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Compliance of diabetic patients regarding management regimen

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بسم الله الرحمن الرحيم

قال تعالى: (وفوق كل ذي علم علم عليم).

Dedication

To the person who gives me all love and support to face the troubles of life
… .dear mother: Bakheta Eltieb … ..

To the special one who works hard to make happy
… .dear father: abd alla mahmoud … .

To those who made my life happy
… .dear brother and sister… ..

To those who lead me to the way of success
… my teachers… .

To all friend and calleagues.

I dedicate this study

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Abstract

The present study is a cross- sectional study aiming to assess compliance of patients with type 2 diabetes mellitus about all therapeutic regimens. It was conducted in Elmik Nemer university hospital.54 diabetic patients were randomly chosen and studied. Information was collected through a predesigned questionnaire and it was filled by the researcher. The data was analyzed using SPSS. The study revealed that the compliance of the studied group was strongly related to the gender (female's beter) regarding laboratory test, diet, treatment and foot care (15.8, 40.8, 15.8, and 34.2 respectively). (75%) of compliant patients had good level of knowledge about diabetes. simplicity of regimen was another predictor of compliance. The study results also showed that (85.2% were aware about the need of good more foot care. And regarding treatment regimen (83.1%) were compliance, while the poorest area of patients' compliance was related to laboratory test (16.7%), and diet (18.5%).

Finally analysis of the data revealed that good level of patient's knowledge, patient's satisfaction about medical services provided, and high level of patient's education were the only predictors of the aspects of compliance.

ملخص البحث

أجريت هذه الدراسة الوصفية المقطعية على (54) مريض من مرضى السكري من النوع الثاني في مستشفى الملك نمر الجامعي وكانت أهداف هذا البحث هي تقييم إنتظام مرضى السكري من النوع الثاني في إتباع النظام العلاجي الموصوف لهم.

وقد تم جمع البيانات عن طريق الاستبيان والمقابلة الشخصية للمرضى.

أظهرت النتائج أن نسبة إنتظام المرضى في إتباع النظام العلاجي أفضل عند النساء بالنسبة إلى الفحوصات المعملية ، التغذية وأخذ الأدوية والعناية بالقدمين بالنسب التالية (15.8% - 40.8% - 15.8% - 34.2%) على التوالي

وقد أظهرت الدراسة أن (75%) من المرضى الملتزمين في إتباع النظام العلاجي لديهم معلومات جيدة عن مرض السكري وعن النظام العلاجي.

وقد أظهرت الدراسة أن أعلى نسبة للانتظام هي الانتظام في العناية بالقدمين 85.2% ثم الانتظام في أخذ الأدوية 83.1% بينما أقل نسبة للإنتظام كانت الانتظام في الفحوصات المعملية 16.7 % و التغذية 18.5%

وقد أظهرت الدراسة أيضاً أن العوامل التي تؤثر على إنتظام المريض بإتباع النظام العلاجي هي مستوى معلومات المرض ومستوى رضى المريض عن الخدمات الطبية المقدمة له وسلوكيات الأسرة تجاه المريض والمستوى التعليمي للمريض.

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Introduction

Diabetic mellitus (DM)affect large number of people throughout the word. Recent estimation predict that if current trends continue, the number of person with diabetes will be more than double, from 140million in the next 25years. The greater proportion of the increase is likely to occur in the developing countries(W.H.O,2002;and Timpy &smith ,2003).

Diabetes mellitus is define as a group of metabolic disorders characterized by hyperglycemia which results from defects in insulin secretion, insulin action or both (Atlas of diabetes mellitus 2007).

There are three types of diabetes mellitus , the first one is *Type1 Diabetes Mellitus* (juvenile diabetes mellitus, insulin-dependent diabetes mellitus, or IDDM) is caused by destruction of the beta cells of the pancreas.The second type is *Type 2 Diabetes Mellitus* (adult-onset diabetes mellitus, non–insulin-dependent diabetes mellitus, or NIDDM), In this type some insulin is still made by the pancreas, but in inadequate amounts. Sometimes the amount of insulin is normal or even high, but the tissues are resistant to it and hyperglycemia results.The last type is *Gestational Diabetes mellitus (GDM)* which is develop during pregnancy, especially in women with the risk factors for type 2 diabetes .

Non-insulin –dependent diabetes mellitus (NIDDM)is defined as a metabolic disorder characterize by the relative deficiency of insulin production and decrease in this Tory is

common(**White&Duncan,1998;Lewis et al,2000;Smeltzer & Bare ,2000;andWalsh,2002).**

Many studies revealed that at least four sets of factor influence the development of DM; genetic ,microbiological, immunological, and metabolic factor (Phipps et al,1995;and Hargrove-Huttel,2000).about 80%of NIDDM patient are obese, and there is a higher incidence of NIDDM among those who lead a sedentary life and eat a high calorie diet (Dewit,1998;Duran Varela,2001;and Timpy&Smith2003).

Criteria for the diagnosing DM include fasting plasma glucose greater than or equal to 126mg-dl,or-and 2-houre post load glucose greater than or equal 200mg-dl.in addition to these there are the classic symptom of diabetes which include polyurea ,polydipsia, unexplained fatigue, weakness, and tingling or numbness in the feet

(Long et al,1993;White &Duncan,1998; Lewis et al,2000; Smeltzer &Bare,2000;andWalsh,2002)

The linkage between hyperglycemia and complications of diabetes has firmly establish the need for maintenance of blood glucose a recommended rang in individuals with diabetes (DCCT, researchgroup,1993,and Buse,2000). Helping patients to adhere is often complex. Since treatment regimens and achieving tight blood glucose control are all challenges that must be addressed during all with phases of diabetes treatment *(Linton et al,1995;Hollway1999;and Lutfey &Wishner,1999).*

Specific goals have to be considered for the identified nursing diagnosis as health knowledge, self- care, and adherence to prescribed treatment regimen, normal blood glucose, and absence of infection. Promoting compliance with prescribe medication is one way to achieve these aims (Ackely &Lading,1995;Linton et al;1995;Dewit,1998;and Taljamo&Hentinen,2001).

Furthermore DM complication are divided into acute and chronic complication. Acute complication may include diabetic ketoacidosis, hyperglycemia hyperosmolar non-ketotic coma, and hypoglycemia. While chronic complications include macro and microangiopathy, and neuropathy as well as increase susceptibility of infection (**Hanestad & Albrektsen, 1992;Monahen et al,1994;Pickup & Williams,1994;Hargrove-Huttel,2000).**

However, diabetes is one of the chronic illnesses in   which it is particularly important that a patient should play an active role in its management. With effective self-management and good medical and social supports, most diabetic patients can lead fruitful and active lives. One of the most important factors influencing the effectiveness of medical treatment is patient's adherence to therapeutic regimen and his capacity to cope with possible aspects and implications of his disease **(Smeltzer& Bar, 2000).**

Patient's ability to adhere to their treatment regimen is crucial for successful management of type2 diabetes. However, several studies have shown difficulty in maintaining optimal adherence with all aspect of therapy**(harries et al, 1993; Eisenhour& Murphy, 1998; and Lewis et al,2000).**

Ensuring that patients take oral medication as prescribed is among the most common problems encountered by primary care physicians treating patients with type 2 diabetes. Commonly cited reasons for non-adherence to oral medication regimens include forgetfulness and spontaneous activities. Furthermore, patient adherence to diet and exercise regimens is often sub-optimal*(ary et al, 1986; Jacques& jones, 1993; Dawson & Newell, 1994; Hogston& Simpson, 1999; and dey et al 2000).*

Compliance is an essential component in the success of preventive and therapeutic efforts along with the efficacy of the suggested course of action . consequently patient non-compliance is a substantial obstacle for therapeutic goals achievements **(Camerone, 1996; and Toljamo & Hentinen, 2001).**

COMPLIANCE is the extent to which a person's behavior in term of medication administration , following diet , or executing other lifestyle changes, coincides with medical or health advice . On other hand NON-COMPLIANCE is when a person's behavior dose not coincides with medical or health advice**(Kelly, 1995; Cameron, 1996 ; and khattab et al 1999).**

It is easy to prescribe medication for patients in hospitals, where nurses check and administer the medication. However it is a different matter at home as it is difficult to check whether the patient is taking his drugs correctly or not(**Smith& Reynard, 1995; Halloway, 1996; and Hogeston& simpson, 1999).**

The factors affecting compliance can be divided into internal and external factors. The internal factors according to Cameron

(1996) include patient characteristics as; age, educational level , marital status, social background, attitudes and beliefs, severity of symptoms and emotions caused by the disease.

The external factors include the impact of health education, complexity of therapeutic regimen, relationship between the patient and the health care personnel and the support from his family and friends.*(Kyngas &Lahdenpera1999) .*

Raynor et al(1993) and Kelly(1995) had classified the causes of non-compliance into three categories; misinformation, too complicated regimen, and poor information. Firstly comes the misinformation and fear of side effects or dependency, lack of self care , low trust of health-care personnel or simply different personal values to health care personnel. Second, if the regimen is too complicated for patients could results in forgetfulness, poor understanding or inability to fit the regimen into the patient's life style. Third comes poor inadequate given information by health care personnel.

Moreover, Holloway (1996) pointed out that poor communication between physician, nurse and their patient, result in misunderstanding about medication and its dose. Whereas El-Dosoky (2001) add that also, patient's attitude and feeling about taking medication may affect their compliance. As unless feeling ill some people may not be take medication. Others may be over consuming medication as they belief that they may become better.

The nurse's relationship with the patient and his family according to Bolander(1994) play a vital role in assessing the

patient's response to therapy, disease process understanding, health beliefs, degree of compliance. Also other psychological factors as stress , and social factors as socioeconomic levels should be assessed. Colchesty et al (1996) stated that these data assist the nurse in developing a plan to address patient's educational needs accordingly improve compliance.

Various methods have been used to assess compliance with treatments and some of these are technical or as Playle &Keely (1998) called 'direct methods' as checking blood concentration and serum levels of drugs, and urine screening for drug metabolites or add markers. other simpler methods as mentioned by Kyngas et al (2000) were the indirect methods which included pill counts checking if prescription dispensed, and direct questioning of patients.

Thus the present study will be conducted to assess the compliance of type II diabetic patients to their therapeutic regimen in order to determine the impact of the nursing role to overcome the problem of non-compliance among these patients.

Rational

Diabetes mellitus is main cause of morbidity and also contribute in even death.

Importance of management regimen in control of diabetic and its consequences hence is imperative.

Diabetes mellitus is one of common problem for this reason is important to know the compliance of management regimen to find out the suitable recommendation to deal with this type of disorder.

Research objective

General objective:-

To assess the compliance of diabetic patients regarding management regimen.

Specific objective:-

1. To assess patient's knowledge about diabetes mellitus .
2. To assess patient's knowledge and compliance about exercise regimen .
3. To assess patient's knowledge and compliance about diet regimen.
4. To assess patient's knowledge and compliance about oral hypoglycemic and insulin injection.
5. To identify the important of follow up .

