



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 01, pp. 43719-43722, January, 2021

<https://doi.org/10.37118/ijdr.20574.01.2021>



RESEARCH ARTICLE

OPEN ACCESS

DIABETES AWARENESS AND RISK REDUCTION BEHAVIORS AMONG PRE-DIABETIC PATIENTS IN BUSIA COUNTY, WESTERN KENYA

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ARTICLE INFO

Article History:

Received 20th October, 2020

Received in revised form

21st November, 2020

Accepted 11th December, 2020

Published online 30th January, 2021

Key Words:

*Corresponding author:

Linnet N. Munyasia Ayodo George,

ABSTRACT

One-third of people with pre-diabetic condition progress to type 2 diabetes within five years. However, with adequate knowledge on diabetes risk reduction behaviors, progression to diabetes can be controlled. We therefore recruited 220 suspected cases of pre-diabetic patients at Busia County Referral Hospital assessed their knowledge, and adaptation of risk reduction behavior. A cross sectional study design and a systematic sampling approach were used. The findings show that at the time of examination, only 42.7% (n=94) of the respondents were pre-diabetic, 38.6% (n=85) were diabetic and the rest had normal glucose level. Furthermore, only 66.8% (n=147) and 28.1% (n=61) had normal blood pressure reading and BMI status respectively. The majority of the respondents 60% (n=74) thought pre diabetes was caused by being overweight/obese. About 46% (n=57) thought the condition is inherited and 44% (n=55) considered it to be due to physical inactivity. On risk reduction measures, 63.1% (n=65) adopted a proper diet, 38.8% (n=40) engaged in physical activities and 18.5% (n=19) lost weight. In addition, 13.6% (n=14) attempted to stop alcohol/tobacco use and 8.7% (n=9) preferred regular check-up. Marital status, level of education and employment status were significantly associated with knowledge pre diabetes (p-value < 0.05). Our findings show that patients who were already pre-diabetic state had inadequate knowledge about risk reduction measures. The difference in knowledge about risk reduction behaviors between prediabetics and the rest of the respondents was statistically significant (P-value < 0.05). We therefore recommend more health promotion efforts on risk reduction measures for those affected and unaffected within this populations and elsewhere.

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Citation: Linnet N. Munyasia, Ayodo George, Fred Amimo and Sam W. Wafula, 2021. "Diabetes awareness and risk reduction behaviors among pre-diabetic patients in busia County, Western Kenya" *International Journal of Development Research*, 11, (01), 43719-43722.

INTRODUÇÃO

Worldwide, the number of people with pre-diabetes is estimated to be 314 million and is projected to be 418 million in 2025 (Garber et al., 2008). Diabetes in all its forms imposes unacceptably high human, social and economic costs on countries at all income levels (OMS, 2014). Despite the array of tools at our disposal to tackle the disease – effective drug therapies, advanced technology, ever-improving education and preventive strategies – the battle to protect people from diabetes and its disabling, life-threatening complications is being lost (OMS, 2014). Pre-diabetes increases the risk for type 2 diabetes, heart disease and stroke. As a matter of fact, pre-diabetes increases the risk for type 2 diabetes and if untreated, one-third of people with pre-diabetic condition progress to type 2 diabetes within five years (Curtis & Wilson, 2005). Undiagnosed cases of diabetes are a public health concern with costly public health implications. The proportion of undiagnosed diabetes according to a study conducted here in Kenya,

was 52.8%, of which 50.7% among females and 55.9% among males (Mohamed et al, 2018). However, the worrying finding is the low level of awareness of diabetes among adults in Kenya. Most of the Kenya population lack information and are unaware of non-communicable diseases risk and the risk factors associated with them (F. Wekesa, 2018). Previous studies indicate that being knowledgeable of one's condition improves their perceptions and access to relevant prevention messages and comprehension of such information, thus influences healthy behavior projections (Mohamed et al, 2018). Pre diabetes is considered an important risk factor for diabetes and its associated complications such as nephropathy, diabetic retinopathy and increased risk of macro-vascular diseases. Thus, understanding the perception and knowledge of risk reduction behavior on diabetes is important in preventing pre diabetes from progressing to type 2 diabetic condition. The gap in prevalence between those with pre-diabetes and those aware of their condition presents an opportunity to reduce the burden of diabetes by increasing awareness of pre-diabetes and encouraging adoption of healthier lifestyles and risk reduction

activities (Shah, 2011). This paper seeks to assess the knowledge on risk reduction behaviors among suspected pre-diabetic patients.

