55** | **23.06** | **4.73** | **23.92** | **4.34** | **.703** | **.287** | **3.90*** | **.03** |
| **Overall Diabetes Coping Measure** | **75.10** | **12.50** | **79.88** | **10.77** | **81.15** | **10.30** | **8.81** | **.667** | **7.91*** ** | **.05** |
| **Glucose Management** | **7.87** | **2.17** | **9.27** | **2.48** | **9.27** | **2.83** | **.571** | **.151** | **9.83*** ** | **.06** |
| Dietary Control | 6.39 | 1.89 | 6.75 | 1.88 | 7.01 | 1.99 | .058 | .113 | 2.55 | - |
| **Physical Activity** | **3.61** | **1.55** | **4.45** | **1.91** | **4.18** | **1.72** | **.148** | **.103** | **5.82**** | **.04** |
| Health Care Use | 4.55 | 1.60 | 5.03 | 1.69 | 4.93 | 1.50 | .036 | .093 | 2.39 | - |
| **Overall Diabetes Self-management** | **23.60** | **4.33** | **27.23** | **6.06** | **26.70** | **6.42** | **3.42** | **.344** | **11.30*** ** | **.07** |

*Note.* Group I –Below 5years, Group II – 5-10 years, Group III – Above 10 years *$p$<0.05, **$p$<0.01, ***$p$<0.001

Table 4

*Table showing mean comparisons using Tukey's HSD between the three groups of categorised on the basis of duration of disease*

| Variables | Group I- Group-II | Group I- Group III | Group II- Group III |
|---|---|---|---|
| **Diabetes Self-efficacy** | **108.15*** | **179.19*** | **71.04*** |
| Diabetes Outcome Expectancy | 14.28 | 1.13 | 15.42 |
| Outcome Expectancies | .76 | -.19 | .95 |
| Behavioural Expectancies | 1.04 | .25 | .79 |
| **Tackling Spirit** | **2.32*** | .51 | **1.82*** |
| **Avoidance** | .18 | **1.24*** | **1.42*** |
| **Passive Resignation** | **1.56*** | **2.38*** | .82 |
| Diabetes Integration | 1.07 | **1.93*** | .86 |
| **Overall Diabetes Coping Measure** | **4.78*** | **6.06*** | 1.28 |
| **Glucose Management** | **1.40*** | .00 | **1.39*** |
| Dietary Control | .34 | .26 | .62 |
| **Physical Activity** | **.84*** | .27 | .57 |
| Health Care Use | .48 | .19 | .38 |
| **Overall Diabetes Self-management** | **3.63*** | .53 | **3.11*** |

*Note*. Group I – Below 5years, Group II – 5-10 years, Group III – Above 10 years *$p$<0.05, **$p$<0.01, ***$p$<0.001

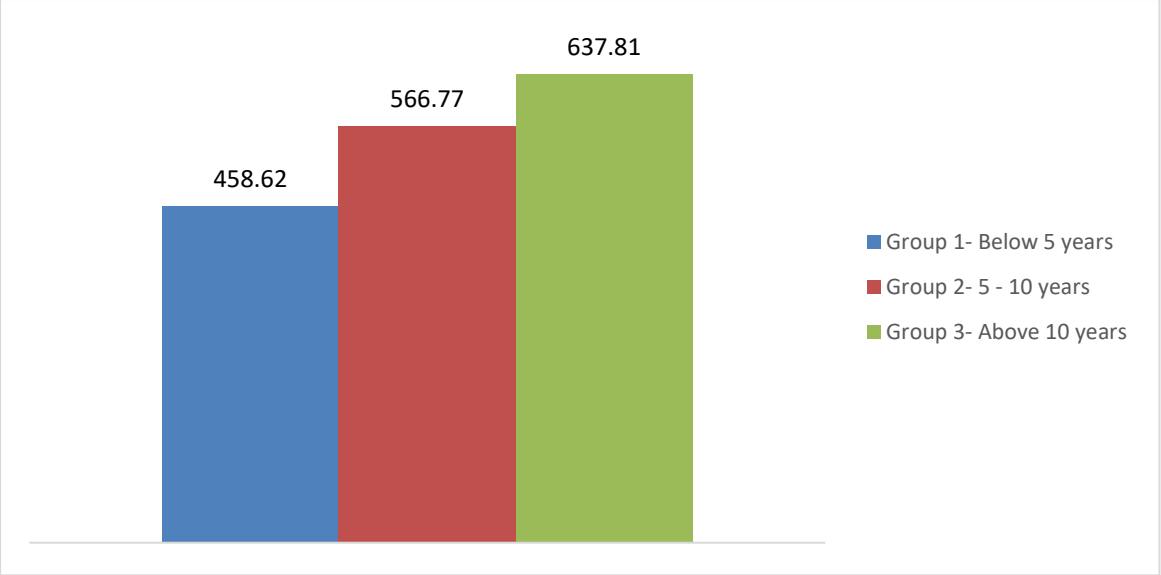


*Figure 2* Figure showing the mean values of the three groups on diabetes self-efficacy

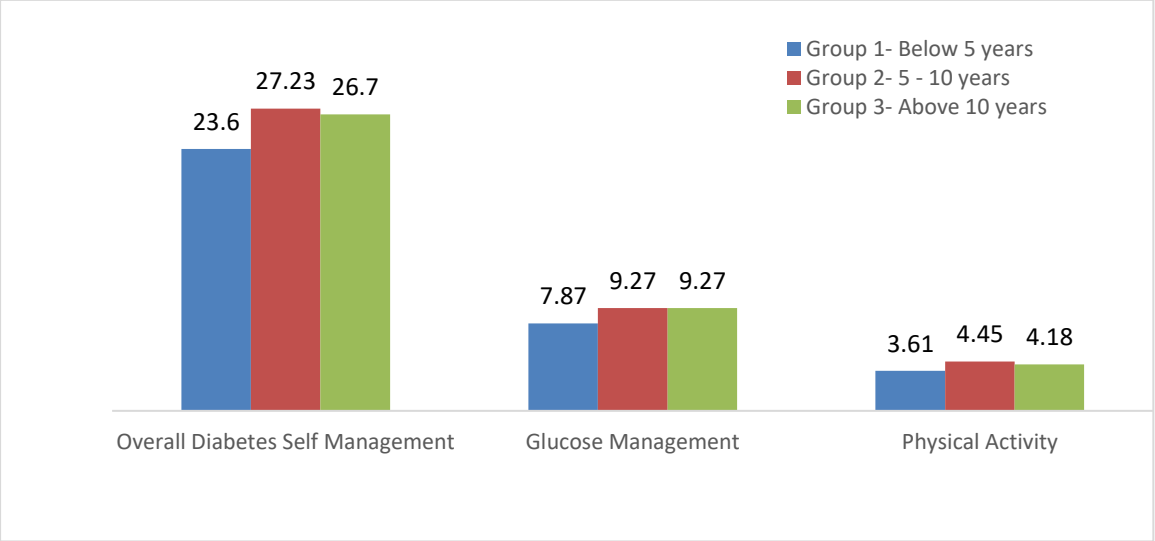


*Figure 3.* Figure showing the mean values of the three groups on overall diabetes self management and its dimensions (glucose management and physical activity)

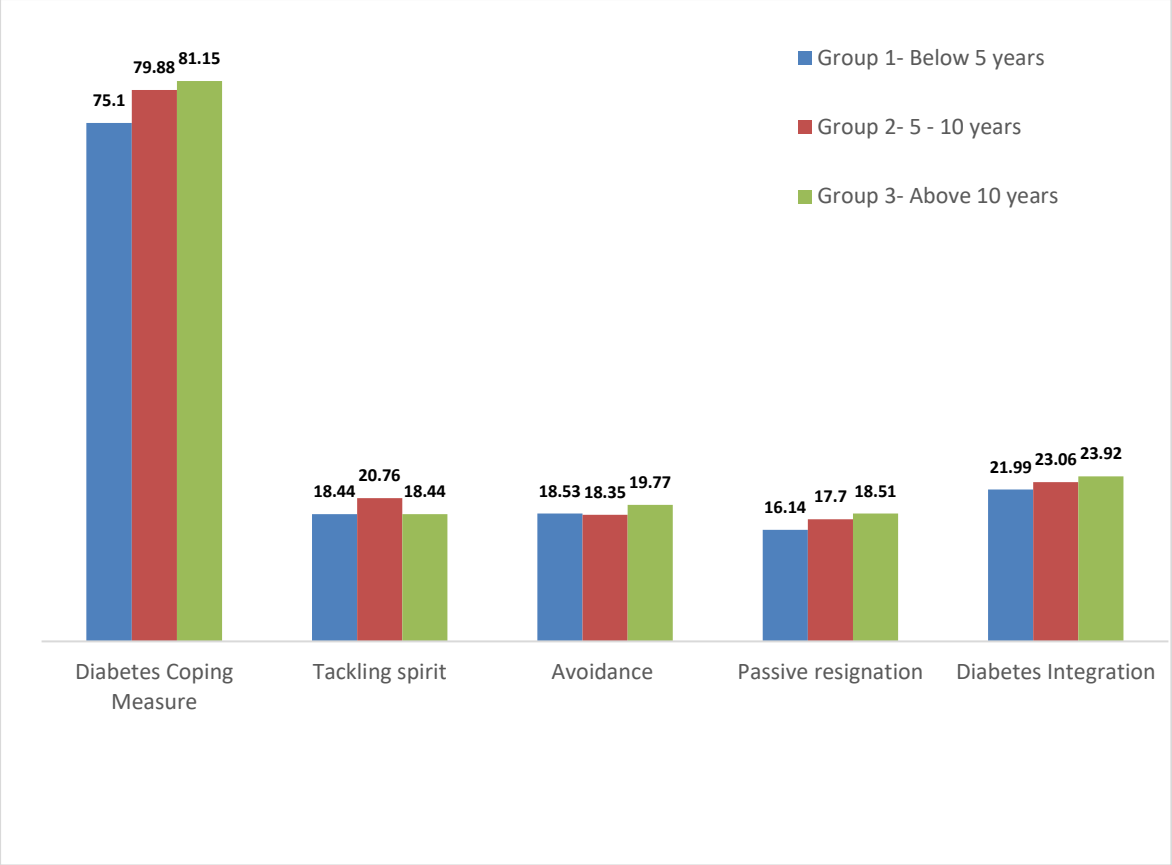


*Figure 4* Figure showing the mean values of the three groups on overall diabetes coping measure and its dimensions (tackling spirit, avoidance, passive resignation and diabetes integration)

**Self-efficacy**

The results of one-way ANOVA showed in Table 3 revealed statistical significant difference between the three groups in their self-efficacy, $F(2,292) = 85.90$, $p<0.001$. The $\eta^2$ was found to be 0.37 stating that the influence of duration of disease on diabetes self-efficacy is large. The Tukey's HSD score presented in Table 4 indicated a statistically significant difference between group I ($M$= 458.62, $SD$= 119.57) and group II ($M$= 566.77, $SD$= 88.31) in their self-efficacy ($MD$= 108.15, $p<0.05$). Group I ($M$= 458.62, $SD$= 119.57) was found to be significantly different from group III ($M$= 637.81, $SD$= 79.46) in their self-efficacy ($MD$= 179.19, $p<0.05$). Group II ($M$= 566.77, $SD$= 88.31) and group III ($M$= 637.81, $SD$= 79.46) had significant difference in their self-efficacy ($MD$= 71.04, $p<0.05$).

**Outcome Expectancy**

There was no significant difference between the three groups in their diabetes outcome expectancy. The results of which are shown in Table 3.

**Perceived Health Competence**

There was no statistical significant difference between the three groups on the variable of perceived health competence and its respective dimensions. The results of which are furnished in Table 3.

**Overall Diabetes Coping Measure**

The results of one-way ANOVA presented in Table 3 revealed statistical significant difference between the three groups in their overall diabetes coping, $F(2,292) = 7.91$, $p<0.001$. The $\eta^2$ was found to be 0.05 stating that the influence of duration of disease on knowledge of diabetes is small. The Tukey's HSD score presented in Table 4 indicated a statistically significant difference between group I ($M$= 75.10, $SD$= 12.50) and group II ($M$= 79.88, $SD$= 10.77) in their overall diabetes

coping (*MD*= -4.78, p<0.05). Group I (*M*= 75.10, *SD*= 12.50) was found to be significantly different from group III (*M*= 81.15, *SD*= 10.30) in their overall diabetes coping (*MD*=6.06, p<0.05). Whereas, no significant difference was found between group II and group III.

***Tackling Spirit***

A statistically significant difference was found between the three groups in their tackling spirit, *F* (2,292) = 6.98, *p*<0.01. The ŋ² was found to be .05 stating that the influence of duration of disease on tackling spirit is small. The Tukey's HSD score presented in Table 4 indicated a statistically significant difference between group I (*M*=18.44, *SD*= 4.49) and group II (*M*= 20.76, *SD*= 3.75) in their tackling spirit (*MD*=-2.32, *p*<0.05). Group II (*M*= 20.76, *SD*= 3.75) was found to be significantly different from group III (*M*= 18.44, *SD*=5.17) in their tackling spirit (*MD*= 1.82, *p*<0.05). Whereas, no significant difference was found between group I and group III.

***Avoidance***

A statistically significant difference was found between the three groups in their avoidance coping, *F* (2,292) = 5.14, *p*<0.01. The ŋ² was found to be .04 stating that the influence of duration of disease on avoidance coping is small. The Tukey's HSD score presented in Table 4 indicated a statistically significant difference between group II (*M*=18.35, *SD*= 3.43) and group III (*M*= 19.77, *SD*= 3.07) in their avoidance coping (*MD*=-1.42, *p*<0.05). Group I (*M*= 20.76, *SD*= 3.75) was found to be significantly different from group III (*M*= 18.44, *SD*=5.17) in their avoidance coping (*MD*= 1.82, *p*<0.05). Whereas, no significant difference was found between group I and group II.

***Passive Resignation***

A statistically significant difference was found between the three groups in their passive resignation, $F$ (2,292) = 9.28, $p$<0.01. The ŋ² was found to be .06 stating that the influence of duration of disease on passive resignation is medium. The Tukey's HSD score showed in Table 4 indicated statistical significant difference between group I ($M$=16.14, $SD$= 4.04) and group II ($M$= 17.70, $SD$= 3.94) in their passive resignation ($MD$=-1.56, $p$<0.05). Group I ($M$= 16.14, $SD$= 4.04) was found to be significantly different from group III ($M$= 18.51, $SD$=3.80) in their passive resignation ($MD$= 2.38, $p$<0.05). Whereas, no significant difference was found between group II and group III.

***Diabetes Integration***

A statistically significant difference was found between the three groups in their diabetes integration, $F$ (2,292) = 3.90, $p$<0.05. The ŋ² was found to be .03 stating that the influence of duration of disease on diabetes integration is small. The Tukey's HSD score showed in Table 4 indicated statistical significant difference between group I ($M$=21.99, $SD$= 5.55) and group III ($M$= 23.92, $SD$=4.34) in their diabetes integration ($MD$= 1.93, $p$<0.05). Whereas, no significant difference was found between group I and group II as well as group II and group III.

**Overall Diabetes Self-Management**

The results of one-way ANOVA revealed a statistically significant difference between the three groups in their overall diabetes self-management, $F$ (2,292) = 11.30, $p$<0.001. The ŋ² was found to be .07 stating that the influence of duration of disease on overall diabetes self-management is large. The Tukey's HSD score showed in Table 4 indicated statistical significant difference between group I ($M$= 23.60, $SD$= 4.33) and group II ($M$= 27.23, $SD$= 6.06) in their overall diabetes self-management

(*MD*=-3.63, *p*<0.05). Group I (*M*= 23.60, *SD*= 4.33) was found to be significantly different from group III (*M*= 26.70, *SD*= 6.42) in their overall diabetes self-management (*MD*= 3.11, *p*<0.05). Whereas, no significant difference was found between group II and group III.

***Glucose Management***

A statistically significant difference was found between the three groups in their glucose management, *F* (2,292) = 9.83, *p*<0.001. The ŋ² was found to be .06 stating that the influence of duration of disease on glucose management is large. The Tukey's HSD score showed in Table 4 indicated statistical significant difference between group I (*M*=7.87, *SD*= 2.17) and group II (*M*= 9.27, *SD*= 2.48) in their glucose management (*MD*=-1.40, *p*<0.05). Group I (*M*= 7.87, *SD*= 2.17) was found to be significantly different from group III (*M*= 9.27, *SD*= 2.83) in their glucose management (*MD*= 1.39, *p*<0.05). Whereas, no significant difference was found between group II and group III.

***Dietary Control***

There was no significant difference between the three groups in their dietary control of diabetes self management.

***Physical Activity***

A statistically significant difference was found between the three groups in their physical activity, *F* (2,292) = 5.82, *p*<0.01. The ŋ² was found to be .03 stating that the influence of duration of disease on physical activity is medium. The Tukey's HSD score showed in Table 4 indicated statistical significant difference between group I (*M*=3.61, *SD*= 1.55) and group II (*M*= 4.45, *SD*= 1.91) in their physical activity (*MD*=-.84, *p*<0.05). Whereas, no significant difference was found between group I and group III as well as group II and group III.

***Health Care Use***

There was no significant difference between the three groups in their health care use of diabetes self-management.

The differences in mean values of the three groups are illustrated through bar graphs. Figure 1 depicts the mean values of diabetes self-efficacy on which the three groups differed significantly. Figure 2 depicts the mean values of overall diabetes self-management and only two of its dimensions, on which the three groups differed significantly. Figure 3 depicts the mean values of overall diabetes coping measures and four of its dimensions, on which the three groups differed significantly.

Following which analyses were performed to assess the impact of the predictor variables on criterion variables, for which Pearson's correlation (*r*) and hierarchical multiple regression were done.

**Relationship among the measures and their respective dimensions for the entire sample**

Pearson's correlation (*r*) was used to find out the relationship between demographic details (age, gender, marital status, comorbidity and duration of disease), diabetes self efficacy, diabetes outcome expectancy, perceived health competence (outcome and behavioural expectancies), diabetes coping measure (tackling spirit, avoidance, passive resignation and diabetes integration), and diabetes self-management (glucose management, dietary control, physical activity and health care use).

Table 5
*Table showing intercorrelations among the variables under study*

| | 1a | 1b | 1c | 1d | 1e | 2 | 3 | 4a | 4b | 5a | 5b | 5c | 5d | 5T | 6a | 6b | 6c | 6d | 6T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a) Age | - | -.02 | -.08 | .02 | .52** | .33** | .07 | .18** | .17** | .17** | .32** | .31** | .33** | .42** | .19** | .19** | .16** | .02 | .23** |
| 1b) Gen | | - | -.03 | -.00 | -.16** | -.10 | -.08 | -.07 | -.09 | .01 | -.07 | -.15* | -.07 | -.10 | -.05 | -.07 | .03 | .13* | -.06 |
| 1c) M_S | | | - | -.05 | -.06 | -.13* | .01 | -.17** | -.22** | -.30** | .00 | -.09 | -.14* | -.21** | -.11 | -.18** | -.17** | -.21** | -.25** |
| 1d) Com | | | | - | -.01 | .09 | .05 | .23** | .11 | .23** | -.09 | .06 | .11 | .14* | .24** | .18** | .25** | .27** | .37** |
| 1e) Dur | | | | | - | .60** | -.01 | -.03 | .03 | .04 | .15** | .24** | .16** | .21** | .22** | .13* | .13* | .09 | .21** |
| 2) DSE | | | | | | - | .14* | .11 | .13* | .09 | .20** | .33** | .19** | .30** | .31** | .31** | .21** | .16** | .37** |
| 3) DOE | | | | | | | - | .04 | .04 | .08 | .18** | .10 | .10 | .17** | .08 | -.00 | .05 | .09 | .09 |
| 4a) PHC1 | | | | | | | | - | .56** | .45** | .10 | .34** | .41** | .51** | .28** | .32** | .12* | .04 | .31** |
| 4b)PHC2 | | | | | | | | | - | .54** | .15** | .25** | .37** | .51** | .33** | .31** | .18** | .14* | .38** |
| 5a)DCM1 | | | | | | | | | | - | -.09 | .19** | .17** | .52** | .41** | .27** | .33** | .27** | .54** |
| 5b)DCM2 | | | | | | | | | | | - | .31** | .41** | .55** | .16** | .22** | -.00 | .02 | .13* |
| 5c)DCM3 | | | | | | | | | | | | - | .55** | .76** | .34** | .35** | .24** | .14* | .43** |
| 5d)DCM4 | | | | | | | | | | | | | - | .82** | .18** | .26** | .10 | .11 | .25** |
| 5T)DCM_T | | | | | | | | | | | | | | - | .41** | .41** | .26** | .21** | .51** |
| 6a)DSM1 | | | | | | | | | | | | | | | - | .30** | .27** | .27** | .77** |
| 6b)DSM2 | | | | | | | | | | | | | | | | - | .21** | .21** | .63** |
| 6c)DSM3 | | | | | | | | | | | | | | | | | - | .19** | .61** |
| 6d)DSM4 | | | | | | | | | | | | | | | | | | - | .57** |
| 6T)DSM_T | | | | | | | | | | | | | | | | | | | - |

*Note.*Gen- Gender,M_S-Marital Status, Com- Comorbidity,Dur- Duration, DSE-Diabetes Self-efficacy, DOE-Diabetes Outcome Expectancy, PHC1-Outcome expectancies, PHC2- Behavioural expectancies, DCM1- Tackling Spirit, DCM2- Avoidance, DCM3- Passive Resignation, DCM4- Diabetes Integration, DCM_T- Overall Diabetes Coping Measures, DSM1- Glucose Managment, DSM2- Dietary Control, DSM3- Physical Activity, DSM4-Health Care Use, DSM_T-Overall Diabetes Self-Management ; *$p$<0.05, **$p$<0.01

**Relationship between demographic details and the rest of the variables**

***a) Relationship between age and other variables***

As seen in Table 5, the results revealed a significant positive relationship between age and diabetes self-efficacy ($r$=.33, $p$<0.01). This indicates that as one's age increases their diabetes self-efficacy also increases. The results however revealed no significant relationship between age and diabetes outcome expectancy.

The results revealed a significant positive relationship between age and dimensions of perceived health competence namely outcome expectancies ($r$=18, $p$<0.01) and behavioural expectancies ($r$=.17, $p$<0.01). This implies that as age increases the score of perceived health competence also increases.

A significant positive relationship was found between age and overall diabetes coping measures ($r$=.42, $p$<0.01), and four of its dimensions namely tackling spirit ($r$= .17, $p$<0.01), avoidance ($r$= .32, $p$<0.01), passive resignation ($r$= .31, $p$<0.01), and diabetes integration ($r$= .33, $p$<0.01). This indicates that as one's age increases their diabetes coping also increases.

The results revealed a significant relationship between age and overall diabetes self-management ($r$=.23, $p$<0.01) and three of its dimensions namely glucose management ($r$=.19, $p$<0.01), dietary control ($r$= .19, $p$<0.01), and physical activity ($r$= .16, $p$<0.01). This indicates that as one's age increases their diabetes self-management also increases. However, there was no significant relationship between age and the dimension - health care use.

***(b) Relationship between gender and other variables***

The results revealed no significant relationship between gender and diabetes self-efficacy, gender and diabetes outcome expectancy as well as gender and perceived health competence (outcome expectancies and behavioural expectancies).

As seen in Table 5, the results revealed a significant negative relationship between gender and one dimension of diabetes coping measures namely passive resignation ($r$=-.15, $p$<0.05). For the analysis, male participants were assigned "1" and female participants were assigned "2". In this context, it implies that there is an inverse correlation between gender and passive resignation. In other words, men have better passive resignation coping than women. However there was no significant correlation between gender and overall diabetes coping measures and other dimensions.

A significant negative relationship was found between gender and one dimension of diabetes self-management namely health care use ($r$=-.13, $p$<0.05), which indicates that males have used health care more efficiently as compared to females. However there was no significant correlation between gender and overall diabetes self-management and other dimensions.

**(c) Relationship between marital status and other variables.**

As seen in Table 5, the results revealed a significant negative relationship between marital status and diabetes self-efficacy ($r$=-.13, $p$<0.05). For the analysis, married participants were assigned "1" and unmarried participants were assigned "2". In this context, it implies that there is an inverse correlation between marital status and diabetes self-efficacy. In other words, unmarried participants have higher diabetes

self-efficacy than married participants. However there was no significant correlation between marital status and diabetes outcome expectancy.

The results revealed a significant negative relationship between marital status and dimensions of perceived health competence namely outcome expectancies ($r$=-.17, $p$<0.01) and behavioural expectancies ($r$=-.22, $p$<0.01). This implies that married participants have higher perceived health competence than married participants.

A significant negative relationship was found between marital status and overall diabetes coping measures ($r$=-.21, $p$<0.01), and two of its dimensions namely tackling spirit ($r$= -.30, $p$<0.01), and diabetes integration ($r$= -.14, $p$<0.05). This indicates that unmarried participants have better diabetes coping measures such as tackling spirit and diabetes integration. However, no significant relationship was found between marital status and dimensions of diabetes coping measures namely avoidance and passive resignation.

The results revealed a significant negative relationship between marital status and overall diabetes self-management ($r$=-,25, $p$<0.01) and three of its dimensions namely dietary control ($r$= .18, $p$<0.01), physical activity ($r$= -.17, $p$<0.01), and health care use ($r$= -.21, $p$<0.01) . This indicates that unmarried participants have better diabetes self-management as compared to married participants. However, there was no significant relationship between marital status and the dimension of glucose management.

**(d) Relationship between comorbidity and other variables**

As seen in Table 5, the results revealed no significant relationship between comorbidity and diabetes self-efficacy as well as comorbidity and diabetes outcome expectancy.

The results revealed a significant positive relationship between comorbidity and one of the dimensions of perceived health competence namely outcome expectancies ($r$=-.23, $p$<0.01). For the analysis, participants with comorbid conditions were assigned "1" and participants without comorbid condition were assigned "2". In this context, it implies that participants with comorbid conditions have better outcome expectancies. However there was no significant correlation between comorbidity and behavioural expectancies.

A significant positive relationship was found between comorbidity and overall diabetes coping measures ($r$= .14, $p$<0.05), and one of its dimensions namely tackling spirit ($r$= .23, $p$<0.01), which indicates that participants with comorbid condition have better diabetes coping measures than participants without comorbid conditions. However, no significant relationship was found between comorbidity and dimensions of diabetes coping measures namely avoidance, passive resignation and diabetes integration.

The results revealed a significant positive relationship between comorbidity and overall diabetes self-management ($r$=.37, $p$<0.01) and all of its dimensions namely glucose management ($r$= .24, $p$<0.01), dietary control ($r$= .18, $p$<0.01), physical activity ($r$= .25, $p$<0.01), and health care use ($r$= .37, $p$<0.01). This indicates that participants with comorbid conditions have better diabetes self-management as compared to participants without comorbid condition.

**e) Relationship between duration of disease and other variables**

As seen in Table 5, the results revealed a significant positive relationship between duration of disease and diabetes self-efficacy ($r$=-.60, $p$<0.01). This indicates that as one's duration of disease increases their diabetes self-efficacy also increases.

The results however revealed no significant relationship between duration of disease and diabetes outcome expectancy as well as perceived health competence (outcome expectancies and behavioural expectancies).

A significant positive relationship was found between duration of disease and overall diabetes coping measures ($r$=.21, $p$<0.01), and three of its dimensions namely avoidance ($r$= .15, $p$<0.01), passive resignation ($r$= .24, $p$<0.01), and diabetes integration ($r$= .16, $p$<0.01). This indicates that as one's duration of disease increases their diabetes coping in the mentioned dimensions also increases. However, no significant relationship was found between duration of disease and one of the dimensions of coping i.e, tackling spirit.

The results revealed a significant relationship between duration of disease and overall diabetes self-management ($r$=.21, $p$<0.01) and three of its dimensions namely glucose management ($r$=.22, $p$<0.01), dietary control ($r$= .13, $p$<0.05), and physical activity ($r$= .13, $p$<0.05). This indicates that as one's duration of disease increases their self-management (namely, glucose management, dietary control physical activity management) increases. However, there was no significant relationship between duration of disease and the dimension- health care use.

**Relationship between Predictors and Criterions**

a) **Relationship between diabetes self efficacy, overall diabetes coping measure and its dimensions**

As seen in table 5, statistically significant positive relationship was observed between diabetes self efficacy and overall diabetes coping measure ($r$= .29, $p$< 0.01) and three of its dimensions namely avoidance ($r$= .20, $p$< 0.01), passive resignation ($r$= .33, $p$< 0.01), and diabetes integration ($r$= .19, $p$< 0.01). This indicates that high diabetes self-efficacy is associated with avoidance, passive resignation, diabetes integration and overall diabetes coping measure. However results showed no significant relationship between diabetes self-efficacy and tackling spirit.

b) **Relationship between diabetes self efficacy, overall diabetes self-management and its dimensions**

Table 5 revealed a significant positive relationship between diabetes self-efficacy and overall diabetes self-management ($r$= .37, $p$< 0.01) and all of its dimensions namely glucose management ($r$= .31, $p$< 0.01), dietary control ($r$= .31, $p$< 0.01), physical activity ($r$= .21, $p$< 0.01), and health care use ($r$= .16, $p$< 0.01).This implies that high diabetes self-efficacy is associated with better glucose management, dietary control, physical activity, health care use and overall diabetes self-management.

c) **Relationship between diabetes outcome expectancy, overall diabetes coping measure and its dimensions**

A significant positive relationship was observed between diabetes outcome expectancy and overall diabetes coping measures ($r$= .17, $p$< 0.01) and one of its dimensions namely avoidance ($r$= .18, $p$< 0.01). This signifies that high diabetes

outcome expectancy is positively linked overall diabetes coping measure and avoidance. On the other hand, no significant association was noticed between diabetes outcome expectancy and tackling spirit, passive resignation and diabetes integration.

**d) Relationship between diabetes outcome expectancy, overall diabetes self-management and its dimensions**

The results revealed no significant relationship between diabetes outcome expectancy and overall diabetes self-management and four of its dimensions.

**e) Relationship between perceived health competence and overall diabetes coping measure and its dimensions**

***Outcome expectancies and overall diabetes coping measure and its dimensions***

A significant positive relationship was found between outcome expectancies and overall diabetes coping measure ($r$= .51, $p$< 0.01) and three of its dimensions namely tackling spirit ($r$= .45, $p$< 0.01), passive resignation ($r$= .34, $p$< 0.01), and diabetes integration ($r$= .41, $p$< 0.01). This shows that high outcome expectancies are associated with better tackling spirit, passive resignation, diabetes integration and overall diabetes coping measure accordingly. However, no significant relationship was found between outcome expectancies and avoidance.

***Behavioural expectancies and overall diabetes coping measure and its dimensions***

As seen in table 5, a significant positive relationship was noticed between behavioural expectancies and overall diabetes coping measure ($r$= .51, $p$< 0.01) and four of its dimensions namely tackling spirit ($r$= .54, $p$< 0.01), avoidance ($r$= .15, $p$<

0.01), passive resignation ($r$= .25, $p$<0.01), and diabetes integration ($r$= .37, $p$< 0.01). Results state that better behavioural expectancies is associated with better tackling spirit, avoidance, passive resignation, diabetes integration and overall diabetes coping measure.