Review of literature

Definition of compliance:

The most early accepted and working definition is that repotted by **Sackeet (1976)** and **Haynes et al (1979)** who stated that compliance is the extent to which a person's behavior(in term of medication, following diet, or executing other life style changes), coincides with medical or health advice.

Hussey and Gilliland (1989) added another dimension to compliance since they defined it as the positive behavior that patient exhibit when moving toward mutually defined therapeutic goals.

Another definition by **Lowry (1989)** is that compliance is a set of behaviors that patients perform at the suggestion of the health care worker in order to maintain their health status. Compliance has often been defined as the ability of the patient to follow the instruction given by health care personnel *(Kyngas and Lahdenpera 1999).*

Moreover, compliance was also defined as an active intentional and responsible process of care, in which the individual works to maintain his or her health in close collaboration with health care personnel to achieve mutually derived goals of health *(Kyngas & Hentinen, 1995; Kyngas et al, 2000; Rose et al ,2000; and Lahdenpera& Kyngas,2001).*

Magnitude of non-compliance to diabetic treatment:

Unfortunately non compliance occur among as many as one-third to one-half or more of patients with chronic medical disorder

such as diabetes *(Kelly & Scott 1990; Abdul – Jabbar & ALshammari 1993; Lo, 1990and Chitakata & Khara 2001)* .

The extent of poor compliance could be represented in a form that one-third of patients always take their medication, one-third some times takes them, and one-third almost never take it(Katzung 1995 chan & Molassiotis, 1999).

Adult diabetic patients have more difficulties in adhering to a suitable diet and exercise habits than to medication taking.
Also reviews of literature indicated that over all adherence levels among patients with diabetes appear to be unsatisfactory, ranging widely from as low as 19% to as high as 91% **(Hanestad,1992 Glasgow 1997 and Ruggiero et at 1997).**

Less than 10% of diabetics adhered to all behaviors deemed essential for good control simply most diabetics are under poor control a problem that consistently plagues managed care outcome. (**Michie& Alue1993 Kravtiz et al 1993 Cramer & Rosenheck 1998 and Hasio &Salmon 1999)**

Moreover (**Stanhope & Lancaster 1996)** and**(taylor et at 2001**) found that approximately 25% of elderly hospital admission results from problems related to non- compliance and drug reactions.

In addition compliance with a prescribed therapeutic regimen can reduce morbidity and mortality from chronic illness where information is provided to patients **(Walker & Edwards 1994 Cameron 1996 Hardman et at, 1996 and EL- Zubier et al, 2000)**

In many cases drug under- utilization could be the consequences of non-compliance where the patient may discontinue taking drug when the symptoms subside and therefore does not use all the prescribed medication **(Wertheimer &Smith 1989; peattie & Walker 1995 and Dey et al, 2000).**

Non-compliance may also result in over- utilization of a drug when a patient who forgets does doubles the next one to make up for the first, some other patients apparently subscribe to a philosophy that if one-tablet dose that has been prescribed provides some relief of symptoms, tow or three tablets will be even more effective *(Eisen et al, 1990 Rowland & Tozer, 1995: and Lewis et al, 2000).*

Theories of compliance

An organizational framework is provided by a theory to understand and to modify compliance. Many theories have been formulated to determine the selection of variables affecting patient's compliance, influence the way of measuring compliance and how to improve it.

Several researches grouped and described the most common models of the compliance behavior, they include health belief, precede model, behavioral learning, locus of control, structural educational, emotional drive, situational and self regulation models *(EL- kholy, 1991; 1o, 1999; and Ryan, 1999and El-Dosoky 2001).*

1-   Health belief model (HBM)

The health belief model is one of the oldest and most widely used models. it was especially developed to explain health

behaviors. Researches that have been conducted on the relationship of HBM variable to both preventive health behavior and illness behavior have demonstrated support for model. High level of perceived susceptibility, perceived severity and perceived benefits are positively correlated with a variety of desirable health behavior (**cummings et, al, 1982 and Heath 1995)**

The individual's cooperation with health advice depends upon the extent to which that person perceives that he/She is susceptible to the disease. That is to say that the disease is serious, the treatment is efficacious, and the barriers to compliance are all possible to overcome *(Nagy& Woalfe, 1984; Hooper 1995and Marland 1999)*

Cost refers to the perceived barrier that must be overcome in order to follow health behavior recommendations. Modifying factors as demographic, structural and psychological variables may influence individual perception and health related behavior. In addition, internal or external causes must be presented and of Sufficient magnitude to initiate the decision making process *(Cumming et at, 1982; and Rosenestock et at 1988)*

The HBM originally proposed by **Rosenstock1966,** while Becker1974 made the HBM modification and by their incorporation the health decision model was form. It includes specific heath belief, as the perceived susceptibility and severity of a condition, as well as the level of belief in the diagnosis .

The mediating variables in this model are truly psychological, representing the mental process intervening between the environment and the behavior *(Ryan, 1999).*

2 -The precede model:

The precede (predisposing reinforcing and Enabling causes in Educational Diagnosis and Evaluation) model was developed by (**Green 1980).**

Predisposing factors according to Robinson &Bailie1981 include the patient's knowledge, value' attitudes, and perception about their illness or therapy

Ryan 1999 mentioned that enabling factor include the availability of accessibility of resources, accessibility of services and the skills the who possess. Reinforcing factors include attitudes and behaviors of health practitioners, family and employers. The model synthesizes educational , behavior science , and epidemiological theory and outline the steps that should be followed to plan health education program.

3- Behavioral learning model:

According to **Glanz 1990** behavioral learning theory or social learning theory is an attractive theory to apply to health education and heath promotion program **Lowry (1988)** stated that it does not only illuminate the dynamics of individual behavior but also gives direction to the design of intervention strategies to influence behavior is change.

This model departs form operant learning theory in two important ways. first, it holds that the individual's

interpretation of the environment determined what is reinforcing and what is not

It postulates secondly that it is possible to teach Someone, and when and how respond without rewarding him/ her for performing the response.

This is especially through modeling the behavior–that is to say- by having the person observe someone who executes the desired behavior(Bruse et al,1999).

4- Locus of control:

Locus of control is a model balances a continuum between internal and external motivation. It proposes that an individual's belief will determine which actions are taken.

Ryan 1999 stated that person, who believes that outcomes are dependent at least partially , on action taken, is considered to be internally oriented.

Conversely persons with external orientation believe that the locus of control for health lies largely outside themselves. These "externals" do not believe that a relationship exists between individual action and outcomes.

Also locus of control is a contrast of social learning theory.

5- STRUCTRAL MODEL:

This model holds compliance is related to the characteristics of the patient and his /her social and cultural environment. in most studies demographic feature of the patient as age, sex,

education, socioeconomic status, occupation, marital status, face and religion have shown no consistent relation to compliance behavior (*Wickowski &Kubsck 1997)*

Al-zab1988 mentioned that the disadvantage of the structural for approaches is their failure to provide intervention strategies for improvement of drug adherence. They serve mostly to identify risk group for dropping out or of low medication compliance. However, in medical practice, Personality trials and the demographic factors of patients are not to change.

6 –Education models:

A major theory of compliance behavior holds that patients generally lack sufficient knowledge of their illness and treatment to comply properly, and that thorough instruction will result in better compliance *(Ajzen &fishbein. 1980)*

Nurse doctors or other health care professionals should elicit the patient's feelings and beliefs. According to **Ryan (1999**)change a belief by providing better information about a disease process may not result in a change in behavior.

7- Emotional drive model:

Bedier 1987 assumes that information about a threat and means of protection form it are insufficient to generate behavioral changes.

Lowry (1998) added that awareness of the subjective discomfort motivates the individual to eliminate it. Also **Brus et al (1999)** mentioned that the stronger the discomfort the stronger the motivation would be to act to eliminate it

Bedier (1987) mentioned that to eliminate fear, the individual searches for various coping responses, and tries to identify which one will reduce his/her fear. When a coping response effectively lowers fear .

8- Situational barrier model :

This model is discovering and removing barriers to compliance. It shifts the patient's attention from the treatment setting **Brus et al (1999)** suggested that long appointments waiting time and complex medical regimen are examples of situational barriers that should be changed to behaviors.

9- Self- regulation model:

The final theoretical construct of relevance is that of self regulation. This model attempts to describe, within the framework of social learning theory, the role, and the method of action of acting of an individual when presented with health advice

Factors affecting compliance:

Patient's compliance are affected by internal and external factors. The internal factor include patient characteristics as: age, educational level, marital status, social back-ground, attitudes and beliefs , severity of symptoms and emotions caused by the disease whereas, the external factors include the impact of health education, complexity of therapeutic regimen, relationship between the patient and the health care personnel and social isolation as well as social support **(Bolander, 1994: Cameron 1996: and Kyngas &Lahdenpera, 1999)**

-Internal Factors:

1-   Age:

AL-Azab (1988) found a positive correlation between increasing age and patient's compliance. Moreover added that for every 1.7-2.5 years increase in age compliance improved by 1%, and those older than 65 years old were 7.9% more likely to comply.

*Tettersell (1993)*and *AL-Sowielem &EL-Zubier* *(1998)* had also reported that relatively young patients had a lower compliance rate than older ones.

AL-Sowielem & EL-Zubier (1998) found that those in the older age group were more likely to comply. this appeared to be a trend, which increased with maturity. According to **Tettessell (1993)** this is possible as those in older age group are more receptive to medical advice than those in the younger age group, less Flexible in their behavior and so adhere more consistently medical orders.

2-   Level of education:

The level of education plays an important role in patients, Compliance or non- compliance with the therapeutic regimen According to **Hussey & Gilliland (1989)** and **Cameron (1996)** poor reading skills can affect understanding and interpretation of meaning, and the person,s Organization of thought, perception and vocabulary development can lead to confusion and misunderstanding so that instruction are misinterpreted **(Moursy, 1997;** and **Merdan, 1998)** show that well- educated patients report higher level of compliance in all regimen area.

3-   Marital status:

There was a significant difference based on marital status and compliance to therapeutic regimen furthermore married patients were afraid from complication and or not to be able to make their duty toward their family if male or female.(El-Dosoky, 2001; and Heggy, 2001).

Meanwhile, that unmarried patients had higher knowledge and better adherence than married ones. Single patient may have more free time and opportunity to look after their own health. On the other hand, married ones may neglect their own health owing to their obligations towards their family, children care and household activities.