METHODOLOGY

The study was conducted at the Busia county referral hospital in Western Kenya. Being a cross-border town, the hospital serves patients from both Kenya and Uganda. The study used a cross-sectional design. A structured questionnaire developed with aid from WHO stepwise instrument, question-by-question guide, was used to collect data. The patient registers as well as request forms were used to collect additional data. Data was collected for a period of three months. Using the clinic registers, a total of 220 suspected pre-diabetic patients visiting the hospital were sampled using systematic sampling with a random start. The clinic register had a total of 1800 pre-diabetic patients and the systematic sampling with a random start automatically picked the first case and picked the next 8th element until the last 220 sampled respondents were selected for interview. Questions such as "Ever told you have pre-diabetes? And ever told you have health risk for diabetes? Were used to determine an individual's awareness of their health risk for diabetes. Here pre-diabetic condition was defined as IPG of between 5.6 to 6.9 mmol/l and diabetic as FPG of ≥ 7 mmol/l. Ethical approval for the study was obtained from the ethical research committee of Jaramogi Oginga Odinga Teaching and Referral hospital. Confidentiality and privacy for the study participants was maintained. All completed questionnaires were verified for accuracy and consistency. Data was entered in SPSS IBM Version 20 and analyzed using descriptive statistics.

RESULTS

Background characteristics of the respondents: The response rate of the participants was 100% (n=220), majority were females 56% (n=122) with most of the respondents 62% (137) aged 45 years and above. In addition, majority had formal education with the exception of 17% (n=38) who had no formal education.

Table 1. A summary of background Characteristics of the respondents

Background characteristic	Cases (220)	Percentage (%)
Sex		
Male	98	44.5
Female	122	55.5
Marital Status		
Single	26	11.8
Married	160	72.7
Separated	27	12.3
Widowed/Divorced	7	3.2
Age		
15-24	22	10
25-34	22	10
35-44	39	17.7
45-54	48	21.8
55-64	48	21.8
Above 65	41	18.6
Educational level		
None	38	17.3
Primary	79	35.9
Secondary	64	29.1
Tertiary	39	17.7
Respondent's Occupation		
Unemployed	90	40.90
Farming	59	26.82
Civil/Public service	28	12.73
Business	43	19.55
Diabetes status		
Pre-diabetic	94	42.7
Diabetic	85	38.6
Normal	41	18.6
Blood pressure		
Abnormal	73	33.2
Normal	147	66.8
BMI status		
Normal	61	27.7
Abnormal	159	72.3

The majority 40.9% (n=90) were unemployed and the minority 12.7% (n=28) were public or civil servants as shown in Table 1. Although respondents taking part in the study were presumed pre-diabetic, a fasting blood glucose test revealed that only 42.7% (n=94) of the respondents were pre-diabetic, 38.6% (n=85) were diabetic and others had normal glucose level. Furthermore, only 66.8% (n=147) and 28.1% (n=61) had normal blood pressure reading and BMI status respectively.

Knowledge on causes of pre-diabetes: Majority of the respondents 60% (n=74) thought pre-diabetes was caused by being overweight/obese. About 46% (n=57) thought the condition is inherited and 44% (n=55) considered it to be due to physical inactivity. However, about 2% did not know. None of the covariates on perceptions was significantly associated with the causes of pre-diabetes ($p > 0.05$). Figure 1 gives details on the respondent's perceptions.

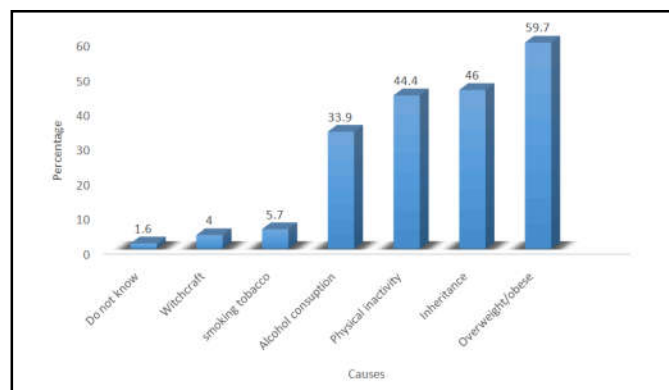


Figure 1. Respondents knowledge on the causes of pre diabetes

Knowledge on risk reduction behaviors: Knowledge provided on ways to prevent pre-diabetes from progressing to type 2 diabetes ranged from proper diet, weight loss, engaging in physical activities, quitting alcohol consumption/tobacco use and regular check-ups. 63.1% (n=65) reported to have adopted a proper diet, 38.8% (n=40) engaged in physical activities and 18.4% (n=19) tried to lose weight. 13.6% (n=14) had attempted to stop alcohol/tobacco use and 8.7% (n=9) preferred regular check-ups as a way to prevent pre-diabetes from progressing to type 2 diabetes as shown in Figure 2.

