Knowledge of Risk Factors for Type 2 Diabetes Mellitus among Civil Servants in Langtang South Local Government Area, Plateau State, Nigeria

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Abstract

Type 2 Diabetes Mellitus (T2DM) has been a global public health burden, particularly in Africa and among the ageing population. It becomes imperative that young adults, especially civil servants possess good knowledge of the risk factors for T2DM to prevent and manage the disease. This study investigated level of knowledge of risk factors for T2DM among civil servants in Langtang South Local Government Area, Plateau State. Five research questions and four null hypotheses guided the study. A cross-sectional survey was conducted among civil servants in Langtang South Local Government Area, Plateau State. A total number of 350 civil servants drawn using non-proportional stratified random sampling technique participated. Data collection was done using Knowledge of Risk Factors of Type 2 Diabetes Mellitus Questionnaire (KRDMIIQ). Descriptive statistics of frequency and percentage, and inferential statistics of chi-square statistics were used for analyses. The findings revealed that 60.6 per cent of civil servants had high knowledge of risk factors for T2DM. Age ($p=.169$ $>.05$), gender ($p=.117$ $>.05$), educational qualification ($p=.103$ $>.05$), and having a relative/friend with T2DM ($p=.869$ $>.05$) were not significantly associated with knowledge of risk factors for T2DM among civil servants. This research work proves that high knowledge of risk factors for T2DM should be acquired so as to reduce prevalence of T2DM disease.

Key words: Type 2 diabetes mellitus, Knowledge, Risk factors, Lifestyle, Civil servants

Introduction

Diabetes mellitus (DM) is a burden on global health with its prevalence on the rise. Globally, an estimated 422 million adults were living with diabetes in 2014 as against 108 million in 1980. When compared, the global prevalence of diabetes in 2014, which stood at 8.5 per cent in the adult population, shows an almost doubled rate to that of 1980 which was 4.7 per cent (International Diabetes Federation [IDF], 2015). In 2017, the worldwide prevalence of diabetes in adults was reported at 8.8 per cent, that is, 424.9 million people living with diabetes in the world as at 2017 (IDF, 2017). By 2019, the IDF reported that an estimate of one in 11 people globally is currently living with DM that is reflected to be 463 million adults (IDF, 2019). These statistics show the prevalence of DM is on the increase, thus the focus of the United Nations and the World Health Organisation (WHO) on DM as a major global health concern (Standl et al., 2019).

Nigeria as a low-middle income country has an untold number of people living with DM, both diagnosed and undiagnosed. About three million Nigerians between age 25 and 79 years are estimated to have diabetes (Saduwa et al., 2015). Dahiru et al. (2016) posited that Nigeria has the largest proportion of people living with T2DM disease worldwide. This was also stated in the IDF report by countries in 2017, that Nigeria being one of the most populous countries in Africa, had about 1.2-3.9 million adults living with diabetes. The IDF (2019) reported some extrapolated estimates of people with impaired glucose tolerance as 3.2-19.5 million, 4.6-27.3 million, 7.2-42.6 million for 2019, 2030, and 2045 respectively. These people are reported to be at the risk of living with diabetes mellitus (IDF, 2019). Diabetes mellitus has high mortality tendency. World Health Organisation (2021) reported 2.2 million deaths accrued to high blood glucose in 2012 and an estimated 1.5 million deaths in 2019 which were directly caused by diabetes.

Studies have shown that to combat type 2 diabetes mellitus, knowledge of its risk factors is pertinent. Studies have been carried out to assess the knowledge of diabetes mellitus and its risk factors, across different populations. Omobuwa and Alebiosu (2014) reported limited knowledge among respondents. Also, Ahmed et al. (2018) reported low awareness and knowledge levels toward DM-related information. Furthermore, there was lack of knowledge of obesity as a risk factor while a greater percentage of the participants did not think physical activity has a role in DM (Ahmed et al., 2018). But recently, perhaps through discussions in seminars, conferences, workshops, and both print and electronic media, raising awareness of lifestyle modification, avoidance of unhealthy diet, regular physical exercise, and recognizing the risk factors, improved awareness is being created and knowledge is enhanced on risk factors for Diabetes Mellitus Type II.

