



Psychosocial Aspects of Diabetes Care and Family-Integrated Diabetes Education

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Authors' contributions

This work was carried out in collaboration between both authors. The manuscript was mainly written by author LYO with the supervision of author AOO as part of the literature review of an ongoing PhD thesis. Both authors were involved in the conception of the idea, literature search and the reading and approval of the final manuscript.

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ABSTRACT

Diabetes mellitus (DM) is a complex, multifaceted condition, which has to be managed throughout the entire life of an individual diagnosed with it. It is complex and multifaceted because it requires a combination of various behavioural modifications. These modifications include changes in diet, the inclusion of an exercise programme in weekly/daily schedule, learning and practising new skills such as self-administration of insulin injection, drawing blood through finger-prick, among others. These changes, along with fear and anxiety about hypoglycaemia, place a lot of psychological stress on the person living with diabetes, since man is a bio psychosocial being.

Psychosocial support from family members can reduce the burden associated with managing DM. However, the psychosocial aspect of DM care is often overlooked by healthcare workers and family members.

The paper highlights the meaning of psychosocial support, the concept of man as a biopsychosocial being; the social and psychological effects of diabetes mellitus; ways of providing psychological support to the patient, importance of family members' diabetes-education and theories that are associated with psychosocial care.

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1. INTRODUCTION

The prevalence of diabetes mellitus continues to increase worldwide with low and middle –income countries bearing 80% of the burden of the disease, [1]. It is one of the leading non-communicable diseases along with cardiovascular diseases, cancers, chronic respiratory diseases, leading to 43% of premature deaths (before the age of 70 years), [2]. The American Diabetes Association [3] stated that ‘diabetes is a complex, chronic illness requiring continuous medical care with multifactorial risk-reduction strategies beyond glycemic control’, (p.S1).

It is a disease that causes fear, anxiety, depression and reduction in the quality of life of those who are diagnosed with the disease. These associated problems can affect adherence to medication and lifestyle changes, [4-6]. It is therefore pertinent that diabetes management should require, not only the input of the patient and healthcare professionals but also the cooperation of family members who provide psychosocial support. Man is a bio- psychosocial being, who usually functions within a family system and is thus influenced by situations around him through social learning. It is therefore imperative for family members to be highly educated about the cause, characteristics and management of diabetes mellitus. This will enhance the ability of family members to effectively provide psychosocial support for the patient and help in the prevention of complications. This education is best conducted through an integrative platform that includes the patient and at least one family member. This will further help in concretizing individual management goals and in addressing psychosocial problems identified during the psychosocial assessment carried out at the first visit, as recommended by American Diabetes Association [5].

2. DEFINITION OF PSYCHOSOCIAL CARE

The word ‘psychosocial’ is a combination of two words, ‘psyche’ and ‘social’. Etymologically, the word ‘*psyche*’ has both Latin and Greek roots. In Latin, ‘psyche’ means animating spirit; while in Greek, the word ‘*psykhe*’ refers to ‘the soul, mind, spirit, breath, life, the invisible animating spirit or entity which occupies and directs the physical body [7].

The word ‘social’ originates from the Latin word ‘*socialis*’ which means companionship; allies; living with others. Hence, psychosocial refers to that aspect of the individual related to the operation of the mind – often seen in external behaviours - and relationship with other individuals, [8]. It can modify the physical/biological aspect of a person. Psychosocial has also been described as that “pertaining to the psychological development of the individual in relation to his or her social environment” [9].

Shumaker and Brownell [10] defined psychosocial care as “an exchange of resources between two individuals perceived by the provider or recipient to be intended to enhance the well - being of the recipient”. It encompasses both psychological and social support. According to Kirk et al. [11], “support systems that include the involvement of family and friends can often play a positive role in the encouragement of individuals to adhere to often complex regimens”.

It is important that the provider of psychosocial care is able to recognize the need to offer this care and when to offer it. This care/support can be in the form of emotional, appraisal, informational and tangible support [12]. It has been suggested that social support can be a mediator or moderator of health outcomes [13]. This can occur either directly leading to some beneficial effects irrespective of the stress level or indirectly by providing the wherewithal to alter the negative consequences of high – level stress conditions [13].

