Knowledge, Attitude and Practice among Mothers towards Diabetes in Alsahafa Administrative Unit, Khartoum Locality, Khartoum State, Sudan,( 2015)

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BSc. in Public and Environmental Health

University of Khartoum (2004)

A Dissertation

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Knowledge, Attitude and Practice among Mothers towards Diabetes in *Alsa$hafa Administrative Unit*, Khartoum Locality, Khartoum State, Sudan, (2015)

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Date of Examination: / / / 2016
Dedication

To my parents, who raised me and loved me
With all their heart, giving me the opportunity to become what I am.

To my husband and lovely brothers and sisters and my sons
Acknowledgement

I would like to thank my supervisor, Dr. AbdElbasitElawad Mohammed Ahmed and my Co. supervisor, Dr. ArafaElgurashi Musa Abdalla for their collaboration, support and guidance throughout this research.

My thanks also to the Khartoum Locality Staff, and Elsahafa Administrative Unit for their support and permission.

By
Awatif Alshreaf Gomndan Adam

ABSTRACT

The burden of diabetes mellitus continues to rise and constitutes a real threat especially in the developing world. As for most non-communicable diseases, change of behavior and adoption of healthy lifestyle habits help to prevent and slow down the increase of diabetes mellitus. The study was aimed to assess the knowledge, attitudes, and practices, among mothers towards diabetes in *Alsahafa administrative unit*, Khartoum state, Sudan, 2015. A descriptive Cross-Sectional community based study was carried out during the period from January, 2015 to May, 2016; a questionnaire was conducted and distributed to 380 mothers selected by simple random Sampling in Alsahafa Administrative unit. The data were analyzed by using Statistical Package Social Sciences (SPSS). The study indicated that 98.9% of the mothers knew diabetes; 14.1% of the mothers said that diabetes is caused by lack of insulin, 86.4% knew diabetes symptoms; 46.8% stated that they knew all factors causing diabetes, 77.1% knew that both diet and physical exercise are methods for prevention from diabetes. 67.6% had a positive attitude towards diabetes, 68.2% had a positive attitudes towards diet, 52.4% had positive attitudes towards taking sugar, 73.9% had a positive attitudes towards sweets, 73.2% had a positive attitudes towards insulin, 71.6% a had healthy practices towards diet system, 50.5% stated that they practiced physical exercise, and 23.4% wearied diabetic shoes. The study recommended that Health Education must be designed and then directed to the mothers regarding diabetes knowledge, attitudes and practices, change mother attitudes regarding wearing diabetic shoes, promote and sustains group education as well as individualized education programmes for better preventive and management techniques in diabetes, increase the use of media to spread the message which could change the attitude of our public in the future, patient education is important in term of self-monitoring and comprehensive educational programme of diabetes, anda programmes for mothers in diabetes should be promoted by Commitment diet system, get rid of excess weight workout, and avoidance of emotional stress, anxiety and tension, and measuring blood sugar regularly to living with diabetes.
المعرفة والموافقت والسلوك للأمهات تجاه مرض السكري بوحدة الصحافة الإدارية، ولاية الخرطوم، 2015.

عواطف الشريف قمدان

الخلاصة

عبء مرض السكري في ارتفاع مستمر، ويشكل تهديداً حقيقياً وخاصة في العالم النامي. بالنسبة لمعظم الأمراض غير المعدية، تغطي السلوك والعادات الصحية ممارسة الأمهات تجاه مرض السكري في وحدة الصحافة الإدارية، ولاية الخرطوم، السودان، التي أجريت عام (2015). وهي دراسة وصفية مقطعية مجتمعية خلال الفترة من يناير 2015 إلى مايو 2016، وقد تم جمع المعلومات عن طريق توزيع استبيان على 380 من الأمهات تم اختيارهم عن طريق عينة عشوائية في وحدة الصحافة الإدارية، تم تجهيز الاستبانة المعدة مسبقاً وتم اختبارها للحصول على المعلومات عن الخصائص السكانية الديمقراطية والمعرفة والموافقت ممارسة الأمهات تجاه مرض السكري، بيد أن 51.6% من الأمهات تراوحت أعمارهم بين 32-45 سنة. كانت 77.6% من الأمهات يعملن، وكان 47.1% منهم تراوح دخلهم الشهري بين 510-850 جنيه، وكان 6.8% من الأمهات تعليهم جامعى وفوق الجامعى، وكان 30% منهم تعليمهم ثانوى، وكان 49.6% من الأمهات حجم الأسرة لديهم أقل من 6 أشخاص. الغالبية من الأمهات 98.8% يعرفون مرض السكري، ومعظمهم لديهم مواقف إيجابية تجاه مرض السكري. غالبية الأمهات 98.9% يعرفون مرض السكري بينما نسبة 14.1% يعتقدون أن سبب مرض السكري هو نقص الأنسولين. معظم الأمهات 86.4% يعرفون أعراض السكري، ما يقرب من النصف 46.8% ذكروا بأنهم يعرفون كل العوامل المسببة لمرض السكري. الغالبية من الأمهات 77.1% يعرفون أن الحمية الغذائية والرياضة البدنية هي من وسائل مكافحة السكري. معظم الأمهات 67.6% لديهم مواقف إيجابية تجاه مرض السكري. أكثر من الثلثين من الأمهات 68.2% لديهم مواقف إيجابية تجاه الحمية الغذائية، أكثر من نصف الأمهات 73.9% لديهم مواقف إيجابية تجاه تناول الحلوى، ومعظم الأمهات 73.2% لديهم مواقف إيجابية تجاه الإسمنولين. غالبية الأمهات 71.6% لديهم ممارسات جيدة تجاه الحمية الغذائية، وآخرين من النصف 50.5% ذكروا بأنه يمارسون الرياضة البدنية، كان عدد قليل من الأمهات بنسبة 23.4% يلبست الأحذية، ومنهم 50.5% لا يمارسون الرياضة البدنية. أوصت الدراسة أن التثقيف الصحي يجب أن يعتمد على معرفة الأمهات وممارساتهم وسلوكهم عن مرض السكري، للتغير للامهات يمثل في ارتداء أحذية السكري، تعزيز مجموعات النقاشات والمحادثات الفردية لتطبيق تقنيات وقائمة أفضل فيما يتعلق بمرض السكري. زيادة استخدام الوسائط المختلفة في تشجيع الرسائل الصحية التي تتعلق غير الممارسات في المستقبل. البرامج التثقيفية لمريض السكري مهمة جداً في الرقابة الذاتية والالتزام بالحمية الغذائية المناسبة، والتخلص من الوزن الزائد وذلك عن طريق الالتزام بممارسات الرياضة والكشف عن الضغوط النفسية والقلق والتوتر والاهتمام بالصحة للعصابات بالسكري على طريق الفحوصات الدورية مثلاً قياس نسبة السكر في الدم.
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<td>(HbA1c)</td>
<td>The proportion of glycosylated hemoglobin in the blood</td>
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<td>AUC</td>
<td>Area Under the Curve</td>
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<td>BMI</td>
<td>Body Mass Index.</td>
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<td>DM</td>
<td>Diabetes Mellitus.</td>
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<td>ECG</td>
<td>Electro Cardio Gram.</td>
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<td>IDF</td>
<td>International Diabetes Federation.</td>
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<td>KAPs</td>
<td>Knowledge, Attitude and Practices.</td>
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<td>LDL</td>
<td>Lipoprotein Density Levels.</td>
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<td>NPD</td>
<td>Neutral Protamine Developed</td>
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<td>NPH</td>
<td>Neutral Protamine Hagedorn</td>
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<td>NSP</td>
<td>Non-starch polysaccharide</td>
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<td>OPD</td>
<td>Out-Patient Department.</td>
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<td>PCC</td>
<td>People's Community Clinic</td>
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<td>PPBG</td>
<td>Post Prandial Blood Glucose.</td>
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<td>SD</td>
<td>Stander Deviation.</td>
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<td>SDG</td>
<td>Sudanese Genaih.</td>
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<td>SPSS</td>
<td>Statistical Package for Social Scenes.</td>
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<td>TC</td>
<td>Total Cholesterol.</td>
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<td>Thyroid Function Test.</td>
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<td>Triglycerides.</td>
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CHAPTER ONE
INTRODUCTION

1.1. Introduction:

Knowledge is a fact or a condition of knowing something with familiarity gained through experience or association or acquaintance with or understanding of a science, art, or technique, the fact or condition of being aware of something, the range of one’s information, understanding, answered to the best of my knowledge, the circumstance, condition of apprehending truth or fact through reasoning. (Mohammed, 2006).

Attitude is a hypothetical construct that represents an individual’s degree of like or dislike for something. Attitudes are generally positive or negative views of a person, place, thing, or event, this is often referred to as the attitude object. People can also be conflicted or ambivalent towards an object, meaning that they simultaneously possess both positive and negative attitude towards the item in question. (Mohammed, 2006).

Practice is an actual performance, application, repeated customary action, or the usual way of doing something. (Mohammed, 2006).

Health education is an important factor in controlling diabetes, And Knowledge and Attitude and Practice are playing a key role in controlling the disease and reducing complications. (Mohammed, 2006).

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin (a hormone that regulates blood sugar) or alternatively, when the body cannot effectively use the insulin it produces. The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes. (NDSS, 2014).

There are two main types of diabetes: Type 1 or insulin dependent diabetes, which usually affects young people and requires daily injections of insulin; and Type 2 or non-insulin dependent diabetes, which usually affects people over 45 years, is treated by healthy eating and regular exercise. Tablets and insulin injections are sometimes necessary. This second type is the more common form of diabetes. (NDSS, 2014).

More than 75% of all people with diabetes will reside in developing countries. The prevalence is increasing largely due to population growth, ageing, urbanization, sedentary life style and food consumptions patterns with high fat contents and more refined carbohydrates. At least 50% of all people with diabetes are unaware of their condition (Hussein, 2007).
1.2. Problem statement:

(Park, 2000) reported that 30 million people worldwide had diabetes in 1985. By 1995 this number had shot up to 135 million with prevalence around 4%. The WHO estimates for the number of people with diabetes, worldwide in 2000 was 177 million. This will increase to at least 300 million by the year 2025, with prevalence around 5.4%. The majority of this increase will be in developing countries.

Diabetes mellitus predisposes to vascular, renal, ophtalmic and neurological complications. It is the leading cause of blindness, kidney failure and the leading cause of death in most developed countries.

WHO in 2004 indicated that 3.2 million worldwide annual deaths are attributable to diabetes, which is death in every minute? Diabetes with its extensive complications has a severe impact on the quality of life of people affected (IDF, 2004).

In USA, 18.2 million people are affected with DM. The total economic cost of diabetes in 2002 was estimated to be 132 billion dollars or one out of every ten health care dollar spent in USA. From this figure, the direct medical cost was 92 billion and the indirect 42 billion dollars (Fantahun, Degu, 2007).

In USA 2008, Adults: 18.3 million adult Americans had physician-diagnosed of diabetes, 8.3 million male’s and 10.0 million females.
In 2008, diabetes killed 70,553 Americans. 35,346 male deaths (50.1% of total deaths from diabetes).
In 2009, 688,000 U.S. adults (313,000 males; 304,000 females)
In USA 2011, Youth: approximately 186,000 people <20 years of age had diabetes (NCDE, 2011).

In one study conducted in Sudan in 1992, the prevalence of diabetes was 3.2% in some states the percentages were as follows: Northern state 5.5%, Central State 4.0%, Kordofan State 0.9%.

A survey was done in 2003 in Argo Town (Northern State) and DM is growing as a health problem worldwide. Type 2 diabetes is silent, chronic, unidentified killer among adult population in developing countries most of type 2 diabetics are aged by years and above in the developing world the age in 45-65 years, most productive period of their life, and this is true for the Sudanese diabetic patients (WHO, 2007).