Diabetes Mellitus (DM) is a non-communicable disease. Diabetes mellitus refers to non-communicable disease which is characterized by high concentration of sugar in the blood due to insulin deficiency. A number of different types of diabetes exist with three major types as Type 1, Type 2 also known as insulin resistance and gestational diabetes (Taylor, 2020). Type 2 diabetes occurs when the body is unable to utilize the insulin it produces. There are known risk factors that predispose an individual to Type 2 diabetes. Oputa and Chinenye (2015) enumerated some of the factors to include: obesity, unhealthy diet, insufficient physical activity (PA), excess alcohol intake, increasing age, family history, hypertension, ethnicity, and history of gestational diabetes for women.

Diabetes affects the most productive years in midlife. Given the prevalence of this disease among the productive workforce, it has negative effect on work productivity, and also has its negative effect on cost of healthcare, thus leading to high economic burden (Vigersky, 2011). In addition to sedentary lifestyle due to their work, civil servants are considered a high-risk population for T2DM because of unhealthy eating habits (Gyening et al., 2018).

Diabetes mellitus type 2 is a chronic and debilitating disease which is terminal. Ideally, individuals ought to be informed and aware of this disease, its complications and risk factors. This knowledge, especially of the risk factors, arms the individuals sufficiently to adopt healthy lifestyles and behaviours that reduce the susceptibility to T2DM. Also, this knowledge would help civil servants adopt adequate preventive measures to reduce the risk of suffering from T2DM.

Limited research has been conducted on the knowledge of risk factors for Diabetes Mellitus Type II. This study addressed this gap in the literature. In view of these facts, the study investigated the knowledge of risk factors for Diabetes Mellitus Type II among civil servants. Specifically, the study determined knowledge of risk factors for Diabetes Mellitus Type II among civil servants; and in relation to gender, age, educational qualification, and having a relative/friend with DM. The study hypothesized that gender, age, educational qualification, and having a relative/friend with DM are not significantly associated with the

level of knowledge of risk factors for Diabetes Mellitus Type II among civil servants in Langtang South Local Government Area, Plateau State. The study findings could serve as reference in planning, implementation and execution of intervention strategies by public health educators, Ministry of Health, NGOs, religious leaders, among others.

Materials and Methods

Study design and setting

A cross-sectional survey was conducted among civil servants in Langtang South Local Government Area (LGA), Plateau State. Langtang South Local Government Plateau State, Nigeria, is one of the 17 local government areas in Plateau State, with it headquarters in Mabudi. Langtang South LGA is divided into four districts, namely Lashel Timbol, Sabon Gida, Dadin Gowa, and Turaki districts. The area was chosen for the study because of the unhealthy consumption of alcohol and high consumption of carbohydrates among the people which could have implications for T2DM.

Participants

The study participants consisted of civil servants in the study area. Only civil servants in in the study irrespective of their departments, who had time and expressed their consent in responding to the questionnaires, were included in the study population.

Sampling procedures

A sample size of 350 civil servants was used for the study. The sample size was determined using Cohen, Manion, and Morrison (2011) randomized sample size estimates, which stipulated that when a population size is 2,500 or above at 95 confidence level (5% interval), the sample size should be at the minimum, 333. Non-proportional stratified random sampling technique was used in the selection of the participants of the study. The civil servants' departments were stratified into seven. These were Agriculture, WASH (Water, Sanitation and Hygiene), Health, Personnel, Budgeting, Social Services, and Education Departments. Furthermore, 50 civil servants were drawn from each of the seven stratified departments, which gave a total number of 350 civil servants, who participated in the study.