Furthermore, according to Dam Van et al. [12], in the context of diabetes management, psychosocial care can, and is often provided by the family and friends of the person living with DM (PWD). It can also be provided by peers, neighbours, colleagues, fellow patients, penfriends and even social networking on the internet.

3. THE CONCEPT OF “MAN AS A BIOPSYCHOSOCIAL BEING”

Diabetes affects the totality of a person and as such has biological, psychological and social dimensions. Health care workers must be aware of these dimensions and should also take steps to promote ways by which needs arising from these dimensions can be met. An understanding

of the biopsychosocial model can be an effective tool in achieving this.

The biopsychosocial model as compared to the biomedical model views disease on a broader scope in which biological, (genetic, biochemical), psychological (mood, personality, behaviour), and social (familial, cultural, socio-economic, medical) factors interact [14]. The model was developed by George Engel in 1977, [15] who believed that physicians who want to fully understand and care for patients who are suffering must take into cognizance and attend to the biological, psychological, and social facets of illness at the same time. His approach was holistic and was an alternative to the then more popular biomedical approach which had dominated the medical world in developed societies since the mid-20th century.

Engel's biopsychosocial model which came about three decades after the World Health Organization (WHO)'s definition of health brought about a link between the model and the definition. In 1948, WHO [16] had defined health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity"

4. PSYCHOSOCIAL EFFECTS OF DIABETES MELLITUS

DM has many effects on the psychosocial state of an individual. The manifestations of these effects can take varied forms. Some of the effects of diabetes are:

Hypoglycaemia related fear and anxiety: Mandrik et al. [4] reported that the possibility of having hypoglycaemia episodes can cause fear, anxiety and depression with a subsequent negative impact on patient's feeling of well-being. According to the authors, some of the specific instances which cause these negative effects are: being afraid of having hypoglycaemia in public, having hypoglycaemia when alone with no one around to make available the needed help, fear of collapsing, among others. Generally, the hypoglycaemia related fear and anxiety often lead to the curtailment of physical activities, moving the time of insulin administration, having an extra meal and reducing long – distance journeys.

Furthermore, hypoglycaemia leads to a reduction in the health-related quality of life of diabetic patients, [17]. Other indicators of

anxiety are finding it challenging to maintain control when required to bear responsibility for other people or finding it difficult to perform important tasks due to low sugar level, [4].

Reduced work productivity and employment discrimination: DM patients sometimes suffer from discrimination at work because of employers' erroneous belief about DM. Some employers believe that people with DM will not perform maximally at work or absent themselves from work due to possible frequent hospitalizations and complications of the illness, [18].

In the United States (US) for instance, people with diabetes are not allowed into military service on the claim that 'serving in the US military requires a certain level of physical fitness and freedom from any disability "that may require excessive time lost from duty for necessary treatment.". While this is a necessary prohibition for the security of the nation, it has a psychological and social impact on people with diabetes who may wish to enlist in the military, [19]. In some societies, military personnel who develop diabetes are discharged, although in some other places, they are simply required to bring testimony from health professionals that DM will not interfere with their work, [20]. Nebika-Pedrotti et al. [21] reported a 5 – 11% workplace discrimination against individuals with diabetes in Switzerland.

Reduction in quality of life: People with diabetes mellitus tend to have poor quality of life when compared with those who do not have DM, [9]. Various factors are responsible for this. The fact that DM makes demand on lifestyle and causes debilitating and life-threatening complications affect the patients' feeling of wellbeing and social life. The economic burden of managing DM is another reason that leads to poor quality of life. This is particularly poignant in developing countries with poor health care and lack of financial support from the government to DM patients, [18]. In addition, lifestyle changes including weight reduction in those who are obese, alcohol cessation, modification of food intake are challenging and often affect the patients' sense of wellbeing. These, added to the lack of understanding and support from family, colleagues and peers further cause psychological and social complexes, [18].

