Knowledge, Attitude and Practices about Diabetic Complications among Diabetic patients attending Maygoma Primary Health Care Center, Khartoum State, Sudan (2018)

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Azza Mustafa Nasr Mohmmed

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Dedication

To

my beloved mother ... She is behind every success in my life was and still is the symbol of infinite giving

To

the spirit of my dear father

To

my dear husband, yes, he was the help, support and source of inspiration

To

My wonderful sister Ghada and my brother Mohammed

To

the flowers that perfume my life my kids; Abdulrahman, Razan, Asma and Yosra.

To

everyone supported me and stood beside me until this stage. My best friends Hind & Walla.
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I would like to express my sincere gratitude for the guidance, mentoring, and intellectual support provided to me by my supervisor Dr. Osman Hamid Abulhamed. He has been really helpful.

Special thanks are dedicated to my colleagues who help me greatly along the process of data analysis and interpretation and writing the report.

My great appreciation and sincere thanks to all health center staff; they supported me in all technical and fieldwork, and facilitated for me data collection.
Knowledge, Attitude and Practices about Diabetic Complications among Diabetic patients attending Maygoma Primary Health Care Center, Khartoum State, Sudan (2018)

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ABSTRACT

This study assessed knowledge of diabetic patients about diabetes chronic complications & their attitudes and practices towards the prevention measures. A facility base, cross sectional study, used semi-structured questionnaires, data analyzed by using SPSS program. In this study, the response rate was 100%. Most of study participants were females, their age was 40-60, married, and housewives, had secondary school level of education, and had diabetes for less than 5 years. The study found that the participants had average knowledge score, it was 69.4%. Females, patients were age 41-60 years, educated patients and who had diabetes for more than 10 years had better knowledge. The mean attitude and practices scores were 69% and 66 respectively. Significantly, older being a female patients and who had diabetes more than 10 years had average positive level of attitude. Positive practices were higher among males and among educated patients. Still there is gap in patients’ knowledge, attitude, and practices level, therefore, the study suggested to develop health education campaigns to all diabetic patients to aware them about the importance of close follow up
معرفة وسلوكيات وممارسات مرضى السكري اتجاه المضاعفات مرض السكري
في مركز المايقوما الصحي النموذجي، ولاية الخرطوم السودان 2018

عزة مصطفى نصر محمد

ملخص الورقة

يعتبر مرض السكري من المشاكل الصحية التي ينتج عنها ارتفاع معدلات الوفيات، وتحتاج لجهد كبير لمنع هذا المرض وتقليل المضاعفات الناجمة عنه، كما أن الكشف المبكر عن مضاعفات السكري يمكن أن يحسن نوعية حياة مرضى السكري. تم تأسيس هذه الدراسة لقياس معرفة وسلوك وممارسات مرضى السكري عن مرض السكري والمضاعفات المزمنة والتدابير الوقائية. تعتبر هذه الدراسة مقطعية وصفية تمثل مستوي المؤسسة الصحية، بواسطة استبيانات الكمية. تم تحليل البيانات بالبرنامج الإحصائي SPSS. في هذه الدراسة كان معدل الاستجابة 100%. كان معظم المشاركين في هذه الدراسة من الإناث، عمرهم 40-60، متزوجون، من ربات المنازل، لديهم مستوى تعليم ثانوي، ولديهم مرض السكري لأقل من 5 سنوات. وجدت الدراسة أن المشاركين لديهم درجة معرفة متوسطة، وكان متوسط معدل المعرفة 69.4 حيث وجدت الدراسة أن الإناث والمرضى في سن 41-60 سنة، والمرضى المتعلمين، الذين يعانون من مرض السكري لأكثر من 10 سنوات لديهم معرفة أفضل من المرضى الآخرين كما كان متوسط درجة السلوك 69% بشكل كبير كبار السن والإناث والذين يعانون من مرض السكري لمدة تتجاوز الست سنوات متوسطي من حيث المواقف الإيجابية اتجاه مضاعفات السكري. بينما كانت الممارسات الإيجابية أعلى بين الذكور والمرضى المتعلمين. أكدت الدراسة بأنه لا تزال عمك تفتقد بين معرفة المريض وموقفه من جهة وبين ممارساته من جهة أخرى، ولذلك اقترحت الدراسة القيام بحملات التثقيف الصحي لجميع مرضى السكري لرفع وعيهم بأهمية المتابعة اللصيقة لمرض السكري.
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ABBREVIATIONS

Put them in alphabetical order

CKD  Chronic kidney disease
DM   Diabetes mellitus
DMPFM DM Patient’s Family Members
ESRD End stage renal disease
SPSS Statistical Package in Social Science
WHO  World health organization
CHAPTER [1]
INTRODUCTION

1.1 INTRODUCTION

Diabetes mellitus (DM) refers to a group of diseases that affect how the patient’s body uses blood glucose. Glucose is vital to everyone health because it is an important source of energy for the cells that make up your muscles and tissues. It is also the brain's main source of fuel. The underlying cause of diabetes varies by type: type 1 and type 2. But, no matter what type of diabetes the patient has, it can lead to excess blood glucose, which can lead to serious health problems. (Lozano R. 2012)

Globally Diabetes is the cardinal cause of death (Murray CJ. 2012). World Health Organization (WHO) reported that from a total of 3.7 million deaths linked to blood glucose level in 2012, diabetes was the direct cause of 1.5 million deaths worldwide and additional 2.2 million deaths were caused by increasing risk of cardiovascular and other diseases due to hyperglycemia (WHO, 2012). Also, WHO reported that, it expected for diabetes to become the 7th leading cause of death by 2030 (WHO, 2012). In sub-Saharan Africa alone, there are about 12 million people suffering from this condition and there are projections that this number will reach 18 million by 2030, making the region the one with the fastest growing rates of diabetes mellitus in the world (Shaw JE. 2010).