4-   Social background:

Social background reflects personal beliefs About illness and its treatment, as well as the roles of symptoms patterning and perceived well being. Personal interaction is effected by cultural factor values ,beliefs and tradition that are observed in various cultural groups have deep roots that affect individuals behavior and reaction to different situation and evens **(Chan &Molassiotis, 1999: and , LO, 1999)**

5-   Health beliefs and attitudes:

The relationship between culture, health related belief and health behavior is complex. health beliefs and attitudes appear to have significant influence on whether or not person will comply with therapeutic regimen; thus, Patient attitude and

beliefs can strongly influence the effectiveness of intervention **(Dey et at. 2000)**

However, the attitudes and what the patient believes about himself and the illness often predicts the degree of compliance **(Heath 1995)**. Patients are also more likely to comply with therapeutic regimens when they believe in health providers. **(Cameron 1996)** warned that non- compliance was found to be common when patients doubt in treating personnel or the regimens safety or believed that it had some side effects.

Many studies found that it is more difficult for the provider to modify health beliefs compared with some of other factors influencing compliance (**Cameron , 1996)**

6-Severity of the symptoms:

The perceived severity of the symptoms was proved to be the most important factor for seeking care and complying with medical recommendation.

In addition non- adherence to medication is potentially more serious than simple dropping out from the treatment program efficacy, patient acceptability, side effects and cost are important issues to be considered in developing therapeutic regimen it may urge patients to stop medication with a negative consequence on compliance **(Cargill**, **Ryan,1999)**

7- Emotions caused by disease:

Feeling concerning the seriousness of contracting an illness vary from person to another. The degree of seriousness may be judged both by the degree of emotional arousal created

by the thought of disease. Moreover difficulties that a person would believe a disease would create for him/her(merdan,1998) .

Lourance et al (1999) and **Funnel &Anderson (2000)** demonstrated that diabetic patients often become frustrated and dissatisfied if they feel that they are being judged by medical goals, or if the physician does not consider their goal to be important. Once patients are viewed as collaborators who establish their own goals, the whole concept of compliance become irrelevant. When patients work toward their own goals, their motivation is intrinsic.

Wichowski &Kubsch (1997) mentioned that clients might have a negative self – perception of their illness, This requires modification or elimination of various life styles behaviors. Ignoring medication regimens and dietary restrictions, neglecting to engage in therapeutic exercise programmers and failing to keep medical appointments may manifest as non-compliance.

External Factors:

1-Impact of health educations:

Diabetic patient education must start at the diagnosis and continue there after. To carry out this education, The education should identify the treatment procedures of the health problem in sequential order. In other word, he or she has to identify the steps that patients have to go through to comply with a

recommended method of prevention or treatment *(1998 Chan &Molassiotis 1999 and Laurensce et al, 1999).*

Health education motivates the person to avoid action that is harmful and push habits that are beneficial. Indeed , health education is a process that bridges the gap between health information and health practices **(Cameron,1996).**

So health education is a vital part of nursing, it viewed as an important and integral aspect of the professional nurse's role in the promotion of the life style for client with chronic condition -teaching has been viewed as a significant responsibility of nurses since the early work of Florence Nightingle

2-Complexity of therapeutic regimen:

Complex regimen is consider to affect compliance because it can confuse the patient and lead to errors in time, frequency or does. The greater the number of drugs prescribed for a patient the greater the probability of poor compliance. Also patients are less likely to comply with a regimen reguiring four or more doses a day than with one requiring one or two daily doses**(Rovinski & Zastocki, 1998; Bolander,1994;)**

Moreover, the difficulty of dietary adherence, Complexity of some medication regimen and fear of hypoglycemia and weight gain are all factors that can adversely influence patients ability to adhere to treatment (Ryan,1999;and Dey et al, 2000).

AL-Sowielem & EL-Zubier (1998)reported that the greater the behavioral   demands of a treatment, The poorer the compliance. This means that regimens requiring changes in life style such as dieting, exercising, and bad habits result in much poorer compliance than simply taking pills.

3-patient – provider relationship:

The patient- provider relationship has been recognized by most investigation as an important factor in compliance, the behavior and attitude of health care professionals can have either a positive or negative effect on client compliance (**Gillman et al, 1991; Abdul Jabbar & AL- shammari, 1993; Furlong, 1993;)**

Many studies found that two thirds of physicians attributed the problem of poor compliance to their patient uncooperative personality,only quarter reported that problem may be attributed to physicians themselves (**Kravitze et al,1993;**

Dawsen & Newel, 1994;Cameron, 1996;)

Lo (1999) agreed with these finding, which were interesting in viewing the lack of linking personality with compliance. In addition, the quality of rapport of patient with their health professionals is crucial to the success of client adhering to their health regimen.

According to **Anderson et al (1995) and El-Mowafy (2000)**Found that if physician view themselves as experts. So their job is to get patients to behave in ways that reflect them expertise, both will continue to be less frustrated. However, when health professionals let go of the traditional view of provider- centered

and recognize the patient as the primary decision- maker, they become more effective practitioners.

Inadequate communication and counseling between the patient and the doctor or other health team members can result in lack of understanding of the medication regimen and lack of knowledge about his condition, so poor compliance will often results

(Dawsen&Newell,1994;Walker&Edward,1994;Hardman et al,1996 Eisenhouer &Mourphy,1998;)

4-Social isolation and social support:

Social isolation was the major contribution to non-adherence among general practice in chronic illness with medications. The stability and support of the patient's family are strongly correlated with her – his compliance. On the other hand patients living alone or in social isolation are more liable to become non- adherent to the treatment. **(Lo,1999).**

Cameron (1996) reviewed the literature on 19 studies, which investigated social support, and dropping out of treatment, and found dropping out was associated with low social support in all of the studies.

Kyngas & Hentinen (1995) suggested that family and friends have also been shown to be important in supporting the compliance of diabetics.

Many studies suggested that the stability and support the patient's family is strongly correlated with his- her compliance,

taking medication under unfamiliar condition marked influence on compliance **(Wright &Levac, 1992;).**

Measurement of compliance:

Compliance is difficult to measure. There are problems involved in evaluation of compliance as it is difficult to obtain reliable information **(*Hentinen & Kyngas, 1992; Kyngas et al, 1996; Collingworth et a, 1997)***

Duran- Varela (2001) suggested that for diabetics patient to comply the day after interview and pill count, glycosilated hemoglobin had to be measured to determine metabolic control; the percentage of glycosilated hemoglobin was taken as the gold standard.

Various methods have been used to assess compliance with drug treatment in particular. This can be done by both direct or technical methods, and indirect methods ***(Esposito, 1995; and Kyngas et al, 2000).***

1- *Direct methods:*

These involved the detection of chemicals in body fluids through blood and urine analysis. They are useful for compounds with long half- life, with the result of providing an approximation of use during the predicting week or longer (El-Dosoky, 2oo1).

On the other hand, this analysis can be misleading for the drugs with short half – life if the patient has taken the medicine immediately before testing. Although these methods are relatively inexpensive, they are only able to detect 36% of drugs taken by elderly patients **(Esposito, 1995).**

Modern analytic methods are permitting a wide array of medications to be both qualitatively and quantitatively measured in urine, blood, and breath *(Kygnas & Lahdenpera, 1999).*

The urine test for detecting excretion of a prescribed medication will show whether he medication has been taken, but can not show whether it was taken at the correct dosage,for the correct number of time per day, or at the most suitable times of the day*(Daswson &Newel, 1994; and playle & Keeley,1998).*

Prior patient's knowledge of an up-coming request for urine or blood sample may uses this detection method. Generally non-compliant patients may ingest several doses of medication immediately prior to the expected request *(Esposito, 1995).*

11- *Indirect methods:*

In the clinical setting, indirect measurement of compliance is generally more applicable than direct methods, although **Cargill (1992)** has stated that indirect methods are not always practical or reliable. Indirect methods involve the therapeutic outcome , patient's interview, pill count and observation of patient's behavior *(Bolander,1994).*

(A)Therapeutic out come:

It is important to determine empirically derived goals for compliance behavior based on desired therapeutic outcome .Assessment of blood glucose was less accurate. It was never performed under uniform conditions and if elevated, could indicate genuinely poor control by medication rather than non-compliance *(Collingsworth et al 1997)*

Therapeutic outcome is dependent on combination of factors as the physical condition of patient, presence of more than one disease, physiological changes and psychological status of the patient and not only on drug compliance. Therefore, according to **playele & keeley (1998)**it can not be considered as reliable criterion for measuring compliance since the patient condition may change in away unrelated to compliance itself .

(**B)The patient interview:**

This most obvious method of indirect assessment is done through asking the patient directly about if he-she has taken the prescribed amount of medication (Cargill,1992). The method has been employed by many earlier researchers and is still occasionally used along today .Moreover, interview questioning has emerged as the most effective approach, able to detect non – compliance with 85% accuracy *(**Furlong, 1996;** and **Collingsworth et al, 1997).***

Validity and reliability of this method was frequently tested. However, some problems may be encountered with this method since some patients with low degree of compliance Tend to overestimate their compliance by giving excessively favorable picture of the situation **(*Laurence et al, 1999)***

Furlong (1996) considered questioning patients as the most appropriate method for checking compliance knowledge was examined and details of non – compliance were asked for. Periodic assessment of compliance to treatment regiment in diabetic patients was recommended.

(C) Observation of patient's behavior:

Moreover observation of patient's behavior is considered of the method used to measure compliance but many researchers reported that, is difficult and not always possible or even relevant because it requires close supervision of the patient's behavior, needs more time and effort **(Hentinen &Kyngas, 1992; Hardman et al, 1996)**

(D) Pill count:

Counting the number of pills is the method recently used in many research protocols. Although, the validity and reliability of this method have been Proven in some studies. yet, some drawback was reported such as taking occasional extra pills could balance days of missed pills creating an erroneous impression of compliance.

Most studies rely on physical measures such as tablets counts, which are not always convenient disease and taken his medication at home for long period of time *(DeGeest et al, 1994; and furlong ,1996)*

A compliance score may be recorded as percentage of pill taken as prescribed number of pills taken number of pills prescribed ×100 **(Cargill 1992)**.Also, a medication adherence score may be calculated using the information from pill counts and self- reports. The following equation is used to determine adherence with many drugs.

Adherence = (1)d (1)a +(2)d(2)a+…nd(n)a/(1)d+(2)d+..(n)d

Where d = number of doses to be taken , a = adherence rate for that medication *(Esposito, 1995).*

Several researchers have developed mechanical devices that make a record of the number and time sequence of pills removed from prescription bottles . The performance of pills count and drug levels are accurate but also expensive, and may not be available for most regiments in most settings *(Dawsen & Newel, 1994; Brus et al, 1999).*

Nurse's role in improving compliance with therapeutic regiment:

Ryan (1999) stressed that clearly the nurse has a major role to play in facilitating patients to maximize the therapeutic effects of their therapeutic regiments.

Prior to educate diabetic patients, **the nurse should assess the cognitive function of patients and tailoring education** according to patient's abilities knowledge of diabetes and its complications that are important factor in achieving better compliance, and hence disease control *(Bullough & Bullough, 1990 ; Tettersel, 1993; Esposito ,1995; and AL-Soweilem & EL-zuber,1998).*

Also, **nurse can use principles of patient teaching** as using audiovisual aids as photographs, videos, written material and tape recording during educational program to enhance patients compliance *(Eisenhauer & mourphy, 1998).*

In fact, patients are more likely to comply successfully with their treatment programs when they have sufficient knowledge about therapeutic regimen.