**f) Relationship between perceived health competence and overall diabetes self-management and its dimensions**

***Outcome expectancies and overall diabetes self-management and its dimensions***

A significant positive relationship was found between outcome expectancies and overall diabetes self-management ($r$= .31, $p$< 0.01) and three of its dimensions namely glucose management ($r$= .28, $p$< 0.01), dietary control ($r$= .32, $p$< 0.01), and physical activity ($r$= .12, $p$< 0.05). This shows that high outcome expectancies are associated with better glucose management, dietary control, physical activity and overall diabetes self-management accordingly. However, no significant relationship was found between outcome expectancies and health care use.

***Behavioural expectancies and overall diabetes self-management and its dimensions***

As seen in table 5, a significant positive relationship was noticed between behavioural expectancies and overall diabetes self-management ($r$= .38, $p$< 0.01) and three of its dimensions namely glucose management ($r$= .33, $p$< 0.01), dietary control ($r$= .31, $p$< 0.01), physical activity ($r$= .18, $p$< 0.01), and health care use ($r$= .14, $p$< 0.05). Results state that better behavioural expectancies is associated with better

glucose management, dietary control, physical activity, health care use and overall diabetes self-management.

**Relationship between criterions and their respective dimensions**

a) **Relationship between diabetes self-efficacy, diabetes outcome expectancy and perceived health competence**

A significant positive relationship was found between diabetes self-efficacy and diabetes outcome expectancy ($r$= .14, $p$< 0.05) as well as one of the dimensions of perceived health competence namely behavioural expectancies ($r$= .13, $p$< 0.05). This indicates that high diabetes self-efficacy is associated with high diabetes outcome expectancy and behavioural expectancies. However, no significant relationship was found between diabetes self-efficacy and outcome expectancies of perceived health competence.

b) **Relationship between diabetes outcome expectancy and perceived health competence**

The results revealed no significant relationship between diabetes outcome expectancy and perceived health competence with its dimensions.

**Relationship between predictors and their respective dimensions**

a) **Relationship between overall diabetes coping measure, overall diabetes self-management and its dimensions**

Table 5 revealed a significant positive relationship between overall diabetes coping measure and overall diabetes self-management ($r$= .51, $p$< 0.01) and all of its dimensions namely glucose management ($r$= .41, $p$< 0.01), dietary control ($r$= .41, $p$< 0.01), physical activity ($r$= .30, $p$< 0.01), and health care use ($r$= .21, $p$< 0.01). This

implies that as diabetes coping increases patients have better glucose management, dietary control, physical activity, health care use and overall diabetes self-management.

**b) Relationship between tackling spirit, overall diabetes self-management and its dimensions**

A significant positive relationship was observed between tackling spirit and overall diabetes self-management ($r$= .54, $p$< 0.01) and all of its dimensions namely glucose management ($r$= .41, $p$< 0.01), dietary control ($r$= .27, $p$< 0.01), physical activity ($r$= .33, $p$< 0.01), and health care use ($r$= .27, $p$< 0.01). This implies that high scores in tackling spirit is associated with better glucose management, dietary control, physical activity, health care use and overall diabetes self-management.

**c) Relationship between avoidance, overall diabetes self-management and its dimensions**

The results in table 5 showed a significant relationship between avoidance and overall diabetes self-management ($r$= .13, $p$< 0.05) and two of its dimensions namely glucose management ($r$= .16, $p$< 0.01) and dietary control ($r$= .22, $p$< 0.01). This indicates that high scores in avoidance is associated with better glucose management, dietary control, and overall diabetes self-management. However, no significant relationship was found between avoidance and two dimensions of diabetes self-management namely, physical activity and health care use.

**d) Relationship between passive resignation, overall diabetes self-management and its dimensions**

As seen in table 5, a significant positive relationship was found between passive resignation and overall diabetes self-management ($r$= .43, $p$< 0.01) and all of

its dimensions namely glucose management ($r$= .34, $p$< 0.01), dietary control ($r$= .35, $p$< 0.01), physical activity ($r$= .24, $p$< 0.01), and health care use ($r$= .14, $p$< 0.05). This suggests that high scores in passive resignation is linked with better glucose management, dietary control, physical activity, health care use and overall diabetes self-management.

**e) Relationship between diabetes integration, overall diabetes self-management and its dimensions**

The results in table 5 showed a significant relationship between diabetes integration and overall diabetes self-management ($r$= .25, $p$< 0.01) and two of its dimensions namely glucose management ($r$= .18 $p$< 0.01) and dietary control ($r$= .26, $p$< 0.01). This indicates that higher scores in passive resignation is associated with better glucose management, dietary control, and overall diabetes self-management. The results however revealed no significant relationship between passive resignation and two of the dimensions namely, physical activity and health care use.

**The impact of self-efficacy, outcome expectancy and perceived health competence on coping and self-management of diabetes**

**Predictors of Diabetes Coping Measure**

Based on the findings of Pearson's correlation, five hierarchical multiple regression analysis models were formulated for diabetes coping measures and its dimensions. Essential assumptions such as normality, homoscedasticity, linearity and absence of multicollinearity were verified for each model. Diabetes self-efficacy was entered in the first model to partial out the variance explained by them. Diabetes outcome expectancy was entered in the second model, perceived health competence (outcome and behavioural expectancies) was then entered in the third model and

finally demographic variables (age, gender, marital status, comorbidity and duration of disease) were added in the fourth model. Similar procedure was followed throughout the five models. The results of these models are presented in Table 6 to Table 10.

**Role of Predictor Variables in Tackling Spirit of Diabetes Coping Measure**

The hierarchical multiple regression analysis model was developed in respect to tackling spirit of diabetes coping measures. From Table 5, it was found that perceived health competence (outcome and behavioural expectancies) and demographic variables (age, marital status, comorbidity) had significant relationship with tackling spirit. Weak to moderately strong correlations were found between predictor variables and criterion (tackling spirit) ranging from $r$=-.17, $p$<0.01 to $r$=.54, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of tackling spirit.

Table 6

*Summary table of Hierarchical Multiple Regression Analysis for Perceived Health Competence and Demographic variables (Age, Marital status and Comorbidity) predicting Tackling Spirit Coping*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C= 7.51, F= 70.70***)** | .57 | .33*** | | | | | |
| Outcome expectancies | | | | .30 | .08 | .21*** | 3.64 |
| Behavioural expectancies | | | | .58 | .08 | .42*** | 7.30 |
| **Model 2(C= 7.50, F=35.34***)** | .62 | .38*** | .05*** | | | | |
| Outcome expectancies | | | | .22 | .08 | .16** | 2.75 |
| Behavioural expectancies | | | | .53 | .08 | .39*** | 6.83 |
| Age | | | | .03 | .02 | .06 | 1.34 |
| Marital Status | | | | - | .47 | - | -3.59 |
| | | | | 1.67 | | .17*** | |
| Comorbidity | | | | 1.39 | .44 | .15 | 3.11 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 6, it can be seen that significantly correlated predictors were entered hierarchically in two models – model1 (outcome and behavioural expectancies) and model 2 (age, marital status and comorbidity) – in relation to tackling spirit.

In the first model of hierarchical multiple regression, one predictor was entered i.e, outcome and behavioural expectancies. The model 1 was statistically significant $F$ (2, 293) = 70.70; $p$<0.001 and explained 33% of significant proportion of variance (*Adjusted* $R^2$= .32) in tackling spirit. From the analysis outcome expectancies ($\beta$= .21, $p$< 0.001) and behavioural expectancies ($\beta$= .42, $p$<0.001) were found to be significant predictor for tackling spirit

In model 2, after the entry of age, marital status and comorbidity, in addition to outcome and behavioural expectancies, the model was found to be significant, $F$ (5, 290) = 35.34; $p$<0.01, and the model explained 5% additional significant proportion of variance ($R^2$ *Change*= .05, $p$<0.001) amounting to total 38% significant proportion of variance of tackling spirit (*Adjusted* $R^2$=.37). From the analysis, outcome expectancies ($\beta$= .16, $p$< 0.01), behavioural expectancies ($\beta$= .39, $p$< 0.001), marital status ($\beta$= .17, $p$< 0.01) and comorbidity ($\beta$= .15, $p$< 0.01) were found to be significant predictors for tackling spirit in model 2.

The result highlighted that outcome and behavioural expectancies were significant predictors for tackling spirit in model 1, outcome and behavioural expectancies, marital status and comorbidity were significant predictors for tackling spirit in model 2.

**Role of Predictor Variables in Avoidance of Diabetes Coping Measure**

The hierarchical multiple regression analysis model was developed in respect to avoidance. From Table 5, it was found that diabetes self-efficacy, diabetes outcome expectancy, perceived health competence (behavioural expectancies) and demographic variables (age, duration of disease) had significant relationship with avoidance. Moderately strong correlations were found between predictor variables and criterion (avoidance) ranging from $r$=.15, $p$<0.01 to $r$=.32, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of avoidance.

Table 7

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self-efficacy, Diabetes Outcome Expectancy, Perceived Health Competence and Demographic variables (Age and Duration of disease) predicting Avoidance Coping*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***B*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C= 15.68, F= 12.52***)** | .20 | .04*** | | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .20*** | 3.54 |
| **Model 2(C= 11.96, F= 10.18***)** | .25 | .06** | .02** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .18** | 3.16 |
| Diabetes Outcome Expectancy | | | | .01 | .00 | .16** | 2.75 |
| **Model 3(C= 10.56, F=8.50***)** | .28 | .08* | .02* | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .16** | 2.86 |
| Diabetes Outcome Expectancy | | | | .00 | .00 | .15** | 2.72 |
| Behavioural expectancies | | | | .13 | .06 | .12* | 2.20 |
| **Model 4(C= 6.82, F=10.02**)** | .38 | .15*** | .07*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .12 | 1.78 |
| Diabetes Outcome Expectancy | | | | .01 | .00 | .14* | 2.50 |
| Behavioural expectancies | | | | .08 | .06 | .08 | 1.47 |
| Age | | | | .12 | .03 | .30*** | 4.64 |
| Duration of disease | | | | -.36 | .33 | -.08 | -1.09 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, $\beta$=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 7, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (diabetes outcome expectancy), model 3 (behavioural expectancies), model 4 (age and duration of disease) in relation to avoidance.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 12.52; $p$<0.001 and explained 4% of significant proportion of variance (*Adjusted* $R^2$=.04) in avoidance. From the analysis diabetes self-efficacy ($\beta$= .20, $p$< 0.001) was found to be significant predictor for avoidance. After entry of diabetes outcome expectancy in model 2 in addition to diabetes self-diabetes efficacy, the model was found to be significant, $F$ (2, 293) = 10.18; $p$<0.001, and the model explained 2% additional significant proportion of variance ($R^2$ *Change*= .02, $p$<0.01) amounting to total 6% significant proportion of variance of avoidance (*Adjusted* $R^2$=.06). From the analysis, diabetes self-efficacy ($\beta$= .18, $p$< 0.01) and diabetes outcome expectancy ($\beta$= .16, $p$< 0.01) were found to be significant predictors for avoidance in model 2.

In model 3, after the entry of behavioural expectancies in addition to diabetes self-efficacy and diabetes outcome expectancy, the model was found to be significant, $F$(3, 292)= 8.50, $p$<0.001, and the model explained 2% more significant proportion of variance ($R^2$ *Change*= .02, $p$<0.05) amounting to total 8% significant proportion of variance of avoidance (*Adjusted* $R^2$=.07). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .16, $p$< 0.01), diabetes outcome expectancy ($\beta$= .15, $p$< 0.01) and behavioural expectancies ($\beta$= .12, $p$< 0.05) were found to be significant predictors for avoidance.

In model 4, age and duration of disease were entered in addition to diabetes self-efficacy, diabetes outcome expectancies and behavioural expectancies, the model was found to be significant, $F$ (5, 290) = 10.02; $p$<0.01, and the model explained 7% additional significant proportion of variance ($R^2$ *Change*= .07, $p$<0.001) amounting to total 15% significant proportion of variance of avoidance (*Adjusted* $R^2$=.13). From the analysis, diabetes outcome expectancy ($\beta$= .14, $p$< 0.05)and age ($\beta$= .30, $p$< 0.000) were found to be significant predictors for avoidance in model 4.

The result highlighted that diabetes self-efficacy was significant predictor for avoidance in model 1, diabetes self-efficacy and diabetes outcome expectancy in model 2, diabetes self-efficacy, diabetes outcome expectancy and behavioural expectancies in model 3 and lastly diabetes outcome expectancy and age in model 4.

**Role of Predictor Variables in Passive Resignation of Diabetes Coping Measure**

The hierarchical multiple regression analysis model was developed in respect to passive resignation of diabetes coping measures. From Table 5, it was found that diabetes self-efficacy, perceived health competence (outcome and behavioural expectancies), and demographic variables (age, gender, comorbidity, duration of disease) had significant relationship with passive resignation. Weak to moderately strong correlations were found between predictor variables and criterion (passive resignation) ranging from $r$=.14, $p$<0.05 to $r$=.34, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of passive resignation.

Table 8

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self – efficacy, Perceived Health Competence and Demographic variables (Age, Marital Status, Comorbidity, Duration of disease) predicting Passive Resignation Coping*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C=11.45, F= 34.86***)** | .33 | .11** | | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .33*** | 5.90 |
| **Model 2(C= 6.61, F= 24.98***)** | .45 | .20*** | .09*** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .29*** | 5.46 |
| Outcome expectancies | | | | .35 | .08 | .28*** | 4.50 |
| Behavioural Expectancies | | | | .06 | .08 | .05 | .79 |
| **Model 3(C= 5.38, F=15.44***)** | .48 | .24** | .04** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .22** | 3.42 |
| Outcome expectancies | | | | .32 | .08 | .26*** | 4.14 |
| Behavioural Expectancies | | | | .04 | .07 | .03 | .57 |
| Age | | | | .09 | .03 | .18** | 2.97 |
| Gender | | | | -.81 | .42 | -.10 | -1.92 |
| Duration of disease | | | | -.01 | .36 | -.00 | -.02 |

*Note*. *C*= Constant, *$\Delta R^2$*=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. **p*=<.05; ***p*<.01; ****p*<.001

From Table 8, it can be seen that significantly correlated predictors were entered hierarchically in three models – model 1 (diabetes self-efficacy), model 2 (outcome and behavioural expectancies) and model 3 (age, marital status, comorbidity and duration of disease) – in relation to passive resignation.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 34.86; $p$<0.001 and explained 11% of significant proportion of variance (*Adjusted* $R^2$= .10) in passive resignation. From the analysis, diabetes self-efficacy ($\beta$= .33, $p$< 0.001) was found to be significant predictor for passive resignation. After entry of outcome and behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (3, 292) = 24.98; $p$<0.001, and the model explained 9% additional significant proportion of variance ($R^2$*Change*= .09, $p$<0.001) amounting to total 20% significant proportion of variance of passive resignation(*Adjusted* $R^2$=.20). From the analysis, diabetes self-efficacy ($\beta$= .29, $p$< 0.001) and outcome expectancies ($\beta$= .28, $p$< 0.001) were found to be significant predictors for passive resignation in model 2.

In model 3, age, gender and duration of disease were entered in addition to diabetes self-efficacy, outcome and behavioural expectancies, the model was found to be significant, $F$ (6, 289) = 13.19; $p$<0.01, and the model explained 4% additional significant proportion of variance ($R^2$*Change*= .04, $p$<0.01) amounting to total 24% significant proportion of variance of passive resignation (*Adjusted* $R^2$=.22). From the analysis, diabetes self- efficacy ($\beta$= .22, $p$< 0.01), outcome expectancies ($\beta$= .26, $p$< 0.001) and age ($\beta$= .18, $p$=0.01) were found to be significant predictors for passive resignation in model 3.

The result highlighted that diabetes self-efficacy was significant predictor for passive resignation in model 1, diabetes self-efficacy and outcome expectancies in model 2, and lastly diabetes self-efficacy, outcome expectancies and age in model 3.

**Role of Predictor Variables in Diabetes Integration of Diabetes Coping Measure**

The hierarchical multiple regression analysis model was developed in respect to diabetes integration of diabetes coping measures. From Table 5, it was found that diabetes self-efficacy, perceived health competence (outcome and behavioural expectancies), and demographic variables (age, marital status and duration of disease) had significant relationship with diabetes integration. Weak to moderately strong correlations were found between predictor variables and criterion (diabetes integration) ranging from $r$=-.13$p$<.05 to $r$=.41, $p$<.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of diabetes integration.

Table 9

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self – efficacy, Perceived Health Competence and Demographic variables (Age, Marital Status, Duration of disease) predicting Diabetes Integration Coping*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SE B*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C=18.73, F= 10.94**)** | .19 | .04** | | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .19** | 3.31 |
| **Model 2(C= 10.47, F=26.15***)** | .46 | .21** * | .17*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .13* | 2.53 |
| Outcome expectancies | | | | .42 | .09 | .28*** | 4.50 |
| Behavioural Expectancies | | | | .28 | .09 | .19** | 3.05 |
| **Model 3(C= 6.84, F=17.04***)** | .51 | .26** * | .05*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .05 | .83 |
| Outcome expectancies | | | | .39 | .09 | .26*** | 4.13 |
| Behavioural Expectancies | | | | .25 | .09 | .17** | 2.75 |
| Age | | | | .13 | .03 | .23*** | 3.83 |
| Marital Status | | | | -.32 | .55 | -.03 | -.59 |
| Duration of disease | | | | .04 | .43 | .01 | .08 |

*Note*. *C*= Constant, *$\Delta R^2$*=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. **p*=<.05; ***p*<.01; ****p*<.001

From Table 9, it can be seen that significantly correlated predictors were entered hierarchically in three models – model 1 (diabetes self-efficacy), model 2 (outcome and behavioural expectancies), model 3 (age, marital status and duration of disease) – in relation to diabetes integration.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 10.94; $p$<0.001 and explained 4% of significant proportion of variance (*Adjusted* $R^2$= .03) in diabetes integration. From the analysis diabetes self-efficacy ($\beta$= .19, $p$< 0.01) was found to be significant predictor for diabetes integration. After entry of outcome and behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (3, 292) = 26.15; $p$<0.001, and the model explained 17% additional significant proportion of variance ($R^2$ *Change*= .17, $p$<.05) amounting to total 21% significant proportion of variance of diabetes integration (*Adjusted* $R^2$=.20). From the analysis, diabetes self efficacy ($\beta$= .13, $p$< 0.05), outcome expectancies ($\beta$= .28, $p$< 0.001) and behavioural expectancies ($\beta$= .19, $p$< 0.01) were found to be significant predictors for diabetes integration in model 2.

In model 3, age, marital status and duration of disease were entered in addition to diabetes self-efficacy, outcome and behavioural expectancies, glucose management and dietary control, the model was found to be significant, $F$ (8, 289) = 17.04; $p$<0.001, and the model explained 5% additional significant proportion of variance ($R^2$ *Change*= .05, $p$<0.001) amounting to total 26% significant proportion of variance of diabetes integration (*Adjusted* $R^2$=.25). From the analysis, outcome expectancies ($\beta$= .26, $p$< 0.001), behavioural expectancies ($\beta$= .17, $p$< 0.01) and age ($\beta$= .23, $p$< 0.001) were found to be significant predictors for diabetes integration.

The result highlighted that diabetes self-efficacy was significant predictor for diabetes integration in model 1, diabetes self-efficacy, outcome and behavioural expectancies were significant predictors in model 2 and outcome and behavioural expectancies as well as age in final model 3.

**Role of Predictor Variables in overall Diabetes Coping Measure**

The hierarchical multiple regression analysis model was developed in respect to overall diabetes coping measures. From Table 5, it was found that diabetes self-efficacy, diabetes outcome expectancy, perceived health competence (outcome and behavioural expectancies) and demographic variables (age, marital status, comorbidity and duration of disease), had significant relationship with overall diabetes coping measures. Weak to moderately strong correlations were found between predictor variables and criterion (overall diabetes coping measures) ranging from $r$=-.14, $p$<0.05 to $r$=.51, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of overall diabetes coping measures.

Table 10

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self – efficacy, Diabetes Outcome Expectancy, Perceived Health Competence and Demographic variables (Age, Marital Status, Comorbidity, Duration of disease) predicting Overall Diabetes Coping Measures*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1** | .29 | .08*** | | | | | |
| **(C=63.27,F=27.97***)** | | | | | | | |
| Diabetes Self-efficacy | | | | .03 | .00 | .29*** | 5.29 |
| **Model 2(C=53.31,** | .32 | .10* | .02* | | | | |
| **F=16.80***)** | | | | | | | |
| Diabetes Self-efficacy | | | | .03 | .00 | .28*** | 4.95 |
| Diabetes Outcome Expectancy | | | | .02 | .01 | .13* | 2.29 |
| **Model 3(C=29.91,** | .63 | .39*** | .29*** | | | | |
| **F=47.29***)** | | | | | | | |
| Diabetes Self-efficacy | | | | .02 | .00 | .20*** | 4.39 |
| Diabetes Outcome Expectancy | | | | .02 | .01 | .11* | 2.41 |
| Outcome expectancies | | | | 1.08 | .19 | .31*** | 5.60 |
| Behavioural expectancies | | | | 1.04 | .19 | .31*** | 5.52 |
| **Model 4 (C=21.37,** | .68 | .46*** | .07*** | | | | |
| **F=31.08***)** | | | | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .11* | 1.97 |
| Diabetes Outcome Expectancy | | | | .02 | .01 | .11* | 2.41 |
| Outcome expectancies | | | | .95 | .19 | .28*** | 5.10 |
| Behavioural expectancies | | | | .94 | .18 | .28*** | 5.19 |
| Age | | | | .36 | .07 | .27*** | 5.24 |
| Marital Status | | | | - 1.63 | 1.09 | -.07 | - 1.50 |
| Comorbidity | | | | .50 | 1.04 | .02 | .48 |
| Duration of disease | | | | .01 | .87 | .00 | .01 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 10, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (diabetes outcome expectancy), model 3 (outcome and behavioural expectancies), and model 4 (age, marital status, comorbidity and duration of disease) – in relation to overall diabetes coping measures.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 27.97; $p$<0.001 and explained 8% of significant proportion of variance (*Adjusted* $R^2$= .08) in overall coping measures. From the analysis diabetes self-efficacy ($\beta$= .29, $p$< 0.001) was found to be significant predictor for overall diabetes coping measures. After entry of diabetes outcome expectancy in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (2, 293) = 16.80; $p$<0.001, and the model explained 2% additional significant proportion of variance ($R^2$ *Change*= .02, $p$<0.05) amounting to total 10% significant proportion of variance of overall diabetes coping measures(*Adjusted* $R^2$=.10). From the analysis, diabetes self-efficacy ($\beta$= .28, $p$< 0.001) and diabetes outcome expectancy ($\beta$= .13, $p$< 0.05) were found to be significant predictors for overall diabetes coping measures in model 2.

In model 3, after the entry of outcome and behavioural expectancies in addition to diabetes self-efficacy and diabetes outcome expectancy, the model was found to be significant, $F$(4, 291)= 29.85, $p$<0.001, and the model explained 29% more significant proportion of variance ($R^2$ *Change*= .29, $p$<0.001) amounting to total 39% significant proportion of variance of overall diabetes coping measures(*Adjusted* $R^2$=.39). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .20, $p$< 0.001), diabetes outcome expectancy ($\beta$= .11, $p$< 0.05), outcome expectancies ($\beta$= .31,

$p$< 0.001), and behavioural expectancies ($\beta$= .31, $p$< 0.001) were found to be significant predictors for overall diabetes coping measures.

In model 4, age, marital status, comorbidity and duration of disease were entered in addition to diabetes self-efficacy, diabetes outcome expectancy, outcome and behavioural expectancies, the model was found to be significant, $F$ (8, 287) = 31.08; $p$<0.001, and the model explained 7% additional significant proportion of variance ($R^2$ *Change*= .07, $p$<0.001) amounting to total 46% significant proportion of variance of overall diabetes coping measures (*Adjusted* $R^2$=.45). From the analysis, diabetes self-efficacy ($\beta$= .11, $p$< 0.05), diabetes outcome expectancy ($\beta$= .11, $p$<0.05), outcome expectancies ($\beta$= .27, $p$< 0.001), behavioural expectancies ($\beta$= .28, $p$< 0.001), age ($\beta$= .27, $p$< 0.001) were found to be significant predictors for overall diabetes coping measures in model 4.

The result highlighted that diabetes self-efficacy was significant predictor for overall diabetes self-management in model 1, diabetes self-efficacy and diabetes outcome expectancy in model 2, diabetes self-efficacy, diabetes outcome expectancy outcome and behavioural expectancies in model 3 and lastly diabetes self-efficacy, diabetes outcome expectancy, outcome and behavioural expectancies and age in model 4.

**Predictors of Diabetes Self-Management**

Based on the findings of Pearson's correlation, five hierarchical multiple regression analysis models were formulated for diabetes self-management and its dimensions. Essential assumptions such as normality, homoscedasticity, linearity and absence of multicollinearity were verified for each model. Diabetes self-efficacy was entered in the first model to partial out the variance explained by them. Diabetes

outcome expectancy was entered in the second model, perceived health competence (outcome and behavioural expectancies) was then entered in the third model. Dimensions of diabetes coping measure (tackling spirit, avoidance, passive resignation, diabetes integration) were entered in the fourth model and finally demographic variables (age, gender, marital status, comorbidity, duration of disease) were added in the fifth model. Similar procedure was followed throughout the five models. The results of these models are presented in Table 11 to Table 15.

**Role of Predictor Variables in Glucose management of Diabetes Self-management**

The hierarchical multiple regression analysis model was developed in respect to glucose management. From Table 5, it was found that diabetes self-efficacy, diabetes outcome expectancy, perceived health competence (behavioural expectancies), dimensions of diabetes coping measure (tackling spirit, avoidance, passive resignation, diabetes integration) and demographic variables (age, comorbidity, duration of disease) had significant relationship with glucose management. Moderately strong correlations were found between predictor variables and criterion (glucose management) ranging from $r$=.16, $p$<0.01 to $r$=.41, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of glucose management.

Table 11

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self –efficacy, Diabetes Outcome Expectancy, Perceived Health Competence, Diabetes Coping Measures and Demographic variables (Age, Comorbidity and Duration of disease) predicting Glucose Management.*

| **Model and predictor variable** | ***R*** | $R^2$ | $\Delta R^2$ | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1 (C=5.09,F=31.84***)** | .31 | .10*** | | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .31*** | 5.64 |
| **Model 2(C=4.38, F=16.15***)** | .32 | .10 | .00 | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .31*** | 5.48 |
| Diabetes Outcome Expectancy | | | | .00 | .00 | .04 | .72 |
| **Model 3(C=1.91, F=22.05***)** | .43 | .18*** | .08*** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .27*** | 4.98 |
| Diabetes Outcome Expectancy | | | | .00 | .00 | .03 | .63 |
| Behavioural expectancies | | | | .23 | .04 | .29*** | 5.53 |
| **Model 4 (C=0.62, F=17.38***)** | .55 | .29*** | .11*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .20*** | 3.73 |
| Diabetes Outcome Expectancy | | | | .00 | .00 | -.01 | -.09 |
| Behavioural expectancies | | | | .08 | .05 | .10 | 1.66 |
| Tackling Spirit | | | | .18 | .03 | .32*** | 5.23 |
| Avoidance | | | | .08 | .04 | .11* | 1.96 |
| Passive Resignation | | | | .14 | .04 | .22*** | 3.56 |
| Diabetes Integration | | | | -.06 | .03 | -.12 | -1.87 |
| **Model 5 (C=1.23, F=13.60***)** | .60 | .35* | .06* | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .14* | 2.14 |
| Diabetes Outcome Expectancy | | | | .00 | .00 | -.00 | -.03 |
| Behavioural expectancies | | | | .09 | .05 | .12 | 1.91 |
| Tackling Spirit | | | | .16 | .03 | .29** | 4.65 |
| Avoidance | | | | .10 | .04 | .14* | 2.43 |
| Passive Resignation | | | | .15 | .04 | .23** | 3.71 |
| Diabetes Integration | | | | -.08 | .03 | -.14* | 2.43 |
| Age | | | | -.01 | .02 | -.05 | -.73 |
| Comorbidity | | | | .84 | .27 | .16** | 3.12 |
| Duration of disease | | | | .29 | .22 | .09 | 1.31 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 11, it can be seen that significantly correlated predictors were entered hierarchically in five models – model 1 (diabetes self-efficacy), model 2 (diabetes outcome expectancy), model 3 (behavioural expectancies), model 4 (tackling spirit, avoidance, passive resignation, diabetes integration) and model 5 (age, comorbidity and duration of disease) in relation to glucose management.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 31.84; $p$<0.001 and explained 10% of significant proportion of variance (*Adjusted* $R^2$=.09) in glucose management. From the analysis diabetes self-efficacy ($\beta$= .31, $p$< 0.001) was found to be significant predictor for glucose management. After entry of diabetes outcome expectancy in model 2 in addition to self-diabetes efficacy, the model was significant, $F$(2, 293)= 16.15, $p$<0.001, and the model did not explain additional significant proportion of variance of diabetes integration(*Adjusted* $R^2$=.09). The results revealed that in model 2 diabetes self-efficacy ($\beta$= .31, $p$< 0.001) was found to be significant predictors for glucose management.

In model 3, after the entry of behavioural expectancies in addition to diabetes self-efficacy and diabetes outcome expectancy, the model was found to be significant, $F$(3, 292)= 22.05, $p$<0.001, and the model explained 8% more significant proportion of variance ($R^2$ *Change*= .08, $p$<0.001) amounting to total 18% significant proportion of variance of glucose management (*Adjusted* $R^2$=.18). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .27, $p$< 0.001) and behavioural expectancies ($\beta$= .29, $p$< 0.001) were found to be significant predictors for glucose management.

After entry of tackling spirit, avoidance, passive resignation and diabetes integration in model 4 in addition to diabetes self-efficacy, diabetes outcome

expectancy and behavioural expectancies, the model was found to be significant, $F$ (7, 288) = 17.38; $p$<0.001, and the model explained 11% additional significant proportion of variance ($R^2$ *Change*= .11, $p$<0.001) amounting to total 29% significant proportion of variance of glucose management (*Adjusted* $R^2$=.28). From the analysis, diabetes self efficacy ($\beta$= .20, $p$< 0.001), tackling spirit ($\beta$= .32, $p$< 0.001), avoidance ($\beta$= .11, $p$< 0.05) and passive resignation ($\beta$= .22, $p$< 0.001) were found to be significant predictors for glucose management in model 4.

In model 5, age, comorbidity and duration of disease were entered in addition to diabetes self-efficacy, diabetes outcome expectancies, behavioural expectancies, tackling spirit, avoidance, passive resignation, diabetes integration the model was found to be significant, $F$ (10, 285) = 13.60; $p$<0.01, and the model explained 6% additional significant proportion of variance ($R^2$ *Change*= .06, $p$<0.05) amounting to total 35% significant proportion of variance of glucose management (*Adjusted* $R^2$=.30). From the analysis, diabetes self efficacy ($\beta$= .14, $p$< 0.05), tackling spirit ($\beta$= .29, $p$< 0.01), avoidance ($\beta$= .14, $p$< 0.05), passive resignation ($\beta$= .23, $p$< 0.01), diabetes integration ($\beta$= -.14, $p$< 0.05), and comorbidity ($\beta$= .16, $p$< 0.01) were found to be significant predictors for glucose management in model 5.