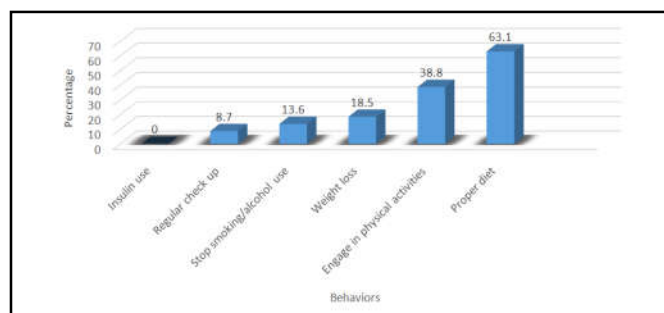


Figure 2. Respondents Knowledge on risk reduction behaviors

A further analysis (not shown) revealed that there was a significant association between marital status of the respondent and whether they had ever heard of pre-diabetes ($\chi^2 = 16.1656$; P -value < 0.001). Married women were particularly more likely to have heard about pre-diabetes than the rest. Furthermore, there was a significant association between having ever heard of pre-diabetes and the level of education ($\chi^2 = 49.2131$; P -value < 0.001). In particular, having secondary or tertiary education was associated with a higher chance of knowledge about pre-diabetes and vice versa and this difference in knowledge could not be explained by chance alone (P -value < 0.000). In addition, being unemployed was associated with the least knowledge about pre-diabetes while working as a public or civil servant was associated with the highest knowledge about pre-diabetes and this difference in the knowledge was statistically significant ($\chi^2 = 36.5347$; P -value < 0.001).

DISCUSSIONS

Our findings show that the pre-diabetic status of the patients was not very clear, some of the patients had comorbidities such as blood pressure and overweight or obesity, knowledge of the predisposing factors appear adequate, most respondents pointed as overweight / obese, inheritance, physical activity. However, risk reduction behavior appeared very minimal. From the study findings, majority of the respondents admitted to have ever engaged in physical activities and adopted specially prescribed diet of fruits and vegetables (39% and 63% respectively). However, weight loss, stopping alcohol/tobacco use and regular check-ups were poorly adopted. In this study, more women appeared are seen to adopt physical activities, proper diet, weight loss and regular check-ups, compared to their male counter parts although the difference was not statistically significant. These findings mirror an initial study which equally found that harmful alcohol use, daily tobacco use, hypertension, low density lipoprotein cholesterol, bad fat intake and high sugar intake were more prevalent in males than in females (Wekesa M F et al, 2018). Diabetes risk reduction behaviors are key in the management of pre diabetes and in preventing pre diabetes from progressing to type 2 diabetes. According to one study, adults who are insufficiently physically active have a higher risk of all-cause mortality compared with those who do at least 150 minutes of moderate intensity physical activity per week or equivalent as recommended by world health organization (Gichu M et al, 2018). At the time of the study, more than half the participants had never heard about diabetes risk reduction behaviors. The risk of developing diabetes was significantly low among patients who had increased knowledge on diabetes risk reduction behaviors as well as those practicing these behaviors (Brown, 2017). In Busia County, there is also paucity of knowledge provision on diabetes risk reduction behaviors as indicated by the study findings. A study by (Geiss et al., 2010), found that although prevention trials had shown that diabetes could be prevented or delayed among adults at high risk through modest weight loss or increased activity, only about half of U.S adults with pre diabetes reported that in the past year, they tried to control or lose weight, reduced the amount of fat or calories in their diet or increased physical activity. However, in this case the doctor's advice was associated with reporting adoption of healthy behaviors by patients. The proportion of people with pre diabetes who reported performing risk reduction behaviors was higher if they reported receiving doctor's advice concerning the behavior in the past. The knowledge of the risk reduction behaviors among the pre diabetic patients is low and this may contribute immensely to patients not adhering to the doctor's advice to adopt diabetes risk reduction behavior. There is need for sensitization of pre diabetic patients at various clinics within the hospital, by providing adequate knowledge on diabetes risk reduction behaviors and their importance in preventing type 2 diabetes.