The nurse should **provide written** and **verbal information** on diet plan, medications, proper exercise, symptoms of hyper and hypoglycemia, what action to take if they occur, and what to do during periods of illness through health teaching program . *(Stanphope & Knallmueller; 1992; and **Monohan et al, 1994).***

Since**, the diet is the cornerstone of type** 11diabetes therapy for diabetes, the nurse should help patients to adhere to an appropriate dietary regimen. This is of great importance and could be achieved by making realistic, flexible). and attractive meal plans ***1992:Fadupin&Kehinro,2001;****and* **perry &potter,2001).**

Many studies found that, several factors must be considered when nurse teaching meal planning to the patient. Such factors include economic status, time and place of meals, food preparation facilities, cultural and religious factors as well as like and dislikes regarding food and any other what may affect the patient's ability or desire to cooperate **(Holloway, 1999; Laurence et al, 1999;** *and* **Fadupin & keshinro, 2001).**

Furthermore , the nurse should teach the patient about diet for diabetic individuals usually provide for regularly spaced meals, often three main meals with in- between snacks. Meal spacing is essential so that absorption coincides with peak level of medication in the blood and protect from hypoglycemia **(Hentinen & kyngas, 1992; long 1993).**

Also , the nurse should involve the patient, family and dietitian in planning a therapeutic diet, reinforce nutritional

guidelines, encourage supervised weigh loss if the patient is over-weight **(Alwan, 1993andDawson&newell,1994).**

The nurse should instruct the patient about the goals of good nutrition and to maintain as near-normal blood glucose level as possible, achieve optimal serum lipid levels, provide adequate energy for maintaining or attaining a reasonable weight, prevent complications of diabetes, and improve overall health **(white &Duncan, 1998; and Holloway,1999)**

The nurse should ensure that **directions on prescription orders should include** all the details necessary for patient to know how, with what, when, and for how long to take medication **(walker &Edwards, 1994; Gad et al, 1997; and Smeltzer & Bare, 2000).**

After the prescription has been written, **the nurse should make sure that the patient understands** the nature and prognosis of the illness and what expect from the medication. Both acceptable and unacceptable unwanted effects , as well assigns of efficacy may help to enforce compliance **(Katzung, 1995; Hardman et al, 1996; and Laurence et al,1999).**

Exercises is another major area of patient education for persons with diabetes mellitus, consequently nursing activities include obtaining an exercise history, helping the person understand and obtain per-exercise examination, and planning an enjoyable and safe exercise program **(Hentinen & Kyngas, 1992; and Ackely & Ladwing, 1995).**

The nurse should help patient to establish a regular exercise routine to reduce the risk of hypoglycemia and, explain the component of safe exercise program and special needs of the person with diabetes *(Phipps et al,1995; and Dewit, 1998).*

The nurse should instruct the patients about benefits of exercise in terms he- she can understand. Exercises are useful for diabetic patients with regard to losing weigh, easing stress or tension and maintaining a feeling of well being *(White & Duncan, 1997; and Hargrove- Huttel, 2000).*

The nurse should encourage the patients to practicing exercise regularly; teach them about proper type of exercise to do, when to do it, for how long, and how frequently. The degree of exercise should be about the same dialy, and supplemental carbohydrate containing snacks should be taken before and during exercise to maintain blood glucose with the normal range *(longet al, 1993)*.

In this regard **Lewis et al (2000)**Suggested that walking is often selected as an exercise program. It is costless and need no equipment and it basically safe.

The nurse should recommend a diabetic patient to exercise when using proper foot wears, avoid exercise in extreme hot or cold and the patient should inspect feet for injuries after each exercise and monitor his- her response to exercise *(Monahan et al, 1994).*

In Heggy (2001) stated that patient with diabetes should bath his/her feet daily keep the skin soft with lotion , trim toe nails

carefully to avoid cuts and in growing nails, keep feet warm without using hot water bags or other external source of heat, and wear comfortable and properly fitted shoes.

They should also avoid cutting out corns or using corn medicines wearing round garters or other constricting clothing, and going barefoot, because of the risk of injury **(*Dewit, 1998; and White &Duncan, 1998).*

The nurse should explain **characteristics of appropriate shoes**. They should be made of natural fibers, well fitting, patient should be cautious against wearing plastic shoes and also wearing sandal.**(*Timpy & smith, 2003).*

Nurse should stress that **patients must know the dangerous signs**, as foot swelling ,color change of the nails, toe or part of the foot, pain, corns, break in the skin including crack or sores and loss of sensation. However if patients have problems, they should seek immediate medical attention to prevent deterioration of these problems **(*Long et al, 1993).*

The nurse should **evaluate cautiously the role of the family** in the patient treatment program and attempt to maximize the potential constrictive contribution and minimize its potential destructive influences such as over involvement and negative attribution, furthermore, nurses should respect cultural, ethnic and religious values in planning regimens and should consider cultural variables as they relate to the patients **(*Cameron, 1996; Lewis et al, 2000; perry & potter, 2001).*

Moreover , the nurse should encourage the patient and family to ask question, identifying essential content that needs to be reinforced and taught as medication, purpose, dosage, side effects and interactions. This also include how the medications relate to the disease , and the therapeutic regimen *(Cargill, 1992; peattie & walker, 1995; Carven & Hirnle, 1996;and Natterlud &Ahlstron, 1999).*

Also it is important for the nurse to **establish understanding and the effectiveness of communication,** which can be tested by immediate feedback **(Cameron, 1996; Eisenhouer &Mourphy, 1998; and Ryan, 1999).**

The nurse should have a **friendly manner** rather than business- like, spent time discovering concerns and expectations discuss these and give necessary information to the patient in consultation sessions with the health care professionals **(Kaplan et al, 1994; Keable1997;, and Charles et al, 2000).**

Therefore, **the quality of communication between the nurse and patient** is very important and the degree of supervisions by the nurse will promote compliance . According to other studies compliance can be improved by good relationship between the patient and health care personnel **(Kyngas, 1995; Lo, 1999; and Ryan, 1999).**

Once a nurse recognize patients as experts on their own lives, they can add their medical expertise to what patient know about themselves. Thus when the nurse's activity support patient's efforts that will help patients to create a plan and achieve their own goals, the resulting commitment and self- motivation, will

leads to improve compliance *(Bolander, 1994; and Anderson et al, 1995)*.

Nurse collaboration with other practitioners involved in the patient's care and the adoption of coordinated team approach facilitation teamwork, will increase patient satisfaction that has a direct effect on patient compliance rate *(funnel Anderson, 2000)*

The nurse can easily **simplify the regimen** to fit the patient's daily life pattern as appropriate, and consult with the physician to decrease changes of regimen as possible unless prescription changes are necessary. Moreover, daily drug reminder chart was proved to improve patient's compliance. The nurse should work with patient to develop a written instructions and reminder chart**(Stanphope & knallmueller, 1992; Ackeley& Ladwing, 1995; furlong, 1996; and Holloway, 1996).**

Whenever possible , the nurse should **involve the patient in his/her own care,** as well as in making decisions about the care , as this will increase motivation and enhance compliance *(Funnel & Andrson, 2000Cameron, 1996 ;and kyngas& Lahdenpera, 1999).*

From the previous review, it becomes clear that successful management of diabetes depends largely on patient's knowledge and improving compliance to therapeutic regimen.

Research Methodology

Study design :

This descriptive study data collection: done by collecting information from patients through questionnaire about compliance of management regimen .

Study area:

This study was carried out at elmak nimer university hospital in Shendi city, river Nile state, Sudan, which is located northern, about 176 Km of Khartoum, population about 80000 persons (WHO 2003) most of them are farmers. The hospital include main four department, medicine, surgery, pediatric and obstetric and gynecology beside oncology and also encompasses cardiac care unit, intensive care unit, otorinolaryngology (ENT), ophthalmology, psychiatric, oncology, orthopedic and there is department of radiology which include ultrasound (US), x-ray, computerize tomography (C-T scan), hemodialysis unit, out patient clinic for various specialty, also advance investigation can be done in hospital as echocardiogram and stress ECG. Cardiac catheterization laboratory will start to work.

The hospital provide it's services to city and it's drawing area which extend from Elgaily to Atbara. The villages on bortle fide of the river Nile and the bed wins.

Study population :

The population in this study includes the diabetic patient who was been admitted in clinic and who was been admitted in Elmak nimer university hospital .

Sampling :

All diabetic patient who was been admitted in clinic and who admitted in Elmak nimer university hospital.

Inclusion criteria: patients from both sexes having type 2 diabetes mellitus and received anti diabetic drugs for more than 6 months.

Exclusion criteria: pregnant women

The size of sample about 54 persons .

Data analysis :

The collected data will be , analyzed , tabulated by using appropriate statistical analysis program (Statistical Package Social Sciences) (SPSS). .

Ethical consideration :

The aim of present study will be explained to the director of the study setting to take his or her permission to carry out the study . Also the aim of present study will be explained to diabetic patients , and verbal consent will be taken from them .

Results

Figure (1) shows the sex among the studied population
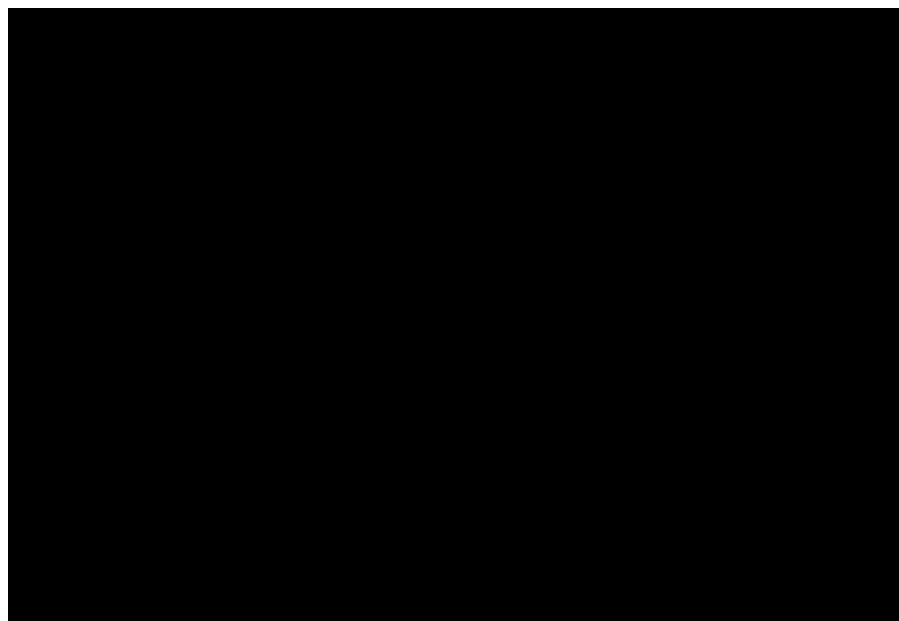
The figure shows that more than half of the studied population is females (61.1 %).