5. PSYCHOSOCIAL SUPPORT FROM FAMILY AND EFFECTS ON DIABETES MANAGEMENT

Studies have described the advantages of social support in diabetes care and education. Some authors reported that family members of people with diabetes assisted them with exercise [22]; and ensured adherence to the diabetes diet, [23-24]. In addition, Garcia – Huidoro, [25] reported a reduction in diabetes patients' A1C as a result of family support. Furthermore, family coherence and structural togetherness had a positive impact on the quality of life of persons with diabetes mellitus, [26]

6. NEGATIVE BEHAVIOR OF FAMILY AND EFFECTS ON DIABETES MANAGEMENT

Mayberry and Osborn, [27] stated that when diabetes patients perceived family members as non - supportive, medication adherence became worse and glycosylated haemoglobin levels also increased. Lack of family support experienced by diabetes patients was manifested in the form of nagging, and arguing, dietary control pressures, censures and overprotection, [28-31]. Some individuals with diabetes affirmed that family members created obstacles to self-care, caused stress, and lack of motivation towards self-care activities due to spousal grief, [32-33; 28]. In contrast to the findings of most authors, Kang et al. [34] found no significant association between family support and self - care behaviour.

7. UNCERTAINTY AMONG FAMILY MEMBERS AS A RESULT OF ILLNESSES

A theory was put forward by Mishel in 1988 [35] about the uncertainty patients feel about the outcome of their illness particularly when the illness is chronic. Building on the basis of this theory, other authors, [36-37], have demonstrated that family members perpetually experience high – levels of uncertainty too. This, as demonstrated by the authors, may further decrease the amount of support offered to the patient by the family.

Furthermore, uncertainty is made worse when health care providers offer simplistic and unclear information that fail to meet the needs of family members. This also occurs when health care providers are viewed as being incapable of

helping to effectively manage the illness, [38]. Mishel, [39], further asserted that structure providers (credible authority, social support and education) help reduce uncertainty in a direct way by helping patient and family understand events surrounding the illness.

8. THE NEED TO ENHANCE THE KNOWLEDGE OF FAMILY MEMBERS

Different beliefs about diabetes by people with diabetes and their family members have been documented, [29,40]. Some family members understand diabetes as being very severe than do persons with diabetes, [41-42]. Inadequate or lack of knowledge about diabetes by persons with diabetes and their family members may be responsible for this. The necessity for more knowledge and understanding of diabetes particularly as regards healthy eating and better spousal communication have been expressed by individuals with diabetes and their family members, [43]. Adejoh [44] made a similar finding among a group of Nigerians where persons with diabetes attributed family members' non – supportive behaviour to inadequate knowledge about diabetes.

When persons with diabetes perceived that their family members were more knowledgeable, they also perceived them as giving diabetes-specific supportive behaviour and were more adherent to treatment, [26]. However, the same authors reported that the reverse was the case when diabetes patients perceive family members as being unsupportive.

9. RECOMMENDATION OF THE AMERICAN DIABETES ASSOCIATION (ADA) ON PSYCHOSOCIAL EVALUATION AND CARE

It has been demonstrated that psychological and social problems can weaken the individual or family's ability to perform tasks associated with diabetes care thus negatively affecting health status, [5]. This underlines the need to include assessment of psychological and social states as an ongoing aspect of the medical and nursing management of DM. Aspects of this evaluation include for example, attitudes about the illness, expectations for medical management and outcomes, affect/mood, general and diabetes-related quality of life [5].

Other specific recommendations made by ADA [5] to health care providers involved in DM care include:

- Integrating psychosocial care into collaborative patient – centred medical care, made available to all patients with diabetes. This integrated care should be aimed at optimizing specific and clearly defined health outcomes such as glycaemic target and health-related quality of life.
- Assessing psychosocial related symptoms such as diabetes distress, depression, anxiety, disordered eating, and cognitive capacities. This should be done using patient- appropriate, culturally - tailored standardized/validated instrument at the first visit, at intermittent intervals, and when there is an alteration in the pattern of the disease, treatment or life situation. It is also advisable to include caregivers and family members in the assessment.
- Monitoring the diabetes self-management behaviours as well as psychosocial influences on these behaviour.
- Assessing life situations that can impact the psychological and physical health outcomes of the patient and include this in the management plan.
- Ensuring that psychosocial issues identified at first visit are attended to and if necessary arranging for a follow – up visit and referral to psychologist or social worker

10.IMPROVING PSYCHOSOCIAL CARE THROUGH FAMILY-EDUCATION: APPLICABLE THEORIES

Health care workers and others involved in the care of diabetes mellitus patients can be further guided in assisting these individuals maintain their health by being guided by certain related theories. These theories include: the Family Systems Theory (FST), the Social Cognitive Theory (SCT) and Pender's Health Promotion Model.