According to ministry of Health Khartoum State, 2016) they were cases of diabetes among male and 55.5% cases among female. While in 2015 the number of diabetes cases among female were 55.2% and 44.8% cases among male.
1.3. Justifications:

- Diabetes mellitus predisposes to vascular, renal, ophthalmic and neurological complications. It is the leading cause of blindness, kidney failure and the leading cause of death in most developed countries.
- WHO in 2004 indicated that 3.2 million worldwide annual deaths are attributable to diabetes, which is death every minute? Diabetes with its extensive complications has a severe impact on the quality of life of people affected (IDF, 2004).
- Dm is one of leading causes of morbidity and mortality.
- DM became majority health problem due to its high prevalence rate.
- Lack of awareness about nutritional habits.
1.4. Objectives:

1.4.1. General objective:
To assess the knowledge, attitudes and practices among mothers towards diabetes-Alsahafa Administrative Unit, Khartoum Locality, Khartoum State, Sudan, 2015

1.4.2. Specific objectives:

- To assess the knowledge of mothers about diabetes.
- To assess the attitudes of mothers about dietary habits.
- To identify the practices of mothers towards diabetes prevention.
- To measure the incidence rate of diabetes diseases among mother questioned.
- To assess the knowledge of mothers towards the most important factors that causes the disease or affecting the occurrence of disease.
CHAPTER TWO
LITERATURE REVIEW

2.1. Background:

Diabetes was first described more than 3,500 years ago in ancient Egypt as very abundant urine. A report from Turkey some 2000 years ago described the extreme thirst and profuse urination of people with diabetes. Although the sweetness of the urine had been mentioned in earlier reports, it was not until 200 years ago that Chevreul in England developed a specific test to measure the concentration of sugar in the urine and provide the positive proof of glycosuria. (ISPAD, 2010).

Later in the nineteenth century, the Frenchman Bouchardat published a work on the hygienic treatment of diabetes mellitus, linking the condition with overeating. The value of Bouchardat’s treatment was confirmed during the siege of Paris in 1870, where it was confirmed that food deprivation endured by the Parisians resulted in a definite improvement in the condition of people with (most likely type 2) diabetes. Nevertheless, after several thousand years of observation, diabetes remained a diabetes for which neither the cause nor the mechanism was known until the 20th century (ISPAD, 2010).

Paul langerhans showed in 1869 that the pancreas contained other cells of unknown function (which he gave his name), in addition to those secreting the pancreatic juice. Minkowski from Strasbourg University showed that the islets of langerhans are involved in the pathogenesis of diabetes mellitus, by inducing diabetes mellitus in the dog by removal of the pancreas. In 1900, stobolev in Russia and Opie in the USA confirmed that diabetes mellitus occurs as a result of destruction of the islets of langerhans. (ISPAD, 2010).

Later research in Toronto by Banting, Best, Macleod and Collip successfully treated diabetic dogs with pancreatic extracts. The first human to be treated with pancreatic extract was Leonard Thompson in 1922. His spectacular recovery resulted in Nobel Prize for Branting and Macleod in 1923, which they shared with their co-researchers. At the University of Toronto, Best had refused to give exclusive rights to a single laboratory to make insulin. The laboratories of Ely Lilly in the United States, Novo Nordisk in Denmark, and Hoechst in Germany and Endopancrine in France launched the first production, starting in 1930. insulin (Neutral Protamine Hagedorn) (NPH) was developed in 1946 by HanschristianHagedorn of the Nordisk laboratories. (ISPAD, 2010).

During the next few decades researchers developed insulin designed to improve blood sugar control, appropriate for daily treatment, with few adverse effects. After first producing pure insulin from cows or pigs, the next advance was to transform animal insulin into ‘human ‘insulin by substituting one amino acid. From1979 Genetic engineering became the preferred
route for making insulin rather than using animal extract; using bacteria and later yeast. A third advance was to modify the activity profile of human insulin, to enable either more rapid uptake, or slow uptake over 24 hours.

People with diabetes in the developed parts of the world or developed countries no longer die because of unavailability of insulin, but in certain regions of the world it is still a real problem (ISPAD, 2010).

2.2. Insulin:

It is a hormone works on maintaining the blood sugar control (Building 2002). It works to ease traffic during the glucose absorbed through the intestines into the blood contribute to building glycogen and fatty acids to be stored in the liver is working not to convert glucose from protein or fat (Ibrahim, 2002).

Also, the effect of insulin prevents the enzymes in the digestive system as well as it reduces the secretion of excess glucose from the liver (Juma; 2003).

2.3. The pancreas insulin and its function:

The gland of the pancreas is found in the upper abdomen, posterior. It is formed of two parts: one of them is an endocrine gland that secrets its hormones directly in the blood, the other secrets digestives enzymes through a duct directly into the small intestine (duodenum), in the endocrine part there are three types of cells that secret three different hormones. They are: alpha cells which secrete the hormone glucagons, beta cells secrete the hormone insulin, and delta cells that secrete the hormone somatostation. Insulin regulates blood glucose level. It helps glucose to enter into the different body cells to be oxidized. When there is excess of glucose, it is stored in liver cells, fatty tissues and muscles in form of glycogen and triglycerides. Insulin works through receptors present in cells of the body and its efficiency depends on the extent of sensitivity of these receptors decreases in obesity and improves when weight is reduced. This explains the occurrence of diabetes mellitus among obese patients (WHO, 2007).

2.4. Classification of diabetes mellitus:

According to World Health Organization (WHO) and the American Society for Diabetes DM was classified into:

2.4.1. Type (1), DM type (2):

This type is divided into three categories: diabetes among non – obese patients: caused by defects in cell receptors for insulin secretion• diabetes among obese patients: caused by defects in cell receptors for insulin, while its secretion is normal or increased old – onset diabetes.

This classification is important because the type of treatment depends on it. In type (2) diabetes in obese patients, treatment depends on dietary regulation, exercise and stimulation of the pancreas by sulphonylureas. In diabetes type (2) for obese patient's treatment depends on
dietary regulation, exercise and increase the sensitivity of receptors by sulphonylureas and the patient does not need insulin except in severe stress conditions. In type (2) diabetes mellitus, symptoms are slow and may take some years before being noticed. These patients rarely develop keto acidosis. Inheritance is the main factor for developing this type which will be overt whenever suitable conditions are present (Hussein, 2011).

2.4.2. Gestational diabetes:

It is the rise of blood glucose during pregnancy only. Gestational diabetes occurs mostly in the second or third trimester. Therefore blood glucose should be tested for pregnant women who have got one of the risk factors for diabetes, should be tested in the first visit. In most of the times a women who had gestational diabetes will have it repeatedly, or she may develop diabetes after many years from pregnancy (Hussein, 2011).

2.4.3. Glucose intolerance:-

In this type the blood glucose level is higher than in normal persons but lower than that of diabetics' diagnosis is done by glucose tolerance test (Hussein, 2007).

2.4.4. Specific types due to specific causes:-

Diabetes may result from a genetic defect in beta cells or genetic defect in insulin or from some disease of the pancreas like pancreatitis and pancreatic tumors. It may also be due to endocrine disorders or use of some drugs and chemicals or in some congenital conditions like Down's syndrome (WHO, 2007).

2.5. Symptoms of diabetes mellitus:

Most of the patients have no symptoms, but in some present there may be symptoms that indicate the likelihood of the presence of the disease:- symptoms are:- increase micturition (in amount and frequency), dryness of the amount and thirst, fatigue and loss of weight, blurring of vision, repeated infections, numbness of the hands and feet, delayed wound healing (Abdella, 2007).

2.6. The causes of diabetes:

2.6.1. Genetic factors or environmental factors: affecting the beta cells of the pancreas may be the result of that lack of the hormone insulin, which is produced by these cells and Diabetes often predisposition to its hereditary transmitted to offspring through previous generations infected diabetes, we find that a number of generations were infected the disease also. It is self-evident to be more people willing to infection are the children who inherit the disease from generations to generations and diabetes occurs also as a result of the disease souls or obese may appear after the disease high fever infectious Scarlet important sugar in urine during some diseases. Other infectious such as pneumonia and other diets is not considered a sign of the onset of diabetes is the result of
damage to public and fever on the body after the demise of urine fever returns to normal and eliminates the presence of sugar in it. There is no doubt that the emotions mental cases influence irrevocable injury diabetes if found this willingness cannot factors psychological anxiety, fear and other cause injury diabetes and more people with diabetes who claim that the disease appeared after exposure to this psychological, it is the direct motivation to injury the disease. (Ibrahim, 2000).

2.6.2. Bacteria and viruses:
Infection by bacteria and viruses cause of the causes of type I and type II are considered for the infection of bacteria showed examinations and medical tests that some patients who complain of severe infection of the bacterium Staphylococcus be prone to diabetes type I and type where sugar appears in the urine of the patient after being infected Bacteria increase of some hormones, anti-insulin because of infection, either about the role of viruses in the incidence of diabetes has been shown in more than a hundred years that the incidence of disease, viral helps incidence of diabetes discovered Norwegian world that is no connection between viruses and the incidence of diabetes by showing him that one of his patients It has suffered the impact of diabetes on the parotid gland inflammation, a severe disease of viral and infectious diseases. (Ibrahim, 2000).

There are studies done in England confirmed that the viruses cause diabetes in children and increasing cases of diabetes in the winter than in the summer where viral diseases spreading in the winter (Ibrahim, 2000).

2.6.3. Aging:
More likely incidence of diseases brought in with age where the individual after 65 year and more exposure to diseases cardiovascular, bone and rheumatic diseases and diabetes, and studies have shown that if the incidence of diabetes is generally equivalent to 5% of the total population, this percentage rises to 20% after the age of 65 medical tests indicate that the blood sugar level rises gradually after the age of 50 years and start developing diabetes if this rate increased significantly than normal and therefore should monitor blood sugar to conduct analyzes medical and especially after the age of 50 age, because high blood sugar leads to diseases and other such as heart disease. There are several reasons leading to the high probability of developing diabetes with age, especially in individuals who increase their weight than normal, and factors that lead to reduced effectiveness of insulin in elderly small muscle size and increasing the volume of fatty tissue as well as the lack of movement and activation physical and where increasing the effectiveness of insulin in the active individuals, especially those who exercise facility. Factors that lead to an increased likelihood of developing diabetes in the elderly overeating because this over with lack of movement in the activity causing the weight increase is an important factor of diabetes(Just 2003).

There is a correlation between aging and diabetes, Ageing is a factor of diabetes factors also that
diabetes is one of the most important factors that make the symptoms of aging, where the disease affects the freshness of the skin and its vitality and this leads to the appearance of wrinkles, one of the symptoms of aging (Just 2003).

2.7. Diagnosis Ways of Diabetes:

2.7.1: Blood test:
Fasting ranges of natural diagnosis glucose concentration in the blood of 80 to 110 mg per 100 cm of blood and being also a special blood test known as the choice of carrying sugar mouth and the patient is given a solution glycemic the form of a drink in the morning, after one night, and then measured the amount of sugar in the blood and urine every half an hour for three hours continuously and through the results and determines the presence of the disease and the degree of injury. (Abdullah 2008.)

2.7.2. Urine test:
The most appropriate way and the fastest known that urine does not contain natural sugar under natural conditions and diabetes if found in urine should be an examination of diabetes in the blood. (Abdullah 2008.)

2.7.3. Analyzes carried out when diagnosing diabetes:
Hemoglobin sugar gives an idea of the strength and effectiveness of the treatment and control of sugar in the blood fat and cholesterol in the blood and kidney function Urinalysis with agriculture when there is inflammation of the urethra urine to look for albumin microscopic fee (ECG) (ECG), especially for the elderly and examine the bottom of the eye and Thyroid function tests (TFT) and examination of the feet, including the examination of the peripheral circulation and nerves (Abdullah, 2008).

2.8. Diabetic complications:-

Patients with long – standing diabetes, both type 1 and type 2, may develop complication effecting the eyes, kidneys or nerves (micro-vascular complications) or major arteries. The major arteries are affected in people with diabetes, causing a substantial increase both in coronary artery disease and strokes as well as peripheral vascular disease. The greatest risk of large vessel disease occurs in those diabetic patients who develop proteinuria or micro albuminuria, which is associated with widespread vascular damage. The distribution of arterial narrowing tends to be more distal than in non-diabetic people, whether in coronary arteries or in the peripheral arteries affecting feet and legs. Medial art aerial calcification (Monck berg’s sclerosis) is also substantially increased in patient with neuropathy and in those with renal impairment. The functional effects of vascular calcification are uncertain (Peter, 2003).
2.9. Prevention of type (2) diabetes:

lifestyle changes in prone to type 2 diabetes can effectively delay the onset of this disease. Several studies in different countries have demonstrated the feasibility of achieving this by a programme of weight reduction, improved diet (less fat, less saturated fat, and more dietary fiber) and increased physical activity. Recent investigations show that the development of diabetes can be approximately halved if these lifestyles change are maintained over four years (Peter, 2003).