The result highlighted that diabetes self-efficacy was significant predictor for glucose management in model 1 and model 2, diabetes self-efficacy and behavioural expectancies in model 3, diabetes self-efficacy, tackling spirit, avoidance and passive resignation in model 4 and lastly diabetes self-efficacy, tackling spirit, avoidance, passive resignation, diabetes integration and comorbidity in model 5.

**Role of Predictor Variables in Dietary Control of Diabetes Self-management**

The hierarchical multiple regression analysis model was developed in respect to dietary control of diabetes self-management. From Table 5, it was found that diabetes self-efficacy, perceived health competence (outcome and behavioural expectancies), dimensions of diabetes coping measure (tackling spirit, avoidance, passive resignation, diabetes integration), demographic variables (age, marital status, comorbidity, duration of disease) had significant relationship with dietary control. Weak to moderately strong correlations were found between predictor variables and criterion (dietary control) ranging from $r$=.18, $p$<0.01 to $r$=.41, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of dietary control.

Table 12

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self –efficacy, Perceived Health Competence, Diabetes Coping Measures and Demographic variables (Age, Marital Status, Duration of disease) predicting Dietary Control.*

| **Model and predictor variable** | ***R*** | $R^2$ | $\Delta R^2$ | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C=3.93, F= 32.44***)** | .31 | .10*** | | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .31*** | 5.68 |
| **Model 2(C= 1.50, F= 23.93***)** | .44 | .20*** | .10*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .27*** | 5.12 |
| Outcome expectancies | | | | .12 | .04 | .20** | 3.09 |
| Behavioural Expectancies | | | | .09 | .04 | .16* | 2.53 |
| **Model 3(C= .30, F=13.40***)** | .50 | .25** | .05** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .20*** | 3.69 |
| Outcome expectancies | | | | .07 | .04 | .12 | 1.88 |
| Behavioural Expectancies | | | | .05 | .04 | .09 | 2.25 |
| Tackling Spirit | | | | .06 | .03 | .13* | 2.09 |
| Avoidance | | | | .07 | .03 | .12* | 2.11 |
| Passive Resignation | | | | .08 | .03 | .17** | 2.60 |
| Diabetes Integration | | | | -.01 | .03 | -.03 | -.39 |
| **Model 4(C=.25, F=9.24***)** | .51 | .26 | .01 | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .23** | 3.37 |
| Outcome expectancies | | | | .06 | .04 | .09 | 1.40 |
| Behavioural Expectancies | | | | .05 | .04 | .09 | 1.32 |
| Tackling Spirit | | | | .04 | .03 | .10 | 1.47 |
| Avoidance | | | | .07 | .03 | .13* | 2.24 |
| Passive Resignation | | | | .09 | .03 | .18** | 2.81 |
| Diabetes Integration | | | | -.02 | .03 | -.04 | -.60 |
| Age | | | | .00 | .01 | .02 | .32 |
| Marital Status | | | | -.28 | .22 | -.07 | -1.28 |
| Comorbidity | | | | .41 | .21 | .10 | 1.95 |
| Duration of disease | | | | -.19 | .17 | -.08 | -1.12 |

*Note*. *C*= Constant, $\Delta R^2$ =$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 12, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (outcome and behavioural expectancies), model 3 (tackling spirit, avoidance, passive resignation, diabetes integration) and model 4 (age, marital status, comorbidity and duration of disease) – in relation to dietary control.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 32.44; $p$<0.001 and explained 10% of significant proportion of variance (*Adjusted* $R^2$= .10) in dietary control. From the analysis self-efficacy ($\beta$= .31, $p$< 0.001) was found to be significant predictor for dietary control. After entry of outcome and behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (3, 292) = 23.93; $p$<0.001, and the model explained 10% additional significant proportion of variance ($R^2$ *Change*= .10, $p$<0.001) amounting to total 20% significant proportion of variance of dietary control (*Adjusted* $R^2$=.19). From the analysis, diabetes self-efficacy ($\beta$= .27, $p$< 0.001), outcome expectancies ($\beta$= .20, $p$< 0.01) and behavioural expectancies ($\beta$= .16, $p$< 0.05) were found to be significant predictors for dietary control in model 2.

In model 3, tackling spirit, avoidance, passive resignation, diabetes integration were entered in addition to diabetes self-efficacy, outcome and behavioural expectancies, the model was found to be significant, $F$ (7, 288) = 13.40; $p$<0.001, and the model explained 5% additional significant proportion of variance ($R^2$ *Change*= .05, $p$<0.01) amounting to total 25% significant proportion of variance of dietary control (*Adjusted* $R^2$=.23). From the analysis, diabetes self-efficacy ($\beta$= .20, $p$< 0.001), tackling spirit ($\beta$= .13, $p$< 0.05), avoidance ($\beta$= .12, $p$< 0.05) and passive

resignation ($\beta$= .17, $p$< 0.01) were found to be significant predictors for dietary control.

In model 4, after the entry of age, marital status, comorbidity and duration of disease in addition to diabetes self-efficacy, outcome and behavioural expectancies, tackling spirit, avoidance, passive resignation, diabetes integration, the model was significant, $F(11, 284)= 9.24$, $p<0.001$, and the model did not explain additional significant proportion of variance of dietary control (*Adjusted* $R^2$=.24). The results revealed that in model 4 diabetes self-efficacy ($\beta$= .23, $p$< 0.001), avoidance ($\beta$= .13, $p$< 0.05) and passive resignation ($\beta$= .18, $p$< 0.01) were found to be significant predictors for dietary control.

The result highlighted that diabetes self-efficacy was significant predictor for diabetes integration in model 1, diabetes self-efficacy, outcome and behavioural expectancies were significant predictors in model 2, diabetes self-efficacy, tackling spirit, avoidance, passive resignation in model 3 and diabetes self-efficacy, avoidance and passive resignation in final model 4.

**Role of Predictor Variables in Physical Activity of Diabetes Self-management**

The hierarchical multiple regression analysis model was developed in respect to physical activity of diabetes self-management. From Table 5, it was found that diabetes self-efficacy, perceived health competence (outcome and behavioural expectancies), dimensions of diabetes coping measure (tackling spirit and passive resignation), and demographic variables (age, marital status, comorbidity, duration of disease) had significant relationship with physical activity. Weak to moderately strong correlations were found between predictor variables and criterion (physical activity) ranging from $r$=-.12, $p$<0.05 to $r$=.26, $p$<0.01, indicating that the data were suitable

for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of physical activity.

Table 13

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self –efficacy, Perceived Health Competence, Diabetes Coping Measures and Demographic variables (Age, Marital Status, Duration of disease) predicting Physical Activity*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***B*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C=2.41, F= 12.96***)** | .21 | .04*** | | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .21*** | 3.60 |
| **Model 2(C= 1.44, F= 6.87***)** | .26 | .07* | .03* | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .18* | 3.22 |
| Outcome expectancies | | | | .01 | .04 | .02 | .24 |
| Behavioural expectancies | | | | .08 | .04 | .15* | 2.12 |
| **Model 3(C= .01, F=11.49***)** | .41 | .17*** | .10*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .13* | 2.28 |
| Outcome expectancies | | | | -.06 | .04 | -.10 | -1.51 |
| Behavioural Expectancies | | | | -.00 | .04 | -.00 | -.05 |
| Tackling Spirit | | | | .13 | .02 | .33*** | 5.08 |
| Passive Resignation | | | | .08 | .03 | .17** | 2.90 |
| **Model 4(C= .30, F=8.07***)** | .45 | .20* | .03* | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .11 | 1.53 |
| Outcome expectancies | | | | -.08 | .04 | -.13* | -2.12 |
| Behavioural Expectancies | | | | .01 | .04 | .01 | .17 |
| Tackling Spirit | | | | .10 | .03 | .27*** | 4.06 |
| Passive Resignation | | | | .08 | .03 | .18** | 2.93 |
| Age | | | | .01 | .01 | .05 | .72 |
| Marital Status | | | | -.26 | .21 | -.07 | -1.23 |
| Comorbidity | | | | .68 | .20 | .19** | 3.41 |
| Duration of disease | | | | -.04 | .16 | -.02 | -.25 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 13, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (outcome and behavioural expectancies), model 3 (tackling spirit and passive resignation) and model 4 (age, marital status, comorbidity and duration of disease) – in relation to physical activity.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 12.96; $p$<0.001 and explained 4% of significant proportion of variance (*Adjusted* $R^2$= .04) in physical activity. From the analysis, diabetes self-efficacy ($\beta$= .21, $p$< 0.001) was found to be significant predictor for physical activity. After entry of outcome and behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (3, 292) = 6.87; $p$<0.001, and the model explained 3% additional significant proportion of variance ($R^2$*Change*= .00, $p$<0.05) amounting to total 7% significant proportion of variance of physical activity (*Adjusted* $R^2$=.06). From the analysis, diabetes self-efficacy ($\beta$= .18, $p$< 0.05) and behavioural expectancies ($\beta$= .15, $p$< 0.05) were found to be significant predictors for physical activity in model 2.

In model 3, after the entry of tackling spirit and passive resignation in addition to diabetes self-efficacy, outcome and behavioural expectancies, the model was found to be significant, $F$(5, 290)= 11.49, $p$<0.001, and the model explained 10% more significant proportion of variance ($R^2$ *Change*= .10, $p$<0.001) amounting to total 17% significant proportion of variance of physical activity (*Adjusted* $R^2$=.15). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .13, $p$< 0.05), tackling spirit ($\beta$= .33, $p$< 0.001), and passive resignation ($\beta$= .17, $p$< 0.001) were found to be significant predictors for physical activity.

In model 4, age, marital status, comorbidity and duration of disease were entered in addition to diabetes self-efficacy, outcome and behavioural expectancies, tackling spirit and passive resignation, the model was found to be significant, $F$ (9,286) = 8.07; $p$<0.001, and the model explained 3% additional significant proportion of variance ($R^2Change$= .03, $p$<0.05) amounting to total 20% significant proportion of variance of physical activity (*Adjusted* $R^2$=.18). From the analysis, outcome expectancies ($\beta$= -.13, $p$< 0.05), tackling spirit ($\beta$= .27, $p$< 0.001), passive resignation ($\beta$= .18, $p$< 0.01), and comorbidity ($\beta$= .19, $p$=0.01) were found to be significant predictors for physical activity in model 4.

The result highlighted that diabetes self-efficacy was significant predictor for physical activity in model 1, diabetes self-efficacy and behavioural expectancies in model 2, diabetes self-efficacy, tackling spirit and passive resignation in model 3 and lastly outcome expectancies, tackling spirit, passive resignation and comorbidity in model 4.

**Role of Predictor Variables in Health Care Use of Diabetes Self-management**

The hierarchical multiple regression analysis model was developed in respect to health care use of diabetes self-management. From Table 5, it was found that diabetes self-efficacy, perceived health competence (behavioural expectancies), dimensions of diabetes coping measure (tackling spirit and passive resignation), and demographic variables (gender, comorbidity, duration of disease) had significant relationship with health care use. Weak to moderately strong correlations were found between predictor variables and criterion (health care use) ranging from $r$=-.13, $p$<0.05 to $r$=.27, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and

VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be entered into hierarchical multiple regression model in order to identify the predictors of health care use.

Table 14

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self – efficacy, Perceived Health Competence, Diabetes Coping Measures and Demographic variables (Gender, Comorbidity, Duration of disease) predicting Health Care Use*

| **Model and predictor variable** | ***R*** | ***$R^2$*** | ***$\Delta R^2$*** | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1(C=3.70, F= 7.29**)** | .16 | .02** | | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .16** | 2.70 |
| **Model 2(C=3.07, F= 5.71**)** | .19 | .03* | .01* | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .14* | 2.42 |
| Behavioural expectancies | | | | .05 | .03 | .12* | 2.01 |
| **Model 3(C=2.03, F=7.55***)** | .31 | .09*** | .06*** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .12* | 1.99 |
| Behavioural Expectancies | | | | -.02 | .03 | -.04 | -.63 |
| Tackling Spirit | | | | .09 | .02 | .27*** | 4.10 |
| Passive Resignation | | | | .02 | .02 | .06 | .92 |
| **Model 4(C=2.10, F=7.05***)** | .38 | .15** | .06** | | | | |
| Diabetes Self-efficacy | | | | .00 | .00 | .10 | 1.31 |
| Behavioural Expectancies | | | | -.02 | .03 | -.05 | -.71 |
| Tackling Spirit | | | | .08 | .02 | .23** | 3.50 |
| Passive Resignation | | | | .02 | .02 | .04 | .69 |
| Gender | | | | -.37 | .18 | -.12* | -.21 |
| Comorbidity | | | | .66 | .18 | .20*** | 3.61 |
| Duration of disease | | | | .01 | .14 | .00 | .06 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 14, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (behavioural expectancies), model 3 (tackling spirit and passive resignation) and model 4 (gender, comorbidity and duration of disease) – in relation to health care use

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 7.29; $p$<0.01 and explained 2% of significant proportion of variance (*Adjusted* $R^2$= .02) in health care use. From the analysis, diabetes self-efficacy ($\beta$= .16, $p$< 0.01) was found to be significant predictor for health care use. After entry of behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (2, 293) = 5.71; $p$<0.01, and the model explained 1% additional significant proportion of variance ($R^2$*Change*= .01, $p$<0.05) amounting to total 3% significant proportion of variance of health care use (*Adjusted* $R^2$=.08). From the analysis, diabetes self-efficacy ($\beta$= .12, $p$< 0.05) and behavioural expectancies ($\beta$= .27, $p$< 0.001) were found to be significant predictors for health care use in model 2.

In model 3, after the entry of tackling spirit and passive resignation in addition to diabetes self-efficacy and behavioural expectancies, the model was found to be significant, $F$(4, 291)= 7.55, $p$<0.01, and the model explained 6% more significant proportion of variance ($R^2$ *Change*= .06, $p$<0.001) amounting to total 9% significant proportion of variance of health care use (*Adjusted* $R^2$=.08). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .12, $p$< 0.05) and tackling spirit ($\beta$= .27, $p$< 0.001) were found to be significant predictors for health care use.

In model 4, gender, comorbidity and duration of disease were entered in addition to diabetes self-efficacy, behavioural expectancies, tackling spirit and passive

resignation, the model was found to be significant, $F$ (7,288) = 7.05; $p$<0.001, and the model explained 6% additional significant proportion of variance ($R^2Change$= .06, $p$<0.01) amounting to total 15% significant proportion of variance of health care use (*Adjusted* $R^2$=.13). From the analysis, tackling spirit ($\beta$= .23, $p$< 0.01), gender ($\beta$= -.12, $p$< 0.05) and comorbidity ($\beta$= .20, $p$=0.001) were found to be significant predictors for health care use in model 4.

The result highlighted that diabetes self-efficacy was significant predictor for health care use in model 1, diabetes self-efficacy and behavioural expectancies in model 2, diabetes self-efficacy and tackling spirit in model 3 and lastly tackling spirit, gender and comorbidity in model 4.

**Role of Predictor Variables in Overall Diabetes Self-management**

The hierarchical multiple regression analysis model was developed in respect to overall diabetes self-management. From Table 5, it was found that diabetes self-efficacy, perceived health competence (outcome and behavioural expectancies), dimensions of diabetes coping measure (tackling spirit, avoidance, passive resignation, diabetes integration), and demographic variables (age, marital status, comorbidity, duration of disease) had significant relationship with overall diabetes self-management. Weak to moderately strong correlations were found between predictor variables and criterion (overall diabetes self-management) ranging from $r$=-.13, $p$<0.05 to $r$=.54, $p$<0.01, indicating that the data were suitable for examination through multiple linear regression. Tolerance values were found to be above .01 and VIF (variance inflation factor) was found to be below 10 indicating absence of multicollinearity. Therefore, the above mentioned variables were selected to be

entered into hierarchical multiple regression model in order to identify the predictors of overall self-management.

Table 15

*Summary table of Hierarchical Multiple Regression Analysis for Diabetes Self –efficacy, Diabetes Outcome Expectancy, Perceived Health Competence, Diabetes Coping Measures and Demographic variables predicting Overall Diabetes Self-Management*

| **Model and predictor variable** | ***R*** | $R^2$ | $\Delta R^2$ | ***B*** | ***SEB*** | ***β*** | ***t*** |
|---|---|---|---|---|---|---|---|
| **Model 1** | .37 | .13*** | | | | | |
| **(C=15.94,F=45.54***)** | | | | | | | |
| Diabetes Self-efficacy | | | | .02 | .00 | .37*** | 6.75 |
| **Model 2(C=7.90, F=33.73***)** | .51 | .26*** | .13*** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .32*** | 6.21 |
| Outcome Expectancies | | | | .23 | .11 | .13* | 2.07 |
| Behavioural Expectancies | | | | .47 | .11 | .27*** | 4.36 |
| **Model 3(C=.38, F=34.43***)** | .68 | .46*** | .20*** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .23*** | 4.93 |
| Outcome expectancies | | | | -.06 | .10 | -.03 | -.59 |
| Behavioural expectancies | | | | .11 | .10 | .06 | 1.08 |
| Tackling Spirit | | | | .59 | .07 | .46*** | 8.44 |
| Avoidance | | | | .09 | .08 | .05 | 1.09 |
| Passive Resignation | | | | .40 | .08 | .28*** | 4.99 |
| Diabetes Integration | | | | -.07 | .07 | -.06 | -1.02 |
| **Model 4 (C= .63, F=28.09***)** | .72 | .52*** | .06*** | | | | |
| Diabetes Self-efficacy | | | | .01 | .00 | .19*** | 3.53 |
| Outcome expectancies | | | | -.14 | .10 | -.08 | -1.47 |
| Behavioural expectancies | | | | .16 | .10 | .09 | 1.61 |
| Tackling Spirit | | | | .50 | .07 | .39*** | 7.27 |
| Avoidance | | | | .15 | .08 | .09 | 1.86 |
| Passive Resignation | | | | .44 | .08 | .30*** | 5.67 |
| Diabetes Integration | | | | -.12 | .07 | -.10 | -1.74 |
| Age | | | | -.00 | .04 | -.00 | -.12 |
| Marital Status | | | | -.98 | .55 | -.08 | -1.80 |
| Comorbidity | | | | 3.13 | .52 | .26*** | 6.02 |
| Duration | | | | .05 | .42 | .01 | .13 |

*Note*. *C*= Constant, $\Delta R^2$=$R^2$ Change, *B*= Unstandardized beta coefficient, *SEB*= Standardized error of beta, *β*=Standardized beta coefficient. *$p$=<.05; **$p$<.01; ***$p$<.001

From Table 15, it can be seen that significantly correlated predictors were entered hierarchically in four models – model 1 (diabetes self-efficacy), model 2 (outcome and behavioural expectancies), model 3 (tackling spirit, avoidance, passive resignation, diabetes integration) and model 4 (age, marital status, comorbidity, duration of disease) – in relation to overall diabetes self-management.

In the first model of hierarchical multiple regression, one predictor was entered i.e, diabetes self-efficacy. The model 1 was statistically significant $F$ (1, 294) = 45.54; $p$<0.001 and explained 13% of significant proportion of variance (*Adjusted* $R^2$= .13) in overall diabetes self-management. From the analysis, diabetes self-efficacy ($\beta$= .37, $p$< 0.001) was found to be significant predictor for overall diabetes self-management. After entry of outcome and behavioural expectancies in model 2 in addition to diabetes self-efficacy, the model was found to be significant, $F$ (3, 292) = 33.73; $p$<0.001, and the model explained 13% additional significant proportion of variance ($R^2$*Change*= .13, $p$<0.001) amounting to total 26% significant proportion of variance of overall diabetes self-management (*Adjusted* $R^2$=.25). From the analysis, diabetes self-efficacy ($\beta$= .32, $p$< 0.001), outcome expectancies ($\beta$= .13, $p$< 0.05) and behavioural expectancies ($\beta$= .27, $p$< 0.001) were found to be significant predictors for overall diabetes self-management in model 2.

In model 3, after the entry of tackling spirit, avoidance, passive resignation and diabetes integration in addition to diabetes self-efficacy, outcome and behavioural expectancies, the model was found to be significant, $F$ (7, 288)= 34.43, $p$<0.001, and the model explained 20% more significant proportion of variance ($R^2$ *Change*= .20, $p$<0.001) amounting to total 46% significant proportion of variance of overall diabetes self-management (*Adjusted* $R^2$=.44). The results revealed that in model 3 diabetes self- efficacy ($\beta$= .23, $p$< 0.001), tackling spirit ($\beta$= .46, $p$< 0.001) and

passive resignation ($\beta$= .28, $p$< 0.001) were found to be significant predictors for overall diabetes self-management.

In model 4, age, marital status, comorbidity and duration of disease were entered in addition to diabetes self-efficacy, outcome and behavioural expectancies, tackling spirit, avoidance, passive resignation and diabetes integration, the model was found to be significant, $F$ (11 ,284) = 28.09; $p$<0.001, and the model explained 6% additional significant proportion of variance ($R^2$*Change*= .06, $p$<0.001) amounting to total 52% significant proportion of variance of overall diabetes self-management (*Adjusted* $R^2$=.50). From the analysis, diabetes self- efficacy ($\beta$= .19, $p$< 0.001), tackling spirit ($\beta$= .39, $p$< 0.001), passive resignation ($\beta$= .30, $p$< 0.001) and comorbidity ($\beta$= .26, $p$< 0.001) were found to be significant predictors for overall diabetes self-management.

The result highlighted that diabetes self-efficacy was significant predictor for overall diabetes self-management in model 1, diabetes self-efficacy, outcome and behavioural expectancies in model 2, diabetes self-efficacy, tackling spirit and passive resignation in model 3 and lastly diabetes self-efficacy, tackling spirit, passive resignation and comorbidity in model 4.

**Phase II: Qualitative Data Analysis**

**Coping strategies of Type 2 Diabetes Patients**

In phase II of the study, qualitative research framework was utilized to investigate the coping strategies employed by type 2 diabetes patients in order to grapple with the disease and its consequences. Interpretative phenomenological analysis was followed and thematic analysis was adopted for analysis of the qualitative data. Semi-structured, in-depth interview was used to collect data in this

phase. This provides a scope for the researcher to explore ample amount of information from the patients on their coping strategies. Patients described a wide range of coping strategies in dealing with their disease and these strategies were grouped into two domains- productive and unproductive coping. The study followed Hariharan and Rath's (2008) classification of coping strategies where productive and unproductive coping were categorized on the criteria of outcome. Those strategies that helped in diabetes management were considered productive coping whereas the strategies which did not provide beneficial outcome in diabetes management were regarded unproductive coping.

The purpose of the qualitative study was to expand the current understanding of the types of coping strategies among type 2 diabetes patients. Identifying the appropriate and helpful coping strategies is the essence of diabetes control (Gafvels & Wandell, 2006) and act as an antidote to feeling helpless.

**Participants' Characteristics**

Table 16 lists the characteristics of the participants. The identities of the participants were held confidential and pseudonyms were used.

During the administration of questionnaire for quantitative data, participants were asked whether they would agree to participate in the second phase of the study. As a result of which 32 participants agreed to participate for the interview session. Out of these 32 participants, 15 participants (5 from each group) were randomly selected on the basis of their duration of disease. However, four participants did not turn up for the interview. Finally a total of 11 participants (6 men and 5 women) with the age group of 39-68 years, diagnosed with type 2 diabetes were interviewed to explore the objective of phase 2 of the study. Duration of disease was categorised into

three groups- group 1 consists of those participants whose duration of disease is below 5 years; group 2 consisted of those between 5 to 10 years and group 3 consisted of those who suffered from the disease for more than 10 years. Both group I and III had four participants each where as group III had only three participants. The duration of the disease among the participants varied from three years to twenty five years.

All participants except one were married. The participants reported comorbid conditions like high blood pressure, thyroid, asthma, and parkinson's disease. Oral medication was strictly followed by all the participants and insulin injection was taken by two of the participants. A total of five coping strategies were reported in relation to their diabetes care.

Table 16

*Demographic Characteristics of Participants* (*N=11*)

| S.No | Participants Pseudonyms | Gender | Age | Marital Status | Duration of disease | Comorbidity | Insulin Intake |
|---|---|---|---|---|---|---|---|
| 1 | Mr A | Men | 68 | Married | 25 years | High blood pressure | Yes |
| 2 | Mr B | Men | 66 | Married | 25 years | Asthma | Yes |
| 3 | Mrs C | Women | 60 | Married | 20 years | Thyroid | No |
| 4 | Mrs D | Women | 64 | Married | 15 years | Parkinson's disease | Yes |
| 5 | Mr E | Men | 58 | Married | 10 years | None | No |
| 6 | Mrs F | Women | 55 | Married | 10 years | Thyroid | No |
| 7 | Mrs G | Women | 49 | Married | 10 years | High blood pressure | No |
| 8 | Mr H | Men | 52 | Married | 8 years | None | No |
| 9 | Mr I | Men | 44 | Married | 5 years | None | No |
| 10 | Mr J | Men | 42 | Married | 5 years | None | No |
| 11 | Ms K | Women | 34 | Single | 3 years | Thyroid | No |

**Analysis**

After completion of interviews, the data collected were transcribed and each transcript was individually analysed. The analysis process involved listening and reading each account several times for familiarity and significant notes were documented. The notes included summarization of the content given by the participants and comments on contradictions, non-verbal behaviours and researcher's observation. After transcripts were re-read several times, relevant preliminary codes which described the content were identified. These codes were then examined and collated to identify the appropriate sub- themes that accurately depict the participant's response. These sub-themes were reviewed and similar sub-themes were clustered together in order to form logical, refined themes. And finally apposite coping strategies were generated for each theme. These coping strategies were then categorised as productive and unproductive coping as presented in table 17. The accuracy of themes was checked by comparing them with the transcripts. Researcher made sure that all the significant areas of data were included in the themes. Experienced qualitative researcher was consulted throughout the course of analysis.

Several themes were identified during the process of analysis. However, some themes which were irrelevant or did not fit well to the research questions (productive coping and unproductive coping) were dropped. The coping strategies, themes and its respective sub-themes along with the excerpts which emerged from the data are seen in table 17.

Table 17
*Coping strategies, Themes and their Sub-themes with excerpts from the interview*

| Coping Strategy | Themes | Sub-themes | Excerpt | Productive (✓) Unproductive (✖) |
|---|---|---|---|---|
| Planful problem solving | Engagement in glycemic management | Adherence to medical regimen | "....taking medicines on time and regularly, that helps me a lot. I can almost say I'm ready to take medicines to stay fit" | ✓ |
| | | Adherence to physical activities | "As it is said exercising is good for diabetics, i go for a morning walk as much as i can... i also keep myself busy with household chores in order to avoid being inactive" | ✓ |
| | | Adherence to healthy diet | "...i figured that controlling my diet (like eating roti) actually has an effect on diabetes, so i try my level best to eat those which are considered healthy" | ✓ |
| | | Regular monitoring of glucose level | "I keep monitoring my blood sugar levels through accu-check...when it spikes i usually consult my doctor or call my sister's husband who is a doctor" | ✓ |
| | | Effective use of time | "being a working mother, i have a tight schedule, yet i make time for my exercise as much as i can... to the extent of walking home from office sometimes" | ✓ |

| Coping Strategy | Themes | Sub-themes | Excerpt | Productive (✓) Unproductive(✖) |
|---|---|---|---|---|
| | Seeking information | Use of technological based information | "I use internet to check about various ways to control sugar and check what food can be eaten in order to take care of my condition" | ✓ |
| | | Consult physician | "....any minor changes with my health i bring it to the notice of my physician in order to avoid worsening of my problem" | ✓ |
| Seeking social support | Social Support | Family involvement | "My family extends support in adjusting with my food habits and reminds me for my medicines" | ✓ |
| | | Facilitation by friends | "...in order to help me with my diabetic condition, my friends would look out food/ drinks that is suitable for me ...." | ✓ |
| | Shifting responsibility | Over dependence on family | "Since i am very busy, i generally missed out on my medicines if my family doesn't remind me...My wife does the cooking. She knows what i am supposed to eat and what not to eat" | ✖ |
| Shifting burden on supernatural power | Dependence on higher power | Transferring to God | "... everything is under His (God) will so whatever i do will not change it so i have left it on Him (God)..... ultimately he is responsible for my good health " | ✖ |

| Coping Strategy | Themes | Sub-themes | Excerpt | Productive(✓) Unproductive(✖) |
|---|---|---|---|---|
| | | Reliance on God | "...as it is, it is genetic disposition and i can only do so much... i believe that whatever happens to my life happens for a reason and God knows it all. As the song goes 'i just take it to the Lord in prayer' " | ✖ |
| Distancing | Non-seriousness | Neglecting check-up and taking medicines | "See my condition is not that bad as of now....skipping check-up and missing few medicines will not be very harmful" | ✖ |
| | | Non-acceptance of severity of the disease | "my (diabetic) condition is not that severe because it has only been few years now... I do not have to take care as much as many people does " | ✖ |
| | Complacence | Self-attribution | "sometimes i fall short of taking care of myself like my medicines and my diet, that is when i usually face problems (diabetes-related problems- fatigue and tingling feelings)" | ✖ |
| Escape-Avoidance | Withdrawal | Intermittent usage | "....several times i stop taking some medicines when they left me feel nauseated or uncomfortable inside" | ✖ |

**Productive coping to type 2 diabetes**

Some studies have highlighted the significance of productive coping strategies in enhancing diabetes care (Frydenberg & Lewis, 2009). Analysis of qualitative data identified two coping strategies as productive coping – planful problem solving and seeking social support. The identified themes and sub-themes under these coping strategies are discussed below:

**I. Planful problem solving**

The themes and their subsequent sub-themes which were identified under this coping strategy are as follows:

***A) Engaging in glycemic management***

Diabetes care among diabetes patients are highly influenced by their engagement in glucose management activities. Participants' approaches to manage their glucose level were divided into different sub-themes as listed below:

*i) Adherence to medical regimen*

Most of the participants considered taking prescribed medicines regularly is of utmost importance when one has diabetes, and helps in avoiding further complications. They reported that following medical regimen strictly as prescribed by the doctor essentially showed positive results in their glucose level. This is clearly seen in one of the excerpts taken from participants,

*"....taking medicines on time and regularly, that help me a lot. I can almost say I'm ready to take medicines to stay fit"*

*ii) Adherence to physical activities*

Participants recognized the importance of physical activities to maintain desired blood sugar level. Some of them even recommended that one should take exercise for overall health benefits. They adopted and maintained physical activities such as taking exercises, going for a walk, etc for management of glucose level. To reduce sedentary lifestyle or behaviour, few had gone to the extent of engaging themselves in household chores. Excerpt from one of the participants,

*"As it is said exercising is good for diabetics, i go for a morning walk as much as i can... i also keep myself busy with household chores in order to avoid being inactive"*

*iii) Adherence to healthy diet*

Overall, participants understood that following a healthy diet regimen is mandatory to healthy lifestyle. Making changes in their daily food intake was 'challenging initially' for many of the participants. Some of the participants did consume their choice of food occasionally in small quantity while some of them completely adhered to diet which they considered healthy and had positive outcome. One participant remarked,

*"...i figured/experienced that controlling my diet (like eating roti) actually has an effect on diabetes, so i try my level best to eat those which are considered healthy"*

*iv) Regular monitoring of glucose level*

Few participants expressed the importance of testing their blood sugar level and medical check-up on a regular basis. They believed that checking their glucose level frequently and consulting doctor regularly would reduce diabetes-related problems and

other complications. Some of them upheld these practices by keeping accu-check at home and contacting their family-doctor through telephone as can be seen as follow,

*"I keep monitoring my blood sugar levels through accu-check...when it spikes i usually consult my doctor or call my sister's husband who is a doctor"*

*"i believed i avoided so much of (diabetes-related)complications by simply keeping a check of my sugar level....i immediately seek for remedy if its above normal"*

*v) Effective use of time*

Despite their busy schedule, few participants reported the effort given to accommodate diabetes-control activities such as exercising and taking medicine promptly. Some of them kept daily schedule time for blood testing, taking medication and doctor-visit. One working lady explained her experience as follows,

*"being a working mother, i have a tight schedule yet i make time for my exercise as much as i can... to the extent of walking home from office sometimes"*

***B) Seeking information***

Patients' ability/behaviour to seek diabetes-related information plays a major role in managing diabetes. Utilization of these resources gathered enables one to cope with the illness more effectively by positively influencing their health management activities.