10.1 The Family Systems Theory

The family systems theory was developed from the General systems theory. System is a bounded set of interrelated elements exhibiting coherent behaviour, [45]. Families are seen as systems due to their having interrelated objects/elements, exhibiting coherent

behaviours, having regular interactions and interdependence on one another.

The key concepts of FST are interrelated elements and structure, patterns of interaction, boundaries, composition law, messages and rules, and subsystems.

Family systems have interrelated elements and structure. Family members constitute the elements of a system. Individual elements have particular features and there are relationships among the elements. These relationships occur in an interdependent manner.

Structure: This is created by the interrelationships among the elements of a system.

Family systems interact in patterns. The interaction of the elements in a family system is predictable. This predictability leads to stability within the family and acts as pointers to family elements about how to act.

Family systems have boundaries which can either be 'open' or 'closed'. Open boundary means that the family systems permits influence from outside the family to act upon it. Closed boundary means elements are separated or segregated from external influence. In reality, a family functions to incorporate both types of boundary.

The family system functions by the Composition Law: There are distinctive characteristics of the family as a whole system which is not a feature of individual elements.

A family system utilizes messages and rules to form members. Even though they are not usually written down, they direct and check the behaviour of family members along the family life span.

Family systems have subsystems. All family systems comprise of some small groups of 2 -3 family elements. The relationships among these people are called alliances, coalitions or subsystems, each having rules, boundaries and particular features.

The diabetes patient is an element within a family and interacts with other elements/ members of the family, hence the need to ensure a proper education of family members about the causes, symptoms, management and complications of

DM. A ready solution to ensuring adequate knowledge by family members is to integrate them into the education of the patient through a family – integrated diabetes education. This fact is further buttressed by Tucker as cited by Surey, [46] who stated that “the diabetic patient is a single element in the family and is interdependent with the other members who are also elements within the family structure. In order to maintain haemostasis the diabetic patient and the family take up different roles and abide or frame different rules. These rules are rarely, explicit or written down. The roles and rules give power; induce guilt; control or limit behaviours; among the family members thereby providing supportive or non-supportive behaviours for health maintenance”.

Application of concepts of FST to family - integrated diabetes education: Interrelated elements and structure within the family systems: The diabetes patient is an element within a family system and relates with other elements (individuals) within the family. The relationship of the diabetes patient with other members is interdependent. Hence, a good understanding of diabetes by family members or a significant family member will make it possible to meet the need for support with managing diabetes that is unique to the patient. This understanding can be enhanced through family - integrated diabetes education.

Structure: The existence of predictable and expected pattern of behaviour in the family of a person with diabetes can make it difficult or otherwise for a patient with diabetes to adhere to diet, exercise, medication and self - monitoring of blood glucose. For instance, if the patient is a

man and his wife and children have a preference for high calorie foods such as cake, ice cream, and fried food, then he may be constrained to join in and will fail to adhere to diabetes diet. However if the family ethnicity favours less calorie meal it will make it easier for the Diabetic patient to adhere to diet that will help to control his blood glucose levels.

10.2 The Social Cognitive Theory (SCT)

The SCT was developed by Bandura [47] by introducing concepts from cognitive psychology into social learning theory. The concepts from psychology helped in understanding factors that influence learning from symbolic communication, experience and observation. In 1997, Bandura [48] introduced concepts from sociology and political science. This was done in order to better appreciate the ability of groups and society to function and adapt. Finally concepts from humanistic psychology have shaped the theory. These latter concepts have helped in determining the issues behind determination, altruism and moral behaviour. According to SCT, human behaviour is a consequence of the “dynamic interplay of personal, behavioural and environmental influences” [49].