Progression of type 2 DM consequences certain acute and chronic complications in the majority of cases (Liu Z. 2010). Worldwide, type 2 diabetes mellitus has become one of the most important chronic public health problems. It is a growing cause of disability and premature death, mainly through cardiovascular disease and other chronic complications. It is estimated that the global number of adults suffering from any form of diabetes will reach 285 million in 2010 and further increase to 439 million in 2030, most of them T2DM cases. (Yang W. 2010)
The present situation in developing countries will lead to consistent rise in the number of people with diabetic complications. Due to the insidious nature of this disease, many people remain undiagnosed until complications appear. Lack of proper care at the early stage of development influences the patient’s quality of life, which also thrusts a considerable economic burden. (WHO, 2012)

The development of chronic complications is influenced by hyperglycemia. In almost all high-income countries, diabetes is a leading cause of cardiovascular disease, blindness, kidney failure, and lower limb amputation (IDF, 2015). The risk of dying among people with diabetes is twice than that of people without diabetes. Necessary interventions should be put in place, otherwise the cost of care for type 2 diabetes mellitus patients will have a negative impact on the health care system, as suggested by experts (Kirigia JM. 2009) (Al-Maskari F. 2013).

Many initiatives have already been taken in developed and developing countries to educate people with diabetes on how to minimize the complications; the impact is yet to be revealed.
PROBLEM STATEMENT

Since diabetes is a major health problem with high morbidity and mortality rate and number of patient is increasing every year, great effort needed for preventing this disease and minimize the complications, diabetic complication is a leading cause of end-stage renal failure, acquired blindness, a variety of neuropathies and accelerated atherosclerosis, which could account for disabilities and high mortality rates in patients with diabetes. Additionally, quality of life of patients with diabetes can be improved if complications of the disease are detected early. On other hand, the role of primary health care is important in controlling diabetes complications through preventive measures in form of health education, regular investigations, early detection and proper management of complications in addition to psychosocial support of patients. Awareness of nature of the disease, risk factors & complications; as well as regular follow up & regularity to medications are the major factors in fighting diabetes.

The final outcome of diabetes is a disability, and/or death and of course has great economic impact which is direct (medical and treatment costs) and indirect (costs of hospitalizations, loss of vision, lower extremity amputations, kidney failure, and cardiovascular events). Thus, prevention is most cost effective than treatment and management of diabetic complications.

(R. Sharma, 2011) (L. Litwak, 2013)

In Sudan there were studies about knowledge of diabetic patient about diabetes conducted in hospitals or tertiary health care centers. Which reflect knowledge of patients with complications & disabilities, in this study I want to assess knowledge among patients attending primary health care centers those with no or little complications.
1.3 JUSTIFICATION

According to the knowledge of the researcher, there were no available published researches that conducted to assess knowledge, attitude & practice about diabetic complications and their prevention measures among diabetic patients at Mygoma health center. As literature has shown there is a correlation between diabetic patients’ knowledge, attitude and practices about the prevention approaches of DM complications and the occurrence of these complications, this study aimed to investigate the KAP regarding DM complications at Maygoma Health center. Mygoma health center is a referral health center that serves large sector of the community so; this study may provide evidence about diabetic patients’ awareness about diabetic complications & their practice to prevent these complications by controlling the risk factors. The results of this study could help to increase patients awareness and raised the level of knowledge about diabetic complications and therefore, improve patients ‘quality of life and delay complications occurrence in addition to decrease the cost of management of diabetic complications & disabilities.
1.4 STUDY OBJECTIVES

General objective:
To assess knowledge, attitude and practices of diabetic patients about diabetes chronic complications & preventive measures.

Specific objectives:
- To determine the knowledge level of diabetic patients about macro & micro vascular complications of DM.
- To identify patients’ attitude towards regularity of investigations& medications.
- To study patients practices regarding controlling risk factors for developing complications& healthy life style.
- To identify factors associated with good knowledge, attitude and practices.

1.5 STUDY OUTCOMES:
The main outcome of this study is to investigate diabetic KAP about chronic diabetic complications in order to raise the level of knowledge about these complications and therefore, improve patients’ quality of life and minimize DM morbidity and mortality.
CHAPTER [2]
LITERATURE REVIEW

2.1 INTRODUCTION

Diabetes mellitus (DM) is a group of common metabolic disorders that share the phenotype of hyperglycemia, which caused by a complex interaction of genetics and environmental factors. It is the leading cause of end-stage renal disease (ESRD), traumatic lower extremity amputations, and adult blindness. It also predisposes to cardiovascular diseases. With an increasing incidence worldwide, DM will be a leading cause of morbidity and mortality in the foreseeable future (American Diabetes Association, 2013) The goal of treatment for DM is to prevent mortality and complications by normalizing blood glucose level, to prevent complications such as disturbances in fat metabolism, nerve damage, and eye disease (American Diabetes Association, 2013) (A. E. Kitabchi, 2009)