Figure (2) shows the distribution of the study population age.
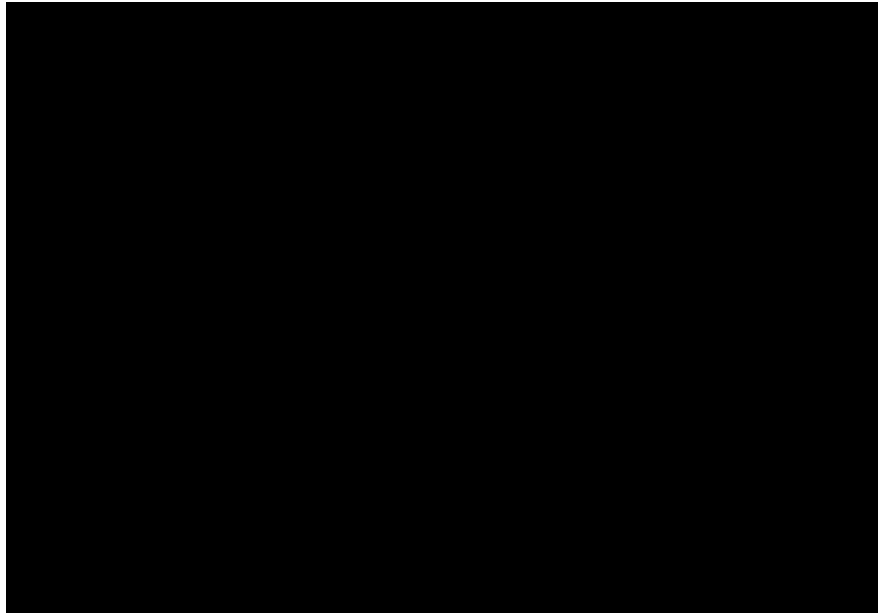
The figure shows that most of population studied ranged between 41- 65 years of age (40.7 %) , followed by age between 26- 40 years and over 65 years (19.1%).

Figure (3): Distribution of the study population according to their residence.
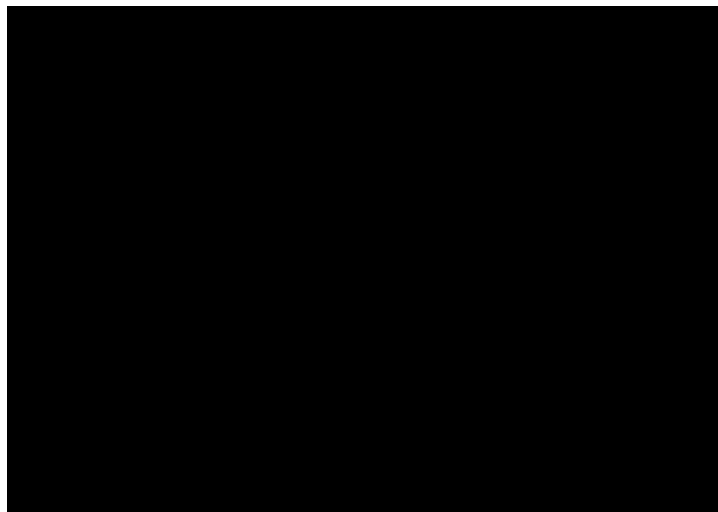
The figure shows that there quarters of studied group are from rural areas (74%) and are from the town(25.9%).

Figure (4): Shows distribution of the study population according to marital status
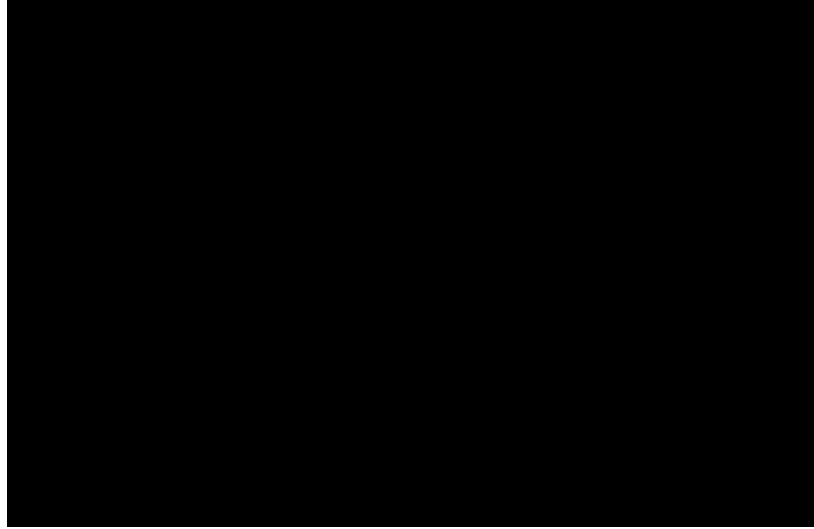
The figure shows that the married population were (81.5%).

Figure (5) distributes the occupation of the study population.
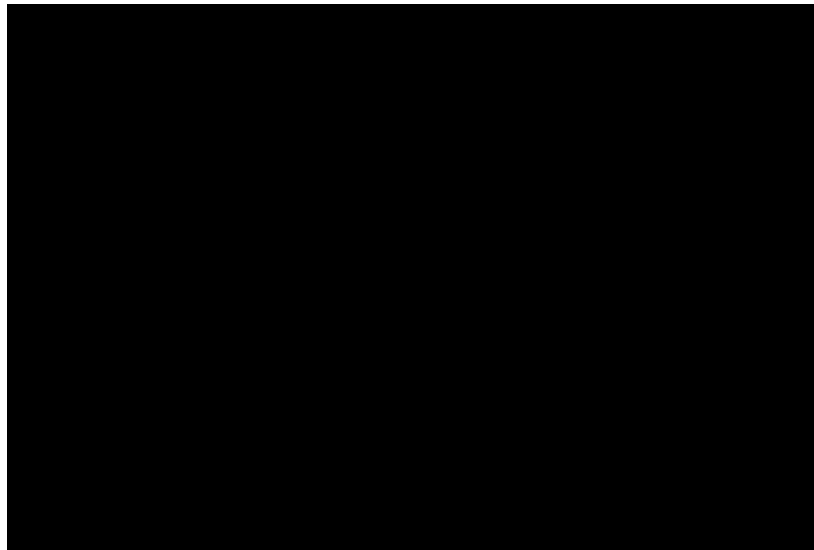
The figure shows that percent of (50 %) of the study population were house wife's.

Figure (6): Distribution of the study population according to the their family size.
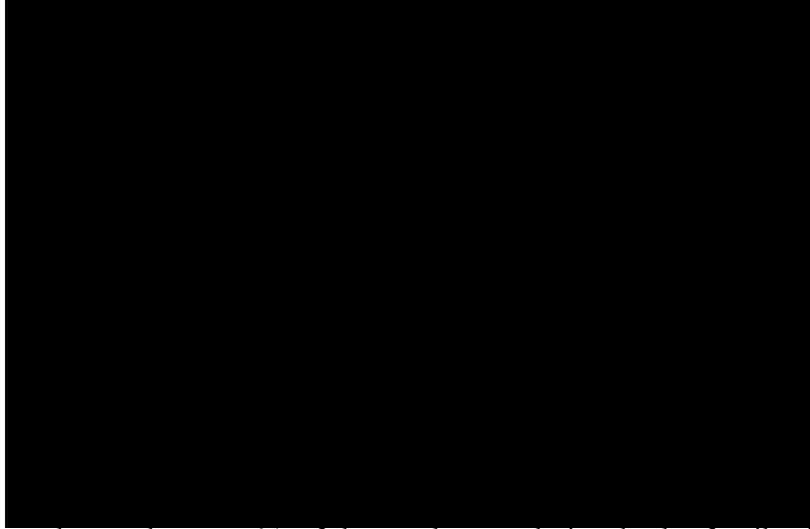
The figure shows that 40.7% of the study population had a family size of 7-9 members.

Figure (7) distribution the educational level of the study population.
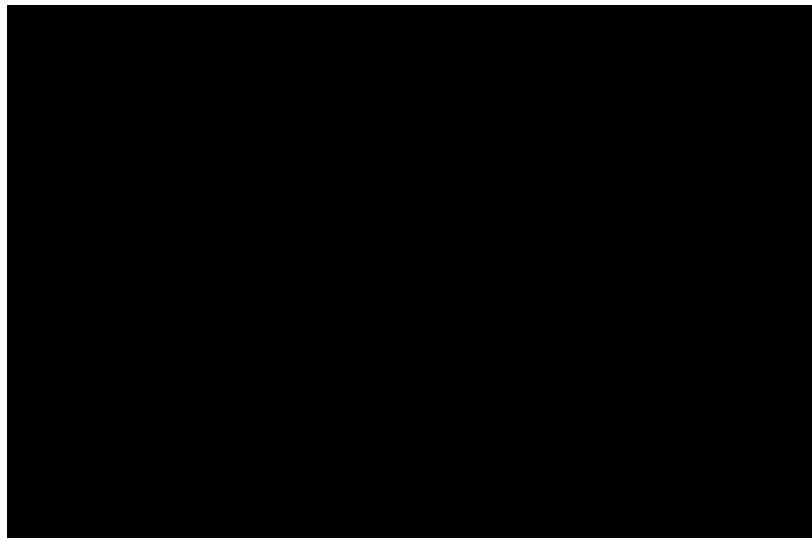
The figure shows that the sample were illiterate (48 %).

Figure (8): Distribution of the study population according to their with they live.
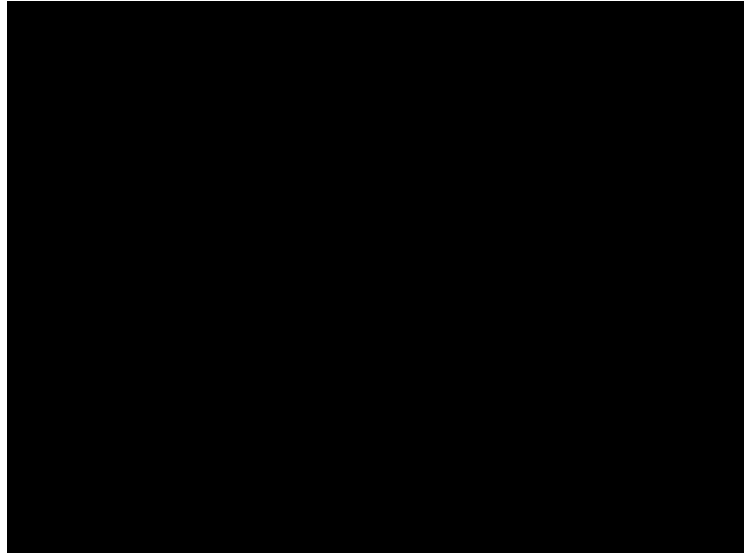
The figure shows that most of sample were living with spouse and children (61.1%) followed by those who are live with their sons (22.2 %).