The main concepts of SCT are: reciprocal determinism, outcome expectations, self - efficacy, collective efficacy, observational learning, incentive motivation, facilitation, self - regulation, moral disengagement. Some of the concepts of SCT which are applicable to psychosocial support in DM care and their respective applications are summarized in the table below:

Concept	Definition	Application/ illustration
Reciprocal determinism	Environmental factors affect individuals and groups. No amount of learning will cause behaviour change unless there is environmental support for the behaviour [even though individuals and groups can also control their own behaviour].	Diabetes patients’ knowledge of diabetes and self- care activities can be enhanced by giving diabetes education to family members as well. This can lead to better adherence to diet, exercise, medication and self -glucose monitoring can be affected by family members’ support.
Observational Learning	Learning to perform new behaviour by exposure to interpersonal displays of them	During family integrated diabetes education, diabetes patients and family member (s) learn new skills from the DM educators to manage diabetes better. Teaching is done by both didactic and demonstration and repeat demonstration by the learners. The skill include blood glucose monitoring, insulin administration and goal setting

Concept	Definition	Application/ illustration
Facilitation	Providing resources or tools that make new behaviours easier to perform	Providing diabetes patients and family members with health education materials such as booklets or DVDs, as reminder of effective diabetes management.
Self – regulation	Controlling oneself through self-monitoring, goal setting and enlistment of social support	Control signifies adherence to Self - Monitoring of Blood Glucose, (SMBG), exercise, medication and diet. This is enhanced by family support and health care support leading to improvement in quality of life (QoI), fasting blood glucose (FBG) and glycated haemoglobin (HbA1c).

10.3 The Health Promotion Model by Pender

The Health promotion model (HPM) was developed by Nola J. Pender in 1982 [50]. The model was built on holistic nursing perspective, social psychology and learning theory. The Social learning theory which later became the social cognitive theory (highlighted above) is a major construct in the development of the model. The HPM explores behaviours that lead to improvement in the health status of an individual.

According to the model, every individual possesses specific experiences and attributes that affect latter actions. The set of variables for behavioural specific knowledge and affect have important motivational significance. Nursing actions can help in shaping the variables that affect individual actions. The outcome of interest to the intervening nurse is health promoting behaviour with measurable outcome. It is expected that health promoting behaviour should lead to better health status, improvement in ability to function and enhanced quality of life.

The model encompasses the following three major concepts as described by Gonzalo [51]

- **Individual characteristics and experiences:** prior related behaviour and personal factors
- **Behaviour specific cognitions and affects:** perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences
- **Behavioural outcomes:** commitment to a plan of action, immediate competing demands and preferences, and health-promoting behaviour.

The three major concepts were further subdivided into sub-concepts as follows:

10.4 Individual characteristics and Experiences

Prior related behaviour: This refers to occurrence of the similar health behaviour in the past.

Personal Factors: Personal factors can be biological, psychological and socio-cultural in nature. These factors are predictive of a given behaviour and shaped by the nature of the target behaviour being considered.

- **Personal biological factors:** This is made up of features such as age gender body mass index pubertal status, aerobic capacity, strength, agility, or balance.
- **Personal psychological factors:** This comprises characteristics like self-esteem, self - motivation, personal competence, perceived health status and definition of health.
- **Personal socio-cultural factors:** Variables such as race ethnicity, acculturation, education and socioeconomic status make up this aspect.

10.5 Behaviour Specific Cognition and Affect

Perceived Benefits of Action: This refers to the expected favourable positive outcomes that accompany health behaviour.

Perceived Barriers to Action: Barriers to action encompasses expected, imagined or actual obstacles and own cost of understanding a particular behaviour.

Perceived Self –Efficacy: An individual's ability to plan and carry out a health - seeking behaviour. This influences perceived barriers to action inversely. The higher the self - efficacy; the lower the perceived barriers to action.

Activity Related Affect: Personal feelings, either positive or negative, which occurs along the performance of a behaviour including before, during and after the behaviour due to stimulus characteristic of the behaviour. It affects perceived self - efficacy in a direct manner. The more positive the affect the higher the self - efficacy. Increased efficacy can also generate greater self - efficacy.

Interpersonal Influences: Awareness regarding attitudes, behaviours or beliefs of others. The influence exerted through interpersonal mode consists of: norms (expectations of significant others), social support (instrumental and emotional encouragement) and modelling (vicarious learning through observing others engaged in a particular behaviour). Families, peers, health care workers are the principal sources of interpersonal influence.