Diabetes and related complications are associated with long-term damage and failure of various organ systems. The line of demarcation between the pathogenic mechanisms of microvascular and macro-vascular complications of diabetes and differing responses to therapeutic interventions is blurred. Diabetes induces changes in the microvasculature, causing extracellular matrix protein synthesis, and capillary basement membrane thickening, which are the pathognomic features of diabetic microangiopathy. These changes in conjunction with advanced glycation products, oxidative stress, low grade inflammation, and neovascularization of vasa vasorum can lead to macro-vascular complications. Hyperglycemia is the principal cause of microvasculopathy but also appears to play an important role in causation of macrovasculopathy. There is thought to be an intersection between micro and macro vascular complications, but the two disorders seem to be strongly interconnected, with micro vascular diseases promoting atherosclerosis through processes such as hypoxia and changes in vasa vasorum. It is thus imperative to understand whether micro vascular complications distinctly precede macro vascular complications or do both of them progress simultaneously as a continuum. This will allow re-focusing on the clinical issues with a unifying perspective which can improve type 2 diabetes mellitus outcomes. (Aastha C, 2016)

Hence, the common causes of diabetic complications are poor control of diabetes either due to non-adherence, poor attitude towards the disease and its complications, unhealthy diet, and insufficient physical activity, and due to poor management by the health care professionals
On top of these complications diabetes can predispose the patient for different infections. The final outcome of diabetes is a disability, and/or death and of course has great economic impact which is direct (medical and treatment costs) and indirect (costs of hospitalizations, loss of vision, lower extremity amputations, kidney failure, and cardiovascular events). Thus, prevention is most cost effective than treatment and management of diabetic complications. (R. Sharma, 2011) (L. Litwak, 2013)

2.2 PREVIOUS STUDIES:
Different studies, in fact, of different methodological quality have documented the complications of diabetes in different setups including hospitals and the community including its contributing factors like poor attitude and adherence. These all affect the treatment outcome and may lead to complications and thus to death. (D. Worku, 2010)

M. Khattab, et. al. concluded that the proportion of patients with poor glycemic control was high, which was nearly comparable to that reported from many countries. Longer duration of diabetes without diabetes self-care management behaviors were associated diabetes chronic complications. An educational program that emphasizes lifestyle modification with importance of adherence to treatment regimen would be of great benefit in glycemic control (M. Khattab, 2010).

Another study conducted to determine the knowledge, attitudes and practices among patients with type 2 diabetes, because, education is the cornerstone of diabetes care. Because of lack of awareness, most patients suffer from diabetes complications. This study found the patients' awareness about diabetes was low. The knowledge, attitude and practice scores were low in most areas of diabetes care emphasizing the need for additional educational efforts (Gul, 2010).

Studies have reported that diabetes and its complications are among the common reasons for inpatient admissions, accounting for about 4.4% of total admissions leading to about 3.4% to 32.5% total deaths. (A. Chijioke, 2010)

The prevalence of chronic complications varies from 52.0% to 74.2%. The most common chronic complications were erectile dysfunction, visual disturbance, and cardiovascular disorders, neuropathy, and nephropathy. A study was conducted to determine the prevalence of chronic complications of type 2 diabetes mellitus in a secondary health Centre in Niger Delta, with the objective of relating the effect of age and gender with these complications as well as determining their glycemic control. Of the 200 T2DM patients evaluated for chronic complications, 130 (65%) presented with one form of complication varying from nephropathy (58%), dyslipidemia (57%), hypertension (48%), neuropathy (14%) and
retinopathy (9%) with 104 (52%) having more than two categories concurrently. Chronic complications varied with gender as well as age. Chronic complications were common among type 2 diabetes in central hospital Warri, Nigeria. Implementation of timely and appropriate screening strategies could decrease the burden of diabetes chronic complications. (Ufuoma Chukwuani, 2016)

Likewise, acute complications had similar trend which ranges 30.5% among which diabetic ketoacidosis (DKA) was 71%, followed by hypoglycemia (19.4%) but hyperosmolar hyperglycemic state (HHS) was insignificant. (Institute for Clinical Systems Improvement, 2012)

The common risk factors for occurrence of complications were gender, long duration with diabetes, poor and inadequate glycemic control, negative attitude towards diabetes, poor treatment adherence, and poor knowledge about the disease and its management. Thus, better understanding of perceptions and attitudes among both patients and providers is needed to guide initiatives to improve the management of diabetes. (R. I. Ekore, 2010) (A. R. Khan, 2012).

A study conducted by G. D. Chen in 2014 demonstrated the interaction of health literacy and understanding of health education and instructions in achieving glycemic control. Five hundred and one consecutive patients with type 2 diabetes mellitus (DM) in the outpatient clinic of the metabolism department were recruited into this pilot study. The demographic data were collected from patients' self-reports. The clinical background information was collected through electronic medical records. Higher educational attainment and higher household income (odds ratios were 2.23 and 2.22, respectively) were significantly associated with patients who had adequate health literacy. Higher educational attainment and patients with a family history of DM (odds ratios were 4.99 and 1.85, respectively) were significantly associated with better understanding of health education and instructions. Adequate health literacy is not the only factor associated with good glycemic control. The effect of adequate health literacy in achieving good glycemic control might be masked by patients with better understanding of health education and instructions. These results revealed that not only were patients with adequate health literacy associated with good glycemic control but patients with marginal health literacy were also able to achieve good glycemic control. Adequate health literacy and better understanding of health education is highly correlated. The role of adequate health literacy on glycemic control could be suppressed if variables are over-controlled during analysis. (G. D. Chen, 2014)
There is a study aimed at assessing the level of knowledge, attitude, and practices (KAP) regarding complications of diabetes mellitus among patients with type 2 diabetes in Dhaka, Bangladesh in 2017. On average, the level of knowledge, attitude, and practices were 9.2 (out of 14), 7.9 (out of 13), and 16.9 (out of 27), respectively. Age and gender were significant predictors of knowledge and attitude. Females had better level of knowledge and attitude compared to males. Patients with graduate degrees and above compared to illiterates reported significantly greater knowledge and practice, after adjustments for covariates. Educational program was the most important significant predictor of KAP. Higher duration of diabetes and positive marital status had influenced better practice. Lack of knowledge, poor attitude, and inadequate practice were found in this surveyed community. Level of education and educational program on diabetes were the most significant contributing factors. The current study suggested the need of structured educational programs on diabetes and its complications on a regular basis to assist patients in living a productive life (Rahaman KH. S. 2017)