Figure (9): Distribution of the study population according to sources of information about DM (n=54)
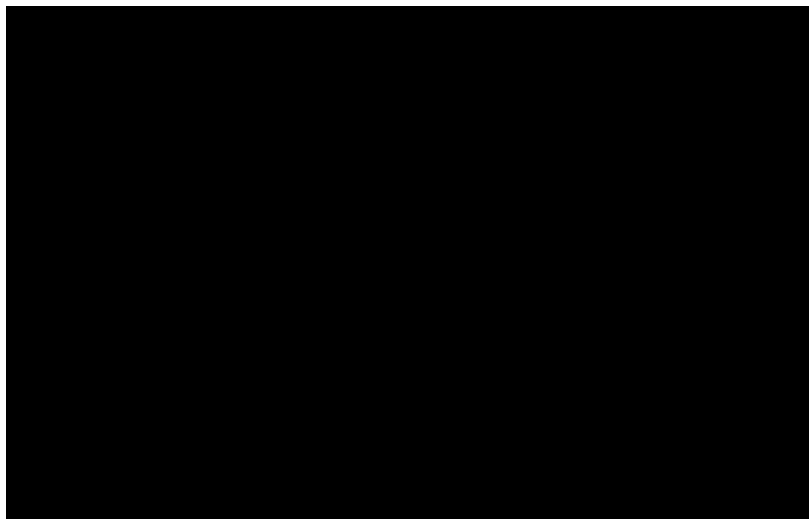
It shows that the sources of information in nearly all of the group was the physicians (92.6%)of the studied group, while the nurse was the source of information only in 1.9 of the group.

Table (1): distribution of the study population according to their level of knowledge related to DM as reported by patients (n=54).

Knowledge about	Level of knowledge			
	Good		poor	
	No	%	No	%
Signs/ symptoms	48	88.9	6	11.1
Complication	48	88.9	6	11.1
Lab tests	10	18.5	44	81.5
Diet	36	66.7	18	33.3
Exercise	49	90.7	5	9.3
Treatment	40	74.1	14	25.9
Foot care	45	83.3	9	16.7

It shows 90.7% of the study population have a good knowledge about exercise and 88.9% of the study population have a good knowledge about signs/symptoms & complication and 83.3% of the study population have a good knowledge about foot care, while 81.5% have a poor knowledge about laboratory test.

Table (2): Distribution of the study population according to their level of compliance related to modality of management of DM (n=54)

Compliance related to:	Level of Compliance			
	compliant		Non-compliant	
	No	%	No	%
Lab tests	9	16.7	45	83.3
Diet	10	18.5	44	81.5
Exercise	22	40	32	59.3
Treatment	45	83.3	9	16.7
Foot care	46	85.2	8	14.8

It shows (85.2%) of the study population was compliant regarding treatment, 83.3% of the study population was compliant regarding foot care. Most of the study population neglect the lab tests (83.3%) and ignore the importance of the diet (81.5%).

Table (3): Distribution of the study population according to their regularity of follow-up as reported by patient (n=54)

Regularity of follow-up	frequency	percent
Regularity in going to clinic for follow-up:		
Yes	33	61.1
No	21	38.9
Causes of irregular follow-up (n=21)		
Un available transporting	10	18.5
Inconvenient time	5	9.3
place Inconvenient	6	11.1

Figure (10): Distribution of the study population according to their family support and help in patient compliance:
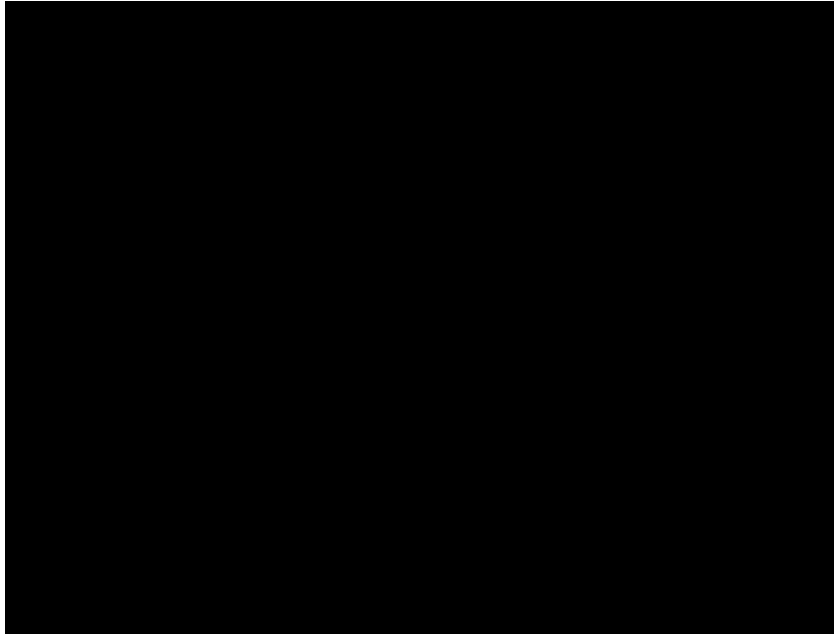
Shows the distributes of the study population according to found of the particular person remind your patient time of medication. Slightly more than half of the study population(53.7%) there are no any person remind the time of medication.

Table (4): Relation between patient's gender and their level of knowledge about DM, as reported by patients(n=54)

Knowledge about	Male n=21		Female n=33		Significance test	P value
	Good	Poor	Good	Poor		
	%	%	%	%		
Signs/symptoms	16.7	83.3	18.4	81.6	$X^2_1= 0.045$	0.538
Complication	10.0	90.0	7.9	92.1	$X^2_1 =0.123$	0.495
Laboratory tests	3.3	96.7	1.3	98.7	$X^2_1 =0.473$	0.488
Diet	60.0	40.0	51.3	48.7	$X^2_1=0.653$	0.278
Exercise	16.7	83.3	3.9	96.1	$X^2_1 =4.987$	0.039*
Treatment	26.7	73.3	28.9	71.1	$X^2_1 =0.055$	0.508
Foot care	70.0	30.0	69.7	30.3	$X^2_1 =0.001$	0.587

The relation between patient's gender and their level of knowledge about DM as reported by patients. Table show that the females have more good knowledge about signs and symptoms (18.4%) than males (16.7%). The females have more good knowledge about treatment (28.9%) than males (26.7%). While the males have more good knowledge about all other aspects than females. The poor knowledge was high among both males and females regarding laboratory tests, complication, exercise, and signs/symptoms with statistically significant difference between them only in their level of knowledge about exercise (P=0.039)

Table (5): Relation between patient's gender and their level of compliance about DM as reported by patients (n=54)

compliance	Male n=21		Females n=33		Significance test	P value
	compliant	Non-comp	compliant	Non- comp		
	%	%	%	%		
Laboratory tests	13.3	86.7	15.8	84.2	X^2_1=0.101	0.506
Diet	36.7	63.3	40.8	59.2	X^2_1=0.153	0.435
Exercise	60.0	40.0	48.7	51.3	X^2_1=1.103	0.202
Treatment	3.3	96.7	15.8	84.2	X^2_1=3.102	0.068
Foot care	26.7	73.3	34.2	65.8	X^2_1=0.562	0.305

Shows the relation between patient gender and their level of compliance about diabetes mellitus as reported by patient and it is clear that females were more compliant in relation to laboratory tests (15.8%), diet (40.8%), treatment (15.8%) and foot care (34.2%) than male. While the male more compliant in relation to exercise (60%) than female(48.7%).

Table (6): Relation between patients compliance and their level of knowledge.

compliance	Level of knowledge				Total n= 54		Significance test	P- value
	Good n= 20		Poor n= 34					
	No	%	No	%	No	%		
Compliant	15	75.0	11	33.7	26	41.5	X = 11.388	0.001
Non-comp.	5	25.0	23	66.3	28	58.5		

Shows the relation between patients' compliance and their level of knowledge related to DM and it demonstrates that compliant patient had more good knowledge (75%) than non compliant patients. with statistically significant deference (P = 0.001) regarding the compliance.

Table (7): Relation between patient's knowledge related to DM and their satisfaction with medical services provided and regularity of follow up.

	Level of knowledge	Total n =	Significan	P-value

	Good n= 20		Poor n= 34				*ce test*	
	No.	%	No.	%	No	%		
Physician survives								
Satisfied		45		73.3		30.2	X1= 2.566	.094
Un Satisfied		55		26.7		69.8		
Nurse survives								
Satisfied		70		43		59.4	X1= 1.141	.209
Un Satisfied		30		57		40.6		
Clinic survives								
Satisfied		100		80.2		84	X1= 4.409	.020*
Un Satisfied		1		19.8		16		
Total survives								
Satisfied		45		31.4		34	X1= 1.339	.184
Un Satisfied		55		68.6		66		
Follow-up reported								
Regular		75		81.4		80.2	X1= .418	.356
Irregular		25		18.6		19.8		
Follow-up recorded								
Regular		65		80.2		77.4	X1. 2.150	.123
Irregular		35		19.8		22.6		

Shows the relation between patients' knowledge related DM and their satisfaction with provided medical services and regularity of follow-up as reported and recorded. It demonstrate that patients with good level of knowledge about DM were more un satisfied with both the physician services and total services provided (55%) each.

Discussion

Measuring the compliance of diabetic patients is a complex issue. It includes several important aspects of diabetic self care activities, such as the extent of adherence to dietary regimen, drugs, appointment systems, exercise and foot care.

Results of the present study revealed that female patient were visiting the clinics more than male patients. This may be attributed to the fact that the working time of the clinic, 9 to 12 am, may be not suitable for working patients who are mostly males, while this time was suitable for housewives. In addition the lower incidence of male patients, may be attributed to the fact that male patients may seek other health care services provided by their situation, as Health Insurance Clinics.

The female is more than male in the population of the present study were expected since diabetes is know to be more prevalent in females. This gender distribution is coincided with El seady (1993), WHO (2002), and NCCDP (2003).

Hsaio & Salmon (1999) who stated that personal or demographic variables could be effective factors in adjustment to chronic illness.

The present study revealed that there was no statistically significant difference based on patients,age,andlevel of knowledge, with compliance. On the other hand Merdan (1998) indicated that age was a significant factor as regards patient's compliance.

The age group see were (55-65) years. This is similar to that reported by El Azab (1988), Elseady (1993) and merdan (1998) that diabetic patients who are mainly seen in the clinics are around 50 years old in many countries. It is documented that diabetes generally occurs more in the fifth and sixth decades.

As regards their occupation, most of the studied population were housewives since the working time of clinic was more suitable for

housewives than working patients. This is congruent with the findings of EL-Dosoky (2001).