Situational Influences: An individual's cognitions and perceptions of every circumstance or milieu that either aids or hinders a behaviour. It comprises of available options, characteristics of demands and aesthetic features of the environment where health promotion is to take place. The effect of situational influences on health behaviour may be either direct or indirect.

Commitment to Plan of Action: The idea of intention and identification of a planned strategy causes realization behaviour associated with health.

Immediate Competing Demands and Preferences: Competing demands refers to other behaviours which individuals have little control over, due to the existence of unforeseen event that can occur in the environment. Examples are duties emanating from family and work.

Competing preferences are behavioural choices that persons have high control over. Examples are choice of juice, beer or coffee for refreshment.

Behavioural outcome - Health promoting behaviour: A health promoting behaviour is the end point or action outcome that is geared towards achieving a health outcome that is positive in nature. These outcomes include productive living, optimal wellbeing and sense of personal fulfilment. Examples of health promoting behaviour include getting psychosocial support from family members and carrying out physical exercise.

10.6 Application of concepts to family - integrated diabetes education

Individual characteristics and experience: Previous level of adherence to diet, medication, exercise and self -monitoring of blood glucose can affect the outcome of diabetes education. In addition, the characteristics of patient and family members such as age, socioeconomic status, previous exposure to diabetes education and diabetes knowledge, educational level, and family developmental stage can affect the overall outcome of interventions such as family - integrated diabetes education.

Interpersonal influences: Perception of social support from family members can influence the uptake of information received during family – integrated diabetes education. This can have a positive impact on the adherence of an individual with diabetes. Thus, better understanding of diabetes and the importance of social support might improve family member's ability to provide support. This might improve QoL and lead to optimum glycaemic control.

Situational influences: The presence of a family member during the family – integrated diabetes education might lead to the family's readiness to adapt family environment to meet the needs of family member with diabetes. The demands from such a person might be reduced when family members understand the impact of diabetes.

Commitment to a plan of action: Diabetes patients and family members who take part in a family - based diabetes education would feel the need to improve diabetes management. This might lead them to jointly discuss plans that will help with better glycaemic control.

Behavioural outcome – health-promoting behaviour: The goal of the family – integrated diabetes education that will be given the diabetes patients and family members is to improve the QoL and glycaemic control. It is expected that the education will influence the family member

attending the family integrated education to provide more psychosocial support, encourage other members of the family to do the same. With these, the adherence to diet, medication, exercise and blood glucose monitoring are expected to improve. This also affects the glycaemic control.

11. IMPLICATIONS FOR NURSING

Nurses are at the forefront of advocacy, support and patient education in all care settings. Nurses' major function in diabetes management is patients' education. Since family members are relevant stakeholders in the management of DM because of their ready availability and the close-knit nature of most traditional African families; nurses need to advocate for a more active involvement of family members in diabetes management at all the stages of management.

12. CONCLUSION

Diabetes mellitus is a chronic condition which places a heavy burden on individuals, with physical, social and psychosocial consequences. In addition, individuals with diabetes experience various negative effects such as fear, anxiety, and discrimination at work. Positive attitude of family members can promote the health of DM patients through psychosocial support. However, lack of knowledge of DM and what the management entails is a major barrier to this. Enhancing the knowledge of family members through family- integration education based on relevant theoretical base can be an effective way of bridging this gap.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. International Diabetes Federation. IDF Diabetes Atlas, 8th edition; 2017. (Accessed 15 February, 2018)