The diabetic complications are becoming common community problems. The outcomes of diabetic complications are increased hospitalization, increased direct patient costs, and mortality. In Dessie, the prevalence of the diabetic complications is not well studied so far. Thus, the aim of a study was conducted Abejew A. A, AbebeZeleke Belay A Z, and KerieM W was to assess prevalence of diabetic complications and associated factors among adult diabetic patients of Dessie Referral Hospital, Northeast Ethiopia. Overall 129 (59.7%) of the patients were found to have been affected by one or more of the diabetic complications. Complications were identified mainly among type II diabetic patients. The age of patients, type of diabetes (P value-0.00), and medication (P value-0.00) were strongly associated with the occurrence of diabetic complication but self-reported adherence, attitude, and knowledge level of patients and the family history were not associated with the presence of complication. In Conclusion the prevalence of complications among diabetic patients in Dessie Referral Hospital was high. Targeted counseling and health information provision to the patients by the clinical staff will be helpful in reducing avoidable morbidity and mortality (Abejew A. 2015).

Chronic complications are the major outcome of type 2 diabetes mellitus progress, which reduce the quality of life of patients, incur heavy burdens to the health care system, and increase diabetic mortality. The aims of Zhaolan Liu, et al. study was to describe the prevalence of chronic complications among urban Chinese type 2 diabetic outpatients; and to analyze the associations between chronic complications and patients' demographics, diabetic
related clinical characteristics. Of the 1,524 study subjects, 637 (41.8%) were male, and the mean age was 63.3 ± 10.2 years. At least one chronic complication was diagnosed in 792 individuals (52.0%) of the study subjects; 509 (33.4%) presented with macro-vascular complications and 528 (34.7%) with micro-vascular complications. The prevalence of cardiovascular and cerebrovascular conditions, neuropathy, nephropathy, ocular lesions and foot disease were 30.1%, 6.8%, 17.8%, 10.7%, 14.8% and 0.8%, respectively. The prevalence of chronic complications varied between cities, and significantly increased with age and duration of diagnosed diabetes. The mean of HbA1c in diabetic patients with chronic complications was 8.2% ± 1.6% and 63.0% of the subjects with type 2 diabetes related complications had a poor glycemic control with the HbA1c > 7.5%. Chronic complications are highly prevalent among type 2 diabetic outpatients, the glycemic control of diabetic patients with chronic complications was poor, and future efforts should be directed at intensive blood glucose control, strengthening early diagnosis and improving case management to prevent and minimize the occurrence of complications. (Zhaolan Liu, 2010).

Addition study was carried out to evaluate the knowledge of diabetic complications in patients with diabetes mellitus. This cross-sectional study was conducted to all admitted diabetic patients above 15 years of age with duration of diabetes mellitus more than one year were included. Out of the 96 patients questioned, 58 were females and 38 were males. Mean age was 53.29 +/- 10.821 years while the mean duration of diabetes mellitus was 9.75 +/- 7.729 years. Of the total 76 (79.1%) of the patients were illiterate; 36 (37.50%) had good, 24 (25%) had average and 36 (37.50%) had poor knowledge about diabetic complications. Males and university graduate patients had slightly better knowledge. Between 50-60% patients were aware of different cardiac complications of diabetes mellitus. Awareness regarding other complications was foot ulcer/gangrene 70 (72.91%), poor wound healing 68 (70.83%), stroke 54 (56.25%), renal diseases 64 (66.66%), eye diseases 53 (55.20%), gastro paresis and other gastrointestinal problems 45 (46.87%), diabetic ketoacidosis 55 (57.29%), hypoglycemia 50 (52.08%), lipid abnormalities 26 (27.08%) and symptoms of diabetic neuropathy ranging from 47-65%. Majority of diabetic patients are unaware of diabetic complications. Therefore, hospital and community based awareness programs should be launched to decrease the morbidity and mortality associated with diabetes mellitus (Ullah F, 2015).