The present study indicated that physicians were the main source of information and there is no specific educator nurse in the clinic and the physician is only sourse of information. patients have full trust in physicians and the majority of them follow their instructions (Heggy, 2001).

While the nurses were the source of information only in a few number of the studied group.

The present study indicated that the majority of diabetic patients was regularly going to there follow up appointments. Diabetic patient should attend regularly their routine follow up, in order to assess their condition. (Merdan, 1998) mentioned that the results of monitoring the patients' condition can be used to assess the efficacy of therapy and thus physician can re-plan accordingly.

Smeltzer &Bare (2000) reported that continuing care of the diabetic patient is critical in managing and preventing complications. The degree to which the client interacts with health providers to obtain ongoing care depends on many factors, as age, socio economic level, existing complications, type of diabetes, and co-morbid conditions. All these factors could indicate the frequency of follow up visits.

Regarding causes of irregular follow up visits, the present study detected that most of irregularly followed-up patients the Un available transporting then Inconvenient time and place Inconvenient as the other causes of some patients of this study.

In this respect Al- Azab (1988) reported that most causes of irregular follow up were mostly special problems as traveling, working shifts, and fasting periods both between Christian and Moslems. The prolonged

waiting time, physician's neglect and the complicated administrative routine also could be among the causes.

While EL-Dosoky (2001) reported that the large number of the patients and the short working time of the clinic, make the health team unable to managed all patients.

Regularity of follow up is important for diabetic patients. The present study revealed that patients who are regularly followed up had a higher knowledge about therapeutic regimen and more compliant than those who were irregularly followed up. This may be explained by the fact that regular follow up gives the patient detailed information about the progress of disease and provides him with good opportunity to know advanced therapeutic management. This may increase patient's motivation to follow instructions given and continue further follow up visits (ElSeady,1993; and merdan, 1998).

In addition Khattab et al (1999) reported that the impact of better care and health education on the various aspect of diabetic regimen given to patients regularly help in improving of the morbidity .

The present study shows that the studied were poor in knowledge regarding the need laboratory tests. But the patient is highly knowledgeable about the important of exercise, signs&symptoms and the complication then foot care reported by the total studied patients. In the contrary to Moursy (1997) who reported that the poorest area of patients' knowledge was related to foot care and diet.

The present study indicated that the patients who were highly knowledgeable about therapeutic regimen were more complaint. This is in line with ElSeady(1993) Furlong (1996) and merdan (1998) they stated that, the greater the patients knowledge of disease and its management, the greater the patients compliance with therapeutic regimen.

Although diet is considered as the backbone of any treatment plan for DM. the present study showed that the majority of patient of patients were non-compliant regarding the prescribed diet. This may be attributed to the fact that as a social habit and tradition, families use to eat together in groups. Moreover they eat whatever is available. Also the economic impact of diabetic special diet for one member will be costly to afford and a there burden on family expenses.

The reasons given for non-compliance to diet include high cost of other medical care, inadequacy of money to purchase the prescribed food regimen (Moursy 1997; Duran – Varela, 2001; Fadupin & Keshinor, 2001).

Dietary non-compliance could be related to patients desire to enjoy food, using food as an emotional comfort, trying not to be different from others and to be socially accepted while eating in a group. It must also be considered that food habits are the most difficult to change. Since food is usually accepted with a multitude of events in the normal life of an individual family as a community. This result does not go in agreement with Merdan,(1998) who indicated that most of diabetic patients had complied with diet prescribed in a very good way.

The results of the present study revealed that the majority of patients were non-compliant to the ordered laboratory tests, and compliant better to the treatment. This to the high cost of the laboratory test.

Several researchers reported that diabetic patients in general tend to follow the instructions related to medications. Most of patients believe that drugs are more important than diet in the management. Hence the medication compliance was much better than compliance with diet Al-Azab (1988), Kravitz et al (1993), merdan (1998), Khattab et al (1999) and Fadupin & Keshinor (2001).

Chronic ill patient who complied to one aspect of regimen did not comply with another aspect of the regimen. This may be due to each aspect of the regimen requires different knowledge and skills as well as different levels of patients motivation as for example diabetic patient may comply with medications but not comply with diet or exercises Kravitze et al(1993), Toljamo and Hentinen (2001) .

The results of the present study revealed that the majority of patients were compliant related to foot care. This is consistent with Merdan (1998) who reported that most diabetic patients were more compliant related to foot care in order to reduce foot problems and lower extremity amputation.

Exercise forms were another corner in the management of diabetes. In the present study less than half of patients were compliant related to exercise. The female patients are more compliant than male in all variables except compliance related to exercise. while Al-Azab (1988) stated that female patients tended to exercise more. On the other hand Heggy (2001) reported that this equality between studied sample of patients' male and female in level of compliance was only in exercise.

Duran-Varela et al (2001), and Heggy (2001) reported that most patients were not exercising regularly as they do not know what and how to exercise. Also most patients believed that they are not young to exercise.

The findings of this study revealed that there is a statistically signification differences between patient compliance and non compliance as regard their level of knowledge about therapeutic regimen, complexity of the regimen and education this in line with Moursy (1997), Merdan (1998), and Duran-Varela (2001).

Conclusion

The present study has shown that more than two fifth of the studied patients with type 2 diabetes mellitus were compliant with their therapeutic regimen. The statistically significant differences between compliant and non-compliant patients were related to level of education, patient's satisfaction with medical services provided by nurse and physician, patient's satisfaction about total services provided, and family behaviors related to patient's condition, complexity of regimen and social traditional behavior regarding diets.

Patients who had good level of knowledge about therapeutic regimen were more compliant. The study also showed statistically significant differences between compliant and non-compliant patients regarding level of knowledge about therapeutic regimen. The good level of patient's knowledge, patient's satisfaction about medical services provided and high level of patient's education were the only predictors for increasing compliance.

Recommendations

Based on the present study findings, the following recommendations are suggested:

- Educator centers for diabetic patient must be builds.

- Training of nurse-educators specifically to teaching the patient.

- Improving of services provided to the patient.

- Giving more time for single patient and group discussion.

-Encouraging the families to support their diabetic members.

- Use of simple diabetic regimens.

- Use of mass media in education in particular regarding dietary habits.

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بسم الله الرحمن الرحيم

استبيان لتقييم انتظام مريض السكري بالمعالجات المختلفة

البيانات الشخصية والاجتماعية :-

1/ الاسم: ....

2/ العمر : ....

3/ النوع : أ – ذكر   (   )   ب – أنثي (   )

4/ السكن : ....

5/ الوظيفة : ....

6/ الحالة الاجتماعية

أ– أعزب (   )   ب – متزوج (   )   ج- أرمل (   )   د – مطلق (   )

7/ عدد أفراد الاسره : ....

8/ المستوي التعليمي للمريض:

أ – أمي   (   )   ب – يقرأ ويكتب (   )   ج – تعليم أساسي د – تعليم ثانوي (   )

) ه تعليم جامعي (   ) و– فوق الجامعي (   )

9/ هل تعيش مع :

أ– الزوج/ الزوجة (   )   ب– الوالدين (   )

ج- الإخوة (   )   د– الأولاد (   )

ه – الأصدقاء (   )   و– الزوج .الزوجة.الأولاد(   )

ز– بمفردي (   )   ي- دار مسنين (   )

العوامل المؤثرة علي انتظام المريض بالنظام العلاجي:

10/ ما هو مصدر معلوماتك عن مرضي السكري ؟

أ– الدوريات (   )   ب– وسائل الإعلام (   )

ج– الطبيب (   )   د– الممرضة (   )

ه– الجيران (   )   و– أخري اذكر........................

11/ متي اكتشفت انك مريض بالسكري ؟

أ- 0 – 2 سنه (   )   ب- 2 سنه- 5 سنه (   )

ج- 5 – 10 سنه (   )   د – 10 – 20 سنه (   )

ه – أكثر من 20 سنه (   )

12/ هل اكتشفت انك مريض بالسكري عن طريق :

أ – الصدفة (   )   ب- ظهور أعراض السكري (   )

ج- ظهور مضاعفات السكر (   )

13/ هل تعرف أعراض مرض السكري ؟

أ-   نعم (   )   ب- لا (   )

في حالة الاجابه بنعم ما هي هذه الأعراض ؟

أ- الفتور (   )   ب- كثرة التبول (   )

ج- هرش الجلد (   )   د- نقص الوزن (   )

و – تأخر التئام الجروح (   )   ه- كثرة العطش (   )

14/ هل تعتقد أن هذا المرض له مضاعفات ؟

أ – نعم (   )   لا (   )

في حالة الاجابه بنعم ما هذه المضاعفات ؟

أ- مضاعفات النظر (   )   ب – مضاعفات الحمل (   )

ج- مضاعفات الأسنان واللثة (   )د- مضاعفات القلب (   )

ه- مضاعفات الكلي (   )   و- غيبوبة (   )

ز – لا أعرف (   )ح- غرغرينا (   )   ل- أخري ....

الفحوصات اللازمة لمريض السكري :

15/ ما هي الفحوصات اللازمة لمريض السكري ؟

أ- تحليل الدم في السكر (   )   ب – تحليل البول للسكر (   )

ج- تحليل البول للأستون (   )   د – الهميقلوبين المرتبط بالجلوكوز (   )

و- لا يعرف (   )

16/هل تعرف كيف تحلل البول عن طريق الشريط ؟

أ – نعم (   )   ب– لا (   )

إذا كانت الإجابة بنعم فهل تستطيع أن تفسر النتيجة ؟

أ – نعم (   )   ب– لا (   )

17/ هل تعرف نسبة السكر الطبيعية في الدم ؟

أ/ نعم (   )   ب – لا (   )

إذا كانت الإجابة بنعم فما هو المعدل الطبيعي ؟

....

18/ ما هي الأسباب التي تؤدي إلي ظهور السكر في البول أو ارتفاعه في الدم ؟

أ/ عدم الانتظام في تناول الطعام الموصوف   (   )

ب/ عدم الانتظام في تناول كمية الدواء الموصوف   (   )

ج/ قلة المجهود   (   )

د/ عوامل نفسية – التفكير – القلق والتهيج العصبي   (   )

و/ لا أعرف   (   )

19/ هل تعاني من أمراض أخري مصاحبة ؟

....

20/ متي يكون الفحص بالنسبة إلي مواعيد الأكل ؟

أ– قبل الأكل (   )   ب– بعد الأكل بساعتين   (   )

ج– غير مرتبط بالأكل (   )   د– بعد الأكل مباشرة (   )

21/ عادة يكون تحليل السكر في الدم:

أ – كل شهر (   )   ب– كل ثلاثة أشهر (   )

ج– كل ستة أشهر (   )   د– أكثر من ستة أشهر (   )

أخري أذكر ....