2.10. Dietary of diabetic diet:

Dietary measures are required in the treatment of all diabetic patients to achieve the overall therapeutic goal: normal metabolism (John, 2002).

Most people eat two or three large meals per day. Consuming a large meal increases the amount of carbohydrates and sugars that digestive system may process at once; this can cause rapid blood sugar spikes immediately after a meal. Because body quickly burns glucose, it can also lead to feelings of fatigue between meals. Dividing daily calorie intake into four or five meals can help to maintain consistent energy and avoid blood glucose spikes. The interval time between eating small meals is important. A diabetic should consider eating every 3 hours apart. The interval time is when the feast-famine cycle is operating. If eat within 3 hours of previous meal, may disrupt the feast-famine cycle, leading to more insulin secretum for the additional food. This is not giving the body time for proper digestion (Vecchito, 2011).

2.10.1. Nutrition

Nutrition intervention is an integral diabetes care. Dietary management entails a series of eating behavior changes regarding meal planning, food selection, food preparation, dining out, portion control, as well as appropriate responses to eating challenges. Diabetic patients encounter several difficulties in complying with the dietary regime. They exhibit restrictive eating behaviors, express feelings of dietary deprivation, and rigid dietary control is perceived as the only way to a proper diet and weight management. However, pressure to conform to nutritional recommendations may render diabetics more prone to dietary under-reporting. Binge eating, restraint and body dissatisfaction frequently occur among these patients. Health professionals, therefore, need to take into account these difficulties in their collaboration with the patients in order to improve the effectiveness of nutrition intervention (SBDR, 2010).

2.10.2. Types of diabetic diet:

Two basic types of diet that used in the treatment of diabetes: weight-reducing diets and weight maintenance diets. The beneficial effect of weight reducing on the mortality rate of obese non-diabetic people is well known and applies even more strikingly to the obese diabetic patient.
Management of obese people (both diabetic and non-diabetic) with a diet low in refined carbohydrate and high in unrefined carbohydrate and restricted in total energy content results in increased insulin sensitivity. This promotes a decline in blood glucose in the obese diabetic patient. The precise mechanism of this effect is uncertain. Reduction in body weight increases this effect, encourages a rise in the plasma insulin concentration in many patients so that additional therapy can often be avoided (John, 2002).

2.10.3. Carbohydrate and non-starch polysaccharide (Dietary fiber):
A suitable diet for diabetic people should have 50% of the daily caloric intake derived from carbohydrate, of which significant amounts should be in the form carbohydrate, of Non-Starch Polysaccharide (NSP), as dietary fiber. The most useful effect of a high-carbohydrate diet is to facilitate the maintenance of a much less atherogenic low-fat diet. Restricted consumption of mono- and disaccharides (fructose, sucrose and glucose) is advised as part of healthy eating guidelines. Foods which contain a lot of sucrose are often high in fat and their intake should be limited. Sugar free drinks should be used and unsweetened fruit juices avoided. Confectionery, puddings, biscuit and cakes should be restricted, as should quenching thirst with milk when appetite is normal (John, 2002).

Classification of foods according to their acute effect on the blood glucose concentration (glycaemic index, glycaemic index is the incremental area under the two hour plasma glucose after eating the amount of a food containing 50 g carbohydrate, the glycaemic is high for bread, potatoes and glucose, and lower of pasta, legumes and wholegrain cereals. The index may be useful in constructing therapeutic diets for diabetes). It has been suggested as a means of determining the optimal carbohydrate foods for diabetic patient, but this system are not widely used (John, 2002).

2.10.4 Fat:
The high incidence of vascular disease in people with type 1 diabetes is long-recognized, as is the association of hyperglycemic poor glucose control (apart from genetic hyperlipidaemia). All of these conditions indicate the relation of diet and activity with high or low blood lipid levels. Genetic factors may be the most important influence, followed by the presence or absence of obesity (John, 2002).

Knowledge of the blood lipids of a child or adolescent helps to understand their individual risks, and knowledge of the family history also helps to place this in proper perspective. Decreasing animal-source saturated fats is beneficial as part of a meal plan for people with diabetes, setting limits on red and brown meats, animal skin, egg yolks, high-fat dairy products (milk, cheese, butter and margarine). Increase fish and white meats such as chicken breast and turkey, and also soy-based products, should be encouraged, since these are often low in
saturated fats. General fat content should usually be less than 30-35% of total caloric intake (ISPAD, 2010).

2.10.5. Protein:
No restriction of dietary protein is needed in modern meal planning for people with type 1 diabetes, although excessive protein has been associated with renal problems. Low saturated-fat sources of dietary protein should be provided and encouraged, but individual likes and national preference must be taken into account. In general, protein intake should usually be about 10-15% of total energy intake (ISPAD, 2010).

2.10.6: Salt:
Diabetic patients should follow the advice given to the general population; namely to reduce sodium intake to no more than 6g daily. Further restriction of sodium intake (to less than 3g daily) is important in the management of hypertensive diabetic patient (John, 2002).

2.10.7. Minerals and vitamins:
Infants, children, adolescents, and adults do not usually have significant cardiac or renal problems and therefore there is hardly any reason for limiting sodium intake, although there maybe individual exception, particularly if saltsensitive hypertension occurs. Maximizing intake of calcium and vitamin D helps promote cardio health, brain function, bone mineralization; it may also decrease incidence of cancer. Many children and adolescents are deficient in calcium and vitamin D because of dietary insufficie-ncies, chronic hyperglycemia and glycosuria (ISPAD, 2010).

2.10.8. Diabetic foods and sweeteners:
Low-calorie and sugar-free drinks are useful for patient with diabetes. These drinks usually contain non- nutritive sweeteners. Many diabetic foods contain sorbitol or fructose which are relatively high in energy, may be expensive and may have gastrointestinal side-effects. They are not recommended as part of the diabetic diet. The non-nutritive sweeteners saccharin, aspartame, sucramate and acesulphame K are the most widely used and provided means for reducing energy intake without loss of palatability (John, 2002).

All meals plans suggested for use by children and adolescents with type 1 diabetes agree that very concentrated sugar carbohydrate or carbohydrate sources rich in simple sugar (sucrose) should be drastically restricted offering < 10% of total calories. Because this is so different from the diet commonly followed by many young people, artificial sweeteners should be considered. Nutritive sweeteners are cane sugar, fruit sugar (fructose), milk sugar alcohols provide calories and raise the blood glucose level rather quickly and dramatically. Non-nutritive (artificial) sweeteners generally have minimal or no caloric content, but produce a sweet taste and therefore can substitute for nutritive sweeteners. These include cyclamate, saccharine, aspartame, acesulfame-K and stevia. When eating artificially sweetened foods and snacks, however, it is
still essential to pay attention to the other caloric content. Any other sources of carbohydrate must be counterbalanced with appropriate insulin doses, and total calories from carbohydrate, protein and fat must be counted at that meal or snack (ISPAD, 2010).

2.10.9. Principles of dietary care:
Children and adolescent with type 1 diabetes need to have a healthy diet, with food in amount and proportions appropriate to their age and stage of growth.

The child with diabetes does not produces insulin, so needs insulin injections in order to use the food consumed to provide energy in the cells of the body. The insulin doses must be matched to the carbohydrate content of food consumed, or alternatively the carbohydrate content of food consumed must be matched to the timing and the type of insulin injections. This, in turn, affects the way in which insulin is injected and is released into the bloodstream.

Dietary management in childhood diabetes means helping and encouraging the child to take the right dose of insulin for the right type and amount of food, and to eat in the right amounts for that dose of insulin, at the right time. However, when food is scarce or not always available, dietary management is more difficult than calculations based on a regular number of predictable meals every day (IDF, 2004).

When the child with diabetes is doing a lot of exercise or manual work, more glucose can enter the cells for every unit of insulin. When this happens, the carbohydrate ratio and the correction ratio will be temporarily changed for a variable time during and after exercise. So the child will either have to eat more, take less insulin or do both (IDF, 2004).

2.10.10. Basic regulations for dietitian in diabetes:
The basic principle is to avoid excess food and to take limited Specified amounts of food advised by a person specified in dietitian. Without this, there will not be any control of diabetes. The allowed amount is distributed daily on many meals instead of taking one large meal. Food taken should contain all nutrients (starch, fats and proteins) with specified ratios according to the condition of the patient.

The patient should comply with the time of the meals. If the patient was not careful to this, he or she may be in danger due to high levels of glucose or uncontrolled diabetes (IDF, 2004).

2.10.11. Poverty-related nutrition issues:-
In many parts of the world, improved diabetes care at least partly hampered by economic constraints. Food is not always available, or is too costly or too inconsistently supplied. This presents a major barrier to improved diabetes care, since deciding how much insulin to supply is essentially impossible without knowing how much food will be supplied at the Memont. In such situations, because of the financial problems, not only is food unreliably available, but monitoring is virtually non-existent. Whether or not insulin is available in these places is also doubtful. (ISPAD, 2010).
The child or adolescent with type 1 diabetes at high risk of chronic hyperglycemia, because a common and reasonable response to inadequate food is to under dose insulin, avoiding hypoglycemia. Efforts to address these issues are complex, societal and government-related; and remain extremely difficult for the family and the diabetes specialty healthcare team (ISPAD, 2010).

2.11. Health Education:

2.11.1. Patients Education:

An integral aspect of diabetes care to inform all patients of the nature of the disorder and its treatment, and to place the potential threat of complications in their true perspective. Educational facilities are offered by the whole of the diabetes team both to individuals and to groups. Instructions to new patients are always given initially on an individual basis. Most centers also organize courses for groups, ranging from a single half-day to comprehensive weekly series (ISPAD, 2010).

2.11.2. Nutrition Education:

The Nutritional Educational Program at People's Community Clinic is dedicated to working intensively with patients as they develop the confidence to make long-lasting lifestyle changes that will improve their health.

The Clinic diagnoses approximately 100 new cases of diabetes annually. People's Community Clinic (PCC’s) Nutrition Education Program enables patients and their families to better manage their diabetes and other conditions that are affected by nutrition, thus forestalling the devastating medical complications that can occur. The program provides counseling and educational services and low-cost equipment and medications so that patients can monitor their conditions. The diabetes and Nutrition Education Team empower patients to actively participate in their treatment and make relevant, achievable changes for health. People's Community Clinic (PCC’s) nutritionist works closely with the Clinic’s medical staff to provide nutrition education and one-on-one consultations for patients. Each consultation incorporates visuals, food models, easy-to-understand handouts, and healthy low-cost recipes to help patients gain confidence and develop their self-management skills. Subsequently patients can reduce complications and enjoy better health outcomes.

The Nutrition Education Program focuses on initiatives that educate and motivate patients to make behavioral changes (ISPAD, 2010).

2.11.3. Food pyramid:

A food guide pyramid is a pyramid shaped guide of healthy foods divided into sections to show the recommended intake for each food group. The first food pyramid was published in
Sweden in 1974. The most widely known food pyramid was introduced by the United States Department of Agriculture in the year 1992, was updated in 2005, and then replaced in 2011 (Vecchiato, 2011).

The food pyramid has been to ensure availability of all nutritional elements for diabetic patient. Human body needs all nutritional elements which include starch, fats and proteins in addition to the vitamins and minerals. Starches form the base of the pyramid or the last part of the daily food bench. Next are the vegetables and fruits, then milk and meat lipids, oils and sweets form the top of the pyramid or the smaller part of the daily amount of food. (Abdella, 2011).

2.12 Diabetes Food Pyramid:
For people with diabetes, a special food pyramid is used to describe what and how much to eat each day. Consisting of six food groups, this pyramid is no substitute for a diet created by a dietician or doctor. The number of servings needed every day is not the same for everyone, so this food pyramid offers a range of servings.

The food groups suggested servings per day as part of the Diabetes Food Pyramid include:
- Grains, beans, and starchy vegetables: These foods at the base of the pyramid are a good source of B vitamins and fiber - 6 or more servings/day.
- Fruits: These contain vitamins C and A, potassium, folate, and fiber - 3 to 4 servings/day.
- Vegetables: These provide vitamins A and C, folate, and fiber -- 3 to 5 servings/day.
- Milk: This is a great source of calcium, protein, and vitamins A and D -- 2 to 3 servings/day.
- Meat and meat substitutes: These are a good source of iron, zinc, B vitamins, and protein -- 2 to 3 servings/day.
- Fats, sweets, and alcohol: These foods at the top of the pyramid should be eaten in small amounts, fats and oils should be limited because they are high in calories. Sweets are high in sugar and should only be eaten once in a while (Abdella, 2011).