Another study was conducted by O'Sullivan EP to assess the awareness of diabetes complications among patients with diabetes in Ireland. A total of 258 (59.3% male) patients completed the questionnaire; mean age 57.8 years. On questioning, 53.5% reported
cardiovascular disease as a potential complication of diabetes, with awareness rates of 61.2, 17.1, 16.3 and 12% for retinopathy, stroke, peripheral vascular disease and amputation, respectively. Disappointingly, less than half of respondents felt that improvements in diet and exercise could potentially reduce their cardiovascular risk. Awareness of cardiovascular risk and knowledge of effective measures to reduce this were low in our study and an alternative means of education may need to be considered (O'Sullivan EP, 2009). Also, there was a study designed to evaluate level of KAP in type-2 diabetic patients in Tehran capital city of Iran identifying variables that affect this KAP level. The study investigated 200 type-2 diabetic patients, their mean age of 60.17 years was evaluated (106 males and 94 female). The mean diabetes duration was 13.06 years. The levels of patients’ good knowledge, attitude, and practice were 61.41%, 50.44% and 52.23%, respectively. Age, treatment methods, DM duration, and existence of diabetic retinopathy had significant correlations with KAP level. The results of this study showed that recent educational programs in Iran improved KAP level. Patients’ KAP increases as their condition worsens. Hence, education should considered as a priority for newly diagnosed patients and those with lower KAP levels before occurrence of diabetes complications (Niroomand M, 2016). Furthermore, a cross sectional study conducted in 2014 in Ethiopia assessed the awareness of DM patients’ family members (DMPFMs) about DM occurrence and prevention. Of the total 347 study participants, 45.5% (n = 158) had DMPFMs. Majority, 60.8% of DMPFMs and 73.0% of controls were males. Mean age of DMPFMs (30.06 years) was less than that of the controls (37.38 years). On living style, 51.9% DMPFMs, and 42.8% of controls were single. In both study groups, the majority of study participants attended grade 7–12. The likelihood of having good level of knowledge among DMPFMs were 2.94 times (AOR = 2.94 95% CI 1.87–4.86) higher compared to those who did not. Those attaining higher educational levels were 3.41 times (AOR = 3.41, 95% CI 1.31–8.91) more likely to have good level of knowledge, as compared to those who were unable to read and write. The likelihood of having good level of positive practice among DMPFMs were 3.38 times (AOR = 3.38% CI 2.05–5.58) higher as compared to controls. Participants who were living in Kombolcha were 2.33 times (AOR = 2.33 95% CI 1.31–4.12) more likely to have good level of practice, as compared to individuals from Kemisse. Diabetes mellitus family members in the Ethiopian suburban cities Kemisse, and Kombolcha had better knowledge and practice about DM compared to controls. But, the overall awareness about DM occurrence and prevention was relatively low. Thus, DM awareness campaigns should be strongly pursued regardless of
family history and educational background to prevent further increase of DM in Ethiopia (MistireWolde, 2017)

Chronic Kidney Disease (CKD) is a global health burden with associated high mortality and morbidity. Early detection helps tremendously at improving the general condition of the patient. Despite the fact that CKD can be prevented, lack of knowledge concerning preventive measures of CKD for diabetic patients is still problematic. Therefore, the sole objective to this study is assessing the Knowledge, Attitude and Practice (KAP) of diabetic patients in regards to Kidney diseases for avoidance of worsening progression to End Stage Renal Disease (ESRD) and/or its prevention. A quantitative cross sectional study with convenience sampling on a sample of 132 Diabetic patients at renal clinic. 132 patients were enrolled in this study of which 54% were young <30 years and the majority were females 53% while 59% had moderate knowledge regarding Chronic Kidney Disorders (CKD) prevention, 35.6% had high level of knowledge and 5.3% had a low level of knowledge. Respondents showed some positive attitudes regarding CKD prevention with significant statistical differences for different groups. Practices regarding CKD prevention were found with some correct practices. Therefore, in conclusion, study showed that participants had moderate knowledge, positive attitudes and to some extent followed correct practices regarding CKD prevention. (Kayitesi, J., 2016)

Faraja S. Chiwanga and Marina A. Njelekela. Conducted a study to determine knowledge of foot care and reported practice of foot self-care among diabetic patients with the aim of identifying and addressing barriers to preventing amputations among diabetic patients. Of 404 patients included in this study, 15% had foot ulcers, 44% had peripheral neuropathy, and 15% had peripheral vascular disease. In multivariate analysis, peripheral neuropathy and insulin treatment were significantly associated with presence of foot ulcer. The mean knowledge score was 11.2 ± 6.4 out of a total possible score of 23. Low mean scores were associated with lack of formal education (8.3 ± 6.1), diabetes duration of < 5 years (10.2 ± 6.7) and not receiving advice on foot care (8.0 ± 6.1). Among the 404 patients, 48% had received advice on foot care, and 27.5% had their feet examined by a doctor at least once since their initial diagnosis. Foot self-care was significantly higher in patients who had received advice on foot care and in those whose feet had been examined by a doctor at least once. There is an urgent need to establish coordinated foot care services within the diabetic clinic to identify feet at risk, institute early management, and provide continuous foot care education to patients and health care providers (Faraja S. 2015).
A study was documented Knowledge, Attitude and Practice (KAP) patterns of diabetic patients regarding diabetes and diabetic retinopathy, to determine association between them, and to identify barriers to compliance with follow up and treatment regimes. Out of the 288 patients in the study, 42% had good knowledge about diabetes, but only 4.5% had good knowledge about retinopathy. Good knowledge about diabetes was significantly associated with positive attitude towards diabetes and good practice patterns regarding retinopathy; awareness of retinopathy was also significantly associated with good practice. A total of 61.1% of patients did not have periodic eye examination; most common barrier identified was lack of awareness about the necessity for this (38.5%). Good knowledge about the disease was significantly associated with positive attitude and good practice patterns. Knowledge about diabetic retinopathy was poor among the patients in this study. Lack of awareness concerning the need for screening for retinopathy was a major barrier to regular screening. There is an urgent need to educate diabetic patients about this potentially blinding complication of diabetes. (Srinivasan NK. 2017)
CHAPTER [3]
RESEARCH METHODOLOGY

3.1 STUDY DESIGN

It is a descriptive, cross sectional and facility based study.

3.2 STUDY AREA

The study conducted in Mygoma health center. It is a referral health center that located in Mygoma area, Khartoum middle locality, Khartoum state. It served 24500 of populations. Mygoma health center provided all primary health care services, these services were delivered by 3 family physicians, vaccination and nutritional personals, health visitors, laboratory personals, pharmacy assistant, statistician, dental specialist, nursing staff, additionally there are dermatologist, obstetrician and ophthalmologist once per week. The center is well equipped with needed equipment and supplies except the ECG and radiology units were temporary not working.