*i) Use of technological based information*

All the participants in this study believed that listening to and reading about diabetes-related information is essential in diabetes care. Participants reported of getting information through print and electronic media that they were unable to receive from the physicians. They found such information useful for their diabetes treatment/care ,

*"i use internet to check about various ways to control sugar and check what food can be eaten in order to take care of my condition"*

*ii) Consultation with physician*

Some of the participants reported that frequent consultation with their doctors whenever they experienced changes in their health status kept them at ease. Few participants said that they consulted the doctors mainly with regards to diet and the potential problems that accompany the disease. They believed that this practice helped them in avoiding further complications. Excerpt from the participant explained this theme,

*"....any minor changes with my health i bring it to the notice of my physician in order to avoid worsening of my problem"*

**II. Seeking Social Support**

The study identified one theme and two sub-themes under this coping strategy.

***Social Support***

Numerous studies have highlighted positive relationship between social support and diabetes control. Participants expressed that support from family and peers help diabetes patients to follow their diabetes care regimen actively even in times of social, physical and economic issues.

*i) Facilitation by family*

Seeking support from family members is possibly the most crucial component of support for diabetes control and management. Participants explained that family support provided them practical help and "the presence of their spouse or kid alone could buffer their stresses". In many instances participants requested family members to avoid

unhealthy diet and family rendered support by restricting themselves from cooking/eating food which was not suitable for diabetes patients. One participant remarked,

*"I asked my wife to avoid making dishes and food that are not suitable for my sugar level"*

*ii) Facilitation by friend(s)*

Seeking support facilitated by peers is considered another viable option for patients with diabetes. Some participants reported that they received the support from close friends on their request to accompany them for physical exercise and check-up. Such support helped in emotional upliftment and complemented the parental/family support. Simple gestures like showing solidarity (not eating sweets/chocolates when they are around), accompany them for their medical check-up etc, served as an essential source of support for diabetes patients. One lady expressed her gratitude,

*"I requested my friend to come along whenever i go for check-up.... sometime even for my work-out session"*

**Unproductive coping to type 2 diabetes**

Coping strategies that avoid confrontation of major problems and indirectly reduce emotional tensions are considered unproductive coping. Sense of helplessness in dealing with the main stressor or depending on external sources to alleviate stress was reflected in unproductive coping. Qualitative data analysis identified five coping strategies as unproductive coping- seeking social support, shifting burden on supernatural power, distancing and escape avoidance. The themes and sub-themes under these coping strategies are discussed below:

**I. Shifting burden on supernatural power**

The theme and its subsequent sub-themes which were identified under this coping strategy are as follows:

***Dependence on external power***

Turning problems over to God can act as a relief from distress in many circumstances. Reading religious scripts and praying may temporarily help patients by giving them emotional peace. But in the long run, these types of strategies may found to be unproductive to manage diabetes. Some of the sub-themes under this theme are:

*i) Transferring responsibility to God*

Participants told that their relationship with God or supreme power was the fundamental source in managing their illness (diabetes). Participants reported that praying and reading biblical texts put them at ease. One of the participants remarked that though his trust in God might not be a cure but his hope in him (God) facilitated in handling his illness. Excerpt from the same participant,

*"....everything is under His (God) will so whatever i do will not change it so i have left it on Him (God). I take care of my health but ultimately he is responsible for my good health"*

*ii) Reliance on God*

All the participants reported that their religious engagement (prayers) gave them spiritual upliftment thereby providing them positive attitude which helped them to look forward. Some of them told that although it might not directly affect their blood glucose level, they still considered it an important aspect of diabetes management as it enabled one to cope with diabetes-related stress. One participant described,

*"...as it is, it is genetic disposition and i can only do so much... i believe that whatever happens to my life happens for a reason and God knows it all. As the song goes i just take it to the Lord in prayer"*

**II. Distancing**

The theme and its subsequent sub-themes which were identified under this coping strategy are as follows:

***Non-seriousness***

Treating one condition as not serious or having casual attitude towards diabetes can exacerbates the condition. Participants tend to avoid important diabetes management activities because of negligibility thereby creating further diabetes-related complications.

*i) Neglecting check-up and medical regimen*

It was seen that some of the participants considered their illness as less severe. Hence not following strict diet and not taking medicine regularly was tolerable. They cited their busy schedule as one of the reasons for irregular check-up and medication regimen. Excerpt from one of the participants,

*"See my condition is not that bad, as of now...skipping check-up and missing few medicines will not be very harmful"*

*ii) Non-acceptance of the severity of disease*

Especially those participants whose duration of illness was less than 5 years reported that use of this coping strategy. One of the participants reported that since she considered her condition as easily manageable and not serious, she failed to follow diabetes regimen dutifully. Another participant cited,

*"my (diabetic) condition is not that severe because it has only been few years... I do not have to take care as much as others do"*

***Complacence***

In many instances, people take responsibility for their own actions and blame themselves for the occurrence of their stressors. Many of them employ this behavioural self-blame strategy as a way of coping with diabetes where they blame themselves yet they repeatedly perform the same actions/behaviours that is risky for their condition.

***i)*** *Self-attribution*

Participants accepted that many diabetes-related issues that they faced were caused by their own actions/behaviours. Participants blamed themselves regarding the consequences (frequent urination, unquenchable thirst, fatigue, tingling feelings on palms and feet etc) of their disease. One participant remarked,

*"sometimes i fall short of taking care of myself..sometimes i missed taking medicines or neglect my diet, that is when i usually face problems (diabetes-related problems-fatigue and tingling feelings)"*

**III. Escape Avoidance**

The theme and its subsequent sub-themes which were identified under this coping strategy are as follows:

***Withdrawal***

Studies have shown that participants who employed withdrawal as coping strategy are at a higher risk for poor glycemic control. Participants' remark for employing this strategy can be seen in the following.

***i) Intermittent usage***

Some participants reported of discontinuation of taking medicine, the moment they felt fit and healthy. One participant reported that the side effects of diabetes medicine had led her to halt or discontinue medical regime. The excerpt of participant is as follow,

*"...several times i stop taking some medicines when they left me feel nauseated or uncomfortable inside"*

**IV. Seeking Social Support**

The theme and its subsequent sub-themes which were identified under this coping strategy are as follows:

***Shifting responsibility***

Even though social support can be an important factor for diabetes care and management, complete dependence on others for care and support with regards to diabetes management can be detrimental for the patients. When there is indiscriminate, excessive use of seeking social support is counterproductive and results in negative consequences in healthcare practices.

*i) Over-dependence on family*

Sometimes participants entirely depend on their family for diabetes care activities. Some participants reported that they would forget their visit to doctors and take their medicines if they were not reminded by their spouses or kids. One participant said that he put his trust in his wife pertaining to diabetes care, his excerpt as follow,

*"Since i am very busy, i generally missed out on my medicines if my family doesn't remind me...I told my wife to keep track of my food intake and medical regimen. She knows about my diabetes care more than me"*

In conclusion, it was seen that type 2 diabetes patients engaged themselves in different coping strategies to deal with their condition- some effectively dealt with the disease and others passively dealt with the condition. In order to live a healthy dynamic life, patients need to employ productive coping such as planful problem solving and seeking social support. On the other hand, unproductive coping should be avoided to efficiently manage the challenges of type 2 diabetes.

**Investigator's Report**

To pursue all avenues of inquiry considered under this study, the researcher set out with curiosity and interest. The study involved getting permissions from clinics and hospitals and collecting data accordingly. The responses received from the concerned authorities, doctors and patients were warming and accommodating. Above all, the patients' readiness to enthusiastically participate in the study was gratifying. Their positive feedback on the study was motivating. Their reiteration on the significance of the study, considering the prevalence of type 2 diabetes in Mizoram was encouraging. Bearing in mind the importance of psychological factors in managing type 2 diabetes, participants reported that awareness and measures to enhance diabetes management psychologically are limited. Hence, the current study was appreciated for taking initiative in this area.

Throughout the data collection, the staffs and receptionists were obliging and supportive in helping the researcher to carry out the work efficiently. The doctors were cooperative enough to inform their patients about the significance of the research and request them to participate in the study. Participants' attitude towards the researcher varied- while most of them were welcoming, few were quiet hesitant and even declined to

participate in the study and some dropped out because of time-constraint. Many participants showed interest in the research after the main purpose of the study was briefed. They were keen to know the outcome of the study as they believed that would benefit them to a large extent. Different trends were noticed with regards to filling up of questionnaires, while some of them took time and introspect to give truthful responses, some seemed hesitant to respond few questions and even left unanswered, and few others casually responded without being honest. Fortunately, the participants selected for the interview sessions were extremely cooperative, as a result of which the researcher was able to gather insightful information for the study. It was noticed that the participants were honest and open about their struggle with type 2 diabetes. While some of them had casual attitude coping with the disease, for others it was a daily burden living with the condition. It was observed that for the most part, patients with long duration of diabetes disease followed management activities better and coped well with the disease as compared to those with shorter duration. The participants expressed their gratitude for gaining information about diabetes care through the conversation and wished well for the researcher.

In retrospect, interaction with the participants had given an immense knowledge to the researcher which sharpened her research skills. The researcher also gained valuable hands-on experience of administering psychological scales and interviewing participants. The overall experience of the study was enjoyable and educative and the positive feedbacks from participants were encouraging.

# CHAPTER V

# DISCUSSION

The primary aim of the study was to find out the difference in the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type II diabetes patients categorized on the basis of duration of disease. Secondly, it was aimed to find out the relationship between self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness of Type2 diabetes patients. Thirdly, it was aimed to assess the role of self-efficacy, outcome expectancy, and perceived health competence in coping of Type2 diabetes patients. Fourthly, it was aimed to assess the role of self-efficacy, outcome expectancy, perceived health competence, and coping in self management of illness of Type2 diabetes patients. Lastly, it was aimed to explore the lived experiences of Type 2 diabetes patients regarding their coping strategies to diabetes.

The first hypothesis posited that there would be a difference in the level of self-efficacy, outcome expectancy, perceived health competence, coping and self-management of illness among three groups of Type 2 diabetes patients categorized on the basis of duration of disease. This hypothesis was accepted as the results showed a difference in the level of the above mentioned variables with increased in duration of the disease. From the results it was seen that there existed a difference in the level of self-efficacy, diabetes coping and its dimensions and diabetes self-management and its dimensions among these three groups. However, no difference was found in the level of outcome expectancy and perceived health competencies among the three groups.

Results found significant differences between the three groups on diabetes self-efficacy and duration of disease had a large effect on diabetes self-efficacy of the patients. This indicates that increase in duration of disease conceivably brings about a change in the patients' diabetes self-efficacy. Further analysis showed significant differences between the three groups. It was seen that group I (Below 5 years) had lower diabetes self-efficacy than group II (5-10 years) and group III (Above 10 years) had the highest diabetes self-efficacy which implied that those with longer duration of disease had higher diabetes self-efficacy.

The increased diabetes self-efficacy as duration increased may be attributed to increased knowledge and management pattern. As the duration of disease increased, patients' knowledge regarding diabetes care also increased which inturn improved their diabetes self-efficacy. Patients become more aware of the pattern of personal care and what is best for them as they go about with their diabetic care regimen which makes them more confident in carrying out the regimens. Therefore the greater the duration, the greater is their knowledge and their self-efficacy. Secondly, patients who have longer duration of diabetes have higher diabetes self-efficacy possibly as a result of management pattern. Management essentially becomes a part of patients' life as duration of disease advances. Management, which is one of the most important components of diabetes treatment, plays a pivotal role in increasing diabetes self-efficacy and vice versa. Successful management of diabetes brings about confidence in one's ability to manage the disease. At the same time as the individuals become more efficacious, they tend to dutifully engage in necessary task, which in this case is carrying out diabetes regimens. This precisely implies that longer duration of disease has impacted diabetes management

positively and consequently leads to higher self-efficacy. Additionally, self-efficacy continues to occur throughout a person's life as one experience and learn to develop into complex human being (Shortridge-Baggett, 2002). Hence, in most cases, it is assumed that people tend to have higher self-efficacy as they grow older. Therefore, the results indicated, as the duration of disease increased (parallelly with age) there was an increase in diabetes self-efficacy.

Significant difference was not observed between the three groups on diabetes outcome expectancy as well as perceived health competence. This implies that duration of disease seems to have no effect on diabetes outcome expectancy and perceived health competence. Once diagnosed, patients perceived their outcome expectancies and health competence in the same manner irrespective of the number of years they have been living with the condition.

The three groups differed significantly in their diabetes coping, where duration of disease had large effect on overall diabetes coping level of the patients. Results showed that as duration of disease increased, there was an increase in coping level of the patients with group I having the lowest mean and group III with highest mean. Further analysis showed that group I (below 5 years) had significantly lower overall diabetes coping compared to group II (5 to 10 years) and group III (above 10 years). However, there was no significant between group II and group III in their overall diabetes coping. This indicated that duration of disease plays a considerable role in increasing patients' diabetes coping level.

On the tackling spirit dimension of coping, the groups were found to differ significantly and duration of disease had small effect on tackling spirit. It was found that patients belonging to group II (5 to 10 years) had better tackling spirit coping level compared to group I (below 5 years) and group III (above 10 years). In this dimension, group II were found to employ tackling spirit better than group I and group III. Statistical significant difference was however not found between group I and group III.

Results also indicated that significant difference was found between the three groups on the dimension of avoidance coping, where duration of disease was found to have small effect size on avoidance coping. The findings showed that group III (above 10 years) had significantly higher avoidance coping in comparison with group I (below 5 years) and group II (5-10 years). However, no significant difference was found between group I and group II in avoidance coping.

On the dimension of passive resignation, significant difference was observed between the three groups, where duration of disease had large effect on diabetes coping level. It was found that patients belonging to group I (below 5 years) had significantly lower passive resignation coping than those who are in group II (5-10 years) and group III (above 10 years). However group II and group III did not differ significantly in their passive resignation coping.

A significant difference was found among the three groups on the dimension of diabetes integration, where duration of disease had small effect size on diabetes integration. A significantly low diabetes integration coping was found in patients belonging to group I (below 5 years) compared with group III (above 10 years).

However, group I and group II as well as group II and group III did not differ significantly in their diabetes integration coping.

Dealing with diabetes can be quite challenging and difficult at times. When people are diagnosed with diabetes, they realise that the condition will accompany them for the rest of their life. Fundamentally, coping with diabetes becomes a part of one's life. In order to remain healthy and sound, a person usually develops a wide range of coping skills and techniques which encompass carrying out activities to control diabetes and determine ways to cater the emotional needs to endure with the condition. In due course, patients tend to get familiar with the coping process and this enables them to attain effortless coping skills and techniques as they persist with the diabetes care. Therefore, as results suggested, as the duration of disease increased, patients had better overall diabetes coping. A study among chronic illness patients reported higher used of adaptive coping strategies among patients with longer duration of disease (Brown, Brown & Jason, 2010).

As mentioned earlier, when the duration of disease increases, a person becomes more attune to his/her body. This in turn enhances his/her knowledge and awareness on how to deal with the condition which eventually leads to better coping. The findings of the study showed that group III patients had the highest score in dimension of passive resignation and diabetes integration whereas group I patients had the lowest score. This may be attributed to patients' adaptability and active participation in controlling diabetes. The study by Whittemore et al., (2010) among type 1 diabetes patients found that duration of disease had an impact on patient's adaptation to illness. Another study also found that with the progression of duration of disease, patients actively participated to better their condition (Brown, Brown & Jason, 2010). Interestingly, results also showed

that longer duration of disease did not necessarily result in better coping level in the dimension of tackling spirit. Group II had higher mean than group I and group III in this dimension. This may be due to the fact that when a person is initially diagnosed or been diagnosed with the disease for a longer period, failure to accept or frustration with the condition may results in manifestation of casual attitude towards diabetes coping (DCHS, 2012; American Psychological Association, 2019). Hence, as result suggested group II showed better interest and sincerity than group I and group III in coping with the condition effectively.

Statistical significant difference was seen between the three groups in overall and two dimensions of diabetes self-management, namely glucose management and physical activity. It was found that duration of disease had large effect on overall diabetes self-management of the patients. Further analysis showed that group II (5 to 10 years) had higher overall diabetes self-management compared with group I (below 5 years) and group III (above 10 years). However, no significant difference was found between group I and group III.

A significant difference was found among the three groups on the dimension of glucose management, where duration of disease had medium effect size on glucose management. There was a significantly low glucose management among patients belonging to group I (below 5 years) when compared with group II (5 to 10 years) and group III while group II (5 to 10 years) and group III (above 10 years) had equal means. Significant difference was not observed between patients belonging to group I and group III in their glucose management.

On the dimension of physical activity the three groups differed significantly in their management of physical activity, where duration of disease had a medium effect on their physical activity management. It was found that patients belonging to group I (below 5 years) had lower physical activity management than those in group II (5 to 10 years). However, no difference was found between group I and group III as well as group II and group III in physical activity management. Significant difference among the three groups was not seen in the dimension of dietary control and health care use.

For any given diabetes patient, self-management is an imperative component for preventing and controlling blood glucose levels. In addition, diabetes self-management helps in prevention of diabetes complications and improves the glycemic status of the patients. However, initial diagnosis of the disease can come as a shock and leaves an individual resistant to change, which is one of the most crucial elements for self-management. On the contrary, patients who have longer duration of disease seem to perform self-management effortlessly yet effectively. Evidently, as the results suggested, duration of disease contributed a considerable role in overall diabetes self-management, glucose management and physical activity management where patients with longer duration of disease tends to be more active in carrying out these self-management activities. Similar findings reported better experience among patients with greater duration of diabetes with regards to living with diabetes which resulted in improved diabetes self-management (Alrahbi, 2014; Chelli, 2018). Living with diabetes for a longer period of time also enables an individual to confidently self-manage his/her condition when compared with patients who have shorter duration of diabetes. Patients with longer duration of diabetes had better self-management due to their adaptability level that they

acquired over time (Xu, Pan & Liu, 2010; Mc Cleary- Jones, 2011). Another possible explanation of increased management with increased duration of diabetes could be that those patients belonging to group I were comparatively younger as compared to group II and group III. Studies showed that young patients, in general, were generally busy engaging themselves in several activities like careers and other social activities which gave them limited time for their diabetes self-management (Huang, Zhao, Li & Jiang, 2014). The results also found that there were no significant difference between the three groups in dietary control and health care use management. This could be attributed to sharing certain commonalities in executing dietary control and health care use. The patients belonging to the three groups perform these two practices in the same manner and therefore do not provide sufficient variation that can produce significant difference in their dietary control and health care use management.

The second hypothesis posited that there would be a relationship between diabetes self-efficacy, diabetes outcome expectancy, perceived health competence, coping and self-management of illness, for which Pearson's product moment correlation (*r*) was calculated. The second hypothesis was accepted as the results showed significant relationship among the variables. Demographic variables of age, gender, marital status, comorbidity and duration of disease were also included in the analysis. It was found that as age increased, diabetes self-efficacy, perceived health competence, diabetes coping and diabetes self-management increased. Age of the patient was found to have no relationship with outcome expectancy. It was already mentioned that as age increased, self-efficacy is enhanced (Shortridge-Baggett, 2002). In many circumstances, individual's belief in their capability to achieve certain goals lead to better perceived

health competence. Moreover, as people grow older, they become more concerned about their health issues which consequently lead to improved coping and self-management.

Gender was found to be correlated with passive resignation and health care use. Women were found to have better health care use whereas men showed higher score in passive resignation which implied that they are more active in coping. Being the breadwinner of the family, men are more concerned about their work; hence neglect visiting doctors and other health physicians. This finding is in concordance with a study by Sherman, Schiffman and Mathur (2001) which reported that women visited their doctors more frequently than men and were conditioned to carry out medical check-ups for health preventive care. Men, on the other hand, utilized active coping strategies than women. Another reason could be attributed to Cannon's (1932) flight and fight response to stress postulated that men are more likely to encounter threats while the opposite happens in case of women. This indicates that there is a biological basis for gender difference in coping where men are more active in attempting to change the circumstance/stressor generated by diabetes.

The demographic variable of marital status was found to be correlated with other variables of the study. Married patients were found to have higher diabetes self-efficacy, perceived health competence, tackling spirit coping, diabetes integration coping, overall diabetes coping, dietary control management, physical activity management, health care use management and overall diabetes self-management. This might be the fact that patients living with spouses receive more support which enhances their diabetes self-efficacy and perceived health competence. This is in concordance with the result of study by Gunggu, Thon and Whye Lian, (2016) where support from spouses enhanced self-

efficacy. Rosland et al., (2010) reported that active involvement of spouses among chronic illness showed higher self-efficacy and management. Married patients were found to have better diabetes self-management compared with patients who were single, divorced or widowed (Gunggu, Thon & Whye Lian, 2016). Brigham Young University (2019) studies found that chronic illness patients with spouses coped better with their disease as they received constant tangible and intangible support from their respective spouses.

The demographic variable of comorbidity was found to correlate with other variables under study. It was found that patients with comorbid conditions had better outcome expectancies, tackling spirit coping, overall diabetes coping and diabetes self-management. This may be attributed to the reason that many diabetes patients with comorbid conditions are found to have more complications and other health related issues. In order to avoid these problems and other disease- related issues, patients with comorbid conditions tend to go extra mile to cope and manage the disease which might have resulted in better outcome expectation. Liddy, Blazkho and Mill (2014) found a bi-directional relationship between patients with multiple chronic conditions and self-management and coping. They found that patients who lived with multiple chronic conditions showed enhanced self-management and coping. At the same time improved self-management and coping were higher among these patients in an attempt to avoid further medical complications.

Duration of disease was found to have correlations with some of the variables in the study. It was found as duration of disease increased, patients showed high level of diabetes self-efficacy, coping and self-management. With the increase in duration of

diabetes, patients are more inclined to carry out the treatment regimens confidently which subsequently helped them to cope and manage their condition better. Several studies have illuminated the relationship between duration of disease and diabetes self-efficacy (Grønning, Bratås & Steinsbekk, 2016), diabetes coping (Brown, Brown & Jason, 2010) and diabetes self-management (Mc Cleary-Jones, 2011).

Diabetes self-efficacy significantly correlated with diabetes outcome expectancy and one of the dimensions of perceived health competence. Those with high diabetes self-efficacy had better diabetes outcome expectancy as well as general outcome expectancies. Possible reason could be that these two variables being part of Social Cognitive Theory are highly associated with each other where change in one automatically leads to change in the other. In terms of following regimen, self-efficacy is the belief about one's ability to successfully executing the required behaviours and outcome expectancy refers to the belief in these behaviours for specific outcome. Therefore, low/high self-efficacy results in low/high outcome expectancy accordingly. This result is accordance with the study done by Brown et al. (2014). In addition, an increased in diabetes self-efficacy seemed to increase patients' diabetes self-management such as physical activity management, glucose management, health care use, dietary control management as well as overall diabetes self-management. Results show that increased in diabetes self-efficacy also led to increase in avoidance coping, passive resignation coping, diabetes integration coping and overall diabetes coping. When patients successfully execute required behaviours, reaching the goals act as positive feedback and motivate them in performing coping strategies and management activities dutifully. Several other studies reported the direct relationship between self-efficacy with

coping (Jensen, Turner & Romano, 1991) and management (August, Kelly & Abbamonte, 2015; Padhy, Krishnakumar, Chelli & Lalnuntluangi, 2017).

The variable diabetes outcome expectancy was found to correlate only with diabetes coping and its dimension (avoidance coping). The results indicated that increased outcome expectancy is correlated with better diabetes coping. This might be attributed to the fact that patients' belief on the consequence of their behaviour have a huge impact on their coping level. High score in outcome expectancy yields better diabetes coping and the opposite holds true in case of low outcome expectancy. Many studies also highlighted the significance of outcome expectancy on chronic illness coping (Lin & Ward, 1996; Bene, 2015)

Results found that perceived health competence was interrelated with all the dimensions as well as overall diabetes coping and diabetes self-management. The dimension of behavioural expectancies was found to be positively correlated with all the dimensions of diabetes coping except avoidance coping and correlated with all the dimensions of diabetes self-management except for health care use management. Diabetes treatment or control encompasses patients' involvement for behavioural changes. A patient's positive anticipation in the outcome results in better diabetes coping and diabetes self-management. When people perceive the outcome to be positive they try to cope and manage their illness better. The findings showed a positive relationship between outcome expectancies and all dimensions of diabetes coping and diabetes self-management. As discussed earlier, outcome expectancies was another important factor that motivated patient to develop better coping (Bene, 2015) and self-management (Zebracki & Drotar, 2004).

Finally significant positive correlation was observed between diabetes coping and its four dimensions with diabetes self-management. Tacking spirit coping and passive resignation coping have positive relationship with all the dimensions and overall of diabetes self-management. However avoidance coping and diabetes integration coping seemed to have positive correlation only with dimensions of glucose management and dietary control management. The overall diabetes coping showed significant relationship with all the dimensions of diabetes self-management which indicated that, for the most part, increase in coping resulted in increased self-management of the patients. Healthy coping is fundamental to successful self-management among diabetes patients (Kent et al., 2010). Coping facilitates diabetes management by enabling people to be more adaptive and flexible in carrying out rigorous activities demanded by diabetes care. A study on type 2 diabetes patients found that use of appropriate coping strategies resulted in better self-management (Shayeghian et al., 2016)

**Predictors of Overall Diabetes Coping Measures and its dimensions**

The third hypothesis stated that self-efficacy, outcome expectancy, perceived health competence would play a role in coping of type 2 diabetes patients. This hypothesis was accepted as the results showed the impact of mentioned variables on diabetes coping.

***Predictors of Overall diabetes coping measures***

From the results it was seen that there existed a relationship between overall diabetes coping measures and diabetes self-efficacy, diabetes outcome expectancy, both dimensions perceived health competence and demographic variables viz, age, marital

status, comorbidity and duration of disease. Hierarchical multiple regression was carried out which comprised of four models and all the models significantly contributed to overall diabetes coping measures. In the first model, diabetes self-efficacy significantly predicted overall diabetes coping measures, in second model diabetes self-efficacy and diabetes outcome expectancy significantly predicted overall diabetes coping measures, in the third model diabetes self-efficacy, diabetes outcome expectancy, outcome expectancies and behavioural expectancies significantly contributed to overall diabetes coping measures, and in the final adjusted model, diabetes self-efficacy, diabetes outcome expectancy, outcome expectancies, behavioural expectancies and age significantly predicted overall diabetes coping measures. Marital status, comorbidity and duration of disease significantly correlated with overall diabetes coping measures yet the variables were not significant predictors of overall diabetes coping measures. Out of the predicting variables both the dimensions of perceived health competence namely, outcome expectancies and behavioural expectancies were found to have higher impact on overall diabetes coping measures. The study by Gandhi et al., (2014) on patients with inflammatory bowel disease found high association between higher perceived health competence and better coping. The behavioural expectancies of individuals may influence their health outcomes by augmenting their adjustment level (Chan, Leung & Liang, 2018). Studies have also highlighted the impact of self-efficacy (Heitzmann et al., 2011) and age (Chen, Peng, Xu & O'Brien, 2018) on coping with illness.

***Predictors of Tackling Spirit Coping***

Results showed that tackling spirit was significantly correlated with both dimensions of perceived health competence and demographic variables namely, age,

marital status and comorbidity. In order to find out the role of these variables on tackling spirit, hierarchical multiple regression analysis was performed accordingly which had two models. Both the models were found to be significant in predicting tackling spirit. In first model, outcome expectancies and behavioural expectancies significantly contributed to tackling spirit. In second adjusted model outcome expectancies, behavioural expectancies, marital status and comorbidity significantly contributed to tackling spirit. Results indicated that age although correlated with tackling spirit did not have significant contribution to this dimension. Perceived health competence was found to have higher prediction as compared to demographic variables (age, marital status and comorbidity). Optimizing cancer patients' expectations was an effective positive predictor of illness coping (von Blanckenburg, Schuricht, Albert, Rief & Nestoriuc, 2013). Probable reason could be that optimistic outlook on health outcome might have increased patients' coping level.

***Predictors of Avoidance Coping***

A significant relationship was observed between avoidance coping and diabetes self-efficacy, diabetes outcome expectancy, behavioural expectancies and demographic variables namely age and duration of disease. Hierarchical multiple regression analysis was employed to examine the role of these mentioned variables on the avoidance coping. The analysis consisted of four models and all the models were found to be significant in predicting avoidance. In first model, diabetes self-efficacy was found to be significantly predicting avoidance coping. In the second model diabetes self-efficacy and diabetes outcome expectancy significantly impacted avoidance coping. In the third model diabetes self-efficacy, diabetes outcome expectancy and behavioural expectancies significantly

contributed to avoidance coping. In the fourth adjusted model only diabetes outcome expectancy and age were significant contributors of avoidance coping. It was found that duration of disease had significant correlation with avoidance coping yet this variable did not significantly predict avoidance coping in the model. The results found that dimension of behavioural expectancies was found to have higher individual contribution on avoidance coping as compared to other variables. Hatzigeorgiadis (2006) stated that when an individual perceived a goal as desirable, they coped with the barriers whereas individual who had negative expectancies on the goal tended to employ avoidance coping. Tahmassian and Moghadam (2011) found that high sense of self-efficacy had an impact on avoidance coping. Few studies had also found that self-efficacy and outcome expectancy were predicative of approach coping and this could imply that low outcome expectancy and self-efficacy contributes to usage of avoidance coping. Result also showed that age was a significant predictor of avoidance coping. This finding is supported by a study done by Oberhauser, Neubaue and Kessler (2017) which found that older adults perceived more threats which instigated employment of avoidance coping as a preventive act.