2.13 Diabetes and exercise:
Physical exercise is a common part of all children’s and adolescents’ lives and should be equally encouraged for those with diabetes. In addition to an improved sense of well-being, exercise may help with weight control; it limits the rise in glucose after meals, keeps the heart rate and blood pressure lower and helps keeping blood lipid levels normal. These factors may reduce cardiovascular risk and may be associated with a lower (HbA1c) (ISPAD, 2010).

2.13.1 Effect of activity on diabetes:
Children and adolescents with diabetes are not able to self-regulate insulin effects during exercise. Insulin has been injected and is not regulated by the pancreas, and they have impaired glucose counter-regulation (i.e. they lack the glucagon’s response to hypoglycemia). These
factors frequently result in hypoglycemia during or after activity. Hypoglycemia is more likely to occur with prolonged or intense activity. Hypoglycemia may also develop many hours after prolonged activity, if there is a delay in replacing glycogen stores in the liver (ISPAD, 2010).

2.13.2: Type and timing of food:
A meal containing carbohydrate, fats, and protein consumed a few hours before activity will help to prevent hypoglycemia. Fast-acting foods and fluids used prior to activity can provide the extra energy needed for short-duration activities. These are best given as isotonic drinks. No food, or inadequate food intake prior to activity, increase the likelihood of developing hypoglycemia (ISPAD, 2010).

2.13.3: Meal planning as a part of healthy lifestyle:
Involve the entire family in nutrition education and re-education. Teach adjustment of food for changes in activity. Teach adjustment of liquid and food intake when caring for illnesses, especially respiratory and gastrointestinal disturbances. Plot height and weight as well as Body Mass Index (BMI) on standardized charts and review with the child/adolescent and family at least every 6 months, or preferably every 3 months. Emphasize food quality, portion size and fat and sugar intake.

Consistent dietary advice should be considered for the severely obese, as well as for those with other eating disorders such as diaberie, bulimia and anorexia nervosa. It should be recognized in particular that these conditions are more common in people with type 1 diabetes than in the general population (ISPAD, 2010).

2.13.4: Dietary behavior compliance:
The tendency to ignore a suitable diet is often a major problem; arising either through misinformation, inconsistent messages from family, society or health care professional or even direct confrontation. Interference with optimal glucose control is often diet-related. Food has been used within a family unit in the past could be an important factor in dietary precision and changing food-related behavior and choices as part of diabetes treatment programme.

Obesity often follows family patterns. Anorexia nervosa, bulimia and diabulimia may also be related to psychosocial parameters of the family unit as well as food constructs. Food should not be labeled as good or bad, but placed into categories relating to how it affects blood glucose control. Examples by parents and other members of the family, and their support, often help to improve dietary compliance and understanding (ISPIAD, 2010).

2.14: Diabetes treatment:
Three methods of treatment are available for diabetic patient: diet alone, oral hypoglycemic drugs, and insulin. Approximately 50% of new cases of diabetes can be controlled adequately by diet alone, 20 – 30% will need oral hypoglycemic drugs, and 20 – 30%
will require insulin. Regardless of etiology, the type of treatment required is determined by the circulating plasma insulin concentration. In clinical practice, the age and weight of the patient at diagnosis are closely related to the plasma insulin and usually indicate the type of treatment required. However, in each individual case, the adopted is effectively chosen therapeutic trial. The importance of lifestyle changes such as taking regular exercise, observing a healthy diet and reducing alcohol consumption should not be underestimated in improving glycaemic control, but many people, particularly the middle-aged and elderly, find them difficult to sustain. Patients should also be encouraged to stop smoking (John, 2002).

2.15. Previous studies:

A study by (William et al., 2010) was studied in Africa to assess knowledge; attitude and practices related to diabetes among community members in four provinces in Kenya, then found that targeted to 2000 respondents, there were more females 1151 (58.1%) than males 83 (41.9%). 358 (18%) of the respondents had tertiary education, 737 (37.2%) had secondary education, 725 (36.6%) had primary education while 162 (8.2%) had no education at all. Only 575 (29%) of respondents had good knowledge of signs and symptoms of diabetes while 1407 (71%) of respondents had poor knowledge on what diabetes is. 518 (26.1%) could correctly identify the probable causes of diabetes mellitus while 1464 (73.9%) could not. Only 523 (26.4%) of the respondents could identify complications of diabetes they knew while 1459 (73.4%) had very little or no knowledge of complications of diabetes. Overall on average 539 (27.2%) respondents 1443 (72.8%) had poor knowledge of the disease. There was no significant difference in knowledge levels between genders. The proportion of females who had good knowledge was 26.8% compared to 27.7% in males (Waithak, 2010), was determined to nutritional knowledge, attitudes and practices in management of type 2 diabetes among adult aged between 25 and 75 years in Nakuru provincial hospital. He found that, majority of the respondent with type 2 diabetes patient engaged in poor nutrition practices such as meal patterns; time interval between meals and total meals taken in a day. Practices on physical activity were good as majority (83.3%) engaged in physical activity although they did not know the right time to exercise and balancing meals and physical activity. Findings indicate that, attitude regards meal patterns was fair (63.3%) among people with type 2 diabetes. Majority of people with type 2 diabetes (71.7%) held positive attitude as regards time interval between meals. There was a significant relationship between nutrition knowledge and attitude held towards diabetes (p = 0.047). Additionally there was no significant relationship between knowledge on nutrition management of type 2 diabetes and various practices like no of meals (p = 0.069). There was a significant relationship between knowledge and some of the socio demographic characteristics like years suffered (p = 0.034), and between attitude and years
suffered (p = 0.035). There was a significant relationship between blood sugar levels and nutritional status (p=0.014) and also nutritional knowledge and physical activity (p=0.036). Additionally there was no significant relationship between blood sugar level and nutrition education and also with the number of meals (p= 0.263). The main conclusion that emerges from this study is that the assumption that greater amount of correct knowledge about nutrition knowledge should be associated with good practices and more favorite attitudes was supported in relation to attitude but not with meal pattern. Therefore, greater attention should be given in ensuring that people with diabetes are enlightened on various issues of diabetes besides nutrition as this has an impact on attitude and healthy practices the indulge in (Waithak, 2010).

Abass, 2010 studied the blood sugar level and insulin response after meals starchy traditional Sudanese patients with type II diabetes In six different days between every other day Sorghum flatbread, in Sudan Omdurman hospital Sorghum porridge, millet flatbread, millet porridge,maize (corn) a week eating ten patients with diabetes type II six meals which contain: porridge, wheat pancakes. The blood samples were taken before meals (fasting) and after meals, half an hour - an hour - two and four hours. Blood plasma was analyzed for glucose and the degree of insulin response and then calculates the area under the curve (AUC). And found clear differences in the area under the curve for the proportion of glucose and insulin response between meals. In conclusion it can be said that the comparison of the high sugar and insulin response to six meals and sacrificed the therapeutic importance of differences, and can lay the groundwork for dietary guidelines for diabetic patients in the Sudan and diagonals that have the same eating habits.

Salim, 2010 studied Knowledge, attitude and practices of Saudi women towards diabetes mellitus, He found 56.14 % of respondents scored 100% in the questions related with knowledge. However 17.58 % scored 100% in the attitude questions and 15.78 % scored 100% in practice questions. The overall KAP score had a mean of 16 and standard deviation (SD) of 6.066. The respondents correctly answering (all?) the knowledge questions had a mean Score of 12.42 and SD 3.034. The respondents answering correctly attitude and Practice questions had a mean Score of 1.46±1.739 and 2.79±2.289 respectively. Results revealed good knowledge but poor attitude and Practices toward diabetes. We concluded that there is a need for structured programmes to improve attitude and practices of diabetic patients to promote better compliance (Salim et al., 2010).

A study was conducted by (Malath, 2011) with an aim to study the effect of a diabetes counseling programme on knowledge, attitude and practice among diabetic patient in Erode district of South India, a total of 207 (85 males and 122 females) type 2 diabetes mellitus patients were enrolled and randomized into test and control groups. At the end of the study, the KAP score of test group patients improved significantly (P<0.0001), whereas no significant
changes were observed in control group patients. The postprandial blood glucose (PPBG) levels decreased significantly in the test group. Total cholesterol (TC), triglycerides (TGL), and low density lipoprotein levels (LDL) also showed a decrease in the test group. Thus, our study reveals that pharmacist counseling might be an important element in diabetes management programs (Malathy, et al, 2011).

A study was conducted by (Badruddin, 2002) with an aim to assess the general characteristics, knowledge, attitude and practices of type 2 diabetic patients attending the Out-Patient Department (OPD) of Baqai Institute of Dialectology and Endocrinology (Karachi, Pakistan). Fifty-seven percent of the patients were overweight or obese. Only 10.7% had good glycemic control. Sixty seven percent did not do exercise of any kind. The overall awareness about the risk of complications was satisfactory but the misconceptions regarding diet, insulin and diabetes were quite common. This study highlights the need for better health information to the patient through large scale awareness programmes so as to change the attitude of our public regarding diabetes (Badruddin, et al, 2002).

A study was carried, about the Nutrition habits and compliance with dietary recommendations by diabetic patients, The Patients Republic of Poland. The study group included 70 patients with diabetes mellitus (5 patients with type 1 and 65 patients with type 2 diabetes). The patients filled in a two-part questionnaire. The first part included patient personal data, the second one included 37 questions on nutrition habits before the diagnosis of disease, participation in dietetic trainings and compliance with dietary recommendations and conclusions. Nutrition habits prior to diabetes diagnosis were improper in majority of patients (83%), and their diet significantly exceeded energy requirements, as reflected by high BMI values. Among patients who claimed to follow a low fat and low calorie diet formerly, 60% were overweight or obese. Those who stated that their previous meals were fat and calorie rich were overweight in 52.7% or obese in 30.9% cases. (Bronisz, et al, 2006).

A study was carried by (Miller, 2002) about the Nutrition education improves metabolic outcomes among older adults with diabetes mellitus: results from a randomized controlled trial in USA. Ninety-eight people were randomized to the experimental or control group. A pretest-posttest control group design was used to evaluate the intervention. Ninety-two people (94%) completed the study. The 10-week intervention incorporates principles from information processing, learning theory, and Social Cognitive Theory to meet the needs of older adults. Analysis of covariance compared outcome between groups. The experimental group had greater improvements in fasting plasma glucose (P = 0.05) and glycated hemoglobin (P<0.01) than the control group. Significantly more participants in the experimental group than control group met the treatment goal for total cholesterol at posttest (Miller, et al, 2002).
CHAPTER THREE
MATERIAL AND METHODS

3.1. Study design:
Descriptive cross sectional community based study was conducted.

3.2. Study area:
Elsahafa unit located in Khartoum locality, Alshed Mokhtar Suleiman street east wards Gabra street West Alkalakla street south wards and Elamtidad and Elashra area in the north.

Khartoum State (Metropolitan area) which is characterized by a semi-arid region of the tropical countries, the weather is generally hot and dry. The rainy season starts in mid July and end in September, with an annual rainfall ranging rate ranged between 200-500 mm, but this rate is influenced by climatic changes which affect the central part of the Sudan during the last few decades, Khartoum locality climate character by desert climate most of the year, so Khartoum locality consider as one of the most hot city in the world, in temperature degree may exceed 48 °c in medium of summer, The average of relative humidity is about 60% the maximum average of annual degree temperature reach 37.1 c.

start From February up to December winter and temperature may be from 32 °c to 28 c. Sandy storms occurs during the months, June and July.

Health services are available; there is 1 hospital, 2 private health centers (Ministry of Health Khartoum State, 2014).

The buildings are made of brick, the main water sources in Khartoum locality is surface water are from River and ground water dug wells, and borehole wells. Water is supply to the houses by Khartoum State Water Corporation.

Solid waste management depends on house to house collection system; and then finally disposed using sanitary land filling.

There are different ways used for disposal of Liquid waste as sewerage system, septic tanks, VIP, and congenital pit latrines.

3.2.1. Education Services:
There are adequate education services including: 13 basic school, 6 higher secondary schools, and 1 university.