3.3 STUDY PERIOD:

The study was carried out over a period of 5 months from June to October 2018.

3.4 TARGET POPULATION:

The target population consisted of every adult diabetic patient (above 20 years) both males and females attending the health center during the study period

3.4.1 INCLUSION CRITERIA:

✓ All adult diabetic patients: type 1 & 2.
3.5 SAMPLE SIZE AND TECHNIQUE:
Total coverage (N=107)
In this study, data was collected by total coverage of all diabetic patients presented to the health center during the study period. During one month at Mygoma health center, around 480-600 patients presented to the center, as the daily frequency of patients is 20-25 patients. From those patients, 100-120 are diabetic patients with a daily frequency 5-6 patient per day. The above data took from the center statistic department.

3.6 Data Collection:

3.6.1 Study variables:
The dependent variable: diabetic complications.
The independent variables include:
- Belief about diabetes complications.
- Knowledge about preventive methods.
- Regularity of investigations.
- Adherence to treatment.
- Following healthy Life style.

3.6.2 Data Collection Procedures (tool):
The study tool used semi-structured questionnaires

3.7 Data analysis plan: -
- Data was collected and processed with SPSS(statistical package for social science) program
- A result was displayed in graphs and tables.

3.8 Ethical Consideration
✓ Ethical clearance was obtained from the ethics and research Committee of University of Gezira.
✓ Verbal consent was obtained from each study participant.
✓ Confidentiality and Privacy of collected data was considered.
investigated 107 patients; Results were described below:

**Socio demographic characteristic results**: The study found 50.5% of the patients were females, 51.4% of them were age 40-60 yrs., 71% were married, 32.8% secondary school educated, 51.4% were unemployed and 56.1% had medium income. See table -1

**Duration of DM**: 28% had DM for less than 5 years, see figure-1

**Knowledge results**: The study found 94.4% knew that DM could affect their eyes, 93.5% were aware about renal complications of DM, 71% knew that DM could affect the feet and nerves, 45.8% knew it caused cardiac disorders and 42.1% knew that DM can cause vascular complications. Figure2-6

**Attitude findings**: the study found 97.2% illustrated that periodic investigations were important to diabetic patients. 74.8% of patients illustrated that controlled blood glucose level will delay the occurrence of DM complications. 71% illustrated that regular random blood glucose investigations is important, at least once monthly. 57.9% mentioned it is essential to do renal function tests annually. Only 43.9% stated that HA1c is important test for diabetics at least every 6 months, and another 43.9% stated that it is important for diabetic patients to do ECG annually. Figure8-14
Association results:

**Knowledge with other variables:** Significantly, females, patient’s age 41-60 years, had secondary level of education and who had diabetes for more than 10 years had higher knowledge.

**Attitude with other variables:** Age and gender of the participants had significant influence on patients’ attitude. Older patients, being a female and had diabetes more than 10 years had positive attitude.

**Practice with other variables:** Practice score is also influenced by gender, and education. Unlike knowledge and attitude, mean score of practice was higher among males. See table-11.

![Figure-1: Duration of DM among investigated participants (n=107)](image-url)
Table-1: Participants’ socio-demographic characteristic

<table>
<thead>
<tr>
<th>Socio demographic</th>
<th>Details</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Male</td>
<td>53</td>
<td>49.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>54</td>
<td>50.5</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td>20-40</td>
<td>19</td>
<td>17.8</td>
</tr>
<tr>
<td></td>
<td>40-60</td>
<td>55</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td>Above 60</td>
<td>33</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td><strong>Material Status</strong></td>
<td>Single</td>
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<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>76</td>
<td>71.0</td>
</tr>
<tr>
<td></td>
<td>Divorce</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>Widow</td>
<td>13</td>
<td>12.1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td>Uneducated</td>
<td>21</td>
<td>19.6</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>23</td>
<td>21.5</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>34</td>
<td>32.8</td>
</tr>
<tr>
<td></td>
<td>University</td>
<td>29</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>worker</td>
<td>17</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>Employer</td>
<td>25</td>
<td>23.4</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>10</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>55</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td>Low</td>
<td>40</td>
<td>37.4</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>60</td>
<td>56.1</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>107</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Figure-2: participants’ knowledge level regarding renal complications of DM

Figure-3: participants’ knowledge level regarding heart complications of DM N=107
Figure-4: participants’ knowledge level regarding vascular complications of DM
N=107

Figure-5: participants’ knowledge level regarding foot and nerve complications of DM
N=107
Figure-6: participants’ knowledge level regarding eye complications of DM N=107

ATTITUDE RESULT:

Figure-7: Distribution of participants’ mentioned the importance of periodic investigations N=107
Figure-8: Distribution of participants’ mentioned good glycemic control delay complications occurrence N=107

Figure-9: Proportion of participants mentioned the importance to do random blood glucose monthly N=107
Figure 10: Proportion of participants stated that HbA1c important to performed every 6 months N=107

Figure-11: Proportion of participants stated the importance of renal function tests annually N=107
Figure-12: Proportion of participants mentioned to perform ECG annually
N=107

Figure-13: Proportion of participants stated to do eye checkup annually
N=107
Practices results:

Table -4: proportion of patient that follows diabetic diet.