Measures

Data collection was done using a validated self-structured Knowledge of Risk Factors of Type 2 Diabetes Mellitus Questionnaire (KRDMIIQ). The Test Scale consists of two parts: Part I consists of four socio-demographic characteristics of the respondents (age, gender, education level, and relative/friend with T2DM). Age was measured as a continuous variable (Below 30 years, 30-39 years, 40-49 years, 50-59 years, and Above 59 years). Gender was dichotomized into male and female. Educational qualification was categorized into five groups (NCE, OND, HND, B.Sc, M.Sc). Having a relative/friend with T2DM was dichotomized into Yes or No. Part II consists of 12 questions with dichotomous response options covering on knowledge of risk factors of type 2 diabetes mellitus.
Face and content validity of the questionnaire was evaluated by a professional board of three experts in public health, as well was tested for internal consistency. The internal consistency of KRDMIIQ was computed using split-half statistics (Spearman-Brown Coefficient). The reliability coefficient obtained was .744.

Data collection procedure

This research was developed in accordance with the Ethical Principles of the World Medical Association Declaration of Helsinki for medical research involving human subjects

(World Medical Association, 2013), and the research was approved by the Research Ethics Committee of the Faculty of Education, University of Nigeria, Nsukka (UNN/FE/REC21/41).

After obtaining permission from the drawn departmental heads in Langtang South Local Government Area, the researchers explained the objectives of research to the participants and they were reassured that their responses are confidential and no personal identifiers will be disclosed. The questionnaire was administered by the researchers. A total number of 350 questionnaires were filled out in the process. The 350 questionnaires were returned, which gave a return rate of 100 per cent. Out of the returned questionnaires, 20 copies were not duly filled out, thus discarded. Only 330 questionnaires duly filled out were used for analyses.

Data analysis

The sorted data were coded into IBM Statistical Package for Social Sciences (SPSS) version 25, and analysed using frequency, percentage, and chi-square statistics.

In determining the level of knowledge of risk factors for diabetes Mellitus Type II, Okafor (1997) guidelines were used. By these guidelines, below 20 per cent was interpreted very low knowledge; 20-39 per cent was interpreted low knowledge; 40-59 per cent was interpreted average/moderate knowledge; 60-79 per cent was considered high knowledge and 80 per cent and above was interpreted very high knowledge.

Results

Table 1: Frequency Table of Demographic Characteristics of Civil Servants (*n*=330)

S/N	Demographic Characteristics	Frequency	Per cent
1.	Age		
	Below 30 years	48	14.5
	30-39 years	68	20.6
	40-49 years	97	29.4
	50-59 years	37	11.2
	Above 59 years	80	24.2
	Total	**330**	**100.0**
2.	Gender		
	Male	125	37.9
	Female	205	62.1
	Total	**330**	**100.0**
3.	Educational Qualification		
	NCE	60	18.2
	OND	86	26.1
	HND	119	36.1
	B.Sc.	53	16.1
	M.Sc.	12	3.6
	Total	**330**	**100.0**
4.	Having a Relative/Friend with DM		
	Yes	116	35.2
	No	214	64.8
	Total	**330**	**100.0**

As shown in Table 1, the final sample was 330; comprising 125 (37.9%) male and 205 (62.1%) female. Majority of the respondents 97 (29.4%) were aged between 40-49 years.

Majority of the respondents 119 (36.1%) had HND as highest educational qualification. More number of respondents 214 (64.8%) did not indicate having any relative or friend with T2DM.

Table 2: Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants (*n*=330)

S/N	Knowledge of risk factors	Correct f (%)	Incorrect f (%)
1	Increasing age cannot make one prone to type 2 diabetes mellitus	208(63.0)	122(37.0)
2	Family history of diabetes is a risk factor for T2DM	245(74.2)	85(25.8)
3	Excessive alcohol intake is not a risk factor for T2DM	160(48.5)	170(51.5)
4	Holding in urine is a risk factor for T2DM	186(56.4)	144(43.6)
5	Not exercising regularly is not a risk factor for T2DM	159(48.2)	171(51.8)
6	Smoking is not related to T2DM	201(60.9)	129(39.1)
7	Obesity is a risk factor for T2DM	242(73.3)	88(26.7)
8	Eating unhealthy diets can expose one to T2DM	233(70.6)	97(29.4)
9	Sedentary lifestyle is not associated with T2DM	177(53.6)	153(46.4)
10	Gestational diabetes (high sugar level during pregnancy) is a risk factor for T2DM	241(73.0)	89(27.0)
11	Poison can cause T2DM	159(48.2)	171(51.8)
12	Psychological stress and disorders cannot predispose one to T2DM	202(61.2)	128(38.8)
	Overall percentage	**60.6**	**39.4**

Table 2 shows that overall civil servants in Langtang South LGA, Plateau State had high Knowledge of risk factors of Diabetes Mellitus Type II (60.6%).