The uptake of diabetes risk reduction behaviors among patients with pre diabetes in Busia County is low as indicated by the study findings. The minimal knowledge on the pre diabetes condition among the population in Busia County has impacted on respondents' perception towards adopting diabetes risk reduction behaviors to prevent type 2 diabetes. The low adoption of diabetes risk reduction behaviors among the pre diabetic patients is of great concern perhaps due to inadequate provision of education on their importance in preventing type 2 diabetes. Some of the reasons that could be influencing low levels of healthcare worker's advice to patients on the adoption of diabetes risk reduction behaviors could be due to lack of adequate training on what pre diabetes is and means, in regard to disease management and nutrition, successful strategies to help patients and perceived futility of patient effort to make changes. From the study, a number of patients had made effort in adopting weight loss programs, involving in physical activities and adopting proper diets of low fat, low sugar and salt, and increased consumption of fruits and vegetables, to slow progression to type 2 diabetes. Efforts to improve awareness of pre diabetes increases promotion of healthy behaviors and improve availability of evidence-based lifestyle programs needed to slow growth in new cases of diabetes. Therefore, identification and

awareness of pre diabetes status is potentially important for the initiation of several different avenues of prevention with strongest evidence currently existing for structured lifestyle interventions applied to high risk individuals (Geiss et al., 2010). Moreover, undiagnosed type 2 diabetes and pre diabetes is not milder than clinically detected diabetes.

This study recommends that owing to the known diabetes-related complications early in the pre-diabetic state, there is need to acknowledge and address these challenges in pre diabetes as a condition. In particular, healthcare professionals must address questions such as: "When do the risks of diabetes begin in individuals with pre diabetes?" "How can pre diabetic patients identify the signs and symptoms of the disease?" "What strategies are in place to ensure that diabetes risk reduction behaviors are introduced to patients as an intervention to pre diabetes?" "Which are the best ways of creating awareness of the condition in the community and health facilities?" and "Which is the best strategy for monitoring patients with pre diabetes?" (Garber et al., 2008). Consequently, the paper recommends for the need to increase community awareness to bridge the knowledge gap and poor perception about pre diabetic condition by the patients. In particular, there is need for community sensitization on pre diabetes as a risk to type 2 diabetes by development of health promotion and preventive strategies that are geared towards addressing pre diabetes as a condition. Another effective approach is lifestyle intervention which over the last century has been shown to result in a dramatic decrease in the incidence of diabetes in both developed and developing countries (Liu et al, 2014). Moreover, a patient's perception towards a condition such as pre diabetes is key in facilitating the adoption of diabetes risk reduction behavior. Therefore, the adoption of healthier lifestyles by pre diabetic patients, including: regular physical activities, weight control, healthy diets, medication, not smoking or alcohol use are part of the long-term management of pre diabetes. However, the adoption of a healthy lifestyle depends on how much knowledge one has in order to facilitate informed decision when choosing the type of lifestyle intervention to adopt. The recommendations to achieve success in addressing these issues include but not limited to: Sensitization and training of healthcare workers on pre diabetic condition and on importance of diabetes risk reduction behaviors. This should be done with an effort to improve the patient's perception towards the disease. The county government of Busia should also work towards strengthening pre diabetes management by incorporating it in the existing diabetes program activities. Guidelines should be provided to healthcare workers to screen for the risk factors among population and sensitize on appropriate care. Also, the County should establish policies and programs to continuously monitor and follow up on pre diabetic patients who had previously adopted diabetes risk reduction behavior, to ensure that the behaviors adopted and practiced are sustained. This study further recommends for future research to facilitate new strategies of identifying and managing patients with pre-diabetes. There is need to develop and clearly outline the best treatment/management for pre diabetic patients, when to initiate and how to monitor their progress.

Data Availability: The dataset was collected from the Busia County Teaching and Referral Hospital in Kenya. These data are available upon reasonable request to the principal investigator.

Ethical Approval: Ethical approval for the study was obtained from the ethical research committee of Jaramogi Oginga Odinga Teaching and Referral hospital through permit number: Ref: ERC.1B/VOL.1/284. Confidentiality and privacy for the study participants was maintained.

Disclosure: No funding was received for this study. The study was part of the principal investigator's degree requirement for an award for MSc. in Epidemiology and Biostatistics at Jaramogi Oginga Odinga University of Science and Technology (JOUST). The opinions, results, conclusions and recommendations are those of the author's and do not represent the standpoints of BCRH or JOUST.

ACKNOWLEDGEMENT

We wish to thank the management of Busia County Referral hospital for allowing us to conduct the research at the facility. We also extend our gratitude to the ethical review committee at the Jaramogi Oginga Odinga teaching and referral hospital for approving the research study through the permitRef: ERC.1B/VOL.1/284. The authors also acknowledge the comments and review of the anonymous reviewers of the initial manuscript of this paper.

Author's contributions

LM did the conceptualization, development of the first draft of the paper; GA and FA- supervision on data collection, literature review and reviewed the first draft; SW did data analysis and reviewed the first draft of the manuscript.

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