3.2.2. Population:
the population is about 27,800 inhabitants in 2014, mostly working in government and private jobs and crafts professional and industrial different, and most of the population of Sudan's various tribes and the majority of northern Sudan and some Ethiopian and Eritrean communities.
3.3. Study populations:

The target populations of this study were mothers in the Elsahafa Administrative Unit during the year 2013.

3.4. Sampling

3.4.1. Sampling Technique:

Sample random sampling was used. The study area is divided into (3) clusters and sample size distributed proportionally over these 3 clusters.

<table>
<thead>
<tr>
<th>No</th>
<th>Clusters</th>
<th>Total mothers</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wasat</td>
<td>1735</td>
<td>117</td>
</tr>
<tr>
<td>2.</td>
<td>Garib</td>
<td>2283</td>
<td>153</td>
</tr>
<tr>
<td>3.</td>
<td>Shareg</td>
<td>3582</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7600</td>
<td>380</td>
</tr>
</tbody>
</table>

3.4.2. Sample size:

Total of (380) randomized samples were selected. Sample size was calculated by using the formula below.

\[ n = \frac{N}{1+N(e)^2} \]  

(Glenn, 1992)

Whereas:

\[ n = \text{minimum required sample size} \]

\[ N = \text{total population} = 7600 \]

\[ e = \text{level of precision} = 0.05 \]

\[ n = \frac{7600}{1+7600(0.05*0.05)} = 380 \]

3.5. Data collection methods:

Data was collected using general in format: a prepared and tested questionnaire to collected data with respect to diabetes mother’s Knowledge, attitudes, practices (Appendix 1).
3.5.1. Questionnaire:

A questionnaire was conducted and distributed to 380 mothers selected by simple random Sampling in Alsahafa Administrative unit.

3.6. Data analysis:

Data was analyzed using Statistical Package for Social Sciences (SPSS) Programme version. 19. And the association between different variables was checked using $\chi^2$ tests at signified level of 95%.
CHAPTER FOUR

RESULTS

4.1. Questionnaire:

A descriptive cross sectional community based study was conducted in Elshahafa Administrative Unit with an objective to study knowledge, attitudes, and practices among mothers towards diabetes at Khartoum Locality and it revealed the following findings as shown in the tables below:

Table (4.1): The summery of analyzed results concerning general information of the mothers:

<table>
<thead>
<tr>
<th>General information</th>
<th>Characteristics</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>Work</td>
<td>295</td>
<td>77.6</td>
</tr>
<tr>
<td></td>
<td>not work</td>
<td>85</td>
<td>22.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>380</td>
<td>100</td>
</tr>
<tr>
<td>Monthly income/SDG</td>
<td>&lt; 450</td>
<td>92</td>
<td>24.2</td>
</tr>
<tr>
<td></td>
<td>451 – 850</td>
<td>179</td>
<td>47.1</td>
</tr>
<tr>
<td></td>
<td>851 – 1250</td>
<td>80</td>
<td>21.1</td>
</tr>
<tr>
<td></td>
<td>&gt; 1250</td>
<td>29</td>
<td>7.6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>380</td>
<td>100</td>
</tr>
<tr>
<td>Educational level</td>
<td>Illiterate</td>
<td>57</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Khalwa</td>
<td>16</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>Basic / primary</td>
<td>45</td>
<td>11.8</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>46</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>114</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>University and post graduate</td>
<td>102</td>
<td>26.8</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>380</td>
<td>100</td>
</tr>
<tr>
<td>Age group</td>
<td>&lt; 18</td>
<td>11</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>18 – 31</td>
<td>60</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>32 – 45</td>
<td>196</td>
<td>51.6</td>
</tr>
<tr>
<td></td>
<td>&gt; 45</td>
<td>113</td>
<td>29.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>380</td>
<td>100</td>
</tr>
<tr>
<td>Family size</td>
<td>&lt; 6</td>
<td>190</td>
<td>49.6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>129</td>
<td>33.9</td>
</tr>
<tr>
<td></td>
<td>&gt; 6</td>
<td>61</td>
<td>16.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>380</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (4.1) shows the demographic and general characteristics among mothers.
Figure (4.1): Knowledge of diabetes - *Elsahafa Administrative Unit, 2015* (n=380)

Figure (4.1) shows that 98.9% of the mothers know diabetes, while 1.1% of them didn’t know.
Table (4.2): Reasons that lead to high and low blood sugars mentioned by mothers in *Elsahafa Administrative Unit, 2015* (n=376)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>pancreas is unable to secrete insulin</td>
<td>53</td>
<td>14.1</td>
</tr>
<tr>
<td>ineffectiveness of insulin</td>
<td>39</td>
<td>10.4</td>
</tr>
<tr>
<td>all mentioned</td>
<td>284</td>
<td>75.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>376</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (4.2) indicated that 75.5 % mothers know the Reasons that lead to high and low blood sugars is all mentioned
Figure (4.2): Distribution of mothers according to the meaning of diabetes in *Elsahafa Administrative Unit, 2015* (n=376)

As for the definition of diabetes 79.8% of mothers definition as all above. On the other hand 14.9% and 3.2% of them said that diabetes increases blood sugar and decreases it in blood sugar. Figure (4.2).
Table (4.3): Knowledge about insulin among mothers in *Elsahafa Administrative Unit, 2015* (n=376)

<table>
<thead>
<tr>
<th>knowledge</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>376</td>
<td>100</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (4.3) indicates that, all of mothers know the insulin.
Figure (4.3): Definition of insulin  
(n=376)

Figure (4.3) illustrate that, all of the mothers define the insulin as a hormone that, controls blood sugar.
Table (4.4): Knowledge among mothers about the organ that secret the insulin Elsahafa Administrative Unit, 2015
(n=376)

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>295</td>
<td>78.5</td>
</tr>
<tr>
<td>No</td>
<td>81</td>
<td>21.5</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.4) shows that 78.5% of the mothers know the organ responsible for secretion of insulin, while 21.5% didn’t know.
Figure (4.4): organ that secretes the insulin

(n=295)

Figure (4.4) shows that 95.9% of the mothers know recreational about were organ that secretes the insulin is by pancreas and 4.1% by livers.
Table (4.5): Knowledge among mothers about the symptoms of diabetes in *Elsahafa Administrative Unit, 2015* (N=376)

<table>
<thead>
<tr>
<th>knowledge</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>325</td>
<td>86.4</td>
</tr>
<tr>
<td>No</td>
<td>51</td>
<td>13.6</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.5) postulates that 86.4% of mothers know the symptom diabetes while 13.6% didn’t know.
Figure (4.5)  Symptoms of diabetes

(n=325)

Figure (4.5) reveals that 76.3% of the mothers mentioned all symptoms of diabetes were all mentioned while 0.6% were hunger.
Figure (4.6): Factors that lead to diabetes

(n=376)

Figure (4.6) showed that 46.8% of Mather mentioned factors that lead to diabetes all mentioned while 0.7 other.
As revealed in table (4.6) above, 63.3% of the mothers know the types of diabetes while 36.7% of them stated that they did not know.
Figure (4.7): Type of diabetes according to mother’s knowledge in Elsahafa Administrative Unit, 2015
(n=238)

As shown in figure (4.7), 71.8% of the mothers know the type of diabetes both, 18.5% type 2, 9.7% type1.
It is oblivious from table (4.7) that 58.8% of the mothers knew diabetes complications, but 41.2% of them did not.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>221</td>
<td>58.8</td>
</tr>
<tr>
<td>No</td>
<td>155</td>
<td>41.2</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.7): Mother’s knowledge about complications of diabetes in Elshafa Administrative Unit, 2015 (n=376)
Table (4.8): Types of complications according to mother’s knowledge in

*Elsahafa Administrative Unit, 2015*

(n=221)

<table>
<thead>
<tr>
<th>Type of complications</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal failure</td>
<td>23</td>
<td>10.4</td>
</tr>
<tr>
<td>narrow arteries</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>non-healing wounds</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>White eye Water</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td>strikes at heart</td>
<td>20</td>
<td>9.0</td>
</tr>
<tr>
<td>blood pressure</td>
<td>5</td>
<td>2.3</td>
</tr>
<tr>
<td>loss of limbs</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>Sexual dysfunction</td>
<td>14</td>
<td>6.3</td>
</tr>
<tr>
<td>immune compromised</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>all of the above mentioned</td>
<td>137</td>
<td>62.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>221</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.8): As far as diabetes complications are concerned, 62.0% of mothers said that they knew all diabetes complications, and 10.4% said renal failure.
Figure (4.8): Mothers knowledge about whether diabetes is preventable or not in Elsahafa Administrative Unit, 2015 (n=376)

As shown in figure (4.8), 63.8% of the mothers knew that diabetes is a preventable disease while 36.2% of them did not know.
Table (4.9): method of prevention methods according to mother’s knowledge in Elsahafa Administrative Unit, 2015 (n=240)

<table>
<thead>
<tr>
<th>methods</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>dieting</td>
<td>35</td>
<td>14.6</td>
</tr>
<tr>
<td>exercise</td>
<td>20</td>
<td>8.3</td>
</tr>
<tr>
<td>answer (a + b)</td>
<td>185</td>
<td>77.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

As can be seen in table (4.9) above, 77.1% of the mothers said that both answer (a + b) and 14.6% of the mothers said dieting and 8.3% of the mothers said exercise.
Figure (4.9): Mother’s knowledge about whether diabetes is controllable or not in *Elsahafa Administrative Unit, 2015* (n=376)

Figure (4.9) shows that 68.1% of the mothers knew that diabetes can be controlled, but 31.9% of them did not know.
Table (4.10): Method Control  
(n=256)

<table>
<thead>
<tr>
<th>Control method</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin injection</td>
<td>41</td>
<td>16.0</td>
</tr>
<tr>
<td>organizing a sports program</td>
<td>10</td>
<td>3.9</td>
</tr>
<tr>
<td>follow the diet system</td>
<td>22</td>
<td>8.6</td>
</tr>
<tr>
<td>all mentioned</td>
<td>183</td>
<td>71.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>256</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

As revealed by table (4.10), 71.5% of the mothers said that diabetes can be controlled through all mentioned 16% insulin injection, 3.9% organizing a sports program.
Figure (4.10): Mother’s attitudes towards diabetes in *Elsahafa Administrative Unit, 2015* (n=376)

It is obvious from Figure (4.10) that 67.6% of the mothers had positive attitudes towards diabetes, while 32.4% of them had negative attitudes.
Table (4.11): Reasons of positive attitudes towards diabetes among mothers in *Elsahafa Administrative Unit, 2015* (n=254)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>possible to control</td>
<td>200</td>
<td>78.7</td>
</tr>
<tr>
<td>Not fatal</td>
<td>54</td>
<td>21.3</td>
</tr>
<tr>
<td>Total</td>
<td>254</td>
<td>100.0</td>
</tr>
</tbody>
</table>

It can be stated from table (4.11) illustries that 78.7% of mothers mentioned possible to control while 21.3% not fatal.
Figure (4.11): Reasons of negative attitudes towards diabetes among mothers in *Elsahafa Administrative Unit, 2015* (n=122)

54.1% among mothers' reason of negative attitude towards diabetes is that diabetes difficult to treat and 34.4% said answer (a, b).
Table (4.12): Attitudes among mothers towards diet system in *Elsahafa Administrative Unit, 2015* (n=376)

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>324</td>
<td>86.2</td>
</tr>
<tr>
<td>Negative</td>
<td>52</td>
<td>13.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>376</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table (4.12): As far as diet is concerned, 86.2 % of the mothers had positive attitudes towards diet, system but 13.8% of them had negative attitudes.
Table (4.13): Reasons behind mother’s positive attitudes towards diet (n=324)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>controlled blood sugar</td>
<td>59</td>
<td>18.2</td>
</tr>
<tr>
<td>safe food for the patient</td>
<td>55</td>
<td>17.0</td>
</tr>
<tr>
<td>all of mentioned</td>
<td>210</td>
<td>64.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>324</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.13) showed that 64.8% of mothers mentioned the reason behind positive attitudes is all mentioned 17.0% safe food for the patient and 18.2% controlled blood sugar.
Table (4.14): Mother’s reasons behind negative attitudes toward diabetes diet in *Elsahafa Administrative Unit, 2015*  
*(n=52)*

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Represent treatment</td>
<td>7</td>
<td>13.5</td>
</tr>
<tr>
<td>deprived for eating</td>
<td>45</td>
<td>86.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table (4.14) shows that 86.5% of the mothers had negative attitudes towards deprived for eating, while 13.5% of the mothers sad that Represent treatment
Table (4.15): Mother’s attitudes towards taking sugar in *Elsahafa Administrative Unit*, 2015