***Predictors of Passive Resignation***

Passive resignation significantly correlated with diabetes self-efficacy, both the dimensions of perceived health competence and demographic variables (age, marital status, comorbidity and duration of disease). To find the role of the mentioned variables on passive resignation, hierarchical multiple regression which comprised of three models was performed. It was seen that all these three models significantly predicted the variable. In first model diabetes self-efficacy was found to have significant impact on

passive resignation, in the second model diabetes self-efficacy and outcome expectancies significantly predicted passive resignation, in the third model final adjusted model diabetes self-efficacy, outcome expectancies and age were found to predict passive resignation. Although behavioural expectancies, marital status, comorbidity and duration of disease were significantly correlated with passive resignation, no significant contribution was found in the model. It was seen from the results that behavioural expectancies had higher individual impact in comparison with the other variables. A study among arthritis patients found that high expectancies for disability contributed to passive coping while low expectancies contributed to active coping (Ferrari & Russell, 2010).Studies have shown the impact of self-efficacy on passive coping where people with lower self-efficacy were more likely to utilize passive coping and vice versa. Age was also found to be significantly predicted passive resignation. Possible reason might be that as one grows older, they become less active in their management activities which results in utilization of passive coping.

***Predictors of Diabetes Integration***

Diabetes integration significantly correlated with diabetes self-efficacy, both dimensions of perceived health competence and demographic variables namely, age, marital status and duration of disease. Hierarchical multiple regression was carried out which comprised of three models where all the models were found to be significant predictors of diabetes integration. In the first model, diabetes self-efficacy significantly predicted diabetes integration, in second model diabetes self-efficacy, outcome expectancies and behavioural expectancies significantly predicted diabetes integration, in the third final adjusted model outcome expectancies, behavioural expectancies and age

significantly predicted diabetes integration. The results showed that marital status and duration of diabetes although correlated with diabetes integration did not significantly predict this dimension. In comparison with other variables, perceived health competence was observed to have higher impact on diabetes integration. The plausible explanation for higher contribution could be that since individuals with high outcome and behavioural expectancies are confident in their ability to control the outcome, they accept their illness as a challenge and this enables them to effectively cope with their illness.

**Predictors of Overall Diabetes Self-management and its dimensions**

The fourth hypothesis stated that self-efficacy, outcome expectancy, perceived health competence and coping would play a role in self-management of type 2 diabetes patients. This hypothesis was accepted as the results showed the impact of mentioned variables on diabetes self-management.

***Predictors of Overall diabetes self-management***

It was seen from the results that there existed a relationship between overall diabetes self-management and diabetes self-efficacy, both the dimensions of perceived health competence, all the dimensions of diabetes coping measures and demographic variables viz, age, marital status, comorbidity and duration of disease. Hierarchical multiple regression was carried out which comprised of four models where all the models except model 2 were significant predictors of overall diabetes self-management. In the first model, diabetes self-efficacy significantly predicted overall diabetes self-management. In second model diabetes self-efficacy, outcome expectancies and behavioural expectancies significantly predicted overall diabetes self-management. In the

third model diabetes self-efficacy, tackling spirit and passive resignation significantly contributed to overall diabetes self-management. In the fourth final adjusted model diabetes self-efficacy, tackling spirit, passive resignation and comorbidity significantly predicted overall diabetes self-management overall diabetes coping measures. Avoidance coping, diabetes integration coping, age, marital status and duration of disease significantly correlated with overall diabetes self-management yet the variables were not significant predictor of the same. Dimension of tackling spirit was observed to have highest individual impact on overall diabetes self-management. This could be attributed to the fact that encountering the problems and dutifully taking charge of one's responsibility in taking care of any disease would have massive impact in management of their disease. Studies also revealed the impact of self-efficacy (Abedi, Salimi, Feizi & Safari, 2013), perceived health competence (Bachmann et al., 2016), coping (Leske, Strodl& Hou, 2017) and comorbidity (Piette & Kerr, 2006) on self-management.

***Predictors of Glucose Management***

Results showed a significant correlation between glucose management with diabetes self-efficacy, diabetes outcome expectancy, behavioural expectancies, all dimensions of diabetes coping measures and demographic variables namely, age, comorbidity and duration of disease. In order to find out the role of these variables on glucose management, hierarchical multiple regression analysis was performed accordingly which had five models. All the five models were found to be significant in predicting glucose management. In first model, diabetes self-efficacy significantly contributed to glucose management. In second model only diabetes self-efficacy was found to have significant impact on glucose management. In the third model diabetes

self-efficacy and behavioural expectancies significantly predicted glucose management. In fourth model diabetes self-efficacy, tackling spirit, avoidance and passive resignation were significant contributors of glucose management. In the fifth adjusted model diabetes self-efficacy, diabetes integration, passive resignation, avoidance, tackling spirit, and comorbidity had significantly impacted glucose management. Results indicated that diabetes outcome expectancy, age and duration of disease although correlated with glucose management did not have significant contribution to this dimension. Comorbidity had higher individual impact on glucose management when compared with other variables. Several studies had also noticed the effect of presence of comorbid condition on glycemic control and monitoring (Weinzimer,Doyle & Tamborlane, 2005; Luijks et al., 2015). Mindful approach to coping was seen to predict glucose management among type 2 diabetes patients (Napora, 2013). Self-efficacy (Beckerle & Lavin, 2013), outcome expectancy (Karl, Holle, Schwettmann, Peters & Laxy, 2018) and behavioural expectancies were also found to be significant predictors of glucose management. Behavioural activities are the fundamental to management of glucose level in the blood and to successfully carry out those behaviours have an impact on maintaining optimal glucose level.

***Predictors of Dietary Control***

A significant correlation was found between dietary control and diabetes self-efficacy, both the dimensions of perceived health competence, all the dimensions of diabetes coping measures and demographic variables namely, age, marital status, comorbidity and duration of disease. Hierarchical multiple regression analysis was performed to examine the impact of these mentioned variables on dietary control. The

analysis consisted of four models and all the models except the final model were found to be significant in predicting dietary control. In first model, diabetes self-efficacy significantly predicted dietary control. In the second model diabetes self-efficacy, outcome expectancies and behavioural expectancies significantly impacted dietary control. In the third model diabetes self-efficacy, tackling spirit, avoidance and passive resignation significantly contributed to dietary control, in the fourth adjusted model, diabetes self-efficacy, avoidance and passive resignation significantly predicted dietary control. It was found that dietary control and diabetes integration, age, comorbidity and duration of disease had significant correlation with dietary control yet these variables did not significantly predict this dimension in any of the models. Individual contribution of outcome expectancies on dietary control was higher in comparison with other variables. The study by Doerksen and McAuley (2014) on university students found an indirect effect of outcome expectancies on dietary change. Research studies also found that other variables like self-efficacy (Nezami et al., 2016), behavioural expectancies (Batra et al., 2013) and diabetes coping (Leske, Strodl & Hou, 2017) predicted dietary control.

***Predictors of Physical Activity***

Physical activity significantly correlated with diabetes self-efficacy, both dimensions of perceived health competence, tackling spirit, passive resignation and demographic variables (age, marital status, comorbidity and duration of disease). To examine the role of the mentioned variables on physical activity, hierarchical multiple regression which comprised of four models was performed. It was seen that all these four models significantly predicted the variable. In first model diabetes self-efficacy was found to have significant contribution to physical activity. In the second model diabetes

self-efficacy and behavioural expectancies significantly contributed to physical activity. In the third model diabetes self-efficacy, tackling spirit and passive resignation significantly contributed to physical activity. In the fourth final adjusted model tackling spirit, passive resignation and comorbidity were found to predict physical activity. Although significant correlation was found between demographic variables like age, marital status and duration of disease with physical activity, no significant contribution was found in the models. Results found that comorbidity was the highest individual contributor of physical activity. A study on rheumatoid arthritis patients suggested that presence of comorbidities is a strong predictor for level of daily physical activity (Marques, Cruz, Rego & Silva, 2016). Maintenance of physical fitness among older adults largely depends on their self-efficacy level (McAuley, Szabo, Gothe & Olson, 2011). Research had found that outcome predictions (Ghahremani, Niknami & Nazari, 2012) also predicted physical activity. Results highlighted that coping significantly predicted physical activity. This might be possible due to the fact that coping helps an individual in managing their physical activities.

***Predictors of Health Care Use***

A significant relationship was observed between health care use with diabetes self-efficacy, behavioural expectancies, tackling spirit, passive resignation and demographic variables namely, gender, comorbidity and duration of disease. Hierarchical multiple regression which comprised of four models was carried out and all the models significantly predicts of health care use. In the first model, diabetes self-efficacy significantly predicted health care use. In second model diabetes self-efficacy and behavioural expectancies significantly predicted health care use. In the third model

diabetes self-efficacy and tackling spirit significantly impacted health care use. In the fourth final adjusted model tackling spirit, gender and comorbidity significantly predicted health care use. Physical activity, health care use, marital status, comorbidity and duration of disease were the variables that significantly correlated to overall diabetes coping measures but did not have significant contribution to it. The results showed that passive resignation and duration of diabetes although correlated with health care use did not significantly predict this dimension. Results observed that comorbidity had the highest individual contribution on health care use. Research found that the presence of two or more comorbid conditions had an impact on health service usage (Browne, Edwards, Rhodes, Brimicombe & Payne, 2017). A study by Miller and Cronan (1998) on osteoarthritis patients found a direct and indirect effect of self-efficacy, coping styles, age, gender and on health care utilization.

**Coping Strategies of type 2 diabetes**

Qualitative approach was employed to explore participants' lived experiences, with particular reference to coping strategies among the participants. Since coping strategies had influenced diabetes management such as blood glucose control, adherence to diet, compliance with physical activities and medical regimen, employing appropriate coping strategy is imperative. Results found that participants reported a wide range of coping strategies that facilitated (productive) and/or obstructed (unproductive) their diabetes management. These identified coping strategies are discussed below.

***Planful Problem Solving***

Active involvement in management and control of glycemic level is the foundation to diabetes care. Results reported that participants engaged themselves in activities such as adherence to medical regimen and healthy diet, regular test and check-ups, practising physical activities and time management in order to maintain optimal blood glucose level. The study by Grover et al., (2016) type 1 diabetes patients showed that planful problem solving helped in dealing with stressors. A study by Shrivastava, Shrivastava and Ramasamy (2013) found that diabetes care activities were positively associated with better glycemic control and lesser complications. Participants belonging to all the three groups unanimously reported engagement in glycemic control as one of the factors for diabetes management. It was seen that group III had better engagement in glycemic control activities when compared with the other two groups. As mentioned earlier, this could possibly be due to the fact that group I and group II, comparatively younger in age, found themselves busy chasing their career. As a result they found themselves having limited time to practise diabetes care activities (Huang, Zhao, Li & Jiang, 2014).

One of the participants reported that she coped with her condition by taking medication regularly as prescribed by the doctor and this had better impact on her condition. This is in concordance with a study done by Wabe, Angamo and Hussein (2011) which stated that compliance to prescribed medication is crucial in maintaining optimal glycemic level and managing diabetes successfully. Adherence to medicines and insulin injections decreased, delayed, and prevented the complications of the disease and resulted in achievement of desirable glycemic goals (García-Pérez, Álvarez, Dilla, Gil-

Guillén & Orozco-Beltrán, 2013). Non-compliance to medical regimen on the other hand is associated with poor health outcome and exacerbation of the problem (King, Mainous, Carnemolla & Everett, 2009).

Practising physical activities was another factor that participants reported in order to cope with diabetes. The adoption and maintenance of physical activities were essential foci for overall health and blood glucose monitoring among diabetes patients (Colberg et al.,2016). Few participants reported taking walks/jogs either in the morning or evening to avoid sedentary lifestyle. Few others reported their efforts of doing household chores so as to stay active in order to maintain their condition intact. This is in line with a study by American Diabetes Association (2016) which stated that when one is active, excess glucose in the blood is lowered and A1C is improved which further resulted in better overall well-being.

Participants also reported following diet as a way of coping with the condition. One participant recounted his positive experience on controlling diet. The participant's strict adherence to healthy diet in order to cope with diabetes led to optimal blood sugar level. The finding concurs with Alhariri, Daud and Saghir (2017) who suggested that having healthy dietary habit is beneficial for achieving desired glucose level and to decrease the burden of the disease. It was noted from the study that group III had better adherence to diet as compared to group I and II. Conceivable reason could be that changes in diet can be problematic initially as new recommendations usually differ from the normal patients' current diet. For this reason, newly diagnosed patients had difficulty following their new dietary habits when compared with patients with longer duration of disease (Gupta, Khandelwal, Singla, Gupta & Kalra , 2017).

As a part of diabetes care, many participants from all the three groups performed routine check-ups and doctor visits. One of the participants who emphasized the significance of checking blood sugar level monitored glucose level by testing his blood using accu-chek (blood glucose measuring device) and consulted doctor whenever there was an abnormal spike. Regular and consistent check-ups and testing of blood glucose level is vital for type 2 diabetes management (Suszynski, 2015). On the contrary, irregularity of blood glucose monitoring was considered the main shortcoming of diabetes management (Tewahido& Berhane, 2017).

A working mother shared her experience on how she managed to take time out for exercise despite her busy schedule in order to cope with diabetes. The participant, at times, walked long distance from office to home. Managing one's time to keep up with all the diabetes care duties improved blood glucose and health outcome (Kam, 2008). The journey of diabetes management is often a struggle and finding time to carry out required diabetes management activities are necessary for achieving desirable blood glucose range.

Seeking diabetes-related information through media and physicians are other techniques reported by the participants which facilitated coping with the disease. Information seeking behaviour enabled individual to cope with the consequence of the disease (Kalantzi, Kostagiolas, Kechagias, Niakas & Makrilakis, 2015). Studies have propagated that the fundamental role of seeking disease-related information is to help the newly diagnosed patients coped with the diagnosis as well as the ongoing adverse impact of the disease (Mills & Davidson, 2002). Diabetes management vastly relied on patients' information and knowledge about the disease (Kalantzi et al., 2015). One participant

reported browsing internet to gather necessary information regarding management and some participants sought help from their respective doctors when they noticed changes in their health condition in order to avoid further problems. A study among cancer found that internet was used as a source to acquire cancer-related information (George et al., 2019). Health physicians also played significant role in addressing doubts and providing necessary information to diabetes patients (Kuske et al, 2017) which may enhance their management skills.

**Seeking Social Support**

Coping through social support has potential to be productive and unproductive in nature. Although ample evidences reflected the positive impact of social support on diabetes management (Shao, Liang, Shi, Wan & Yu, 2017; Ramkisson, Pillay & Sibanda, 2017), indiscriminate and excessive use of social support can also result in negative outcome. The positive and negative outcomes of seeking social support identified among few participants are discussed below.

Several participants sought support from family with regards to their diet. One participant reported that he requested his wife to avoid making foods and dishes that could be harmful for his diabetes. Another reported that he requested his wife to remind him of his medicines and doctor's visit. Family support was considered the ultimate support which played a vital role in lifestyle changes demanded by diabetes management (Rintala, Jaatinen & Paavilainen, 2013). "Diabetes is a family disease" where the dynamics of the family influenced glycemic and metabolic control of the patients (Solowiejczyk, 2004)

Seeking support from friends and peers was another factor utilized by participants to cope with the condition. Some reported that they requested their friends and peers to accompany them for doctors' visit and workout session and encourage them to do the necessary regimens. The amount of support from peers, friends and family predicted the effectiveness of diabetes care (Ramkisson, Pillay & Sibanda, 2017). Emotional support provided by friends facilitated coping with difficult medical complications and helped adjust to chronic illness (Burroughs et al., 1997).

When seeking support, some participant reported complete reliance on others which resulted in undesirable outcome. Participants reported their complete reliance on others for their healthcare regime. They showed irregular medicine dosage when not reminded by relatives or peers. In these situations, diabetes care responsibilities were shifted upon the other members and this led to poor blood glucose level. Seeking social support, as discussed earlier is not of universal benefit. Over dependence on others or over exhaustion of social support can have boomerang effect and results in unproductive coping.

**Shifting burden on supernatural power**

Coping through this strategy involves engaging oneself in several spiritual activities like attending church, prayers, reading Bible etc. Like most coping strategies, this has a potential of being either a productive or unproductive coping.

One of the participants reported his submission to God as he has the ultimate power and the effort given by an individual will scarcely change the health status. Other participants tend to put their faith in prayers and emphasized the worthlessness of the

effort made towards their health. Taking the participant's reports into account, shifting burden on supernatural power was categorised under unproductive coping as the outcome of the strategy did not contribute to management of diabetes. Conceivable reason might be participants' feeling of helplessness towards the incurable disease (diabetes) had led the participants to turn to supernatural/external power.

**Distancing**

Few participants reported negligence of diabetes regimen as a result of considering their condition as non-serious. These participants believed they afforded to skip doctors' visit and taking medicines as their condition was less serious in comparison with others. Others who were recently been diagnosed with diabetes considered their condition less severe and hence refused to engage in several diabetes management activities. Here the coping strategy used was ineffective and unproductive as it did not yield desirable outcome with regards to diabetes management. Plausible reason might be that participants in trying to avoid the burden of having to cope with diabetes employ this coping strategy which results in inertia and inaction.

**Escape-Avoidance**

The strategy provided temporary escape but did not resolve the crux of the problem. Few participants reported discontinuation of prescribed medicines as they felt nauseated consuming them. This can be classified under unproductive coping as withdrawal or intermittent intake of medicines will deteriorate their blood glucose level. Diabetes management activities can be quite troublesome and the plight of having to deal

with it might have left the participants frustrated which resulted in avoidance of the main problem.

The overall qualitative findings showed that participants with longer duration of disease employed better productive coping as compared to those with shorter duration. Those with longer duration had learnt the effective way of dealing with their illness as their duration increases (Eldred, 2011).Chronic illness patients reported higher used of adaptive coping strategies with longer duration of disease (Brown, Brown & Jason, 2010).

**Conclusion**

The findings of the study indicated that there exists a difference in the level of the variables among the three groups that were categorized based on their duration of disease. Patients whose duration of disease was above five years and ten years had better diabetes self-efficacy, diabetes coping and diabetes self-management than those who were below five years of duration. This indicates that those below five years of duration require enhancement of diabetes related self-efficacy, coping and self-management for to better diabetes care. Findings of the study showed that demographic variables like age, gender, marital status, comorbidity, duration of disease are correlated with diabetes self-efficacy, outcome expectancy, perceived health competence, diabetes coping and diabetes self-management. The variable gender correlated only with passive resignation coping and health care use management, it showed that men had better which passive resignation coping and women had better health care use management. Results found a significant correlation between the other variables under study.

Findings of the study indicated that diabetes self-efficacy, diabetes outcome expectancy, perceived health competence and age were significant individual predictors of overall diabetes coping measure. Similarly, diabetes self-efficacy, diabetes outcome expectancy, perceived health competence, dimensions of diabetes coping measure and comorbidity individually contributed to diabetes self-management. These findings can be projected in intervention studies which will facilitate diabetes care.

Lastly qualitative study identified several coping strategies used by patients to cope with diabetes, these include - planful problem solving, seeking social support, shifting burden to supernatural power, distancing and escape-avoidance. Depending on the outcome, these coping strategies are categorised as productive and unproductive coping. In order to improve diabetes management, intervention should be formulated to enhance productive coping in the individuals.

**Implications**

This study is one of the few studies carried out in North-eastern part of India which focuses on the psychological aspects of diabetes patients. This implies the need to promote field research which focuses on the significance of other psychological variables on diabetes management.

The study also illuminates the positive individual contribution of self-efficacy, outcome expectancy and perceived health competence in coping and management of diabetes. This implied that enhancing these mentioned variables will improve patients' diabetes coping and management accordingly. The findings of the study also indicated that appropriate coping strategies can have dramatic impact on diabetes management;

keeping in this mind, health professionals, policy makers and researchers should identify these coping strategies and generate specific and pragmatic recommendations to improve diabetes management. It was seen that unproductive coping hinders management of blood glucose level. Hence, effective intervention which targets on altering these unproductive copings is required. Reinforcing diabetes management through this intervention might help the patients to efficiently maintain their health promoting behaviours and health conditions.

As seen in the study, coping and self-management is lower among those with having shorter duration of disease. This implies the need to offer tailor-made and practical intervention for newly diagnosed patients to enhance their coping and self-management skills. This will pave a long way in maintaining optimal glycemic level as diabetes is a lifelong disease which requires constant care. Here, the role of health psychologist is imperative as they are best suited for this psychological assistance. Unlike doctors and other health professionals, health psychologists focus on the psychological aspect of the disease and understand the possible impact these variables on diabetes coping and self-management.

Given the recognized importance of self-management in diabetes care, this study highlights the significance of early concerns and active management such as physical activity, diet follow up, behavioural alteration for behavioural change/alteration to optimize glycemic level and reduce diabetes complications.

**Limitations**

- Quantitative phase of the study used self-report measures to procure information from the participants about the variables under study. These measures assume that the participants were well aware of their actions and feelings in different situations and the information provided by each of them was accurate and reliable. However, the obtained information were subjected to the limitations of such measures, namely social desirability, carelessness response biases etc.
- No claims can be made about the cause effect relationships between the variables.
- Demographic variables such as socio-economic status and education which would have played an important role in the studied variables were not considered due to missing data.
- The Cronbach alpha values for some of the sub-scales of measures were found to be slightly lower than acceptable level.

**Future Directions**

- Future studies could include larger sample size and demographic variables like socio-economic and education status as these factors can have an impact on the variables under study.

- Despite the high prevalence rate of diabetes in North-east India, research studies in this area is still limited. Further research should consider exploring the role of

other psychological variables on diabetes coping and management as this may benefit diabetic patients in improving their diabetes care.

- Health psychologists in collaboration with health professionals can develop an intervention which targets on enhancing self-efficacy, outcome expectancy and perceived health competence as this may help patients with low self-esteem in management of diabetes.
- Awareness programs can be conducted to propagate the effective contribution of utilizing productive coping for management of diabetes.
- Furthermore, health practitioners should organise education program at a primary level for improvement of diabetes care where emphasis are laid on health behaviour change. These programs should be held frequently as periodical reinforcement is essential to attain change in behaviour and sustain the same.

# REFERENCES

Abbas, Y., Mashinchi, A. N., Reza, V., Farzad, N., & Garooci, F. M. (2011). Effect of exercise on psychological well-being in T2DM. *Journal of Stress Physiology & Biochemistry, 7*(3).

Abedi, H., Salimi, S. J., Feizi, A., & Safari, S. (2013). Effect of self-efficacy enhancement program on self-care behaviors in chronic obstructive pulmonary disease. *Iranian journal of nursing and midwifery research, 18*(5), 421.

Abotalebi, G. (2009). The study of self- care agency based on Orem's theory in individuals with hypertension admitted to the selected hospitals of Ardebil. (Dissertation.Tehran Islamic Azad University Medical Sciences Branch).

Adeghate, E., Schattner, P., & Dunn, E. (2006). An update on the etiology and epidemiology of diabetes mellitus. *Annals of the New York Academy of Sciences, 1084*(1), 1-29.

ALhariri, A., Daud, F., & Saghir, S. A. M. (2017). Factors associated with adherence to diet and exercise among type 2 diabetes patients in Yemen. *Diabetes Management, 7*(3), 264-271.

Al-Khawaldeh, O. A., Al-Hassan, M. A., & Froelicher, E. S. (2012). Self-efficacy, self-management, and glycemic control in adults with type 2 diabetes mellitus. Journal of Diabetes and its Complications, 26(1), 10-16.

Alrahbi, H. (2014). Diabetes self-management (DSM) in Omani with type-2 diabetes. *International Journal of Nursing Sciences*, *1*(4), 352-359.

Ambady, R., & Chamukuttan, S. (2008). Early diagnosis and prevention of diabetes in developing countries. *Reviews in Endocrine and Metabolic Disorders*, *9*(3), 193.

American Association of Diabetes Educator (2018). Retrieved from https:// www. Diabetes educator.org/news/aade-blog/aade-blog-details/karen-kemmis-pt-dpt-ms-cde-faade /2017/12/15/2018-standards-of-medical-care-diabetes-are-here

American Diabetes Association. (2013). Standards of medical care in diabetes—2013. *Diabetes care*, *36*(Supplement 1), S11-S66.

American Diabetes Association (2014). *Living with diabetes*. Retrieved from http://www.diabetes.org/living-with-diabetes/complications/mental-health/denial.html

American Diabetes Association (2016). Physical activity is important. Retrieved from http://www.diabetes.org/food-and-fitness/fitness/physical-activity-is-important.html.

American Heart Association (2018). Cardiovascular disease and diabetes. Retrieved from http://www.heart.org/HEARTORG/Conditions/More/Diabetes/WhyDiabetesMatters/%20Cardiovascular-Disease-Diabetes_UCM_313865_Article.jsp#.W-GURTHhXIU

American Psychological Association (2019). *Coping with diagnosis of chronic illness*. Retrieved from https://www.apa.org/helpcenter/chronic-illness.

Angiel, P.R. (2016). *Adherence and quality of life of patients with type II diabetes: Role of psychosocial factors.* (Unpublished Doctoral dissertation. University of Hyderabad).

Arora, N. K., Johnson, P., Gustafson, D. H., Mctavish, F., Hawkins, R. P., & Pingree, S. (2002). Barriers to information access, perceived health competence, and psychosocial health outcomes: test of a mediation model in a breast cancer sample. *Patient education and counseling*, *47*(1), 37-46.

Ashraf, S., Ambreen, I., & Shah, M., (2018).Effects of Social Support on Psycho-Social Adjustment of Patients with Breast Cancer in Setting of Lahore Pakistan. *Biomedical , journal of scientific and technical research. 3*(3) , 1-8.

Asif, M. (2014). The prevention and control the type-2 diabetes by changing lifestyle and dietary pattern. *Journal of education and health promotion*, *3* (1).

Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological bulletin*, *121*(3), 417.

AtienoJalang'o, G., Tsolekile, L. P., & Puoane, T. (2014). Do Healthcare Workers Adhere to Diabetes Clinical Care Guidelines? A Study at a National Hospital, Kenya. *J Hypertens*, *3*(188), 2167-1095.

August, K. J., Kelly, C. S., & Abbamonte, J. M. (2015). Psychosocial factors associated with diabetes self-management. In *Glucose Intake and Utilization in Pre-Diabetes and Diabetes* (pp. 45-56). Academic Press.

Bachmann, J. M., Goggins, K. M., Nwosu, S. K., Schildcrout, J. S., Kripalani, S., & Wallston, K. A. (2016). Perceived health competence predicts health behavior and health-related quality of life in patients with cardiovascular disease. *Patient education and counseling*, *99*(12), 2071-2079.

Bachmann, J. M., Mayberry, L. S., Wallston, K. A., Huang, S., Roumie, C. L., Muñoz, D., ... & Kripalani, S. (2018). Relation of Perceived Health Competence to Physical Activity in Patients With Coronary Heart Disease. *The American journal of cardiology*, *121*(9), 1032-1038.

Balk, E. M., Earley, A., Raman, G., Avendano, E. A., Pittas, A. G., & Remington, P. L. (2015). Combined diet and physical activity promotion programs to prevent type 2 diabetes among persons at increased risk: a systematic review for the Community Preventive Services Task Force. *Annals of internal medicine*, *163*(6), 437-451.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ.

Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. Cambridge university press.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, *52*(1), 1-26.

Barba, E. L., de Miguel, M. R., Hernández-Mijares, A., Alonso-Moreno, F. J., Peña, M. L. O., Aceituno, S., & Dader, M. J. F. (2017). Medication adherence and persistence in type 2 diabetes mellitus: perspectives of patients, physicians and pharmacists on the Spanish health care system. *Patient preference and adherence*, *11*, 707.

Barlow, J., Wright, C., Sheasby, J., Turner, A. and Hainsworth, J. (2002) Self-management approaches for people with chronic conditions: a review, Patient Education and Counseling, 48:177-187.

Batra, P., Das, S. K., Salinardi, T., Robinson, L., Saltzman, E., Scott, T., ... & Roberts, S. B. (2013). Eating behaviors as predictors of weight loss in a 6 month weight loss intervention. *Obesity*, *21*(11), 2256-2263.

Bayliss, E. A., Ellis, J. L., & Steiner, J. F. (2007). Barriers to self-management and quality-of-life outcomes in seniors with multimorbidities. *The Annals of Family Medicine*, *5*(5), 395-402.

Bazargani, R. H., Besharat, M. A., Ehsan, H. B., Nejatian, M., & Hosseini, K. (2011). The efficacy of chronic disease self management programs and Tele-health on psychosocial adjustment by increasing self-efficacy in patients with CABG. *Procedia-Social and Behavioral Sciences*, *30*, 830-834.

Beckerle, C. M., & Lavin, M. A. (2013). Association of self-efficacy and self-care with glycemic control in diabetes. *Diabetes Spectrum*, *26*(3), 172-178.

Bene, K. (2015). *Examining self-efficacy, outcome expectancy beliefs, and coping strategies in helping parents cope with their child's diagnosis of Autism Spectrum Disorder: A Multi-methods study* (Doctoral dissertation).

Ben-Zur, H. (2017). Emotion-Focused Coping. In: Zeigler-Hill V., Shackelford T. (eds) Encyclopedia of Personality and Individual Differences. Springer, Cham.

Bertolin, D. C., Pace, A. E., Kusumota, L., & Haas, V. (2011). An association between forms of coping and the socio-demographic variables of people on chronic hemodialysis. *Revista da Escola de Enfermagem da USP*, *45*(5), 1070-1076.

Bialo, S.R. (2018). Type 1 Diabetes: How is it treated?. Teens Health. Retrieved from https:// kids health .org /en/teens/treating-type1.html

Bird, S. R., & Hawley, J. A. (2017). Update on the effects of physical activity on insulin sensitivity in humans. *BMJ open sport & exercise medicine*, *2*(1), e000143.

Birol,L., & Akdemir, N. (2005). Internal Medicine Nursing, Extended 2 Print, New York: Offset Publications.

Bloomgarden, Z. T. (2006). Glycemic treatment in type 1 and type 2 diabetes. *Diabetes care*, *29*(11), 2549-2555.

Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Jama*, *288*(19), 2469-2475.

Boonen, A., Van Der Heijde, D., Landewe, R., Chorus, A., Van Lankveld, W., Miedema, H., ... & Van Der Linden, S. (2004). Is avoidant coping independent of disease

status and stable over time in patients with ankylosing spondylitis?. *Annals of the rheumatic diseases*, *63*(10), 1264-1268.

Brigham Young University.(2019). Coping with chronic illness of a spouse. Retrieved from https://foreverfamilies.byu.edu/Pages/coping-with-chronic-illness-spouse.

Brown, L. A., Wiley, J. F., Wolitzky-Taylor, K., Roy-Byrne, P., Sherbourne, C., Stein, M. B., ... & Craske, M. G. (2014). Changes in self-efficacy and outcome expectancy as predictors of anxiety outcomes from the CALM study. *Depression and anxiety*, *31*(8), 678-689.

Brown, M. M., Brown, A. A., & Jason, L. A. (2010). Illness duration and coping style in chronic fatigue syndrome. *Psychological reports*, *106*(2), 383-393.