Table 3: Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants based on Age (n=330)

S/N	Knowledge of risk factors	Below 30 years (n=48) f (%)	30yrs-39yrs (n=68) f (%)	40yrs-49yrs (n=97) f (%)	50yrs-59yrs (n=37) f (%)	Above 59yrs- (n=80) f (%)
1	Increasing age cannot make one prone to type 2 diabetes mellitus	34(70.8)	43(63.2)	53(54.6)	23(62.2)	55(68.8)
2	Family history of diabetes is a risk factor for T2DM	35(72.9)	51(75.0)	78(80.4)	24(64.9)	57(71.3)

S/N	Knowledge of risk factors					
3	Excessive alcohol intake is not a risk factor for T2DM	27(56.3)	36(52.9)	28(28.9)	19(51.4)	50(62.5)
4	Holding in urine is a risk factor for T2DM	26(54.2)	37(54.4)	57(58.8)	19(51.4)	47(58.8)
5	Not exercising regularly is not a risk factor for T2DM	23(47.9)	38(55.9)	37(38.1)	19(51.4)	42(52.5)
6	Smoking is not related to T2DM	31(64.6)	45(66.6)	61(62.9)	15(40.5)	49(61.3)
7	Obesity is a risk factor for T2DM	29(60.4)	50(73.5)	82(84.5)	28(75.7)	53(66.3)
8	Eating unhealthy diets can expose one to T2DM	30(62.5)	49(72.1)	68(70.1)	28(75.7)	58(72.5)
9	Sedentary lifestyle is not associated with T2DM	28(58.3)	42(61.8)	39(40.2)	21(56.8)	47(58.8)
10	Gestational diabetes (high sugar level during pregnancy) is a risk factor for T2DM	35(72.9)	43(63.2)	75(77.3)	26(70.3)	62(77.5)
11	Poison can cause T2DM	23(47.9)	36(52.9)	34(35.1)	18(48.6)	48(60.0)
12	Psychological stress and disorders cannot predispose one to T2DM	33(68.8)	44(64.7)	49(50.5)	21(56.8)	55(68.8)
	Overall percentage	**60.4**	**58.8**	**57.7**	**48.6**	**71.3**

Table 3 shows that overall civil servants aged 59 years and above (71.3%) had high knowledge of risk factors for Diabetes Mellitus type II than those aged below 30 years (60.4%), 30-39 years (58.8%), 40-49 years (57.7%) and 50-59years (48.6%).

Table 4: Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants based on Gender (n=330)

S/N	Knowledge of risk factors	Male n=125 f (%)	Female n=205 f (%)
1	Increasing age cannot make one prone to type 2 diabetes mellitus	76(60.8)	132(64.4)
2	Family history of diabetes is a risk factor for T2DM	87(69.6)	158(77.1)
3	Excessive alcohol intake is not a risk factor for T2DM	64(51.2)	96(46.8)
4	Holding in urine is a risk factor for T2DM	68(54.4)	118(57.6)
5	Not exercising regularly is not a risk factor for T2DM	66(52.8)	93(45.4)
6	Smoking is not related to T2DM	75(60.0)	126(61.5)
7	Obesity is a risk factor for T2DM	90(72.0)	152(74.1)
8	Eating unhealthy diets can expose one to T2DM	89(71.2)	144(70.2)
9	Sedentary lifestyle is not associated with T2DM	69(55.2)	108(52.7)
10	Gestational diabetes (high sugar level during pregnancy) is a risk factor for T2DM	81(64.8)	160(78.0)
11	Poison can cause T2DM	60(48.0)	99(48.3)
12	Psychological stress and disorders cannot predispose one to T2DM	73(58.4)	129(62.9)
	Overall percentage	55.2	63.9

Table 4 shows that overall female civil servants (63.9%) had high knowledge of risk factors for Diabetes Mellitus type II than their male counterpart (55.2%).