(n=376)

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>179</td>
<td>47.6</td>
</tr>
<tr>
<td>Negative</td>
<td>197</td>
<td>52.4</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100</td>
</tr>
</tbody>
</table>

52.4% of the mothers had Negative attitudes towards taking sugar, but 47.6% of them had negative attitudes, table (4.15).
Table (4.16): Reasons of positive attitudes towards taking sugar by mothers in *Elsahafa Administrative Unit, 2015* (n=179)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>sugar does not raise blood</td>
<td>145</td>
<td>81.0</td>
</tr>
<tr>
<td>safety</td>
<td>34</td>
<td>19.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>179</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table (4.16): Concerning the mother’s reasons of positive attitudes towards taking sugar, reveals that 81.0% of the mothers said that it sugar does not raise blood and 19% considered it as safety.
Figure (4.12): Reasons among mothers for negative attitudes towards taking sugar in Elsahafa Administrative Unit, 2015 (n= 197)

Figure (4.12): reveales that 62.9% of the mothers said reasons for negative does not regulate blood sugar, while 37.1% of the mothers’ said regulates sugar in the blood.
Table (4.17): mothers attitudes towards eating diabetic sugar
(n= 380)

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>281</td>
<td>73.9</td>
</tr>
<tr>
<td>Negative</td>
<td>99</td>
<td>26.1</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.17) above shows that 73.9% of the mothers had a positive attitude towards eating diabetic sugar but 26.1% of them had negative attitudes.
Table (4.18): Mother’s attitudes towards insulin injection in *Elsahafa Administrative Unit, 2015* (n= 376)

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>278</td>
<td>73.9</td>
</tr>
<tr>
<td>Negative</td>
<td>98</td>
<td>26.1</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.18) reveals that 73.9% of the mothers had positive attitudes towards insulin injection, while 26.1% had negative attitudes.
Table (4.19): Mother’s attitudes towards physical exercise in *Elsahafa Administrative Unit, 2015*  
(n= 380)

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>325</td>
<td>85.5</td>
</tr>
<tr>
<td>Negative</td>
<td>55</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>100</td>
</tr>
</tbody>
</table>

As table (4.19) shows that 85.5% of the mothers had positive attitudes towards physical exercise, but 14.5% of the mothers had negative attitudes.
Table (4.20): Prevalence of diabetes among mothers questioned  
(n= 376)

<table>
<thead>
<tr>
<th>Diabetic</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>175</td>
<td>46.5</td>
</tr>
<tr>
<td>No</td>
<td>201</td>
<td>53.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>376</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

It is obvious from table (4.20) that 53.5% of the mothers were not diabetic, but 46.5% of them were diabetic.
Figure (4.13): treatment of diabetic mothers

(n= 175)

Figure (4.13) indicates that 83.4% of mothers see the doctor and make medical check diagnosis, while 2.9% see the doctor.
Table (4.21): organization in dealing with insulin
(n= 175)

<table>
<thead>
<tr>
<th>Using</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>165</td>
<td>94.3</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>5.7</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.21) shows that 94.3% of the mothers’ use insulin, but 5.7 % of them did not use.
Table (4.22): wearing of diabetes shoes by diabetic Mothers in *Elsahafa Administrative Unit, 2015* 
(n= 175)

<table>
<thead>
<tr>
<th>wearing</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>23.4</td>
</tr>
<tr>
<td>No</td>
<td>134</td>
<td>76.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>175</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Regarding the practice of wearing diabetes shoes, table (4.22) shows that 23.4% of the mothers stated that they wear diabetes shoes, while 76.6% did not wear.
As for sugar check practice, 48.9% of the mothers said that they checked sugar and 51.1% said they did not check it, table (4.23).

<table>
<thead>
<tr>
<th>Sugar check</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>184</td>
<td>48.9</td>
</tr>
<tr>
<td>No</td>
<td>192</td>
<td>51.1</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table (4.23): sugar check among mothers in *Elsahafa Administrative Unit*, 2015 (n= 376)
Table (4.24): Mothers practices of sports activates (physical exercise)

(n= 380)

<table>
<thead>
<tr>
<th>practices</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>188</td>
<td>49.5</td>
</tr>
<tr>
<td>No</td>
<td>192</td>
<td>50.5</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>100.0</td>
</tr>
</tbody>
</table>

From table (4.24), it is obvious that 49.5% of the mothers stated that they practiced physical exercise and 50.5% of them said that they did not.
Table (4.25): following of diet system among mothers in *Elsahafa Administrative Unit*, 2015.

(n = 380)

<table>
<thead>
<tr>
<th>follow up diet</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>272</td>
<td>71.6</td>
</tr>
<tr>
<td>No</td>
<td>108</td>
<td>28.4</td>
</tr>
<tr>
<td>Total</td>
<td>380</td>
<td>100</td>
</tr>
</tbody>
</table>

(4.25) postulates that 71.6% of the mothers following a diet system, while 28.4% didn’t.
Table (4.26): Mothers using diet disenable by dietitians in *Elsahafa Administrative Unit, 2015* (n= 272)

<table>
<thead>
<tr>
<th>practices</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>261</td>
<td>96</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>272</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As it is clear from table (4.26), 96% of the mothers stated that they eat diet which describer prescribed by dietitian while 4.0% of did not eat.
85.8% of mothers stated that their intake of bread was one bread, 8.7% took more than one bread and 5.5% took half bread; Figure (4.14).
**Table (4.27): Meals content among mothers in *Elsahafa Administrative Unit*, 2015 (n= 380)**

<table>
<thead>
<tr>
<th>Content of meals</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>22</td>
<td>5.8</td>
</tr>
<tr>
<td>starches</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>low lipids</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>low salt</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>fibers</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>all of the mentioned</td>
<td>358</td>
<td>94.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>380</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (4.27) indicated that 94.2% of mothers' meal content all of the mentioned, while 5.8% Protein
Figure (4.15): Number of meals per day among mothers in Elsahafa Administrative Unit, 2015

(n= 380)

Figure (4.15) shows that 64.5% of the mothers had more than 3 meals, 20.8% of them had 2 meals and 14.7% had 3 meals.
Table (4.28): Interval in hours between meals among mothers in *Elsahafa Administrative Unit, 2015* (n= 380)

<table>
<thead>
<tr>
<th>interval</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 hours</td>
<td>10</td>
<td>2.7</td>
</tr>
<tr>
<td>3 hours</td>
<td>181</td>
<td>47.6</td>
</tr>
<tr>
<td>Others</td>
<td>189</td>
<td>49.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>380</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table (4.28) reveals that 49.7% of the mothers stated that the interval in hours between meals others. 47.6% and 3 hours and 2.7% 2 hours.
Table (4.29): Relationship between educational level and knowledge among mothers about Diabetes

<table>
<thead>
<tr>
<th>Educational level</th>
<th>knowledge among mothers about Diabetes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>no</td>
</tr>
<tr>
<td>Illiterate</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Khalwa</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Basic or primary</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>University and post graduate</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
</tbody>
</table>

\( \chi^2 = 7.9, \ DF=5. \quad P\text{-value} = .000 \)

There was a significant relation between mother’s educational level and their knowledge about Diabetes, as seen in table (4.29), \( p=.000 \).
Table (4.30): Relationship between mothers’ educational level and their attitudes towards diet system

<table>
<thead>
<tr>
<th>Educational level</th>
<th>attitudes towards diet system</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Illiterate</td>
<td>N 54</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>% 16.7%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Khalwa</td>
<td>N 7</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>% 2.2%</td>
<td>16.1%</td>
</tr>
<tr>
<td>Basic or primary</td>
<td>N 42</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>% 13.0%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>N 41</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>% 12.7%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Secondary</td>
<td>N 90</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>% 27.8%</td>
<td>42.9%</td>
</tr>
<tr>
<td>University and post graduate</td>
<td>N 90</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>% 27.8%</td>
<td>21.4%</td>
</tr>
<tr>
<td>Total</td>
<td>N 376</td>
<td>324</td>
</tr>
<tr>
<td></td>
<td>% 100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

\( \chi^2 = 33.2, DF=5\)  \( P\text{-value}= .000 \)

As it can be seen from table (4.30), there was a significant relation between mothers’ educational level and their attitudes towards diet (p=.000).
Table (4.31): Relationship between education level and mothers practices of physical exercises

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Practice Physical exercise</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Illiterate</td>
<td>36</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>19.1%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Khalwa</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2.1%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Basic or primary</td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>6.4%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>13.3%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Secondary</td>
<td>59</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>31.4%</td>
<td>28.6%</td>
</tr>
<tr>
<td>University and post graduate</td>
<td>52</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>27.7%</td>
<td>26.0%</td>
</tr>
<tr>
<td>Total</td>
<td>376</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

\( \chi^2 = 18.2, \ DF=5. \) \hspace{1cm} \( P\text{-value}= .003 \)

It is obvious from table (4.31) that there was a strong relation between education level and mothers practice of physical exercise (p=.003).
Chapter five
DISCUSSION

5-1. DISCUSSION

This descriptive cross-sectional community based study was conducted among mothers at Khartoum locality – Elsahafa administration with an objective study knowledge, attitudes, and practices among mothers towards diabetes. It revealed the following findings as seen in the discussion below:

The results presented in (Table 4.1) indicated that 51.6% aged between 32-45 years followed by the age group more than 45 years 29.7% this means the majority of mothers have been questionnaire. This result is agreement with who reported by Memon (2015) in Pakistan state that the age group of mothers between 20-30 years was 10.4%, 31-40 years 57.9%, 41-50 years 27.2% and more than 50 years was 4.5%.

Also the study showed that 30% had secondary education. This means that mothers attained high level of education and had more information about diabetes. This result is agreement with who reported by William et al., (2010); found that mother who had tertiary education was 18.0%; secondary 37% and 36.6% had primary education.

47.1% of mothers had monthly income were ranged between 451-850 SDG, normally this means low income and poverty would lead families to live in poor socio-economic status that affected to treatment and nutrition. The result agreement with Idrees, (2013) who reported that 39.5% between 250-500 SDG and 34% had family monthly income less than 250 SDG.

The results presented on (Fig. 4.1) indicated that the knowledge of mothers regarding diabetes was high 98.9% this mean the educational level of mothers is high. This results not agreement to Memon, (2015) who found that the most of participants 40% only had good knowledge towards diabetes also not agreement with William et al., (2010) who found that the most of participants 27.2% had good knowledge about diabetes and from (Table 4-29) The study found a relationship between educational level and knowledge of mothers about diabetes and attitudes of mothers towards diabetes and mothers practiced of physical exercises (p=.000).

Table (4.2) indicated that 75.5 % mothers know the Reasons that lead to high and low blood sugars is all mentioned ( No Insulin , Insulin in-efficiency ) and from (Fig 4-2) As for the definition of diabetes 79.8% of mothers said that diabetes increases blood sugar and decreases it in blood sugar. This means the mothers had good awareness This agreement with which reported by Ibrahim (2002) Insulin is a hormone works on maintaining the blood sugar control, It works to ease traffic during the glucose absorbed through the intestines into the blood contribute to building glycogen and fatty acids to be stored in the liver is working not to convert glucose from protein or fat.
It is clear from (Table 4.3) all the mothers know insulin this means the mothers had good information about diabetes and from (Fig 4-3) all of mothers define insulin as Hormone that controlled blood sugar this result coincide with a which reported by world health organization (WHO, 2007) Insulin a hormone that regulates level of glucose (sugar on the blood).

It is clear from (Table 4.4) 78.5% of the mothers know the organ responsible for secretion of insulin. And (Fig 4. 4) 95.9% of the mothers know secreational about were organ that secreates the insulin is pancreas, it mean mother’s education is high.

This agreement with those recorded by WHO (2007) the gland of the pancreas is found in the upper abdomen, posterior. It is formed of two parts: one of them is an endocrine gland that secretes its hormones directly in the blood, the other secretes digestives enzymes through a duct directly into the small intestine (duodenum), in the endocrine part there are three types of cells that secret three different hormones. They are: alpha cells which secrete the hormone and which reported by Juma, (2003) indicated that, the effect of insulin prevents the enzymes in the digestive system as well as it reduces the secretion of excess glucose from the liver.