2. Available:www.diabetesatlas.org
2. United Nations, Department of Economic and Social affairs. Report of the Secretary-General: Progress towards the Sustainable Development Goals report; 2017. (Accessed 15 April, 2018) Available:<https://sustainabledevelopment.un.org/sdg3>
3. American Diabetes Association. Standards of Care 2018. Diabetes Care Supplement. 2018;41(Supplement 1).
4. Mandrik O, Severens JL, Doroshenko O, Pan'kiv V, Kravchun N, Vlasenko M, et al. Impact of hypoglycemia on daily life of type 2 diabetes patients in Ukraine. J Multidiscip Healthc. 2013;6:249.
5. American Diabetes Association. Standards of medical care in diabetes-2012. Diabetes Care. 2012;35:S11.
6. Odili VU, Ugboka LU, Oparah AC. Quality of life of people with diabetes in benin city as measured with WHOQOLBREF. Internet J Law Healthcare Ethics. 2010; 6(2).
7. Online Etymology Dictionary. (Accessed 15 March, 2017) Available: <http://www.etymonline.com>
8. Your dictionary: Dictionary definitions you can understand. (Accessed 15 March, 2017) Available: <http://www.yourdictionary.com>
9. Berkman LF. Measures of social networks and social support: Evidence and measurement. Measuring Psychosocial Variables in Epidemiologic Studies of Cardiovascular Disease. Washington, DC: NIH Publication/Public Health Service. 1985;51-79.
10. Shumaker SA, Brownell A. Towards a theory of social support: Closing conceptual gaps. J Social Issues. 1984; 40(4):11-36.
11. Kirk JK, Ebert CN, Gamble GP, Ebert CE. Social support strategies in adult patients with diabetes: a review of strategies in the USA and Europe. Expert Rev Endocrinol Metab. 2013;8(4):379-89.
12. Van Dam HA, Van der Horst F, Van den Borne B, Ryckman R, Crebolder H. Provider-patient interaction in diabetes care: Effects on patient self-care and outcomes: A systematic review. Patient Educ Couns. 2003;51(1):17-28.
13. Kadirvelu A, Sivalal Sadasivan SH. Social support in type II diabetes care: a case of too little, too late. Diabetes Metab Syndr Obes. 2012;5:407.

14. Borrell-Carrió F, Suchman AL, Epstein RM. The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Ann Fam Med*. 2004;2(6):576-82.
15. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129-36.
16. World Health Organization. Constitution of the world health organization: Principles. (Retrieved 20th May, 2017) Available:<http://www.who.int/about/mission/en/>
17. Stargardt T, Gonder-Frederick L, Krobot KJ, Alexander CM. Fear of hypoglycaemia: defining a minimum clinically important difference in patients with type 2 diabetes. *Health Qual Life Outcomes*. 2009;7(1):91.
18. Young EE, Unachukwu CN. Psychosocial aspects of diabetes mellitus. *African J Diab Medicine*. 2012;20(1):5-7.
19. Hieronymus L. Diabetes in the military. *Diabetes Self-Management*; 2012. (Accessed 12 April, 2017) Available:<https://www.diabetesselfmanagement.com/about-diabetes/general-diabetes-information/diabetes-in-the-military/>
20. Diabetes Info. Social issues for the type 1 diabetic. (Accessed 12 April, 2017) Available:<http://www.diabetes-info.co.uk/managing-diabetes/social-issues.html>
21. Nebiker-Pedrotti PM, Keller U, Iselin HU, Ruiz J, Pärli K, Caplazi A, Puder JJ. Perceived discrimination against diabetics in the workplace and in work-related insurances in Switzerland. *Swiss Med Wkly*. 2009;139(7-8):103-9.
22. Beverly EA, Wray LA. The role of collective efficacy in exercise adherence: A qualitative study of spousal support and type 2 diabetes management. *Health Educ Res*. 2008;25(2):211-23.
23. Stephens MA, Rook KS, Franks MM, Khan C, Iida M. Spouses use of social control to improve diabetic patients' dietary adherence. *Fam Syst Health*. 2010;28(3):199.
24. Watanabe K, Kurose T, Kitatani N, Yabe D, Hishizawa M, Hyo T, Seino Y. The role of family nutritional support in Japanese patients with type 2 diabetes mellitus. *Intern Med*. 2010;49(11):983-9.
25. García AA, Brown SA, Horner SD, Zuñiga J, Arheart KL. Home-based diabetes symptom self-management education for Mexican Americans with type 2 diabetes. *Health Educ Res*. 2015;30(3):484-96.
26. Chesla CA, Fisher L, Mullan JT, Skaff MM, Gardiner P, Chun K, Kanter R. Family and disease management in African-American patients with type 2 diabetes. *Diabetes Care*. 2004;27(12):2850-5.
27. Mayberry LS, Osborn CY. Family support, medication adherence, and glycemic control among adults with type 2 diabetes. *Diabetes care*. 2012;35(6):1239-45.
28. Beverly EA. Living with type 2 diabetes: Marital perspectives of middle-aged and older couples. *J Psychosoc Nurs Ment Health Serv*. 2007;45(2):25.
29. Franks MM, Sahin ZS, Seidel AJ, Shields CG, Oates SK, Boushey CJ. Table for two: Diabetes distress and diet-related interactions of married patients with diabetes and their spouses. *Fam Syst Health*. 2012;30(2):154.
30. Sabone MB. The illness demands of diabetes on couples in Botswana. *J Fam Nurs*. 2008;14(3):363-82.
31. Hagedoorn M, Keers JC, Links TP, Bouma J, Ter Maaten JC, Sanderman R. Improving self-management in insulin-treated adults participating in diabetes education. The role of overprotection by the partner. *Diabet Med*. 2006;23(3):271-7.
32. Rosland AM, Kieffer E, Israel B, Cofield M, Palmisano G, Sinco B, Spencer M, Heisler M. When is social support important? The association of family support and professional support with specific diabetes self-management behaviors. *J Gen Intern Med*. 2008;23(12):1992.
33. Lohri-Posey B. Middle-aged appalachians living with diabetes mellitus: A family affair. *Fam Community Health*. 2006;29(3):214-20.
34. Kang CM, Chang SC, Chen PL, Liu PF, Liu WC, Chang CC, Chang WY. Comparison of family partnership intervention care vs. conventional care in adult patients with poorly controlled type 2 diabetes in a community hospital: A randomized controlled trial. *Int J Nurs Stud*. 2010;47(11):1363-73.
35. Mishel MH. Uncertainty in illness. *J Nurs Scholarsh*. 1988;20(4):225-32.
36. Brown MA, Powell-Cope GM. AIDS family caregiving: Transitions through uncertainty. *Nurs Res*. 1991;40(6):338-45.