Browne, J., Edwards, D. A., Rhodes, K. M., Brimicombe, D. J., & Payne, R. A. (2017). Association of comorbidity and health service usage among patients with dementia in the UK: a population-based study. *BMJ open*, *7*(3), e012546.

Browning, C. J., & Thomas, S. A. (2005). *Behavioural change: an evidence-based handbook for social and public health*. Elsevier Health Sciences.

Burner, E., Menchine, M., Taylor, E., & Arora, S. (2013). Gender differences in diabetes self-management: a mixed-methods analysis of a mobile health intervention for inner-city Latino patients. *Journal of diabetes science and technology*, *7*(1), 111-118.

Burroughs, T. E., Harris, M. A., Pontious, S. L., & Santiago, J. V. (1997). Research on social support in adolescents with IDDM: a critical review. *The Diabetes Educator*, *23*(4), 438-448.

Cannon., W. (1932). *Wisdom of the Body*. United States: W.W. Norton & Company. ISBN 0393002055.

Carryer, J., Budge, C., Hansen, C., & Gibbs, K. (2010). Providing and receiving self-management support for chronic illness: Patients and health practitioners' assessments. *Journal of Primary Health Care*, *2*(2), 124-129.

Centers for Disease Control and Prevention (2018, August 15). *Diabetes*. Retrieved from https://www.cdc.gov/diabetes/basics/type2.html

Chan, I., Leung, M. Y., & Liang, Q. (2018). The roles of motivation and coping behaviours in managing stress: Qualitative interview study of Hong Kong expatriate construction professionals in mainland China. *International journal of environmental research and public health*, *15*(3), 561.

Chase, H.P., Horner, B., McFann, K., Yetzer, H., Gaston, J., Banion, C., Fiallo-Scharer, R., Slover, R., & Klingensmith, G. (2006). The use of insulin pumps with meal bolus alarms in children with type 1 diabetes to improve glycemic control. *Diabetes Care 29*, 1012–1015.

Chelli (2018). *Impact of Illness Perceptions and Health Hardiness on Diabetes Self-management among Type 2 Diabetes Patients*. (Unpublished Doctoral dissertation. University of Hyderabad).

Chen, S. L., Lee, W. L., Liang, T., & Liao, I. C. (2014). Factors associated with gender differences in medication adherence: a longitudinal study. *Journal of advanced nursing*, *70*(9), 2031-2040.

Chen, Y., Peng, Y., Xu, H., & O'Brien, W. H. (2018). Age differences in stress and coping: Problem-focused strategies mediate the relationship between age and positive affect. *The International Journal of Aging and Human Development*, *86*(4), 347-363.

Chlebowy, D. O., & Garvin, B. J. (2006). Impact on self-care behaviors and glycemic control in Caucasian and African American adults with type 2 diabetes. *The Diabetes Educator*, *32*(5), 777-786.

Chlebowy, D. O., Hood, S., & LaJoie, A. S. (2013). Gender differences in diabetes self-management among African American adults. *Western journal of nursing research*, *35*(6), 703-721.

Christensen, A.W.J., Benotsch, E., & Lawton, W. (1996). Perceived health competence, health locus of control, and patient adherence in renal dialysis. *Cognitive Therapy and Research. 20,* 411–421.

Clark, N. M., Becker, M. H., Janz, N. K., Lorig, K., Rakowski, W., & Anderson, L. (1991). Self-management of chronic disease by older adults: a review and questions for research. *Journal of Aging and Health*, *3*(1), 3-27.

Colberg, S. R., Sigal, R. J., Fernhall, B., Regensteiner, J. G., Blissmer, B. J., Rubin, R. R., ... & Braun, B. (2010). Exercise and type 2 diabetes: the American College of

Sports Medicine and the American Diabetes Association: joint position statement. *Diabetes care*, *33*(12), e147-e167.

Colberg, S. R., Sigal, R. J., Yardley, J. E., Riddell, M. C., Dunstan, D. W., Dempsey, P. C., ... & Tate, D. F. (2016). Physical activity/exercise and diabetes: a position statement of the American Diabetes Association. *Diabetes care*, *39*(11), 2065-2079.

Cormier Daigle, M., & Stewart, M. (1997). Support and coping of male hemodialysis-dependent patients. *International Journal of Nursing Studies*, *34*(6), 420-430.

Cramm, J. M., & Nieboer, A. P. (2015). Chronically ill patients' self-management abilities to maintain overall well-being: what is needed to take the next step in the primary care setting?. *BMC family practice*, *16*(1), 123.

Curtin, R. B., Walters, B. A., Schatell, D., Pennell, P., Wise, M., & Klicko, K. (2008). Self-efficacy and self-management behaviors in patients with chronic kidney disease. *Advances in chronic kidney disease*, *15*(2), 191-205.)

D'Amico, S., Marano, A., Geraci, M. A., & Legge, E. (2013). Perceived self-efficacy and coping styles related to stressful critical life events. *PloS one*, *8*(7), e67571.

Davis, R., Campbell, R., Hildon, Z., Hobbs, L., & Michie, S. (2015). Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health psychology review*, *9*(3), 323-344.

De Ridder, D., Geenen, R., Kuijer, R., & van Middendorp, H. (2008). Psychological adjustment to chronic disease. *The Lancet*, *372*(9634), 246-255.

Debussche, X. (2014). Is adherence a relevant issue in the self-management education of diabetes? A mixed narrative review. *Diabetes, metabolic syndrome and obesity: targets and therapy*, *7*, 357.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. University Rochester Press.

Derbyshire Community Health Services (2012). *Dealing with the challenges of long-term illness.* Retrieved from http://www.dchs.nhs.uk/assets/public/dchs/services_we _provide/service-directory/our-services/health-psychology/LTI/Dealing_with_the_ challenges _of_long_term_illness.pdf

Didarloo, A. R., Shojaeizadeh, D., Asl, R. G., Habibzadeh, H., Niknami, S., & Pourali, R. (2012). Prediction of self-management behavior among Iranian women with type 2 diabetes: application of the theory of reasoned action along with self-efficacy (etra). *Iranian Red Crescent Medical Journal*, *14*(2), 86.

Doerksen, S., & McAuley, E. (2014). Social cognitive determinants of dietary behavior change in university employees. *Frontiers in public health*, *2*, 23.

Douglas, B. M., & Howard, E. P. (2015). Predictors of self-management behaviors in older adults with hypertension. *Advances in preventive medicine*, *2015*, 1-6.

Eapen, V., Cavanna, A. E., & Robertson, M. M. (2016). Comorbidities, social impact, and quality of life in Tourette syndrome. *Frontiers in psychiatry*, *7*, 97.

Ershow, A. G. (2009). Environmental influences on development of type 2 diabetes and obesity: challenges in personalizing prevention and management. *Journal of Diabetes Science and Technology, 3* (4), 727-734.

Ferrari, R., & Russell, A. S. (2010). Correlations between coping styles and symptom expectation for rheumatoid arthritis. *Clinical rheumatology*, *29*(12), 1445-1448.

Fowler,M. (2010). Diagnosis, Classification, and Lifestyle Treatment of Diabetes. *Clinical Diabetes, 28* (2): 79-86.

Franken, I. H., Hendriks, V. M., Haffmans, P. J., & van der Meer, C. W. (2001). Coping style of substance-abuse patients: Effects of anxiety and mood disorders on coping change. *Journal of clinical psychology*, *57*(3), 299-306.

Frey, J. A. I. (2000). Gender differences in coping styles and coping effectiveness in chronic obstructive pulmonary disease groups. *Heart & lung*, *29*(5), 367-377.

Friedman-Wheeler, D. G., Haaga, D. A., Gunthert, K. C., Ahrens, A. H., & McIntosh, E. (2008). Depression, neuroticism, and mood-regulation expectancies for engagement and disengagement coping among cigarette smokers. *Cognitive therapy and research*, *32*(1), 105-115.

Friedman-Wheeler, D. G., Pederson, J. E., Rizzo-Busack, H. M., & Haaga, D. A. (2016). Measuring Outcome Expectancies for Specific Coping Behaviors: the Coping Expectancies Scale (CES). *Journal of Psychopathology and Behavioral Assessment*, *38*(3), 421-432.

Frydenberg, E., & Lewis, R. (2009). The relationship between problem-solving efficacy and coping amongst Australian adolescents. *British Journal of Guidance & Counselling*, *37*(1), 51-64.

Funnell, M. M., & Anderson, R. M. (2004). Empowerment and self-management of diabetes. *Clinical diabetes*, *22*(3), 123-127.

Gåfvels, C., & Wändell, P. E. (2006). Coping strategies in men and women with type 2 diabetes in Swedish primary care. *Diabetes research and clinical practice*, *71*(3), 280-289.

Gandhi, S., Jedel, S., Hood, M. M., Mutlu, E., Swanson, G., & Keshavarzian, A. (2014). The relationship between coping, health competence and patient participation among patients with inactive inflammatory bowel disease. *Journal of Crohn's and Colitis*, *8*(5), 401-408.

García-Pérez, L. E., Álvarez, M., Dilla, T., Gil-Guillén, V., & Orozco-Beltrán, D. (2013). Adherence to therapies in patients with type 2 diabetes. *Diabetes Therapy*, *4*(2), 175-194.

Garnett, A., Ploeg, J., Markle-Reid, M., & Strachan, P. H. (2018). Self-management of multiple chronic conditions by community-dwelling older adults: A concept analysis. *SAGE Open Nursing*, *4*, 2377960817752471.

George, G. C., Iwuanyanwu, E. C., Buford, A. S., Piha-Paul, S. A., Subbiah, V., Fu, S., ... & Cleeland, C. S. (2019). Cancer-Related Internet Use and Its Association With Patient Decision Making and Trust in Physicians Among Patients in an Early

Drug Development Clinic: A Questionnaire-Based Cross-Sectional Observational Study. *Journal of medical Internet research*, *21*(3), e10348.

Ghahremani, L., Niknami, S., & Nazari, M. (2012). The prediction of physical activity intention and behavior in elderly male residents of a nursing home: a comparison of two behavioral theories. *Iranian journal of medical sciences*, *37*(1), 23.

Gillibrand, R., & Stevenson, J. (2006). The extended health belief model applied to the experience of diabetes in young people. *British journal of health psychology*, *11*(1), 155-169.

Glasgow, R.E., Toobert, D.J., Hampson, S.E., & Strycker, L.A. (2002). Implementation, generalization and long-term results of the "'choosing well" diabetes self-management intervention. Patient Education Counselling, 48, 115–122. doi: 10.1016/S0738-3991(02)00025-3

Grady, P. A., & Gough, L. L. (2014). Self-management: a comprehensive approach to management of chronic conditions. *American Journal of Public Health*, *104*(8), e25-e31.

Grey, M. (2000). Coping and diabetes. *Diabetes Spectrum*, *13*(3), 167.

Griva, K., Myers, L. B., & Newman, S. (2000). Illness perceptions and self efficacy beliefs in adolescents and young adults with insulin dependent diabetes mellitus. *Psychology and Health*, *15*(6), 733-750.

Grønning, K., Bratås, O., & Steinsbekk, A. (2016). Which Factors Influence Self-Efficacy in Patients with Chronic Inflammatory Polyarthritis?. *Musculoskeletal care*, *14*(2), 77-86.

Grover, S., Bhadada, S., Kate, N., Sarkar, S., Bhansali, A., Avasthi, A., ... & Goel, R. (2016). Coping and caregiving experience of parents of children and adolescents with type-1 diabetes: An exploratory study. *Perspectives in clinical research*, *7*(1), 32.

Gunggu, A., Thon, C. C., & Whye Lian, C. (2016). Predictors of diabetes self-management among type 2 diabetes patients. *Journal of diabetes research, 2016*.

Guo, J., Whittemore ,R., & He, G.P. (2011). The relationship between diabetes self-management and metabolic control in youth with type 1 diabetes: an integrative review. *Journal of Advanced Nursing, 67*(11), 2294–2310.

Gupta, L., Khandelwal, D., Singla, R., Gupta, P., & Kalra, S. (2017). Pragmatic dietary advice for diabetes during Navratris. *Indian Journal of Endocrinology and Metabolism, 21*(1):231–237.

Hagger MS, Orbell S. A meta-analytic review of the common-sense model of illness representations. Psychology & Health. 2003;18(2):141–184.

Hariharan, M., & Rath, R. (2008). Coping with life stress: The Indian Experience. India, Sage Publication.

Hattori-Hara, M., & González-Celis, A. L. (2013). Coping Strategies and Self-Efficacy for Diabetes Management in Older Mexican Adults. *Psychology*, *4*(06), 39.

Hatzigeorgiadis, A. (2006). Approach and avoidance coping during task performance in young men: The role of goal attainment expectancies. *Journal of Sports Sciences, 24*(3), 299-307.

Heisler, M., Bouknight, R. R., Hayward, R. A., Smith, D. M., & Kerr, E. A. (2002). The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *Journal of general internal medicine, 17*(4), 243-252.

Heitzmann, C. A., Merluzzi, T. V., Jean-Pierre, P., Roscoe, J. A., Kirsh, K. L., & Passik, S. D. (2011). Assessing self-efficacy for coping with cancer: development and psychometric analysis of the brief version of the Cancer Behavior Inventory (CBI-B). *Psycho‐Oncology*, *20*(3), 302-312.

Helgeson, V. S., Escobar, O., Siminerio, L., & Becker, D. (2010). Relation of stressful life events to metabolic control among adolescents with diabetes: 5-year longitudinal study. *Health Psychology, 29*(2), 153.

Hieronymus, L. & Humphries, K. (2012). Coping with diabetes overtime. Diabetes Self-management. Retrieved from https://www.diabetesselfmanagement.com/managing-diabetes/emotional-health/coping-with-diabetes-over-time/

Hornung-Prähauser, V., Ploessnig, M., Zauchner-Studnicka, S., Kautzky-Willer, A., & Leutner, M. (2016). Better insight into gender-specific diabetes self-management for more effective diabetes servicesVeronika Hornung-Prähauser. *European Journal of Public Health*, *26*(suppl_1).

Hsieh, P. H. P., & Schallert, D. L. (2008). Implications from self-efficacy and attribution theories for an understanding of undergraduates' motivation in a foreign language course. *Contemporary Educational Psychology*, *33*(4), 513-532.

Huang, M. F., Courtney, M., Edwards, H., & McDowell, J. (2009). Psychometric evaluation of the Chinese version of the diabetes coping measure scale. *Journal of Nursing Scholarship*, *41*(4), 385-390.

Huang, M., Zhao, R., Li, S., & Jiang, X. (2014). Self-management behavior in patients with type 2 diabetes: a cross-sectional survey in western urban China. *PLoS One*, *9*(4), e95138.

Huckell, S. N. (2016). Perceived Health Competence, Risk Knowledge, and Self-Management Behaviors in Adolescents and Young Adults with Congenital Heart Disease (Doctoral dissertation, The Ohio State University).

Hudson, K. (2016). Coping complexity model: coping stressors, coping influencing factors, and coping responses. *Psychology*, *7*(03), 300.

Iannotti, R.J., Schneider, S., Nansel, T.R., Haynie, D.L., Plotnick, L.P., & Clark, L.M., et al. (2006). Self-efficacy, outcome expectations, and diabetes self-management in adolescents with type 1 diabetes. *Journal of Developmental and Behavioural Pediatrics*, *27*(2), 98-105.

Inamdar, S. Z., Kulkarni, R. V., Karajgi, S. R., Manvi, F. V., Ganachari, M. S., & Kumar, B. M. (2013). Medication Adherence in Diabetes Mellitus: An Overview on Pharmacist Role. *Open Journal of Advanced Drug Delivery*, *1*(3), 238-250.

Institute of Medicine, & Institute of Medicine. (2001). Individuals and families: Models and interventions. *Health and behavior: The interplay of biological, behavioral and societal influences*.

International Diabetes Federation (n.d). *About Diabetes*. Retrieved from https:// www .idf. org/aboutdiabetes/what-is-diabetes/complications.html

Ismail, G., Awad, H.E.S., & El-Nady, M.T.(2009) Coping with Life Stressors Among Clients with Type II Diabetes in Kuwait.Medical Journal of Cairo Univ, 77(1) ,787-795.

Janowski, K., Kurpas, D., Kusz, J., Mroczek, B., & Jedynak, T. (2013). Health-related behavior, profile of health locus of control and acceptance of illness in patients suffering from chronic somatic diseases. *PloS one*, *8*(5), e63920.

Jaser, S. S., Faulkner, M. S., Whittemore, R., Jeon, S., Murphy, K., Delamater, A., & Grey, M. (2012). Coping, self-management, and adaptation in adolescents with type 1 diabetes. *Annals of Behavioral Medicine*, *43*(3), 311-319.

Jaser, S. S., Patel, N., Xu, M., Tamborlane, W. V., & Grey, M. (2016). Stress and coping predicts adjustment and glycemic control in adolescents with type 1 diabetes. *Annals of Behavioral Medicine*, *51*(1), 30-38.

Jaworski, M., Panczyk, M., Cedro, M., & Kucharska, A. (2018). Adherence to dietary recommendations in diabetes mellitus: disease acceptance as a potential mediator. *Patient preference and adherence*, *12*, 163.

Jensen, M. P., Turner, J. A., & Romano, J. M. (1991). Self-efficacy and outcome expectancies: relationship to chronic pain coping strategies and adjustment. *Pain*, *44*(3), 263-269.

Johnson, N. J., Backlund, E., Sorlie, P. D., & Loveless, C. A. (2000). Marital status and mortality: the national longitudinal mortality study. *Annals of epidemiology*, *10*(4), 224-238.

Jordan, D.N., & Jordan, J.L. (2010). Self-care behaviors of Filipino-American adults with type 2 diabetes mellitus. *Journal of Diabetes Complication, 24*, 250–258.

Kalantzi, S., Kostagiolas, P., Kechagias, G., Niakas, D., & Makrilakis, K. (2015). Information seeking behavior of patients with diabetes mellitus: a cross-sectional study in an outpatient clinic of a university-affiliated hospital in Athens, Greece. *BMC research notes*, *8*(1), 48.

Kam, K. (2008).*Diabetes Care: Managing Your Time When You Have Diabetes.* WenMd. Retrieved from https://www.webmd.com/diabetes/features/diabetes-time-management #1

Kanat, M., DeFronzo, R. A., & Abdul-Ghani, M. A. (2015). Treatment of prediabetes. *World journal of diabetes*, *6*(12), 1207.

Karbon, R. (2017, August 23). Type  Diabetes: Importance of Screening and Prevention. United Family Medicine. Retrieved from https://unitedfamilymedicine.org/type-2-diabetes-importance-of-screening-and-prevention/

Karl, F. M., Holle, R., Schwettmann, L., Peters, A., & Laxy, M. (2018). Time preference, outcome expectancy, and self-management in patients with type 2 diabetes. *Patient preference and adherence*, *12*, 1937.

Kent, D., Haas, L., Randal, D., Lin, E., Thorpe, C. T., Boren, S. A., ... & Ruggiero, L. (2010). Healthy coping: issues and implications in diabetes education and care. *Population health management*, *13*(5), 227-233.

King, D.E., Mainous, A.G., Carnemolla, M., & Everett, C.J.(2009). Adherence to healthy lifestyle habits in US adults, 1988–2006. *American Journal of Medicine* , *122*, 528–534. doi: 10.1016/j.amjmed.2008.11.013

Kirkman, M. S., Rowan-Martin, M. T., Levin, R., Fonseca, V. A., Schmittdiel, J. A., Herman, W. H., & Aubert, R. E. (2015). Determinants of adherence to diabetes medications: findings from a large pharmacy claims database. *Diabetes Care*, *38* (4), 604-609.

Ko, S. H., Park, S., Cho, J. H., Ko, S. H., Shin, K. M., Lee, S. H., ... & Ahn, Y. B. (2012). Influence of the duration of diabetes on the outcome of a diabetes self-management education program. *Diabetes & metabolism journal*, *36*(3), 222-229.

Koenig , H. G. , McCullough , M. E. , & Larson , D. B. ( 2001 ). *Handbook of religion and health.* Oxford , England : Oxford University Press.

Krein, S. L., Heisler, M., Piette, J. D., Butchart, A., & Kerr, E. A. (2007). Overcoming the influence of chronic pain on older patients' difficulty with recommended self-management activities. *The Gerontologist*, *47*(1), 61-68.

Kuske, S., Schiereck, T., Grobosch, S., Paduch, A., Droste, S., Halbach, S., & Icks, A. (2017). Diabetes-related information-seeking behaviour: a systematic review. *Systematic reviews*, *6*(1), 212.

Lalnuntluangi, R., Chelli, K., & Padhy, M. (2017). Self-efficacy, outcome expectancy and self-management of type 2 diabetes patients. *Indian Journal of Health and Well-being, 8* (9), 1040-1043.

LaMonte, M. J., Blair, S. N., & Church, T. S. (2005). Physical activity and diabetes prevention. *Journal of applied physiology*, *99*(3), 1205-1213.

Laufs, U.,Bohm, M., Kroemer, H.K.,Schussel, K., Griese, N., & Schulz, M. (2011). Strategies to improve medical adherence. *Dtsch Med Wochenschr, 136* (31-32), 1616-1621.

Lazarus, R. S., & Folkman, S. (1984). *Stress,appraisal, and coping.* New York: Springer.

Leske, S., Strodl, E., & Hou, X. Y. (2017). Predictors of dieting and non-dieting approaches among adults living in Australia. *BMC public health*, *17*(1), 214.

Leventhal, H., Leventhal, E. A., & Schaefer, P. M. (1992). Vigilant coping and health behavior. In M. G. Ory, R. P. Abeles, & P. D. Lipman (Eds.), *Aging, health, and behavior* (pp. 109-140). Thousand Oaks, CA, US: Sage Publications, Inc.

Li, G., Zhang, P., Wang, J., Gregg, E. W., Yang, W., Gong, Q., ... & Shuai, Y. (2008). The long-term effect of lifestyle interventions to prevent diabetes in the China Da Qing Diabetes Prevention Study: a 20-year follow-up study. *The Lancet, 371*(9626), 1783-1789.

*Libman, I.M., Becker, D.J. (2003). Coexistence of type 1 and type 2 diabetes mellitus: "double" diabetes? Pediatric Diabetes 4,* 110–*113.*

Liddy, C., Blazkho, V., & Mill, K. (2014). Challenges of self-management when living with multiple chronic conditions: systematic review of the qualitative literature. *Canadian Family Physician*, *60*(12), 1123-1133.

Lin, C. C., & Ward, S. E. (1996). Perceived self-efficacy and outcome expectancies in coping with chronic low back pain. *Research in nursing & health*, *19*(4), 299-310.

Lindner, H., & Sciacchitano, L. (2013) Health Behavior Change Techniques. *Applied Topics in*, 1. John Wiley & son Limited.

Liu, A. Y., Silvestre, M. P., & Poppitt, S. D. (2015). Prevention of type 2 diabetes through lifestyle modification: is there a role for higher-protein diets?. *Advances in nutrition*, *6*(6), 665-673.

Lorig, K. R., & Holman, H. R. (2003). Self-management education: history, definition, outcomes, and mechanisms. *Annals of behavioral medicine*, *26*(1), 1-7.

Lugtenberg, M., Burgers, J. S., Clancy, C., Westert, G. P., & Schneider, E. C. (2011). Current guidelines have limited applicability to patients with comorbid conditions: a systematic analysis of evidence-based guidelines. *PloS one*, *6*(10), e25987.

Luijks, H., Biermans, M., Bor, H., Van Weel, C., Lagro-Janssen, T., de Grauw, W., & Schermer, T. (2015). The Effect of comorbidity on glycemic control and systolic

blood pressure in type 2 diabetes: a cohort study with 5 year follow-up in primary care. *PloS one*, *10*(10), e0138662.

Luszczynska, A., & Schwarzer, R. A. L. F. (2005). The role of self-efficacy in health self-regulation. *The adaptive self: Personal continuity and intentional self-development*, *15*, 137-152.

Macrodimitris, S. D., & Endler, N. S. (2001). Coping, control, and adjustment in type 2 diabetes. *Health psychology*, *20*(3), 208.

Magnan, E. M., Palta, M., Mahoney, J. E., Pandhi, N., Bolt, D. M., Fink, J., ... & Smith, M. A. (2015). The relationship of individual comorbid chronic conditions to diabetes care quality. *BMJ Open Diabetes Research and Care*, *3*(1), e000080.

Manzella. D., (2018). Dont forget your diabetes check-ups. Good health depends on good care. Verywell health. Retrieved from https://www.verywellhealth.com/dont-forget-your-diabetes-check-ups-1087211

Marks, G. R., & Lutgendorf, S. K. (1999). Perceived health competence and personality factors differentially predict health behaviors in older adults. *Journal of Aging and health*, *11*(2), 221-239.

Marques, W. V., Cruz, V. A., Rego, J., & Silva, N. A. D. (2016). The impact of comorbidities on the physical function in patients with rheumatoid arthritis. *Revista brasileira de reumatologia*, *56*(1), 14-21.

Martin, L. R., Williams, S. L., Haskard, K. B., & DiMatteo, M. R. (2005). The challenge of patient adherence. *Therapeutics and clinical risk management*, *1*(3), 189.

Mathew, R. (2010). Updating your coping skills. Diabetes Self-Management Quarterly. Braille Monitor. Volume 53(9).

McAuley, E., Szabo, A., Gothe, N., & Olson, E. A. (2011). Self-efficacy: implications for physical activity, function, and functional limitations in older adults. *American journal of lifestyle medicine*, *5*(4), 361-369.

McCleary-Jones, V. (2011). Health literacy and its association with diabetes knowledge, self-efficacy and disease self-management among African Americans with diabetes mellitus. *ABNF Journal*, *22*(2).

McCollum, M., Hansen, L. B., Lu, L., & Sullivan, P. W. (2005). Gender differences in diabetes mellitus and effectson self-care activity. *Gender Medicine*, *2*(4), 246-254.

Medtronic Mini Med (2006, August). Retrieved from http://store.m inime d.c om/ mm Store/application? Origin =navbar.jsp &event= bea.por t al.fr ame wor k.i nte rna l.r efresh&pageid=Products.

Miller, C., & Cronan, T. (1998). The effects of coping style and self-efficacy on health status and health care costs. *Anxiety, Stress and Coping*, *11*(4), 311-325.

Miller, T. A., & DiMatteo, M. R. (2013). Importance of family/social support and impact on adherence to diabetic therapy. *Diabetes, metabolic syndrome and obesity: targets and therapy*, *6*, 421.

Mills, M.E., Davidson, R. (2002). Cancer patients' sources of information: use and quality issues. *Psychooncology*, *11*, 371–378. doi: 10.1002/pon.584.

Mishali, M., Omer, H., & Heymann, A. D. (2010). The importance of measuring self-efficacy in patients with diabetes. *Family practice*, *28*(1), 82-87.

Modi, A. C., Pai, A. L., Hommel, K. A., Hood, K. K., Cortina, S., Hilliard, M. E., ... & Drotar, D. (2012). Pediatric self-management: a framework for research, practice, and policy. *Pediatrics*, *129*(2), e473-e485.

Mohebi, S., Azadbakht, L., Feizi, A., Sharifirad, G., & Kargar, M. (2013). Review the key role of self-efficacy in diabetes care. *Journal of education and health promotion*, *2*.

Mohn, J., Graue, M., Assmus, J., Zoffmann, V., B. Thordarson, H., Peyrot, M., & Rokne, B. (2015). Self-reported diabetes self-management competence and support from healthcare providers in achieving autonomy are negatively associated with diabetes distress in adults with Type 1 diabetes. *Diabetic Medicine*, *32*(11), 1513-1519.

Morrison, J. D., & Stuifbergen, A. K. (2014). Outcome expectations and physical activity in persons with longstanding multiple sclerosis. *The Journal of neuroscience nursing: journal of the American Association of Neuroscience Nurses*, *46*(3), 171.

Mozzillo, E., Zito, E., Maffeis, C., De Nitto, E., Maltoni, G., Marigliano, M., ... & Valerio, G. (2017). Unhealthy lifestyle habits and diabetes-specific health-related quality of life in youths with type 1 diabetes. *Acta diabetologica*, *54*(12), 1073-1080.

Napora, J. (2013). Managing stress and diabetes. *American Diabetes Association*. Retrived from http://www.diabetes.org/living-with-diabetes/parents-and-kids/everyday-life/ managing-stress-and-diabetes.html

Nath,R. (2016). Diabetes Mellitus an Emerging Silent Killer. *Austin diabetes research, 1* (2), 1-2.

Nathan, D.M. (2014). How often should you get your blood sugar checked?. Harvard Health Publishing. Retrieved from https://www.health.harvard.edu/diseases-and-condit i o n s/how-often-should-you-get-your-blood-sugar-checked-

*Neumark-Sztainer, D., Patterson, J., Mellin, A., Ackard, D.M., Utter, J., Story, M., & Sockalosky, J. (2002). Weight control practices and disordered eating behaviors among adolescent females and males with type 1 diabetes: associations with sociodemographics, weight concerns, familial factors, and metabolic outcomes. Diabetes Care 25,* 1289*–1296.*

Nezami, B. T., Lang, W., Jakicic, J. M., Davis, K. K., Polzien, K., Rickman, A. D., ... & Tate, D. F. (2016). The effect of self-efficacy on behavior and weight in a behavioral weight-loss intervention. *Health Psychology*, *35*(7), 714.

Norris, S. L., Nichols, P. J., Caspersen, C. J., Glasgow, R. E., Engelgau, M. M., Jack Jr, L., ... & Briss, P. (2002). Increasing diabetes self-management education in community settings: a systematic review. *American journal of preventive medicine*, *22*(4), 39-66.

Oberhauser, L., Neubauer, A. B., & Kessler, E.-M. (2017). Conflict avoidance in old age: The role of anticipated loneliness. *GerotoPsychology: The Journal of Gerontopsychology and Geriatric Psychiatry, 30*(2), 61-70.

Olsen, J., Bertollini, R., Victora, C., & Saracci, R. (2012). Global response to non-communicable diseases—the role of epidemiologists. *International journal of epidemiology*, *41*(5), 1219-1220.

Padhy, M., Chottai, P., & Lalnuntluangi, R**.** (2017). Well-being of patients with type 2 diabetes: Role of self-efficacy and outcome expectancy. *International Journal of Social and Allied Research, 6* (1), 9-16.

Padhy, M., Krishnakumar, N., & Lalnuntluangi, R. (2017). Self-efficacy and health locus of control in primary hypertensive patients. *Recent Advances in Psychology : An International Journal, 4* (1), 18-29.

Pargament , K. I. , Koenig , H. G. , & Perez , L. ( 2000 ). The many methods of religious coping: Development and initial validation of the RCOPE . *Journal of Clinical Psychology* , *56* , 519 – 543.

Pera, P. I. (2011). Living with diabetes: quality of care and quality of life. *Patient preference and adherence*, *5*, 65.

Piette,J.D., Kerr, E.A. (2006). The impact of comorbid chronic conditions on diabetes care. *Diabetes Care*, *29*(3), 725–731.