<table>
<thead>
<tr>
<th>Diabetic diet</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>61</td>
<td>57.0</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table -5: proportion of patients who do exercise regularly among investigated participants

<table>
<thead>
<tr>
<th>Physical activities</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>72</td>
<td>67.3</td>
</tr>
<tr>
<td>NO</td>
<td>35</td>
<td>32.7</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table -6: proportion of smoking patients among investigated participants
### Table 7: Smoking Frequency

<table>
<thead>
<tr>
<th>Smoking</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26</td>
<td>24.3</td>
</tr>
<tr>
<td>No</td>
<td>81</td>
<td>75.7</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 7: Proportion of Patients Had Regular Medications

<table>
<thead>
<tr>
<th>Regular Treatment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>91</td>
<td>85.0</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>14.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table -7: proportion of patients had regular medications.
Table -8: proportion of patients did self-foot check

<table>
<thead>
<tr>
<th>Foot check</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>44.9</td>
</tr>
<tr>
<td>No</td>
<td>59</td>
<td>55.1</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table -9: Bivariate Analysis for Knowledge, Attitude and Practices Regarding Diabetic Complications

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Knowledge</th>
<th>P value</th>
<th>Attitude</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (69.4%)</td>
<td></td>
<td>Mean (69%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65.8</td>
<td>0.004</td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Female</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td>0.001</td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>20-40</td>
<td>64</td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>41-60</td>
<td>75.8</td>
<td></td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Above 60</td>
<td>67.7</td>
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<td>78</td>
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</tr>
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<td>Educational level</td>
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<td>0.103</td>
</tr>
<tr>
<td>Uneducated</td>
<td>64.3</td>
<td></td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>68.6</td>
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<td>74</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>73.6</td>
<td></td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>71</td>
<td></td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Duration of the disease</td>
<td></td>
<td>0.008</td>
<td></td>
<td>0.026</td>
</tr>
<tr>
<td>Less than 5</td>
<td>65</td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>5-10</td>
<td>66.3</td>
<td></td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>74.9</td>
<td></td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>69</td>
<td></td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>More than 20</td>
<td>71.1</td>
<td></td>
<td>61</td>
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</tr>
</tbody>
</table>
CHAPTER [5]
DISCUSSION

Most of the participants had average knowledge. This result was similar to others studies, such as; study done in Iran (Niroomand M, 2016) in addition to study done in Bangladesh (Rahaman KH. 2017). In contrast to Irish study (O'Sullivan EP, Et. Al) illustrated the levels of knowledge was low. Another study conducted in north Ethiopia illustrated that knowledge level of patients was not associated with the presence of complication. (Abejew A. A, 2015).

In current study, 94.4% knew that DM cause (retinopathy) was the highest knowledge, while vascular complication was the lowest knowledge about the DM complications. Other study revealed different results; it found cardiovascular (91.8%), cerebrovascular (94.6%), and renal complications (98.6%) were known by most of the participants while eye complications (18.1%) were least known in this study (Rahaman KH. S. 2017). Similarity was found in other study (Niroomand M. 2016). However, inadequate knowledge regarding complications of diabetes tend to decrease awareness and may lead to high economic burden.

Here, significantly, females had higher knowledge than males (P = 0.004), similar to Bangladeshi study, where gender was a significant predictor of knowledge and attitude, (Rahaman KH. S. 2017)

A study in Pakistan had different results, it showed better knowledge level in males regarding diabetic complications than females also (Ullah F, A, 2015)

Moreover, here, patients with age 41-60 years had better knowledge (P≤0.001). The study found similarity to several studies, which revealed that age, was associated with patient’s knowledge, attitude, and practices regarding diabetes (Rahaman KH. S. 2017) and the Iranian study (Niroomand M, 2016)

In the current study, knowledge and attitude improved with older age. Hence, this may suggest that younger patients need greater motivation, education from their care providers to
be aware about the DM chronic complications. Good knowledge was significant among educated participants. Here, educated patients above secondary level (P≤0.001) were more knowledgeable about DM and its complications.

In the current study, duration of diabetes was a significant predictor of practice. Patients, who had diabetes for more than 10 years had better knowledge regarding its complications than patients, who had diabetes for less than 10 years (P = 0.008). A recent study in Iran found a positive significant correlation between disease duration and complication with knowledge, attitude, and practice level (Niroomand M, 2015). This may be due to regular counseling due to regular follow up with care-providers.

Patients attitude was average in this study this finding differ from Rahman study, which found the patients’ attitude was poor (Rahaman KH, 2017)

In this study, majority of patients 97.2% illustrated that periodic investigations were important to diabetic patients and 74.8% of patients illustrated that good glycemic control will delay occurrence of DM complications as a result; they had positive attitude towards regular random blood glucose investigations 71% of participants, another 57.9% mentioned the importance of annual renal function tests but their attitude were negative towards HbA1c, ECG And annual eye check. Similarly, a study in sir lank showed positive attitudes regarding chronic renal diseases prevention among diabetic patients (Kayitesi, J. 2016) and study (Srinivasan NK, 2017) that revealed lack of awareness about screening for retinopathy.

While, there was a study designed to evaluate level of KAP in type-2 diabetic patients in Tehran that found the levels of patients’ good attitude, was 50.44 %( Niroomand M, 2016). Generally, the level of attitude was less than knowledge; the study revealed there is a gap between knowledge and attitude. And, if the patients knew the chronic complications of DM, this knowledge was not reflected in their activities and follow up plan.
Here, age and gender of the participants had a significant influence on patients’ attitude. Older age group (P=0.001) and being a female (P=0.003) was associated with average positive level of attitude. Another study showed that females had better level of attitude compared to males (Rahaman KH. 2017). An additional study reported that age had significant correlations with KAP level. (Niroomand M, 2016)

Regarding practice findings, the study found that the most adequate practice was adherence to treatment 85% and least adequate practice was daily foot care.