37. Hilton BA. Perceptions of uncertainty: Its relevance to life-threatening and chronic illness. *Crit Care Nurse*. 1992;12(2):70.
38. Sharkey T. The effects of uncertainty in families with children who are chronically ill. *Home Healthc Nurse*. 1995;13(4):37-42.
39. Mishel MH. Reconceptualization of the uncertainty in illness theory. *J Nurs Scholarsh*. 1990;22(4):256-62.
40. Searle A, Norman P, Thompson R, Vedhara K. Illness representations among patients with type 2 diabetes and their partners: Relationships with self-management behaviors. *J Psychosom Res*. 2007;63(2):175-84.
41. Rosa S, Sunvisson H, Ahlström G. Lived experience of significant others of persons with diabetes. *J Clin Nurs*. 2007;16(7b):215-22.
42. White P, Smith SM, Hevey D, O'dowd T. Understanding Type 2 Diabetes. *Diabetes Educ*. 2009;35(5):810-7.
43. Beverly EA, Miller CK, Wray LA. Spousal support and food-related behavior change in middle-aged and older adults living with type 2 diabetes. *Health Educ Behav*. 2008;35(5):707-20.
44. Adejoh SO. Family unit in the context of diabetes management among the Igala, North-Central, Nigeria. *Med Soc Online*. 2012;6(3):24-35.
45. Morgaine C. Family Systems Theory'. CFS, 410U Winter; 2001.
46. suresh h. Importance of the family in diabetes care – A review article. *International J Comprehensive Nursing*. 2014;1(4):8-10.
47. Bandura A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ, US: Prentice-Hall, Inc; 1986.
48. Bandura A. Self-efficacy: The exercise of control. Macmillan; 1997.
49. Glanz K, Rimer BK, Viswanath K, editors. Health behavior and health education: Theory, research, and practice. John Wiley & Sons; 2008.
50. Pender NJ, Walker SN, Sechrist KR, Stromborg MF. Development and testing of the Health Promotion Model. *Cardiovasc Nurs*. 1988;24(6):41.
51. Gonzalo A. Nursing Theories; 2011. (Accessed 2 December, 2016) Available:<http://nursingtheories.weebly.com/nola-pender.html>

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