22/ كيف تتصرف في حالة وجود سكر في البول أو ارتفاعه في الدم ؟

أ– أنتظم في كمية ونوع الطعام الموصوف   (   )

ب– أكثر من الرياضة   (   )

ج- انتظم في أخذ الدواء   (   )   (   )

د- أذهب إلي الطبيب (   ) لا اعرف (   )   (   )

غـذاء مـريـض الـسكري :-

23/ هل نصحك الطبيب بانتظام غذائي معين ؟

أ- نعم (   )   ب-   لا   (   )

24/ هل تعرف كمية الطعام المسموح بها لمريض السكري بتناولها في اليوم

الواحد ؟ (من الأصناف التالية)

يعرف   لا يعرف

أ- العيش أو بديله مثل الكسرة –القراصة   (   ) (   )   (   ) (   )

ب- الأرز – المكرونة   (   ) (   )   (   ) (   )

ج- كمية السكر في أي نوع من السكريات (   ) (   )   (   ) (   )

د- الحلوى مثل الكيك – الشوكلاتة الكنافة (   ) (   )   (   ) (   )

ه – خضروات طازجه مثل الجرجير   (   ) (   )   (   ) (   )

و- فاكهة مثل الموز – البرتقال   (   ) (   )   (   ) (   )

ز- سمك – فراخ   (   ) (   )   (   ) (   )

ح- اللبن – الجبن   (   ) (   )   (   ) (   )

ط- الدهون المستعملة في الطبخ   (   ) (   )   (   ) (   )

25/ هل معرفة وزن الجسم ضرورية لمريض السكري ؟

أ - نعم (   )   ب- لا (   )   (   )

إذا كانت الإجابة بنعم فما هي مواعيد الوزن؟

أ- أسبوعيا (   )   ب- شهريا (   )

ج – أكثر من شهر (   )   د- أخري اذكر.............

26/ كم وجبة تأكلها في اليوم ؟

أ- وجبه (   )   ب- وجبتان (   )   ج- ثلاثة   (   )

د- أربع وجبات (   )   و- خمس وجبات (   )   ه- سته وجبات (   )

27/ هل تأخذ وجباتك في مواعيد منتظمة ؟

أ- دائماً (   )   ب- أحيانا (   )

ج- أبداً (   )

28/ هل تحرص علي كميات محسوبة من أنواع الطعام المختلفة ؟

أ- دائماً (   )   ب- أحيانا (   )

ج- أبداً (   )

29/ ماذا تفعل إذا ما لاحظت زيادة أو نقص في وزنك الطبيعي ؟

أ- اتبع نظام الغذاء الموصوف لي   (   )

ب- أغير في المجهود   (   )

ج- أذهب إلي الطبيب   (   )

د- لا افعل شيء   (   )

الـريـاضـة لـمريـض الـسكري :-

30/ هل نصحك الطبيب بممارسة الرياضة ؟

أ - نعم (   )   ب- لا (   )

31/ هل تعرف أهمية ممارسة الرياضة ؟

أ- تقلل كمية السكر الذائدة في الدم (   )

ب- تنشيط الدورة الدموية   (   )

ج- تقلل الوزن   (   )   ه - لا يعرف (   )

أخري اذكر ....

32/ هل تعرف الوقت المناسب لممارسة الرياضة او القيام بمجهود بالنسبة إلي الأكل ؟

أ- قبل الأكل (   )   ب- بعد الأكل (   )

ج- لا يعرف (   )

33/ هل تعرف ماذا يحدث إذا مارست الرياضة أو قمت بمجهود قبل الأكل ؟

أ- غيبوبة   (   )   ب- دوخة أو هبوط (   ) ج- نقص كمية السكر في الدم (   ) ج- لا يعرف   (   ) أ خري اذكر   (   ) ....

/34 ماهي طبيعة مجهودك اليومي ؟

أ- شاق بدون فترات راحة (   )

ب- مجهود متوسط عمل أو رياضة معينة بانتظام (   )

ج- لا أعمل أي مجهود (   )

/35 هل تحرص علي المشي أو القيام بتمرينات رياضة معينة بانتظام؟

أ- نعم (   )   ب- لا (   )

إذا كانت الإجابة بنعم فما مدي تكراره ؟

أ- يوميا (   )   ب- يوم بعد يوم (   )

ج- مرتان في الأسبوع (   )   د- أسبوعيا (   )

/36 ماذا تفعل إذا ما شعرت بالأعراض التاليه ؟

(جوع فجائي – عرق غزير – زغلله – هبوط – غيبوبة – دوخه – تهيج عصبي – سرعة تنفس – صداع .)

أ- أخذ قطعة سكر أو حلوي – عصير   (   )

ب- أخذ كمية من الطعام   (   )

ج- اذهب إلي عيادة الطبيب   (   )

د- لا أفعل شئ   (   )

هـ- أخري اذكر ....

الأدوية المخصصة للسكري :-

/37 هل تعرف اسم الدواء الذي تستخدمة لعلاج مرض السكري ؟

أ – أعرف (   )   ب – لا أعرف (   )

/38 هل تعرف عدد المرات التي يجب أن تأخذ فيها الدواء ؟

أ – أعرف (   )   ب- لا يعرف (   )

/39 من الذي أعطاك النصائح اللازمة عن الدواء ؟

أ – الطبيب ( )   ب– الممرضة ( )   الأهل – الأصدقاء ( )

د– الصيدلي ( )   هـ– الأخبار – النشرة ( )   و– لا احد ( )

40/ هل تعرف ماذا يحدث اذا لم تأخذ الدواء ؟

أ– ذيادة السكر في الدم ( )   ب– وجود سكر البول ( )

ج– غيبوبة سكري ( )   د– لا يعرف ( )

41/ هل تعرف زيادة أعراض السكر في الدم ؟

أ– عطش ( )   ب– جفاف في الفم ( )   ج– زغللة ( )

د– الم بالبطن ( )   هـ– تنميل الأطراف ( )

و– تقلصات ( )   ل– غيبوبة ( )   ح– لا يعرف ( )

ط– أخري أذكر ....

42/ هل عندك مكان مناسب لحفظ الأدوية بالمنزل ؟

أ– نعم ( )   ب– لا ( )

43/ متي تأخذ الدواء بالنسبة لمواعيد الطعام ؟

أ– قبل الأكل ( )   ب– بعد الأكل ( )

44/ ماذا تفعل عند نسيانك للدواء الموصوف لك ؟

أ– تأخذه عندما تتذكر ( )

ب– تتجاهل هذه الجرعة وتأخذ الجديدة ( )

ج– تأخذ جرعة مضاعفة في المرة القادمة ( )   د– لا يعرف ( )

أخري اذكر ....

45/ هل تواظب علي أخذ الدواء ؟

أ– نعم ( )   ب– لا ( )

في حالة الإجابة بنعم ما السبب :

....

46/ ماذا تفعل إذا ما شعرت في أي من هذه الأعراض ؟

زغللة – عطش –تقلصات – تنميل بالأطراف – جفاف الفم – آلام البطن –

أ– اذهب الي الطبيب ( ) ب– أقلل الطعام ( )

ج– أخذ الدواء في مواعيده ( ) د– أحلل البول ( )

ه– اقلل من المجهود اليومي ( ) و– لا أفعل شئ ( )

ل– أخري اذكر ....

الـعنـايـة بـقـدم مـريـض الـسكـري :-

47/ هل العناية بالقدمين ضرورية لمريض السكري ؟

أ– نعم ( ) ب– لا ( )

إذا كانت الإجابة بنعم فما أهميتها ؟

أ– تجنب حدوث جروح ( ) ب– تجنب حدوث غرغرينا ( )

ج– تحسـين الـدورة الدمويـة ( ) د– ملاحظـة وجـود تشـققات أو جـروح أو تسلخات ( )

48/ ماذا تستخدم لقص الأظافر ؟

أ– مقص ( ) ب– موس ( ) ج– ضفارة ( )

49/ ما هي الأفعال التي تمارسها للعناية بقدميك ؟

	لا	نعم	
أ– غسل القدمين يوميا بالماء والصابون	( )	( )	( ) ( )
ب– التنشيف جيدا بين الأصابع	( )	( )	( ) ( )
عدم نزع الجلد الجاف والمتشقق	( )	( )	( ) ( )
د– قص الأظافر مستقيمة	( )	( )	( ) ( )
ه – استعمال شرابات قطنية	( )	( )	( ) ( )
و–أن يكون إستك الشراب غير ضاغط	( )	( )	( ) ( )
ز– لبس حذاء جلد مقفول وطري	( )	( )	( ) ( )
ج– عدم لبس حذاء ضيق	( )	( )	( ) ( )
ط– تجنب لبس الحذاء المفتوح	( )	( )	( ) ( )
ي– لا أمشي حافي القدمين	( )	( )	( ) ( )

ك- معالجة الجروح واستعمال غيارات معقمة والذهاب إلي الطبيب

(   )   (   )   (   )   (   )

أخــــــــــري اذكــــــــــر

. . . .

. . . .

سلـوكيـات الأسرة :-

50/ هل يوجد شخص معين يذكرك بمواعيد الدواء ؟

أ- نعم   (   )   ب- لا (   )

51/ هل الأسرة تنبهك بتسجيل قياس السكر في البول أو الدم في مفكرة ؟

أ- نعم (   )   لا (   )

انتظـــام المـــريض بــالمجئ إلـــي العيـــادة والمتـــابعة:-

52/ هل أنت منتظم بالمجئ إلي العيادة لمتابعة السكري ؟

أ- نعم (   )   لا-(   )

في حالة عدم الإجابة بلا فما هي أسباب عدم الانتظام ؟

1-. . . . .   2-. . . . .   3-. . . . .

53/ عدد المرات المفروضة . . . .

عدد المرات الفعلية . . . .

54/ هل تعرف اسم الطبيب المعالج؟

أ- نعم (   )   ب- لا (   )

55/ هل الطبيب يعرف اسمك؟

أ- نعم (   )   ب- لا (   )

56/ هل الطبيب يعطيك فرصة للتحدث براحتك ؟

أ- نعم (   )   ب- لا (   )

هل الممرضة تقدم لك بعض النصائح الطبية ؟

أ- نعم (   )   ب- لا (   )

Scoring system

For knowledge and compliance questions, the responses were scored "1" for correct answers and "0" for incorrect. For each aspect of the knowledge and compliance the scores were summed up, and converted into a percentage. Then the scores were converted to qualitative variables through categorization based on a cutoff point of 50%. A patient with a knowledge score of 50% or more was considered as having "good" knowledge, and less than 50% was considered as having "poor" knowledge. Similarly, the scores of compliance were categorized into compliant, and non-compliant.

For medical services, (yes) answer was scored "1", and (no) answer scored "0". For each patient, the scores were summed up, and converted into a percentage. If the score is equal to or exceed 50% the patient was considered as "satisfied" with the medical services provided, and if less than 50% the patient was considered as "unsatisfied" with the medical services provided.