It is clear from (Fig 4.5) reveals that 76.3% of the mothers mentioned all symptoms of diabetes (Feeling hungry / thirst / frequent urination / fatigue/ blurred in the vision). Some present had symptoms and from (Table 4.5) 86.4% of mothers know the signs and symptoms this means mothers had good awareness about diabetes these found not agreement with which reported by William, et al, (2010) found that only 29% of respondents had good knowledge of signs and symptoms of diabetes.

As can be seen from (Table 4-7) 58.2% of mothers were know the complications of diabetes (Table 4-8) 62% of mothers mention type of complication. This means the mothers had high knowledge of due to high education level. This is in agreement with Memon, (2015) reported that the knowledge by complication of diabetes was 61.6%.

The results presented on (Fig. 4.6) indicated that 26.1% of mothers know causes of diabetes mellitus this means the mothers had non known the causation of diabetes they should be health educated. This is in agreement with Memon, (2015) who found that 24.1% know the causes of diabetes.

The results presented in (table 4-6) indicated that 63.3% of the mothers know if diabetics had types and (figure 4.7), 71.8% of the mothers know the type of diabetes type1 and type2 this means the mothers had good knowledge. This agreement with those reported by Hussein (2011) Diabetes mellitus was classified into Type (1), DM type (2) This type is divided into three categories: diabetes among non – obese patients: caused by defects in cell receptors for insulin secretion, diabetes among obese patients: caused by defects in cell receptors for insulin, while its secretion is normal or increased old – onset diabetes, This classification is important because the type of treatment depends on it.
The results presented in (Table 4.8) indicated that 62.0% of mothers said that they knew all complications of diabetes, this agreement with those reported by Peter (2003).

Patients with long – standing diabetes, both type 1 and type 2, may develop complication effecting the eyes, kidneys or nerves (micro-vascular complications) or major arteries. The major arteries are affected in people with diabetes, causing a substantial increase both in coronary artery disease and strokes as well as peripheral vascular disease. The greatest risk of large vessel disease occurs in those diabetic patients who develop proteinuria or micro albuminuria, which is associated with widespread vascular damage.

As can be seen from (fig 4.8) 63.8 % of mothers knew the prevention methods of diabetes. The findings indicated high level of knowledge among mothers; this may be because of high level of education. But more than his knowledge it useful to decrees theexposure disease, and (table4.9) indicated that 77.1% of the mothers said that the method of prevention (dieting + exercise) this is agreement with those reported by Momen, (2015that 65.5% were knew the preventable methods of diabetes).

The results presented on (Fig.4.10) indicated that the positive attitude of mothers regarding diabetes was found 67.8%. And from (Fig.4.11) 54% of mothers said reason of negative attitude toward diabetes is that diabetes difficult to treat. And from (Table 4.11) 78.7% of mother said the reason of positive attitude toward diabetes that diabetes possible to control this means the mothers had good knowledge about positive attitude toward diabetes. And from (Table 4.30) there is a relationship between educational level and attitude of mothers toward diabetes, this is agreement with Memon, (2015) reported that the positive attitudes among mothers towards diabetic were 62.3%.

As can be seen from (Table 4.12) 86.2% of the mothers had positive attitudes toward diet system..and from (Table 4.13) showed that 64.8% of mothers said the reason behind positive attitude towards diabetes is control blood sugar and safe food for the patient this means the mothers had healthy life style and it was known that the diet is a basic step to control diabetes and maintain blood sugar within normal levels. this result coincide with those reported by Koso (2010) diet plays a key role in making live energetic and healthy especially in case of diabetic patient blanded diet is a necessary part for maintaining blood glucose level.

It is clear from (Table 4.15) 52.4% of mothers had negative attitudes towards taking sugar, and from (Fig.4.12) 62% of mothers said that negative attitudes towards taking sugar doesn’t regulate blood sugar this means mothers want to increase their knowledge. This finding is in contrast to ISPAD (2010) nutritive sweeteners. Many diabetic foods contain sorbitol or fructose which are relatively high in energy, may be expensive and may have gastrointestinal side-effects. They are not recommended as part of the diabetic diet the non-nutritive sweeteners.
It is clear from (Table 4.19) 85.5% of the mothers had positive attitudes towards physical exercise. This mean mother’s attitude is good, this is agreement with Withak, (2010) found the response had positive attitudes towards physical exercise were 83.3%, and table (4.31) there relationship between education level and mother practice physical exercise.

It is clear from (Table 4.20) that the prevalence of diabetes among mothers was 46.1%. The prevalence is high this need much education program to promote the knowledge of diabetic mother to towards diabetics, this is agreement with those reported According to ministry of Health Khartoum State, (2016) they were cases of diabetes among male and 55.5% cases among female. While in 2015 the number of diabetes cases among female were 55.2% and 44.8% cases among male.

As can be seen from in (Table 4.21) the practices of mothers regarding used of insulin was 94.3%, however this finding indicated good practice among mothers towards insulin. Also good practice among diabetic mothers when infected this means the good practice of mothers towards insulin decrees complication of diabetesthis result not agreement with Kiberenge and colleagues, (2010) in which they found majority of respondents 75.6% had bad practices in used of insulin.

It is clear from (Table 4.22) 23.4% of mothers wear diabetic shoes this mean mothers practice to words diabetic shoes is weak , the result coincided with these reported by Destaet et al., (2013). Showed that as a result of this limited access, shoes were typically preserved for special occasions and might not be provided for children until they reached a certain age. While some barriers for example fit of shoe and fear of labeling through use of a certain type of shoe may be applicable only to certain diseases, underlying structural level barriers related to poverty for example price, quality, unsuitability for daily activities and low risk perception are likely to be relevant to a range of NTDs.

The results presented in (Table 4.25) indicated that 71.6% of the mothers had followed diet determined by dieticians this means mothers known the roll of diet system which helps them to controlled the diabetesthisis agreement with Idrees, (2013) found that those who followed diet determined by dieticians was 75.6%.

The results presented in (table 4.27)  94.2% indicated that of diabetic mothers had meal contents intake (starches, unsaturated fats, proteins, fibers, these agreement with those recorded by IDF(2004) allowed amount is distributed daily on many meals instead of taking one large meal food taken should contain all(starch fat protein fiber ,low salt).

It is clear from (Figure 4.15) 64.5% of diabetic mothers had more than 3 meals per day, and from table (4.29) 2.7% of diabetic mothers had 2 hours between meals, and 47.6% has 3 hours , and 49.7% had others (more than 3 hours ). This agreement with those reported by Vecchito (2011). Most people eat two or three large meals per day. Consuming a large meal increases the amount of carbohydrates and sugars that digestive system may process at once; this can cause
rapid blood sugar spikes immediately after a meal. Because body quickly burns glucose, it can also lead to feelings of fatigue between meals. Dividing daily calorie intake into four or five meals can help to maintain consistent energy and avoid blood glucose spikes. The interval time between eating small meals is important. A diabetic should consider eating every 3 hours apart. The interval time is when the feast-famine cycle is operating. If eat within 3 hours of previous meal, may disrupt the feast-famine cycle, leading to more insulin secretum for the additional food. This is not giving the body time for proper digestion.
Chapter Six

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

– The study showed that the majority of the mothers 98.9% knew diabetes a relationship was found between educational level and mothers knowledge about diabetes (p=.000).

– Few of the mothers 14.1% said that diabetes is caused by lack of insulin all the mothers knew insulin. The majority of the mothers 78.1% knew the organ responsible for secretion of insulin., More than two third of the mothers 68.1% knew that diabetes can be controlled.

– The study reported that 67.6% of the mothers had positive attitudes towards diabetes, the majority among mothers 78.7% believed that diabetes can be controlled, More than half among mothers 54.1% thought that diabetes cannot be treated, More than two third of the mothers 68.2% had positive attitudes towards diet, The majority of the mothers 73.2% had positive attitudes towards insulin.

– About 71.6% of mothers had good practices towards diet, small group among mothers 23.4% stated that they wore diabetes shoes, while 76.6% of them did not wear them; half among mothers 50.5% stated that they practiced physical exercise a relationship was found between educational level and mothers practiced physical exercise (p=.000).

– More than two third among mothers 64.3% had more than 3 measles.
6.2. Recommendations

The following measures are recommended to address the knowledge and practice deficits uncovered in this study:

- Health Education must be designed and then directed to the mothers regarding diabetes knowledge, attitudes and practices.
- To change mother attitudes regarding wearing diabetic shoes.
- To promote and sustains group education as well as individualized education programmers for better preventive and management techniques in diabetes.
- Increase the use of media to spread the message which could change the attitude of our public in the future.
- Patient education is important in term of self-monitoring and comprehensive educational programmed of diabetes.
- A programmes for mothers in diabetes should be promoted by:
  - Commitment diet system.
  - Get rid of excess weight workout, and avoidance of emotional stress, anxiety and tension.
  - Measuring blood sugar regularly to living with diabetes.
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## APPENDIX-1

**جامعة الجزيرة**

**Faculty of health and environmental of science**

**استبيان حول المعرفة والمواعف والسلوك للأمهاتتجته مهرض السكري بوحدة الصحافة الإدارية – محلية الخرطوم ولاية الخرطوم 2015**

### معلومات عامة:

1. **مهنة رب الأسرة:**
   - أ/ يعمل (   ).
   - ب/ لا يعمل (   ).

2. **متوسط الدخل الشهري لرب الأسرة بالجنيه السوداني:**
   - أ/ ج/ 851-1250 (   ).
   - ب/ 500-850 (   ).
   - ج/ 450 (   ).

3. **المستوى التعليمي للأم:**
   - أ/ إبتدائي/باسم (   ).
   - ب/联社ع (   ).
   - ج/ جامعي فما فوق (   ).

4. **العمر بالسنوات:**
   - أ/ ج/ 18-31 (   ).
   - ب/ >31 (   ).

5. **المعرفة:**
   - أ/ مسلم . (   ).
   - ب/ غير مسلم (   ).

6. **حجم الأسرة:**
   - أ/ <6 (   ).
   - ب/ 2 (   ).
   - ج/ >2 (   ).

7. **هل تعرف مهرض السكري؟**
   - أ/ نعم (   ).
   - ب/ لا (   ).

8. **إذا كانت الإجابة (نعم) .. ما هو مرض السكري؟**
   - أ/ ارتفاع السكر في الدم (   ).
   - ب/ انخفاض السكر في الدم (   ).
   - ج/ ه/ أخرى حدد (   ).

9. **ما الذي يؤدي إلى ارتفاع وانخفاض السكر في الدم؟**
   - أ/ عجز البنكرياس عن إفراز الأنسولين (   ).
   - ب/ عدم فعالية الهرمونات (   ).
   - ج/ غير معرفة (   ).

10. **هل تعرف هرمون الانسولين؟**
    - أ/ نعم (   ).
    - ب/ لا (   ).

11. **إذا كانت الإجابة (نعم) ما هو؟**
    - أ/ هرمون يعمل على تحكم السكر في الدم (   ).
    - ب/ هرمون يعمل على هضم البروتينات (   ).
    - ج/ أخرى حدد (   ).

12. **هل تعرف العضو المسؤول عن إفراز العضو المسؤول عن مرض السكري؟**
    - أ/ البنكرياس (   ).
    - ب/ الكبد (   ).

13. **إذا كانت الإجابة (نعم) ما هو العضو المسؤول عن الإصابة بمرض السكري؟**
    - أ/ البكين (   ).
    - ب/ الكبد (   ).

14. **هل تشعر بالتعب (   ).
    - أ/ ج/ العطش (   ).
    - ب/ الشعور بالأعراض (   ).
    - ج/ بالنسبة (   ).
    - ه/ غثيان في البول (   ).

15. **إذا كانت الإجابة (نعم) ما هي أعراض مرض السكري؟**
    - أ/ الشعور بالتعب (   ).
    - ب/ العطش (   ).
    - ج/ الكحة (   ).
    - د/ الشعور بالأعراض (   ).
    - ه/ غثيان في البول (   ).
    - ز/ مرة أخرى حدد (   ).