Only 57% of the patients were on diabetic diet and 67.3% of the patients did regular physical exercise on daily basis fortunately, 75.7% of patients were nonsmokers in contrast to Malaysian study where number of smokers still quite high (Nursyafiza B, 2018)

In contrast to our study, there were two previous studies that revealed low practice scores first was (Gul, 2010)& second (Rahaman KH. 2017) which illustrated that the level of practices was (16.9 out of 27).

Practice score is less than knowledge and attitude. Again the study revealed there is a gap between knowledge, attitude and practices. And, if the patients knew the chronic complications of DM, this knowledge was not reflected in their activities and practices

Evidence suggests that targeted counseling, training and self-management is a core part of the treatment of diabetes in addition to hospital and community based educational programs (Rahaman KH. 2017) (Faraja S. 2015) (Srinivasan NK, 2017) (Hoque MA, 2009) (Nisar N, 2008).

Patient education & early detection lessen complications, and help in management of diabetes. This study re-emphasized the fact that properly designed and implemented education and using alternative ways for education would be helpful for patients to have better life & to cope with DM.
6.1 CONCLUSION

This study investigated the knowledge, attitude and practices of diabetic patients regarding the chronic complications of DM and preventive measures of these complications. The study found that the participants had average knowledge score, it was 69.4%. Significantly, females, patients were age 41-60 years, educated patients above secondary and who had diabetes for more than 10 years had better knowledge regarding its complications than other patients. Although they had average attitude and practices scores is higher among male

The mean attitude and practices score were 69% and 66% respectively. Significantly, older being a female patients and who had diabetes more than for 10 years had average positive level of attitude. Positive practices were higher among males and among educated patients. Still there is gap of patients’ knowledge, attitude, and practices regarding the chronic complications of DM.
6.2 RECOMMENDATIONS

- Improve diabetic patients’ awareness particularly young and male patients in addition to newly discovered patients, as they need more attention in educational programs.

- Use alternative means of educational programs.

- Educate other family members especially the wife about healthy diabetic diet.

- Encourage & train patients to apply their knowledge inform of good attitude & practice as the study showed there is a go-between knowledge, attitude & practices.

- Conduct other studies at different centers to identify the causes of inadequate practices in spite of good knowledge.
REFERENCES

- Guideline: Diagnosis and Management of Type 2 Diabetes Mellitus in Adults, (2012). Institute for Clinical Systems Improvement, Health Care;


ANNEXES:

✓ Study tool: questionnaire
✓ Consent form

DIABETIC PATIENTS’ KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) REGARDING CHRONIC COMPLICATIONS OF DIABETES IN al-MAYGOMA HEALTH CENTER, KHARTOUM STATE, 2018

Consent form

Dr. Azza Mustafa Nasr, a medical doctor to fulfill the requirement of Master Degree in Family Medicine (MFM), will conduct this research.

Dr. Azza clarifies me this research ethics and tools. I am agreeing to participate in this research. She answered all my questions. She informed me she would respect all my information, although she will share my information with her instructors and colleagues only for academic purposes, Additionally, I understand that my participation in this study is voluntary and I can withdraw at any time.
استبيان حول معرفة وسلوك وممارسات مرضى السكري بالمضاعفات المزمنة للسكري
وطرق الوقاية منها في مركز صحي المايقما التابع لمحلية الخرطوم وسط

1/ الجنس:
- ذكر
- أنثى

2/ العمر:
- أقل من 20
- 20 - 40
- 41 - 60
- 60 - فوق الـ 60

3/ الحالة الاجتماعية:
- مطلق
- متزوج
- عازب
- أرمل

4/ المستوى التعليمي:
- غير متعلم
- ابتدائي
- ثانوي
- جامعي

5/ الوظيفة:
- عامل
- موظف
- متقاعد
- لا يعمل

6/ متوسط الدخل:
- منخفض
- متوسط
- مرتفع

7/ الفترة منذ تشخيص:
- أقل من 5 سنة
- 5 - 10
- 11 - 15
- 16 - 20
- أكثر من 20
المعرفة بمضاعفات مرض السكري:

من مضاعفات مرض السكر أنه يؤثر على؟

1/ الكلي: اعرف □ لا أعرف □
2/ القلب: اعرف □ لا أعرف □
3/ الأوعية الدموية: اعرف □ لا أعرف □
4/ القدم والأعصاب الطرفية: اعرف □ لا أعرف □
5/ العين: اعرف □ لا أعرف □

السلوكيات اتجاه الفحوصات الدورية:

هل الفحوصات الدورية مهمة؟

نعم □ لا □

هل المحافظة على مستوي السكر في الدم ممكن أن تؤخر حدوث المضاعفات؟

نعم □ لا □

هل فحص السكر بانتظام (شهرياً على الأقل) مهم لمرضي السكري؟

نعم □ لا □

هل فحص السكر التراكمي كل ستة أشهر ذو أهمية لمتابعة مريض السكري؟

نعم □ لا □

هل تعتقد أن رسم القلب سنوياً مهم لمرض السكري؟

نعم □ لا □

فحص العين السنوي مهم لمرضي السكري؟

نعم □ لا □
الممارسات اتجاه مرض السكري:

1/ هل تحافظ على نظام غذائي خاص بمرض السكر؟
   - نعم
   - لا

2/ هل تمارس أي نوع من الرياضة بانتظام (المشي)؟
   - نعم
   - لا

3/ هل تدخن؟
   - نعم
   - لا

4/ هل تأخذ العلاجات بانتظام؟
   - نعم
   - لا

5/ هل تقوم بالكشف الذاتي لقدميك؟
   - نعم
   - لا