Table 5: Level of Knowledge of risk Factors for Diabetes Mellitus Type II among Civil Servants based on educational qualification (n=330)

S/N	Knowledge of risk factors	NCE (n=60) f (%)	OND (n=86) f (%)	HND (n=119) f (%)	B.Sc. (n=53) f (%)	M.Sc (n=12) f (%)
1	Increasing age cannot make one prone to type 2 diabetes mellitus	39(65.0)	49(57.0)	80(67.2)	34(64.2)	6(50.0)
2	Family history of diabetes is a risk factor for T2DM	38(63.3)	67(77.9)	98(82.4)	33(62.3)	9(75.0)
3	Excessive alcohol intake is not a risk factor for T2DM	33(55.0)	39(45.3)	49(41.2)	31(58.5)	8(66.7)
4	Holding in urine is a risk factor for T2DM	32(53.3)	38(44.2)	77(64.7)	34(64.2)	5(41.7)
5	Not exercising regularly is not a risk factor for T2DM	30(50.0)	31(36.0)	59(49.6)	30(56.6)	9(75.0)
6	Smoking is not related to T2DM	34(56.7)	43(50.0)	76(63.9)	37(69.8)	11(91.7)
7	Obesity is a risk factor for T2DM	40(66.7)	66(76.7)	89(74.8)	38(71.7)	9(75.0)
8	Eating unhealthy diets can expose one to T2DM	36(60.0)	67(77.9)	82(68.9)	40(75.7)	8(66.7)
9	Sedentary lifestyle is not associated with T2DM	24(40.0)	53(61.6)	62(52.1)	30(56.6)	8(66.7)
10	Gestational diabetes (high sugar level during pregnancy) is a risk factor for T2DM	32(53.3)	66(76.7)	94(79.0)	38(71.7)	11(91.7)
11	Poison can cause T2DM	30(50.0)	41(47.7)	51(42.9)	31(58.5)	6(50.0)
12	Psychological stress and disorders cannot predispose one to T2DM	34(56.7)	54(62.8)	70(58.8)	34(64.2)	10(83.3)
	Overall percentage	56.7	51.2	65.5	64.2	83.3

Table 5 shows that overall civil servants with highest education as M.Sc. (83.3%) had very high knowledge of risk factors for Diabetes Mellitus type II than those with HND (65.5%), B.Sc. (64.2%), NCE (56.7%), and OND (51.2%).

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Table 6: Level of Knowledge of risk Factors for Diabetes Mellitus Type II among Civil Servants based on having a relative/friend with DM (n=330)

S/N	Knowledge of risk factors	Relative/friend (n=116) f (%)	No relative/friend (n=214) f (%)
1	Increasing age cannot make one prone to type 2 diabetes mellitus	69(59.5)	139(65.0)
2	Family history of diabetes is a risk factor for T2DM	87(75.0)	158(73.8)
3	Excessive alcohol intake is not a risk factor for T2DM	57(49.1)	103(48.1)
4	Holding in urine is a risk factor for T2DM	63(54.3)	123(57.5)
5	Not exercising regularly is not a risk factor for T2DM	56(48.3)	103(48.1)
6	Smoking is not related to T2DM	67(57.8)	134(62.6)
7	Obesity is a risk factor for T2DM	85(73.3)	157(73.4)
8	Eating unhealthy diets can expose one to T2DM	90(77.6)	143(66.8)
9	Sedentary lifestyle is not associated with T2DM	64(55.2)	113(52.8)
10	Gestational diabetes (high sugar level during pregnancy) is a risk factor for T2DM	89(76.7)	152(71.0)
11	Poison can cause T2DM	63(54.3)	96(44.9)
12	Psychological stress and disorders cannot predispose one to T2DM	70(60.3)	132(61.7)
	Overall percentage	61.2	60.3

Table 6 shows that overall civil servants that have a relative/friend with type II diabetes mellitus (61.2%) had high knowledge of risk factors for Diabetes Mellitus type II than those without any relative/friend with T2DM (60.3%).