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16 - ما هي العوامل التي تؤدي للإصابة بمرض السكري؟
أ/ كثرة تناول السكريات والنشويات (لا). ب/ الوراثة (لا). 
ج/ عدم الحركة والرياضة (لا). د/ التدخين (لا).
17 - هل لمرض السكري أنواع؟
أ/ نعم (لا). ب/ لا (لا).
18 - إذا كانت الإجابة (لا)، ما هي أنواع مرض السكري؟
أ/ النوع 0 (لا). ب/ النوع 5 (لا).
19 - هل لمرض السكري مضاعفات؟
أ/ نعم (لا). ب/ لا (لا).
20 - إذا كانت الإجابة (لا)، ما هي المضاعفات التي تنتج عن الإصابة بمرض السكري؟
أ/ الاسم بالكلار (لا). ب/ ضيق الشرايين (لا). 
ج/ عدم التئام الجروح (لا). د/ فقد الأطراف (لا).
21 - هل يمكن الوقاية من مرض السكري؟
أ/ نعم (لا). ب/ لا (لا).
22 - إذا كانت الإجابة (لا)، ما هي طرق الوقاية؟
أ/ إتباع نظام غذائي (لا). ب/ ممارسة الرياضة (لا).
23 - هل يمكن التحكم في مرض السكري؟
أ/ نعم (لا). ب/ لا (لا).
24 - إذا كانت الإجابة (لا)، كيف يمكن التحكم في مرض السكري؟
أ/ تناول الأنسولين (لا). ب/ تنظيم برنامج رياضي (لا). 
ج/ إتباع الحمية الغذائية (لا).
25 - ما هو موقفك تجاه مرض السكري؟
أ/ إيجابي (لا). ب/ سلبي (لا).
26 - إذا كان موقفك إيجابي، ما هي الأسباب؟
أ/ الشكل المادي (لا). ب/ لا يؤدي لوفيات (لا). 
ج/ إمكانية التحكم فيه (لا). د/ أخرى حدد (لا).
27 - إذا كان موقفك سلبي، ما هي الأسباب؟
أ/ مشكلات صحية (لا). ب/ بدلاً من ذلك (لا). 
ج/ الأسباب الأخرى (لا). د/ حدد (لا).
28 - ما هو موقفك تجاه الحمية الغذائية لمرض السكري؟
أ/ إيجابي (لا). ب/ سلبي (لا).
29 - إذا كان موقفك إيجابي تجاه الحمية الغذائية، ما هو الأسباب؟
أ/ الشكل المادي (لا). ب/ غذاء صحي للمرض (لا). 
ج/ الأسباب الأخرى (لا). د/ حدد (لا).
30 - إذا كان موقفك سلبي تجاه الحمية الغذائية ما هي الأسباب؟
أ/ لا تمثل علاج (لا). ب/ لا تمنع الأكل (لا). 
ج/ أخرى حدد (لا). د/ حدد (لا).
31 - ما رأيك في تناول السكريات؟ (مثل الباستيكي والعصائر المركزة بالسكر).
أ/ إيجابي (لا). ب/ سلبي (لا).
32 - إذا كان موقفك إيجابي تجاه تناول السكريات ما هي الأسباب؟
أ/ تناول السكريات في الدم (لا). ب/ صحة (لا). 
ج/ أخرى حدد (لا). د/ حدد (لا).
33 - إذا كان موقفك سلبي تجاه تناول السكريات ما هي الأسباب؟
أ/ تناول السكريات في الدم (لا). ب/ لا يأكل السكر في الدم (لا). 
ج/ أخرى حدد (لا). د/ حدد (لا).
34 - ما موقفك تجاه تناول (سكر) مرض السكري؟
أ/ إيجابي (لا). ب/ سلبي (لا).
35 - ما هو موقفك تجاه تناول الإنسولين لمرض السكري؟
أ/ إيجابي (لا). ب/ سلبي (لا).

المواقف:
36. ما هو موقفك تجاه ممارسة الرياضة لمرض السكري؟
أ/ إيجابي ( ).
ب/ سلبي ( ).

السلوك :

37. هل أنت مصاب بالسكري؟
أ/ نعم ( ).
ب/ لا ( ).

38. إذا كانت الإجابة (نعم) لماذا فعلت؟
أ/ أذهب للطبيب ( ).
ب/ مأت بإجراء فحص للسكري ( ).
ج/ الإجابة (أ+ب) ( ).
د/ أخرى حدد .

39. هل تلتزم في تناول الأنسولين؟
أ/ نعم ( ).
ب/ لا ( ).

40. هل تلبس حذاء مهرض السكري؟
أ/ نعم ( ).
ب/ لا ( ).

41. إذا شعرت بكثرة التبول والعطش .. هل تقوم بفحص السكري؟
أ/ نعم ( ).
ب/ لا ( ).

42. هل تمارس الرياضة؟
أ/ نعم ( ).
ب/ لا ( ).

43. هل تتبع حمية غذائية؟
أ/ نعم ( ).
ب/ لا ( ).

44. إذا كانت الإجابة (نعم) هل تتبع الحمية الغذائية التي يحددتها اختصاصي الغذاء؟
أ/ نعم ( ).
ب/ لا ( ).

45. كم عدد الأرغفة التي تتناولها في الوجبة؟
أ/ نصف رغيفة ( ).
ب/ رغيفة واحدة ( ).
ج/ أكثر ( ).

46. كم عدد ( أرقاط القرص) التي تتناولها في الوجبة حسب الحجم؟
أ/ أرقاط صغيرة ( ).
ب/ أرقاط صغيرة جمجمة ( ).
ج/ أكثر ( ).

47. كم عدد ( أرقاط الكسرة) التي تتناولها في الوجبة؟
أ/ أرقاط واحدة ( ).
ب/ أرقاطان ( ).
ج/ أكثر ( ).

48. حسب ما ذكر ( ).
أ/ نشيويات ( ).
ب/ بروتينات ( ).
ج/ دهنيات منخفضة ( ).
د/ ملح منخفض ( ).
ه/ باقياً ( ).
و/ كلما ذكر ( ).
ز/ أخرى حدد .

49. كم عدد الوجبات التي تتناولها في اليوم؟
أ/ وجبتين ( ).
ب/ 3 وجبات ( ).
ج/ أكثر من 3 وجبات ( ).

50. ما هو الزمان بين كل وجبة تتناولها؟
أ/ ساعة ( ).
ب/ ساعتين ( ).
ج/ ثلاثة ساعات ( ).
د/ أخرى حدد .
APPENDIX-1

University of Gezira
Faculty of health and environmental of science

Questionnaire on knowledge, attitudes and behavior among mothers towards diabetes - Alsahafa Administrative Unit, Khartoum Locality, Khartoum State, Sudan, 2015

General Information:
1. Occupation of the mother:
   Work ( ). B / not work ( ).

2. The average monthly income of the head of household (Sudanese pounds):
   A / ≤ 450 ( ) B / 451-850 ( ) C / 851 – 1250 ( ) D / > 1250 ( )

3. The educational level of the mother:
   A / Illiterate ( ) B / Khalwa ( ) C / primary / basic ( ) D / Intermediate ( ) E / secondary ( ) university ( ) G / Other ( ) specify........................

4. Mother Age:
   A / <18 ( ) B / 18-31 ( ) C / 32-45 ( ) D / > 45 ( ).

5. Religion:
   A / Muslim ( ) B / non-Muslim ( )

6. Family size individual:
   A / <6 ( ) B / 6 ( ) C / > 6 ( )

Knowledge:
7. Do you know diabetes?
   A / Yes ( ) B / No ( )

8. If the answer (yes)... What is diabetes?
   A / high sugar in the blood ( ) B / low blood sugar ( ) C / high sugar in urine ( ) D / all mentioned ( ) E / Other ( )

9. What leads to increase or decrease sugar in blood?
   A / pancreas is unable to secrete insulin ( ) B / ineffectiveness of insulin ( ) C / all mentioned ( ) D / other ( )

10. Do you know the hormone insulin?
    A / Yes ( ) B / No ( )

11. If the answer (yes) what is it?
    A /hormone works to control blood sugar ( ) B / hormone works to digest proteins ( ) C / Other ( )

12. Do you know the organ that produces insulin:-
    A / Yes ( ) B / No ( )

13. If the answer (yes) what is in charge of Lists for diabetes?
    A / pancreas ( ) B / liver ( ) C / Other ( )

14. is diabetes has symptoms?
    A / Yes ( ) B / No ( )

15. If the answer (yes) what are the symptoms of diabetes?
    A / feeling hungry ( ) B / thirst ( ) C / frequent urination ( )
    D / fatigue ( ) E / blurred in the vision ( ) G / all mentioned ( ) H / Other ( )

16. What are the factors that lead to diabetes?
    A / Too much sugar and starches ( ) B / Genetics ( ) C / obesity ( )
    D / increase intake sugar ( ) E / tension and agitation ( ) F / no movement and sport ( )
    G / smoking ( ) H / aging ( ) I / body's inability to secrete insulin ( ) J / Other ( )

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17. is diabetes has types?
A / Yes ( ) . B / No ( )

18. If the answer (yes) what are the types of diabetes?
A / Type (1) ( ) B / Type (2) ( ) C / (a + b) ( ) D / other specify........................

19. is diabetes has complications?
A / Yes ( ) B / No ( )

20. If the answer (yes) what are the complications of diabetes?
A / renal failure ( ) B / narrow arteries ( ) C / non-healing wounds ( )
D / White eye Water ( ) E / strikes at heart ( ) F / blood pressure ( )
G / loss of limbs ( ) H / Sexual dysfunction ( ) I / immune compromised ( )
J / all of the above mentioned ( )

21. Is it possible to prevent of diabetes?
A / Yes ( ) B / No ( )

22. If the answer (yes) what are the methods of prevention?
A / dieting ( ) B / exercise ( ) C / answer (a + b) ( ) D / other specify........................

23. Is it possible to control diabetes?
A / Yes ( ) B / No ( )

24. If the answer is yes ... How can control diabetes?
A / Intake insulin ( ) B / organizing a sports program ( ) C / follow the diet system ( )
D / all mentioned ( ). E / Other specify........................

Attitudes:
25. What is your attitude toward diabetes?
A / positive ( ) B / negative ( )

26. If a positive attitude, what are the reasons?
A / possible to control ( ) B / not fatal ( ) C / other specify........................

27. If a negative attitude, what are the reasons?
A / serious disease ( ) B / difficult to treat ( ) C / answer (a + b) ( ).
D / other specify........................

28. What is your attitude towards diet system?
A / positive ( ) B / negative ( )

29. If a positive attitude towards diet ... What are the reasons?
A / controlled blood sugar ( ). B / safe food for the patient ( ). C / all of mentioned ( )
D / other specify........................

30. If a negative attitude towards diet system what are the reasons?
A / represent treatment ( ). B / deprived for eating ( ). C / Other specify........................

31. What is your opinion of eating sugars? (Eg. basta and concentrated juices with sugar).
A / positive ( ). B / negative ( )

32. If a positive attitude towards eating sugars what are the reasons?
A / sugar does not raise blood ( ). B / safety ( ). C / Other specify........................

33. If your attitude toward eating sugars negative why?
A / regulates sugar in the blood ( ). B / does not regulate blood sugar ( ).
C / Other specify........................

34. What is your attitude toward using diabetes sugar?
A / positive ( ) B / negative ( )

35. What is your attitude towards taking insulin for diabetes?
A / positive ( ) B / negative ( )

36. What is your attitude toward exercise for diabetes?
A / positive ( ) B / negative ( )

The behavior:
37. Are you diabetic?
A / Yes ( ) B / No ( )
38. If the answer is 'yes' what did you do?
A / I went to the doctor (     ). B / medical check diagnosis (     ). C / answer (a + b) (     ) D / other specify..........................
39. Are you organize in dealing insulin regularly?
A / Yes (     ). B / No (     ).
40. Do you wear the shoes of diabetes?
A / Yes (     ). B / No (     ).
41. If you feel frequent urination and thirst... Do you examine diabetes?
A / Yes (     ). B / No (     ).
42. Do you practice any sports activates?
A / Yes (     ). B / No (     ).
43. Do you follow a diet system?
A / Yes (     ). B / No (     ).
44. If the answer (yes) Do you follow the diet system prescribed by a specialist nutrition?
A / Yes (     ). B / No (     ).
45. How many bread you eat in the meal?
A / half bread (     ). B / one (     ). C / more than (     ).
46. What the contents of the meals you eat?
47. How many meals do you eat per day?
A / 2 meals (     ). B / 3 meals (     ). C / more than 3 meals (     ).
48. What is the interval time between meals?
A / 1 hour (     ). B / 2 hours (     ). C / 3 hours (     ). D / other (     )......specify