Powers, M. A., Bardsley, J., Cypress, M., Duker, P., Funnell, M. M., Fischl, A. H., ... & Vivian, E. (2017). Diabetes self-management education and support in type 2

diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *The Diabetes Educator*, *43*(1), 40-53.

Prati, G., & Pietrantoni, L. (2009). Optimism, social support, and coping strategies as factors contributing to posttraumatic growth: A meta-analysis. *Journal of loss and trauma*, *14*(5), 364-388.

Presseau, J., Hawthorne, G., Sniehotta, F. F., Steen, N., Francis, J. J., Johnston, M., ... & Deverill, M. (2014). Improving Diabetes care through Examining, Advising, and prescribing (IDEA): protocol for a theory-based cluster randomised controlled trial of a multiple behaviour change intervention aimed at primary healthcare professionals. *Implementation Science*, *9*(1), 61.

Rafati, F., Nouhi, E., Sabzevari, S., & Dehghan-Nayeri, N. (2017). Coping strategies of nursing students for dealing with stress in clinical setting: A qualitative study. *Electronic physician*, *9*(12), 6120.

Ramkisson, S., Pillay, B. J., & Sibanda, W. (2017). Social support and coping in adults with type 2 diabetes. *African journal of primary health care & family medicine*, *9*(1), 1-8.

Raum, E., Krämer, H. U., Rüter, G., Rothenbacher, D., Rosemann, T., Szecsenyi, J., & Brenner, H. (2012). Medication non-adherence and poor glycaemic control in patients with type 2 diabetes mellitus. *Diabetes research and clinical practice*, *97*(3), 377-384.

Reesor, L., Vaughan, E. M., Hernandez, D. C., & Johnston, C. A. (2017). Addressing Outcomes Expectancies in Behavior Change. *American journal of lifestyle medicine*, *11*(6), 430-432.

Reisi, M., Mostafavi, F., Javadzade, H., Mahaki, B., Tavassoli, E., & Sharifirad, G. (2016). Impact of health literacy, self-efficacy, and outcome expectations on adherence to self-care behaviors in iranians with type 2 diabetes. *Oman medical journal*, *31*(1), 52.

Rintala, T.M., Jaatinen, P., & Paavilainen, E.Å.-K.P. (2013). Interrelation between adult persons with diabetes and their family: A systematic review of the literature. *Journal of Family Nursing,19*(1), 3–28.

Robards, J., Evandrou, M., Falkingham, J., & Vlachantoni, A. (2012). Marital status, health and mortality. *Maturitas*, *73*(4), 295-299.

Rodgers, W. M., & Brawley, L. R. (1996). The influence of outcome expectancy and self-efficacy on the behavioral intentions of novice exercisers. *Journal of Applied Social Psychology*, *26*(7), 618-634.

Rosland, A. M., Heisler, M., Choi, H. J., Silveira, M. J., & Piette, J. D. (2010). Family influences on self-management among functionally independent adults with diabetes or heart failure: do family members hinder as much as they help?. *Chronic illness*, *6*(1), 22-33.

Rotheram-Borus, M. J., Ingram, B. L., Swendeman, D., & Lee, A. (2012). Adoption of self-management interventions for prevention and care. *Primary Care: Clinics in Office Practice*, *39*(4), 649-660.

Ryan, K. (2013). How problem focused and emotion focused coping affects college students' perceived stress and life satisfaction. Retrieved from http://esource.dbs.ie/handle/10788/1622

Sacco, W.P., Wells, K.J., Vaughan, C.A., Friedman, A., Perez, S., & Matthew, R. (2005). Depression in adults with type 2 diabetes: the role of adherence, body mass index, and self-efficacy. *Health Psychology, 24*(6), 630–634.

Sami, W., Ansari, T., Butt, N. S., & Ab Hamid, M. R. (2017). Effect of diet on type 2 diabetes mellitus: A review. *International journal of health sciences*, *11*(2), 65.

Sarkar, U., Fisher, L., & Schillinger, D. (2006). Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy?. *Diabetes care*, *29*(4), 823-829.

Schechter, C. B., & Walker, E. A. (2002). Improving adherence to diabetes self-management recommendations. *Diabetes Spectrum, 15*(3), 170-175.

Schmitt, A., Gahr, A., Hermanns, N., Kulzer, B., Huber, J., & Haak, T. (2013). The Diabetes Self-Management Questionnaire (DSMQ): development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. *Health and quality of life outcomes*, *11*(1), 138.

Schreurs, K.M.G., Colland, V.T., Kuijer, R.G., De Ridder, D.T.D., & Van Elderen, T. (2003). Development, content, and process evaluation of a short self-management intervention in patients with chronic diseases requiring self-care behaviours. *Patient Education Counselling, 51,* 133–141. doi: 10.1016/S0738-3991(02)00197-0.

Shao, Y., Liang, L., Shi, L., Wan, C., & Yu, S. (2017). The effect of social support on glycemic control in patients with type 2 diabetes mellitus: the mediating roles of self-efficacy and adherence. *Journal of diabetes research*, *2017*. 1-8.

Shayeghian, Z., Hassanabadi, H., Aguilar-Vafaie, M. E., Amiri, P., & Besharat, M. A. (2016). A randomized controlled trial of acceptance and commitment therapy for type 2 diabetes management: the moderating role of coping styles. *PloS one*, *11*(12), e0166599.

Sherman, E., Schiffman, L. G., & Mathur, A. (2001). The influence of gender on the new-age elderly's consumption orientation. *Psychology & Marketing*, *18*(10), 1073-1089.

Shortridge-Baggett, L. M. (2002). The theory and measurement of the self-efficacy construct. *Self-efficacy in nursing: Research and measurement perspectives*, 9.

Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. *Journal of Diabetes & Metabolic Disorders*, *12*(1), 14.

Siddiqui, M. A., Khan, M. F., & Carline, T. E. (2013). Gender differences in living with diabetes mellitus. *Materia socio-medica*, *25*(2), 140.

Sigal, R. J., Kenny, G. P., Wasserman, D. H., & Castaneda-Sceppa, C. (2004). Physical activity/exercise and type 2 diabetes. *Diabetes care*, *27*(10), 2518-2539.

Silverstein, J., Klingensmith, G., Copeland, K., et al. (2005). Care of children and adolescents with type 1 diabetes a statement of the American Diabetes Association. *Diabetes Care*, *28*(1), 186–212.

Sim, H. S., & Moon, W. H. (2015). Relationships between Self-Efficacy, Stress, Depression and Adjustment of College Students. *Indian Journal of Science and Technology*, *8*(35).

Singh, B., & Udainiya, R. (2009). Self-efficacy and well-being of adolescents. *Journal of the Indian Academy of Applied Psychology*, *35*(2), 227-232.

Smith, J.A. (1996). Beyond the divide between cognition and discourse: Using interpretative phenomenological analysis in health psychology. *Psychology & Health*, *11*, 261–271.

Smith, M. S., Wallston, K. A., & Smith, C. A. (1995). The development and validation of the Perceived Health Competence Scale. *Health education research*, *10*(1), 51-64.

Smrtnik Vitulić, H., & Prosen, S. (2016). Coping and emotion regulation strategies in adulthood: Specificities regarding age, gender and level of education. *Društvena istraživanja: časopis za opća društvena pitanja*, *25*(1), 43-62.

Solowiejczyk, J. (2004). The family approach to diabetes management: Theory into practice toward the development of a new paradigm. *Diabetes Spectrum*, *17*(1), 31-36.

Soyseth, T. S., Dew, M. A., Lund, M. B., Haugstad, G. K., Soyseth, V., & Malt, U. F. (2018). Significant associations between Escape-avoidance coping and emotional distress in patients evaluated for lung transplant. *European Respiratory Journal, 52* (62).

Sparring, V., Nyström, L., Wahlström, R., Jonsson, P. M., Östman, J., & Burström, K. (2013). Diabetes duration and health-related quality of life in individuals with onset of diabetes in the age group 15—34 years–a Swedish population-based study using EQ-5D. *BMC public health*, *13*(1), 377.

Suszynski, M.(2015). 8 Important Diabetes Tests to Get Regularly. *Everyday Health.* Retrieved from https://www.everydayhealth.com/hs/type-2-diabetes-live-better-guide/important-diabetes-tests/

Tahmassian, K., & Moghadam, N. J. (2011). Relationship between self-efficacy and symptoms of anxiety, depression, worry and social avoidance in a normal sample of students. *Iranian journal of psychiatry and behavioral sciences*, *5*(2), 91.

Takaki, J., Tadahiro, N., Hiromi, S., Inada, T., Matsuyama, N., Kumano, H., et al. (2005). Possible interactive effects of demographic factors and stress coping mechanisms on depression and anxiety in maintenance hemodialysis patients. *Journal of Psychosomatic Research, 58*(3), 217-223.

Talbot, F., Nouwen, A., Gingras, J., Gosselin, M., & Audet, J. (1997). The assessment of diabetes-related cognitive and social factors: the Multidimensional Diabetes Questionnaire. *Journal of Behavioral Medicine, 20*(3), 291-312.

Tareen, R. S., & Tareen, K. (2017). Psychosocial aspects of diabetes management: dilemma of diabetes distress. *Translational pediatrics*, *6*(4), 383.

Tewahido, D., & Berhane, Y. (2017). Self-care practices among diabetes patients in Addis Ababa: a qualitative study. *PloS one*, *12*(1), e0169062.

The Diabetes Control and Complications Trial Research Group (1993). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New England Journal of Medicine*, *329*, 977–986.

Thent, Z. C., Das, S., & Henry, L. J. (2013). Role of exercise in the management of diabetes mellitus: the global scenario. *PloS one*, *8*(11).

Thomas, D., Elliott, E. J., & Naughton, G. A. (2006). Exercise for type 2 diabetes mellitus. *Cochrane database of systematic reviews*, 19 (3).

Thomas, N., Alder, E., & Leese, G. P. (2004). Barriers to physical activity in patients with diabetes. *Postgraduate medical journal*, *80*(943), 287-291.

Thoolen, B. J., De Ridder, D., Bensing, J., Gorter, K., & Rutten, G. (2009). Beyond good intentions: The role of proactive coping in achieving sustained behavioural change in the context of diabetes management. *Psychology and Health*, *24*(3), 237-254.

Thoolen, B., De Ridder, D., Bensing, J., Maas, C., Griffin, S., Gorter, K., & Rutten, G. (2007). Effectiveness of a self-management intervention in patients with screen-detected type 2 diabetes. *Diabetes Care*, *30*(11), 2832-2837.

Toshuku, K., Hironori, S., & Yuji, S. (1996). "Relationships between Self-Efficacy and Stress Response regarding the Health Behavior of Patients with Chronic Disease."*Mental and Physical Medicine, 36* (6), 500-505.

Trief, P. M., Ploutz-Snyder, R., Britton, K. D., & Weinstock, R. S. (2004). The relationship between marital quality and adherence to the diabetes care regimen. *Annals of Behavioral Medicine*, *27*(3), 148-154.

Tromp, D. M., Brouha, X. D. R., Hordijk, G. J., Winnubst, J. A. M., Gebhardt, W. A., Van Der Doef, M. P., & De Leeuw, J. R. J. (2005). Medical care-seeking and health-risk behavior in patients with head and neck cancer: the role of health value, control beliefs and psychological distress. *Health education research*, *20*(6), 665-675.

Tuncay, T., Musabak, I., Gok, D. E., & Kutlu, M. (2008). The relationship between anxiety, coping strategies and characteristics of patients with diabetes. *Health and quality of life outcomes*, *6*(1), 79.

Turten Kaymaz, T., & Akdemir, N. (2016). Psychosocial Adjustment of Diabetic Patients To Their Disease. *Journal of Psychiatric Nursing/Psikiyatri Hemsireleri Dernegi*, *7*(2).

US Department of Health and Human Services. Multiple chronic conditions: a strategic framework. Washington, DC; 2010.

Vandervoort, D. J. (2006). Hostility and health: Mediating effects of belief systems and coping styles. *Current Psychology*, *25*(1), 50-66.

Vermunt, P. W., Milder, I. E., Wielaard, F., Baan, C. A., Schelfhout, J. D., Westert, G. P., & van Oers, H. A. (2013). Behavior change in a lifestyle intervention for type 2 diabetes prevention in Dutch primary care: opportunities for intervention content. *BMC family practice*, *14*(1), 78.

von Blanckenburg, P., Schuricht, F., Albert, U. S., Rief, W., & Nestoriuc, Y. (2013). Optimizing expectations to prevent side effects and enhance quality of life in breast cancer patients undergoing endocrine therapy: study protocol of a randomized controlled trial. *BMC cancer*, *13*(1), 426.

Voth, J., & Sirois, F. M. (2009). The role of self-blame and responsibility in adjustment to inflammatory bowel disease. *Rehabilitation psychology*, *54*(1), 99.

Wabe, N. T., Angamo, M. T., & Hussein, S. (2011). Medication adherence in diabetes mellitus and self management practices among type-2 diabetics in Ethiopia. *North American journal of medical sciences*, *3*(9), 418.

Wagner, J., & Tennen, H. (2007). Coping with diabetes: Psychological determinants of diabetes outcomes. In *Coping with Chronic Illness and Disability* (pp. 215-239). Springer, Boston, MA.

Wållberg, M., & Cooke, A. (2013). Immune mechanisms in type 1 diabetes. *Trends in immunology*, *34*(12), 583-591.

Weinzimer, S. A., Doyle, E. A., & Tamborlane Jr, W. V. (2005). Disease management in the young diabetic patient: glucose monitoring, coping skills, and treatment strategies. *Clinical pediatrics*, *44*(5), 393-403.

Whittemore, R., D'Eramo, M.G., & Grey, M.(2005). Metabolic control, self-management and psychosocial adjustment in women with type 2 diabetes. *Journal of Clinical Nursing, 14*, 195–203.

Whittemore, R., Jaser, S., Guo, J., & Grey, M. (2010). A conceptual model of childhood adaptation to type 1 diabetes. *Nursing outlook, 58*(5), 242-251.

Williams, K. E., & Bond, M. J. (2002). The roles of self-efficacy, outcome expectancies and social support in the self-care behaviours of diabetics. *Psychology, Health & Medicine*, *7*(2), 127-141.

World Health Organization (2016). *Global report on diabetes*. WHO Publications. 20 Avenue Appia, 1211 Geneva 27, Switzerland.

World Health Organization (2018). Noncommunicable diseases. Retrieved from https:// www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

World Health Organization (n.d). *The global burden of chronic*. Retrieved from https: //www.who.int/nutrition/topics/2_background/en/

Worthington, B. (2008). Diabetes management in young people—family matters. *Social Work Today*, *8*(5), 18.

Wu, S.F., Courtney, M., Edwards, H., McDowell, J., Shortridge-Baggett, L.M., & Chang, P.J. (2007). Self-efficacy, outcome expectations and self-care behaviour in people with type 2 diabetes in Taiwan. *Journal of Clinical Nursing16*(11), 250-257.

Xu, Y., Pan, W., & Liu, H. (2010). Self-management practices of Chinese Americans with type 2 diabetes. *Nursing & health sciences*, *12*(2), 228-234.

Yach, D., Hawkes, C., Gould, C. L., & Hofman, K. J. (2004). The global burden of chronic diseases: overcoming impediments to prevention and control. *Jama*, *291*(21), 2616-2622.

Yazdi-Ravandi, S., Taslimi, Z., Ahmadpanah, M., & Ghaleiha, A. (2016). Adjustment to diabetes among diabetic patients: the roles of social support and self-efficacy. *Avicenna Journal of Neuro Psych Physiology*, *3*(1), 1-5.

Zebracki, K., & Drotar, D. (2004). Outcome expectancy and self-efficacy in adolescent asthma self-management. *Children's Health Care*, *33*(2), 133-149.

Zoellner , T. , & Maercker , A. ( 2006 ). Posttraumatic growth in clinical psychology—A critical review and introduction of a two component model . *Clinical Psychology Review , 26* , 626 – 653.

Zugravu, C. A., Stoian, A., & Patrascu, D. (2014). Diabetics' Adherence to Medical Treatment/Self-Monitoring Program-A Pilot Study. *International Journal of Collaborative Research on Internal Medicine & Public Health*, *6*(10), 276.

**APPENDIX A**

# Institutional Ethics Committee
# University of Hyderabad

**Justice TNC Rangarajan**
Chairperson

**Prof. Geeta K. Vemugan**
Member Secretary

## Decision Letter of Institute Ethics Committee

| | | | |
|---|---|---|---|
| **IEC No.**<br>**Application No:** | UH/IEC/2016/120(R-1) | **Date of review** | 03-10-2018 |
| **Project Title:** | Role of Self-efficacy, Outcome Expectancy and Perceived Health Competence in Illness Adjustment and Management of Diabetes Patients | | |
| **Principal Investigator/ Co-PI:** | PI: Ms. R. Lalnuntluangi<br>CI: Dr. Meera Padhy | | |
| **Participating Institutes if any** | V. R. Healthcare Clinic and Sweetlife Medicare, Aizawl, Mizoram | **Approval from Participating Institute** | YES |
| **Documents received and reviewed** | Proforma for updates | | |
| **In case of renewal submission of update** | ---- | | |
| **Decision of the IEC:** | Approved after the conditions suggested at the IEC meeting were fulfilled on 06.03.2019<br>Duration: One year from the date of approval | | |
| **Any other Comments Requirements for conditional Approval** | ---- | | |
| **Members Present** | Sri Justice Rangarajan, Prof. Geeta K. Vemuganti, Dr. C.T. Anitha, Dr. Insaf Ahmed, Smt. Vimala Sthanikam, Dr. Suvashisa Rana, Dr. Sunita Mishra | | |

**Please note:**

a. Any amendments in the protocol must be informed to the Ethics committee and fresh approval taken.
b. Any serious adverse event must be reported to the Ethics Committee within 48 hours in writing ( mentioning the protocol No. or the study ID)
c. Any advertisement placed in the newspapers, magazines must be submitted for approval.
d. The results of the study should be presented in any of the academic forums of the hospital annually.
e. If the conduct of the study is to be continued beyond the approved period, an application for the same must be forwarded to the Ethics Committee.
f. It is hereby confirmed that neither you nor any of the members of the study team participated in the decision making/voting procedures.

Chairperson

**(Justice Rangarajan)**
Chairperson
Institutional Ethics Committee (IEC)
School of Medical Sciences
University of Hyderabad

Member Secretary

**(Prof. Geeta K Vemuganti)**
Member Secretary
Institutional Ethics Committee (IEC)
School of Medical Sciences
University of Hyderabad

ddress : School of Medical Sciences, University of Hyderabad, C.R. Rao Road, Gachibowli, Hyderabad - 500
Tel (O) : +91-040-23135470 / 23013279
E-mail : iec_uoh@uohyd.ernet.in, deanmd@uohyd.erntd.in

**APPENDIX B**

**INFORMED CONSENT FORM**

**Centre for Health Psychology**

**University of Hyderabad**

**Title: Role of Self-efficacy, Outcome Expectancy and Perceived Health Competence in Coping and Self-management of Diabetes Patients**

We are conducting a study to find out the role of psychological aspects such as self-efficacy, outcome expectancy and perceived health competence on coping and self-management among type 2 diabetes patients. We are approaching you because you are diagnosed with Type 2 diabetes and are under treatment for the same.

During the process of the study, I might have to contact you twice after you agree to participate in the study. The first contact will be at the beginning of the study where 5 questionnaires on the above mentioned areas will be administered, and the second contact will be at the end of the study for an interview where questions will be asked based on the following themes:

1) Identification of diabetes experiences
2) Barriers to coping with diabetes
3) Coping Method
4) Behavioural changes during coping

You can answer these questionnaires in a staggered way so that you will not feel the fatigue of answering them all in one go.

**Is participation in this study compulsory?**

It is not mandatory for you to participate in the study. Even after enrolling, you may decide to withdraw from the study at any point of time without citing any reasons.

**Do I get any benefit of participating in the study?**

You will not get any direct reward or reinforcement for taking part in the study. However, your participation will contribute towards understanding psychological aspects related to type 2 diabetes.

**Confidentiality**

Your identity and your responses to the questionnaires will remain confidential and will be used purely for research purposes.

In case you have any questions or need any clarifications, I will be glad to respond to you now or later. You may contact me on the following phone number + 91-8790969232, or email – MRalte85@gmail.com.

**Consent**

I,_____(your name), have read all the information related to the research on role of self-efficacy, outcome expectancy and perceived health competence in coping and self-management. I was given sufficient time to reflect on the issue. I was also given sufficient opportunity to have my questions clarified. With full knowledge about the proposed research I consent to participate in the research.

**Contact Number:** **Signature of Participant**

**INFORMED CONSENT FORM**
**Centre for Health Psychology**
**University of Hyderabad**
**Title: Role of Self-efficacy, Outcome Expectancy and Perceived Health Competence in Coping and Self-management of Diabetes Patients**

Rilru lam (psychology) in zunthlum (Type 2 diabetes) vei mek te a nghawng dan zirna neih a ni dawn a. He research ah hian Type 2 diabetes nei zingah Self-efficacy, Outcome expectancy leh Perceived Health Competence in Coping leh Self-management a nghawng dan kan zir dawn a.
Zunthlum (Type 2 diabetes) i neih avang leh a enkawlna i lak mek avangin kan lo pan che a ni.
He research hi thawhhnih a neih a nih dawn avangin tel i remtih chuan tum hnih biak che a ngai dawn a ni.
Thawhkhatna ah hian zawhna hlawm lian (questionnaire) 5 chhan a ngai dawn a, thawhhnih ah hian a hnuai a tarlan ah te hian interview i ni ang:
1) Zunthlum hmuhdan/ tawnhriat (experience)
2) Zunthlum enkawlna tur a nundan/awmdan inthlak te
3) Zunthlum enkawl na a harsatna tawhte
4) Zunthlum enkawl nan a tih thin
Heng zawhna leh interview te hi i duh hunah leh i remchan dan a chhan theih a ni ang a, tum khat a chhan zawh nghal vek a ngai kher dawn lo a ni.

**He research ah hian i tel kher a ngai em?**
He research- a tel hi i tih ngei ngei tur a ni kher lo a. Tel i rem tih hnu ah pawh a chhan leh vang sawi lo in i duh hunah i in hnukdawk (withdraw) thei reng a ni.

**He research ah hian hlawkna enge i neih?**
He research a i tel avang hian hlawkna i hmu dawn lo a, Type 2 diabetes vei mek te rilru chhui zauna a tan nasa takin min pui zawk dawn a ni.

**I himna (Confidentiality):**
I nihna (identity) hi phochhuah a ni lo ang. I chhanna te hi research atan chauh hman a ni ang a, thil dang ah tarlan emaw hman enaw a ni hek lo ang.

Zawhna lemaw thil hriatchian duh i neih chuan ka phone number +91-8790969232 ah emaw ka email MRalte85@gmail.com ah min be pawp reng thei ang.

**Phalna (Consent):**
Kei _____ ( i hming), hian a chung a inziak te hi ka chhiar a. Duh ang tak a inngaihtuah na ka neih hnu ah leh ka hraitthiam loh te ka zawhfiah hnu in he research ah hian tel ka rem ti e.

Contact No:_____ Chhangtu Signature

| | | | |
|---|---|---|---|
| **1. Gender** | | **2. Age** | |
| **3. Marital Status** | | **4. Gender** | Male / Female |
| **5.Duration of disease** | Below one year/ One year to five years / Above five years | | |
| **6. Comorbid condition** | | **7. Contact No.** | |

## PERCEIVED HEALTH COMPETENCE SCALE (PHCS)

**Please answer the following questions by circling the number which best describes how you feel**

| Sl No. | Statement | Strongly Disagree | Disagree | Uncertain | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **1** | I handle myself well with respect to my health. | 1 | 2 | 3 | 4 | 5 |
| **2** | No matter how hard I try, my health just doesn't turn out the way I would like. | 1 | 2 | 3 | 4 | 5 |
| **3** | It is difficult for me to find effective solutions to the health problems that come my way | 1 | 2 | 3 | 4 | 5 |
| **4** | I succeed in the projects I undertake to improve my health. | 1 | 2 | 3 | 4 | 5 |
| **5** | I'm generally able to accomplish my goals with respect to my health. | 1 | 2 | 3 | 4 | 5 |
| **6** | I find my efforts to change things I don't like about my health are ineffective | 1 | 2 | 3 | 4 | 5 |
| **7** | Typically, my plans for my health don't work out well. | 1 | 2 | 3 | 4 | 5 |
| **8** | I am able to do things for my health as well as most other people. | 1 | 2 | 3 | 4 | 5 |

| | | | |
|---|---|---|---|
| **1. Gender** | Mipa ( ) / Hmeichhia ( ) | **2. Kum** | |
| **3. Nupui/ Pasal** | Nei ( ) / Neilo ( ) | **4. Contact No** | |
| **5. Diabetes neih chen** | Kumkhat la tling lo/ Kumkhat atanga kum nga inkar/ Kum nga chunglam | | |
| **6. Natna dang i nei em?** | Nei lo ( ) / Nei( ) | | |

## PERCEIVED HEALTH COMPETENCE SCALE (PHCS)

A hnuaia zawhna te hi uluk takin chhiar la, I mil ber nia i hriat number pek zawn ah khan i thai dawn nia. Chhanna dik leh diklo a awm chuang lo.

| **Sl No.** | **Zawhna** | **Pawm lo hul hual** | **Pawm lo** | **Chianglo** | **Pawm** | **Pawm thlap** |
|---|---|---|---|---|---|---|
| **1** | Ka hriselna chungchangah hian ka in enkawl tha hle. | 1 | 2 | 3 | 4 | 5 |
| **2** | Ka beih nasat viau pawhin ka duh ang in a ka hriselna hi a tha theilo. | 1 | 2 | 3 | 4 | 5 |
| **3** | Ka hrisel lohna tikiang tur hian kawng tha zawk zawn ka harsat hle. | 1 | 2 | 3 | 4 | 5 |
| **4** | Ka hriselna tih that tum a ka beihnate hi a hlawhtling thin hle. | 1 | 2 | 3 | 4 | 5 |
| **5** | Ka hrisel zawkna atan a ka hmachhawp te hi ka hlen chhuak thin. | 1 | 2 | 3 | 4 | 5 |
| **6** | Ka hriselna atana ka beihna te hi a thawk mawh hle. | 1 | 2 | 3 | 4 | 5 |
| **7** | A tlangpui thuin ka hriselna atana ka hmalak nate hi a hlawhtlinglo thin. | 1 | 2 | 3 | 4 | 5 |
| **8** | Ka hriselna atan a ka in enkawl bakah midangte ka hriselna atan hma ka lakpui thin. | 1 | 2 | 3 | 4 | 5 |

**Multidimensional Diabetes Questionnaire (MDQ)**

Treatment of diabetes involves several self-care activities (eg. Diet,exercise, etc.). People sometimes find it difficult, or do not see the importance of following one or more of these self-care activities. We like to know how this applies to you. Read each question carefully and circle this number that corresponds best to your situation.

| Sl No. | **Self efficacy** | Not at all | | | | | | | | | | Very Confident |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | How confident are you in your ability to follow your diet? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 2 | How confident are you in your ability to test your blood sugar at the recommended frequency? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 3 | How confident are you in your ability to exercise regularly? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 4 | How confident are you in your ability to keep your weight under control? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 5 | How confident are you in your ability to keep your blood sugar level under control? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 6 | How confident are you in your ability to resist food temptations? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 7 | How confident are you in your ability to follow your diabetes treatment (diet, medication, blood sugar testing, exercise)? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

| Sl No. | **Outcome Expectancy** | Not Much | | | | | | | | | | Very Much |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | To what extent do you think that following your diet is important for controlling your diabetes? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | To what extent do you think that taking your medication as recommended (pills, insulin) is important for controlling your diabetes? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 3 | To what extent do you think that exercise is important for controlling your diabetes? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 4 | To what extent do you think that measuring your blood sugar is important for controlling your diabetes? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 5 | To what extent do you think that following your diabetes treatment (diet, medication, blood sugar testing, exercise) is important for controlling your diabetes? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 6 | To what extent do you think that following your diabetes treatment (diet, medication, blood sugar testing, exercise) is important for delaying and/or preventing long-term diabetes complications (problems related to eyes, kidneys, heart, or feet). | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

**Multidimensional Diabetes Questionnaire (MDQ)**

Diabetes in a i nun a khoihbuai/tihbuaidan zirchian kan duh a,i awmdan ni a i hriatber a hnuai number ah hian min rinbial/tick sak rawh.

| Sl No. | **Self efficacy** | Inring lo hul hual | | | | | | | | | | Inring tawk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ei leh in mumal taka zawm turin inrin tawkna i nei tha em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 2 | A khat tawka (bituk angin) i thisen thlum test thin tur in inring tawk em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 3 | Mumal taka insawizawi (exercise la) thei tura inrin tawk na i nei tha em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 4 | I taksa rihna(weight) dik tawk chiah a vawng thei turin i inring tawk em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 5 | I thisen thlum (blood sugar) normal tak a vawng turin i inring tawk em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 6 | Ei leh in chungchang a insum ngaihna ah insum thei turin i inring tawk em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 7 | I zunthlum enkawlna a tul (entirnan: ei leh in, damdawi hman, thisen en dik, insawizawi) ti thei turin i inring tawk em? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

| Sl No. | **Outcome Expectancy** | Pawimawh lo | | | | | | | | | | Pawimawh lutuk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | I zunthlum khuahkhirh (control) tur in i ei leh in hian eng chen in nge pawimawhna a neiin i hriat? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 2 | I zunthlum khuahkhirh (control) turin i damdawi hman tur (damdawi mum, insulin) a hun taka ei/ lak hi eng chen chiah a pawimawh nge ni a i ngaih? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | I zunthlum khuahkhirh (control) na ah insawizawi(exercise lak) hi eng chen a pawimawh nge a nih i rin? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 4 | I zunthlum khuahkhirh (control) turin i thisenthlum (blood sugar) mumal taka test thin hi eng chen a pawimawh nge ni a i ngaih? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 5 | I zunthlum khuahkhirh (control) tur in i in enkawlna( ei leh in, damdawi, thisen en dik, insawizawi) hi eng chen chiah a pawimawh in nge i ngaih? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 6 | I zunthlum enkawlna( ei leh in, damdawi, thisen endik, insawizawi) te hi zunthlum in a nghawng theih harsatna (mit, kal, lung, emaw kete lama harsatna) te veng tur emaw tikhawtlai tur emaw in eng chen chiah in nge pawimawh a ingaih? | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

# DIABETES COPING MEASURE (DCM)

Read each question carefully and circle the number that corresponds best to your situation. There are no "right" or "wrong" answer. Please use the following response options:

**1= Strongly Disagree** **2= Disagree** **3= Neutral**
**4= Agree** **5= Strongly Agree**

| | **Tackling spirit** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| 1 | Most people would be a lot healthier if they followed a diabetic diet. | | | | | |
| 4 | Because of my own experience, I can help educate other people about diabetes. | | | | | |
| 9 | I believe that research will discover a cure for diabetes before long. | | | | | |
| 12 | Clinical research is continually improving the treatments available for diabetes. | | | | | |
| 20 | My diabetes has caused me to think about life in a more positive way. | | | | | |
| | **Avoidance** | | | | | |
| 2 | I am reluctant to visit my doctor for my regular diabetes check up when I know I am in poor blood glucose control. | | | | | |
| 3 | I dislike reading about diabetes because it only makes me worry more. | | | | | |
| 5 | When my blood sugars are high I don't bother monitoring them as much. | | | | | |
| 6 | It's difficult to undertake regular blood sugar monitoring into my busy lifestyle. | | | | | |
| 8 | I am uncomfortable talking to people about my diabetes. | | | | | |
| | **Passive resignation** | | | | | |
| 7 | Whatever I do, diabetes complications will continue to ruin my health. | | | | | |
| 10 | I feel like just giving in to my diabetes. | | | | | |
| 11 | I can't do much to control my blood | | | | | |
| 13 | Because of my illness, I cannot plan realistically for the future. | | | | | |
| 14 | I always seem to have poor blood sugars no matter what I do. | | | | | |

| | **Diabetes integration** | | | | | |
|---|---|---|---|---|---|---|
| 15 | Diabetes makes me feel different from everyone else. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | I dislike being referred to as a “diabetic”. | | | | | |
| 17 | Diabetes is the worst thing that has ever happened to me. | | | | | |
| 18 | Most people would find it difficult to adjust to diabetes. | | | | | |
| 19 | Having diabetes over a long time changes your outlook on life for the worse. | | | | | |
| 21 | I think it is unfair that I should have diabetes when other people are so healthy. | | | | | |

**DIABETES COPING MEASURE (DCM)**

A hnuaia zawhna te hi uluk takin chhiar la,number pek zawna ah khan I mil ber I thai dawn nia. Chhanna dik leh diklo a awm theilo a; heng tehna te hi hman tur a ni:

**1= Pawm lo hul hual** **2= Pawm thlap** **3= Ngaihdan neilo**
**4= Pawm ve tho** **5= Pawm thlap**

| | **Tackling spirit** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| 1 | Zun thlum natna vei tam zawk hi chuan ei leh in dan mumal tak, zunthlum veite tan a duan bik hi zawm thei se an hrisel phah sawt ang. | | | | | |
| 4 | Zunthlum vei ve tho ka nih avangin ka thil tawnte a tangin midangte kapui thei a ni. | | | | | |
| 9 | Zunthlum natna tih damna hi damdawi thiamna hmang a an hmuhchhuah vat ka ring tlat a ni. | | | | | |
| 12 | Damdawi lam zirchianna a changkan chhoh zel avangin zunthlum veite tan damdawi tha taktak chhawpchhuah mek zel a ni | | | | | |
| 20 | Zunthlum natna vang hian ka nun pawh a eng zawng a thlir dan ka thiam phah a ni. | | | | | |
| | **Avoidance** | | | | | |
| 2 | Ka sugar ka control tha lo ni a ka hriat hian doctor ka hmuh hreh phah thin. | | | | | |
| 3 | Zunthlum natna chungchang chhiar hian rilru hahna min thlen thin avangin chhiar nuam ka tilo. | | | | | |
| 5 | Ka zunthlum (sugar level) a san hian buaipui en ah ka en lemlo. | | | | | |
| 6 | Ka nitin hun hmandan a buai thin em avangin a khat tawka thisen test reng hi ka hmanlo fo thin. | | | | | |
| 8 | Midangte bula ka zunthlum natna chungchang sawi hi nuam ka ti lo. | | | | | |
| | **Passive resignation** | | | | | |
| 7 | Engpawh ti ila, zunthlum natna leh a kaih hnawih hian ka nun a khawih buai reng dawn tho. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 | In enkawl em em lo a zunthlum natna hi in eiral tir mai ka duh thin. | | | | | |
| 11 | Ka zunthlum chungchangah hian thu ka nei tlem hle. | | | | | |
| 13 | Ka natna avang hian ka hmalam hun atan a ruahman na siam lawk a harsa ka ti thin. | | | | | |
| 14 | Engpawh ti ila, ka zunthlum hian that lam a pan theilo. | | | | | |
| | **Diabetes integration** | | | | | |
| 15 | Ka zunthlum natna hian midangte lakah min ti hrang. | | | | | |
| 16 | Zunthlum natna vei tih a sawi hi ka duhlo. | | | | | |
| 17 | Zunthlum natna hi ka chunga thil thleng rapthlak berte zinga mi a ni. | | | | | |
| 18 | Mi tam zawk hi chuan zunthlum natna vei hi an thiam lo ang. | | | | | |
| 19 | Zunthlum natna rei tak vei hian khawvel kan hmuhdan hi a chhe zawngin thuitak a hruai thin. | | | | | |
| 21 | Mi tam tak an hrisel laia zunthlum natna ka vei bik hi ka vanduai bik ka inti thin. | | | | | |

**DIABETES SELF MANAGEMENT QUESTIONNAIRE (DSMQ)**

The following statements describe self-care activities related to your diabetes. Thinking about your self- care over the last 8 weeks, please specify the extent to which each statement applies to you.

| Sl. No | Statement | Applies to me very much | Applies to me to a considerable degree | Applies to me to some degree | Does not apply to me |
|---|---|---|---|---|---|
| 1 | I check my blood sugar levels with care and attention. ☐ Blood sugar measurement is not required as a part of my treatment. | | | | |
| 2 | The food I choose to eat makes it easy to achieve optimal blood sugar levels | | | | |
| 3 | I keep all doctors' appointments recommended for my diabetes treatment. | | | | |
| 4 | I take my diabetes medication (e. g. insulin, tablets) as prescribed. ☐ Diabetes medication / insulin is not required as a part of my treatment. | | | | |
| 5 | Occasionally I eat lots of sweets or other foods rich in carbohydrates. | | | | |
| 6 | I record my blood sugar levels regularly (or analyse the value chart with my blood glucose meter). ☐ Blood sugar measurement is not required as a part of my treatment. | | | | |
| 7 | I tend to avoid diabetes-related doctors' appointments. | | | | |
| 8 | I do regular physical activity to achieve optimal blood sugar levels. | | | | |
| 9 | I strictly follow the dietary recommendations given by my doctor or diabetes specialist | | | | |
| 10 | I do not check my blood sugar levels frequently enough as would be required for achieving good blood glucose control. ☐ Blood sugar measurement is not required as a part of my treatment | | | | |
| 11 | I avoid physical activity, although it would improve my diabetes. | | | | |
| 12 | I tend to forget to take or skip my diabetes medication (e. g. insulin, tablets). ☐ Diabetes medication / insulin is not required as a part of my treatment. | | | | |
| 13 | Sometimes I have real 'food binges' (not triggered by hypoglycaemia). | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 14 | Regarding my diabetes care, I should see my medical practitioner(s) more often. | | | | |
| 15 | I tend to skip planned physical activity | | | | |
| 16 | My diabetes self-care is poor. | | | | |

## DIABETES SELF MANAGEMENT QUESTIONNAIRE (DSMQ)

A hnuaia zawhna te hi uluk takin chhiar la, I mil ber I thai dawn nia.

| Sl. No | Zawhna | | | | |
|---|---|---|---|---|---|
| 1 | Ka thisen thlum san zawng hi uluk takin ka enfiah thin.<br>☐ Thisen san zawng hun bi taka teh hi in enkawlna (treatment ) ah a tel loh loh zawhna chhan a ngai lo. | Enfiah ziah | Enfiah thin | Enfiah zeuh zeuh | Enfiah lo |
| 2 | Ka ei leh in ka vawn that avang hian ka thisen thlum a pangngai phah. | Panngai phah lutuk | Pangngai phah | Pangngai phah ve tho | Pangngai phah lo |
| 3 | Ka zunthlum chungchangah hian doctor taima takin ka hmu thin. | Hmu ziah | Hmu thin | Hmu zeuh zeuh | Hmu lo |
| 4 | Ka zunthlum damdawi hi tha takin ka ei thin.<br>☐ Zunthlum damdawi/ insulin lak/ei ngaih loh chuan zawhna chhan a ngailo | En ziah | Ei thin | Ei zeuh zeuh | Ei lo |
| 5 | A khat tawkin thil thlum ka ei zeuh zeuh thin. | Ei nasa | Ei thin | Ei zeuh zeuh | Ei lo |
| 6 | Ka thisen thlum san zawng hi hunbi neiin ngun takin ka teh thin.<br>☐ Thisen san zawng hunbi taka teh hi in enkawlna (treatment ) ah a tel loh chuan zawhna chhan a ngailo | Teh ngun | Teh thin | Teh zeuh zeuh | Teh lo |
| 7 | Ka zunthlum natna chungchangah hian doctor ka pan hreh thin hle. | Hreh nasa | Hreh | Hreh zeuh zeuh | Hreh lo |
| 8 | Ka thisen thlum enkawlnan taksa insawizawina ka nei thin. | Nei nasa | Nei | Nei zeuh zeuh | Nei lo |
| 9 | Ka zunthlum natna avang hian doctor in ei leh in tur min duan sakte thuawih takin ka zawm thin. | Zawm nasa | Zawm | Zawm zeuh zeuh | Zawm lo |
| 10 | Ka zunthlum san zawng hi ka check uluk lo hle thin.<br>☐ Zunthlum san zawng hunbi taka teh hi in enkawlna (treatment ) ah a tel loh chuan zawhna chhan a ngailo | Uluk lo lutuk | Uluk lo | Uluk vak lo | Uluk |
| 11 | Tha sen ngaihna lam thil (entirnan: exercise) hian zunthluam vawn na ah min pui mahse ka khawihkhat hle | Khawihkhat lutuk | Khawihkhat | Khawihkhat ve tho | Khawihkhat lo |
| 12 | Ka zunthlum natna damdawi hi ei theihngilh chang ka nei fo.<br>☐ Zunthlum damdawi/ insulin lak/ei ngai loh chuan zawhna chhan a ngai lo. | Nei nasa | Nei | Nei zeuh zeuh | Nei lo |

| | | | | | |
|---|---|---|---|---|---|
| 13 | Ei leh in insum theih loh chang ka nei thin. | Nei nasa | Nei | Nei zeuh zeuh | Nei lo |
| 14 | Ka zunthlum chungchangah hian ka natna lama mi thiamte ka hmuh ngun leh zual angai. | Ka pawm hulhual | Ka pawm | Ka pawm ve tho | Ka pawm lo |
| 15 | Hnathawh tur peh hel chang ka nei thin. | Pehhel nasa | Pehhel | Pehhel zeuh zeuh | Pehhel ngai lo |
| 16 | Ka zunthlum natna chungchang a ka mimal in enkawlna hi a chhe hle. | Chhe lutuk | Chhe hle | Chhe ve tho | Chhelo |

**APPENDIX C**

# Role of Self-efficacy, Outcome Expectancy, Perceived Health Competence in Coping and Self-management of Diabetes Patients

*by* Lalnuntluangi R

**Submission date:** 02-May-2019 11:49AM (UTC+0530)
**Submission ID:** 1123390461
**File name:** Final_Thesis.pdf (2.28M)
**Word count:** 41879
**Character count:** 238719

Role of Self-efficacy, Outcome Expectancy, Perceived Health Competence in Coping and Self-management of Diabetes Patients

ORIGINALITY REPORT

| 9% | 3% | 6% | 7% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | Submitted to An-Najah National University<br>Student Paper | <1% |
| 2 | journals.sagepub.com<br>Internet Source | <1% |
| 3 | Bijal M. Shah. "Depressive Symptoms in Patients with Type 2 Diabetes Mellitus: Do Stress and Coping Matter? : Stress among Patients with Diabetes and Depression", Stress and Health, 04/2012<br>Publication | <1% |
| 4 | "2013 Annual Meeting Abstract Supplement", Arthritis & Rheumatism, 2013. | <1% |

## APPENDIX D

Indian Journal of Health and Wel-lbeing
2017, 8(9), 1040-1043
http://www.iahrw.com/index.php/home/journal_detail/19#list


ISSN-p-2229-5356,e-2321-3698
UGC Approved and have NAAS Ratings

# Self-efficacy, outcome expectancy and self-management of type 2 diabetes patients

R. Lalnuntluangi, Kavya Chelli, and Meera Padhy
Centre for Health Psychology, University of Hyderabad, Central University, Gachibowli, Hyderabad, Telangana

Many diabetes patients neglect their role in management of diabetes, which requires self- management in addition to medical treatment. This correlational study examined self-efficacy, outcome expectancy and self-management of type 2 diabetes patients. It was hypothesized that self-efficacy and outcome expectancy would be predictors of self-management. Seventy eight patients from different hospitals and clinics of Mizoram were administered the Multidimensional Diabetes Questionnaire and Diabetes Self-management Questionnaire. The results provided considerable support of the hypotheses. The implications of the present findings for intervention of chronic illness, shortcomings of the present study and future directions were discussed.

Keywords: self-efficacy, outcome expectancy, self-management, type 2 diabetes patients

Diabetes is one of the most prevalent non-communicable diseases both in developed and developing countries. It is potentially the third leading cause of death and type 2 diabetes specifically has contributed to the decline of life expectancy (Mercola, 2017). India was home to 61.3 million diabetes patients in 2011 with predictions of 101.2 million diabetics by the year 2030 (IDF Diabetes Atlas, 2013). In the recent past, it has increased at an alarming rate and there is a need to manage and prevent this illness from its widespread.

Diabetes self-management is the cornerstone of diabetes care and is crucial to prevent complications of diabetes. Jordan and Jordan (2010) found that 98% of diabetes care depended on self-care. A study done by Diabetes Control and Complications Trial Research Group (1993) also suggested the importance of adhering to self-management activities in order to prevent the potential complications that are associated with diabetes and to have a sense of control over diabetes. Effective diabetes self-management is influenced by various individual factors. Two such factors include self-efficacy and outcome expectancy. Sarkar, Fisher, and Schillinger (2006) demonstrated the crucial role played by self-efficacy in improving or enhancing an individual's self-management. A study showed that self-efficacy is one of the most important factors contributing to self-management among chronic illness patients, especially diabetes (Shortridge-Baggett, 2001). Another study by Stuifbergen, Seraphine, and Roberts (2000) found that self-efficacy was successful in initiating and maintaining medical behaviours.

Self-efficacy is a concept which was derived from Social Cognitive theory which refers to a person's belief about his/her ability to successfully execute duties and responsibilities. Self-efficacy can be used to describe the interaction between personal and behavioural factors in chronic illness or general health since it involves individual's ability and confidence to perform health behaviours they engage in (Lorig & Holman, 2003). Self-efficacy has been found to contribute to appropriate self- management among patients with various chronic health conditions (Aljasem, Peyrot, Wissow, & Rubin, 2001). Self-management involved incorporating personal and behavioural factors into daily performance of recommended activities (Aljasem et al., 2001); this proved the relevance of self-efficacy for enhancement of self-management.

Outcome expectancy is another factor which can contribute to the enhancement of self-management among diabetes patients. A study by Williams and Bond (2002) involving diabetic patients revealed significant positive relationship between outcome expectancies and self-care for exercise and glucose testing, but not for diet and an average of 10 percent of the variance in self-care was attributed to outcome expectancies. Another study by Wu et al. (2007) found a positive relationship between outcome expectations and self-care behaviour in people with type 2 diabetes in Taiwan.

Self-efficacy and outcome expectancy are two concepts which are closely related. Self-efficacy, the belief about one's ability to successfully perform behaviour, is independent of outcome expectancy, a belief about the likelihood of the behaviour leading to a specific outcome. Hence, self-efficacy and outcome expectancy are two independent entities and have independent outcome on behavioural change (Maddux, Sherer, & Rogers, 1982). Bandura's (2006) social learning theory stated that self-efficacy and outcome expectancy are two major determinants of coping behaviour; this showed that the two concepts worked hand in hand successfully. He also suggested that (a) expected outcomes do not causally influence self-efficacy, but (b) self-efficacy judgments remain valid when causally influenced by expected outcomes. In other words, self-efficacy causally influences outcome expectancies, but not vice versa (Bandura, 2004- 2006).

Many studies suggested that there exists a significant relationship between self-efficacy and outcome expectancy (Kobau & DiIorio, 2003; Williams, 2010; Zebracki & Drotar, 2004). A study on chronically ill patients found that self-efficacy and outcome expectancy played significant role in maintaining recommended lifestyle behaviour, which is an important factor of self-management (Kobau & DiIorio, 2003). Lin and Ward (1996) found that self-efficacy and outcome expectancy positively correlated with perseverance of coping effort among chronic low back pain patients.

### *The present of the study*

Self-efficacy and outcome expectancy are among many other factors which are essential to enhance and maintain self-management among

Correspondence should be sent to R. Lalnuntluangi
Centre for Health Psychology, University of Hyderabad
Central University, Gachibowli, Hyderabad, Telangana
E-mail: teteyralte@yahoo.in

# Health Hardiness and Illness Perceptions in Type 2 Diabetes Patients

*Kavya Chelli*[*], *R. Lalnuntluangi*[**] *and Meera Padhy*[***]

## ABSTRACT

*Illness perceptions that the patients have about their illness and health hardiness play a significant role in various health outcomes in patients. Assessing these two constructs in type 2 diabetes patients might be helpful in designing health promotion strategies, which in turn influence better management of the condition. With this background the study was intended (1) to assess the relationship between health hardiness and illness perceptions and (2) to find out the impact of the health hardiness on illness perceptions in type 2 diabetes patients. Utilizing a correlational design seventy seven individuals with type 2 diabetes were recruited in the study and were administered revised health hardiness inventory-24 and illness perception questionnaire-revised. The results revealed a significant difference between symptoms experienced and symptoms attributed to type 2 diabetes. Both significant positive and negative correlations were observed between health hardiness and illness perceptions. Health hardiness explained significant proportion of variance in illness perceptions. The limitations and implications of the study are discussed.*

**Key words:** Health hardiness, illness perceptions, type 2 diabetes

[*] Research scholars, Centre for Health Psychology, University of Hyderabad, Central University, Prof C.R. Rao Road; Gachibowli; P.O., Hyderabad – 500046; Telangana; (India), Email ID:kavyahcu@gmail.com, teteyralte@yahoo.in

[**] Research scholars, Centre for Health Psychology, University of Hyderabad, Central University, Prof C.R. Rao Road; Gachibowli; P.O., Hyderabad – 500046; Telangana; (India), Email ID:kavyahcu@gmail.com, teteyralte@yahoo.in

[***] Corresponding author-Assistant professor, Centre for Health Psychology, University of Hyderabad, Central University, Prof C.R. Rao Road; Gachibowli; P.O., Hyderabad – 500046; Telangana; (India), Email ID: meerapadhyuoh @gmail.com, Ph No: 040 23013228.

Indian Journal of Health and Well-being
2018, 9(3), 392-396
http://www.iahrw.com/index.php/home/journal_detail/19#list


ISSN-p-2229-5356,e-2321-3698
UGC Journal No 42787 and NAAS Ratings 4.13

# Conceptual complexity in children's understanding of diabetes

Meera Padhy
Centre for Health Psychology
University of Hyderabad
Hyderabad, Telangana

R. Lalnuntluangi and Kavya Chelli
Centre for Health Psychology,
University of Hyderabad
Hyderabad, Telangana

Meena Hariharan
Centre for Health Psychology
University of Hyderabad
Hyderabad, Telangana

C. Raghavendra Rao
School of Computer and Information Sciences, University of Hyderabad, Hyderabad, Telangana

Diabetes is one of the highly prevalent non communicable diseases (NCD) that has invaded both developed and developing countries. The WHO projections for the world as well as specific countries are highly alarming. Interventions consequent upon these projections must target children who constitute vulnerable population for the projected year. The first stepping stone towards such intervention is to measure the existing knowledge about the disease in children. The present study combined the qualitative and quantitative methods in exploring children's concept of diabetes. A sample of 548 children from three schools studying in class VI through X were administered an open ended question to get data on children's understanding of the concept of diabetes. The data were analyzed qualitatively and quantitatively. The content analyses identified five broad themes, viz., the definition, causes, symptoms, consequences and management of diabetes. Responses indicating misconceptions were grouped separately. A new method of measuring the complexity of the concept was used. The response divergence indicating explanation of the disease across the themes was measured by computing 'Entropy values' using a formula. The response divergence or conceptual complexity was measured for each class. Results indicated a sudden spurt in conceptual complexity in class X. Results also indicated a dismally low level of knowledge about diabetes and large number of misconceptions. Low levels of knowledge and huge misconceptions warrant public health measures through awareness programmes in campaign mode.

Keywords: concept development, concept of diabetes, children's knowledge, entropy, conceptual complexity

The non-communicable diseases (NCDs) also known as life-style diseases are of major concern across the globe. According to Global Status Report on NCDs (2014), non-communicable diseases contribute to around 5.87 million deaths that account for sixty percent of all the deaths in India. Diabetes, a major NCD refers to a condition in which there are high blood sugar levels over a prolonged period. While genetic predisposition is an identified factor, the other major factor related to its etiology is lifestyle. Absence or inadequate exercise, unhealthy dietary habits, heightened levels of stress and obesity are some of the identified risk factors. According to Diabetes Atlas (Diabetes Atlas, 2015) the number of diabetics in India is expected to be 109 million cases by the year 2035 out of an estimated population of 1.5 billion.

Considering the prevalence of the disease in India and the projections, the wisdom lies in designing major interventions targeting that age group of population for which the projections are made. That would be the appropriate preventive action for the future health of the nation. This calls for creating awareness in the age group between 11 years to 16 years, i.e., the school children who will be in their vulnerable age group for diabetes in the year 2035. In this context, taking a scientific approach to study the level of understanding of the disease of diabetes among school children assumes significance. Research have demonstrated that children develop their causal beliefs about illness and health based on their cognitive development (Natapoff, 1982; Williams & Binnie, 2002) and the accuracy of knowledge about disease causality has been found to increase and became differentiated with age (Sigelman, Maddock, Epstein, & Carpenter, 1993). According to Campbell (1975), as children move toward adulthood, their knowledge becomes enlarged, organized and continuously transformed.

A number of studies have been conducted on school students assessing their awareness of NCDs. In a study by Divakaran, Muttapillymyalil, Sreedharan, and Shalini (2010) school students of classes VI to X were assessed regarding the awareness of risk factors of NCDs (cancer, CVD's, diabetes). The findings revealed that majority of the students (84.8%) had a very low awareness about lifestyle risk factors of non-communicable diseases. And a dismally low percentage accounting to 0.8% had good knowledge about the lifestyle risk factors. It was revealed from a study that awareness of risk and preventive factors for NCDs was low among rural school children. Further knowledge levels of children from government schools regarding NCDs were found to be lower compared to those studying in private schools (Ade, Chethana, Mane, & Hiremath, 2014). These findings related to rural school children between the age group of 11 to 16 years. However, the study by Okoh and Jaja (2014) revealed an encouraging trends of progressive increase in knowledge across classes. The study also recorded the misconception that related to excessive consumption of sugar as antecedent of diabetes.

When it comes to measuring children's conceptualization of health and illness related aspects, researchers have used different methods such as draw-and-write technique (Piko & Bak, 2006) and vignette method (Myant & Williams, 2005). In addition to these

Correspondence should be sent to Meena Hariharan
Professor, Centre for Health Psychology, University of Hyderabad
Prof C. R. Rao Road, CUC, Gachibowli, P O Central University,
Hyderabad, Telangana
Email: meena.healthpsychology@gmail.com

Research Paper
p-ISSN 2319-3611
e-ISSN 2349-9311



Meera Padhy et al,
Int. J. of Social & Allied Research (IJSAR),
Vol.6(1): pp.9-16 (2017)

# WELL-BEING OF PATIENTS WITH TYPE 2 DIABETES: ROLE OF SELF-EFFICACY AND OUTCOME EXPECTANCY

**Meera Padhy[1*], Purvi Chottai[2], R. Lalnuntluangi[3]**
*Assistant Professor[1], PhD Research Scholar[3]*
*Centre for Health Psychology, University of Hyderabad, Telangana, India.*
*Health Psychologist[2], Hope Trust, Hyderabad, Telangana, India.*

Abstract

*The objective of the present study was to investigate the role of self-efficacy and outcome expectancy in the well-being of Type 2 diabetes patients. One hundred fifty participants were made to fill out a Multidimensional Diabetes Questionnaire (MDQ) and Mental Health Continuum-Short Form (MHC-SF) along with a demographic questionnaire. Hierarchical regression analysis was computed to identify the psychological and demographic constructs. The results indicated a positive correlation between self-efficacy, outcome expectancy, and well-being. Outcome expectancy was seen to be a significant indicator of well-being in all the models considered in the hierarchical regression analysis. The results also indicated that men have a higher sense of well-being than women. The findings are indicative of development of various intervention strategies that can improve the self-efficacy and the beliefs about the illness in order to enhance the well-being of the diabetes patients.*

**Keywords:** *Self-efficacy, Outcome expectancy, Well-being, Type 2 diabetes, Wellbeing of patients, Diabetes.*

## 1. INTRODUCTION

With the rapid growth in industrialization, there has been a tremendous change in the lifestyle pattern making diabetes mellitus a global epidemic and therefore, a major cause of prolonged ill health and premature mortality. It has been anticipated that a high range of diabetes patients fell in between the age of 40 years to 59 years and the number may remain so with almost equal number of diabetes patients falling in range of 60-79 years age group. It has been estimated that there would be an increase in the cases of diabetes mellitus (50.7% on an average) of the total world adult population from 2011 to 2030[1,2].

With the progress in globalization, diabetes is at a pace in becoming an international health burden, especially in countries with minimal resources and increasing clinical problems. Owing to the diabetes as a chronic illness, it is important that the treatment focuses not only on physical outcomes of the medication but also on various other psychosocial factors that may help in effective self-management. Therefore, it is vital that patients follow a self-care regimen that includes lifestyle modification.

By making a judgment about one's capabilities to deal with a particular situation, an individual would dwell upon putting the thought into action only when he or she believes that the results that may be produced would be desirable and hinder the inimical ones. With a belief of producing positive outcomes, these individuals have an incentive to act or to persevere in difficult situations. Hence, on the basis of these beliefs, people determine what kind of challenges to take up, judging if the failures would be motivating or intimidating and thereby choose the amount of efforts to expand in the health promoting venture.

Within this framework, outcome expectancies are essentially beliefs about the way the world works, that is, about how contingencies are arranged or relationships between actions and their consequences.

Bandura (1990)[3] defined outcome expectancies as "a person's estimate that a given behavior will lead to certain outcomes." The concept of outcome expectancy flows from the theory of self-efficacy and is likely to impact behavior wherein an increase or decrease in performing a certain behavior is due to the positive or negative outcome expectancy. Outcome expectancy influences the individual's perceptions of self-efficacy and therefore, outcome expectancy plays a crucial role in decision-making about a certain behavior. A structural equation modeling analyses done in a study by Cormier et al (2016)[4] indicated a significant positive relationship



Vol.6(1) October 2017
*Corresponding Author

Recent Advances in Psychology:
An International Journal
Peer Reviewed
2017, Vol. 4 (1), Jan.-June, pp. 18-29

ISSN- 2395-5465
UGC Approved: No. 43276

# Self -efficacy and Health Locus of Control in Primary Hypertensive Patients

**Meera Padhy*, Neelima Krishnakumar**, Kavya Chelli*** & R. Lalnuntluangi******

Abstract

*The objectives of the study were (1) to find out the role of duration of illness on self-efficacy and health locus of control (2) to explore the relationship between self-efficacy and health locus of control and (3) to assess the impact of self-efficacy on health locus of control of primary hypertensive patients. A between-subjects design was adopted and 150 individuals were grouped into three categories on the basis of duration of illness below one year, between one to five years and above five years and were administered the chronic disease self-efficacy and multi-dimensional health locus of control scales. Results revealed that the three groups differed significantly in internal and doctors health locus of control as well as in the level of self-efficacy. The internal health locus of control was found to have a significant positive correlation and doctors health locus of control was found to have a significant negative correlation with self-efficacy. Findings revealed the impact of self-efficacy on different dimensions of health locus of control. The implications of the study are discussed.*

***Key words:*** *Self-efficacy, health locus of control, primary hypertensive patients*

Hypertension (HTN), also known as high blood pressure is a non-communicable disease and is one of the leading causes of death and disability in India. According to the World Health Organization (2011) the prevalence of high blood pressure in Indians is 32.5 percent and by 2025, the rates of hypertension are estimated to rise to 22.9 % for men and 23.6% for women in India(Kearney, Whelton, Reynolds, Muntner, Whelton, & He, 2005).Pharmacotherapy and management of hypertension are the two major approaches to the treatment for most of the patients. Management of the condition can sometimes be challenging to the

**Assistant Professor (Corresponding author) ; Centre for Health Psychology, University of Hyderabad, Central University, Prof C.R. Rao Road; Gachibowli; P.O., Hyderabad 500046; Telangana; (India), Email ID: meerapadhyuoh@gmail.com*

***Freelance Psychologist (M. Sc Health Psychology), Bangalore, India; Email ID : neels408@gmail.com*

****&****Research Scholar (M. Sc Health Psychology); Centre for Health Psychology, University of Hyderabad, Prof C.R. Rao Road; Gachibowli; P.O., Hyderabad 500046; Telangana; (India), Email ID: kavyahcu@gmail.com ; teteyralte@yahoo.in*

**Amity Journal of Healthcare Management**
**1(1), (33–40)**


# Social Support and Adherence among Hypertensive Patients

**Meera Padhy, R Lalnuntluangi, Kavya Chelli & Ruth Angiel Padiri**
*University of Hyderabad, Hyderabad, Telangana, India*

**(Received: 24/11/2015; Accepted: 04/05/2016)**

**Abstract**

Adherence to prescribed medical regimen plays a key role in sustaining health and well-being of individuals with hypertension. Among various factors social support seems to have a significant influence on adherence. With this background, this study was carried out with the following objectives- (1) to find out the role of gender in social support and adherence (2) to explore the relationship between social support and adherence and (3) to find out the effect of social support on adherence among hypertensive patients. Utilizing between subjects design, one hundred and fifty (75 men, 75 women) hypertensive patients were recruited from various hospitals in Mizoram, India and were administered the Interpersonal Support Evaluation List and Compliance Scale for hypertensive patients. Data were analysed using independent t test, Pearson r and simple regression. Independent t test indicated a significant gender difference in social support and adherence. A significant positive correlation was noticed between social support and adherence. Social support predicted a significant proportion of variance in adherence among hypertensive patients. The findings illuminate the role of social support in adherence to medical regimen. Psychosocial interventions to optimize social support in enhancing the adherence among patients with hypertension are of great importance in health care management.

**Keywords:** Social Support, Adherence, Hypertensive patients

**JEL Classification***:* I1, I12

**Paper Classification**: Research Paper

## Introduction

Hypertension or high blood pressure is a chronic condition that affects people all over the world. According to World Health Organization (WHO, 2013), over 140 million Indians were considered to have high blood pressure and the number is expected to cross 214 million mark in 2030. As per the World Health Organization 2008 estimates, the incidence of higher blood pressure in Indian men and women was 33.2% and 31.7% (WHO, 2011). According to the survey conducted by Integrated Disease Surveillance Project in 2007-08 on non-communicable disease risk factors, 19.6 % of hypertension cases were reported in north-eastern state of Mizoram, India (Ministry of Health and Family Welfare).