Table 7: Summary of Chi-square Test of Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants Based on Age

Age (years)	N	Yes O(E)	No O(E)	χ^2	df	p-value
Below 30	48	29(29.1)	19(18.9)			
30-39	68	40(41.2)	28(26.8)			
40-49	97	56(58.8)	41(38.2)	6.439	4	.169
50-59	37	18(22.4)	19(14.6)			
Above 59	80	57(48.5)	23(31.5)			

*Significant at p≤0.05

Table 7 shows that the null hypothesis of no significant association between the the level of knowledge of risk factors for Diabetes Mellitus Type II and age among civil servants ((χ^2 = 6.439, df=4, p=.169 >.05) was not rejected, thus not significant. This implies that age had no significant association with the level of knowledge of risk factors for Diabetes Mellitus Type II among civil servants in Langtang South LGA, Plateau State.

Table 8: Chi-square Test of Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants Based on Gender

Gender	N	Yes O(E)	No O(E)	χ^2	Df	p-value
Male	125	69(75.8)	56(49.2)			
Female	205	131(124.2)	74(80.8)	2.463	1	.117

*Significant at p≤0.05

Table 8 shows that the null hypothesis of no significant association between the level of knowledge of risk factors for Diabetes Mellitus Type II and gender among civil servants ((χ^2 = 2.463, df=1, p=.117 >.05) was not rejected, thus not significant. This implies that gender had no significant association with the level of knowledge of risk factors for Diabetes Mellitus Type II among civil servants in Langtang South LGA, Plateau State.

Table 9: Chi-square Test of Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants Based on Educational Qualification

Educational Qualification	N	Yes O(E)	No O(E)	χ^2	Df	p-value
NCE	60	34(36.4)	26(23.6)			
OND	86	44(52.1)	42(33.9)			
HND	119	78(72.1)	41(46.9)	7.694	4	.103
B.Sc.	53	34(32.1)	19(20.9)			
M.Sc.	12	10(7.3)	2(4.7)			

*Significant at p≤0.05

Table 9 shows that the null hypothesis of no significant association between the level of knowledge of risk factors for Diabetes Mellitus Type II and educational qualification among civil servants ((χ^2 = 7.694, df=4, p=.103 >.05) was not rejected, thus not significant. This implies that educational qualification had no significant association with the level of knowledge of risk factors for Diabetes Mellitus Type II among civil servants in Langtang South LGA, Plateau State.

Table 10: Chi-square Test of Level of Knowledge of Risk Factors for Diabetes Mellitus Type II among Civil Servants Based on having a Relative/Friend with T2DM

Relative/friend with T2DM	N	Yes O(E)	No O(E)	χ^2	df	p-value
Yes	214	129(129.7)	85(84.3)			
No	116	71(70.3)	45(45.7)	.027	1	.869

*Significant at p≤0.05

Table 10 shows that the null hypothesis of no significant association between the level of knowledge of risk factors for Diabetes Mellitus Type II and having a relative/friend with T2DM among civil servants ((χ^2 = .027, df=1, p=.869 >.05) was not rejected, thus not significant. This implies that having a relative/friend with T2DM had no significant association with the level of knowledge of risk factors for Diabetes Mellitus Type II among civil servants in Langtang South LGA, Plateau State.

Discussion

The finding in Table 2 showed that civil servants indicated knowing the risk factors for T2DM. This was seen in their possession of high knowledge of risk factors for T2DM. The result was expected and therefore, not surprising because of the health campaigns and health awareness programmes conducted to create awareness on non-communicable diseases, their severity to life and associated risk factors. This could also be due to the presence of primary health centres (PHCs) in different wards in the local government area; health workers in these centres serve as sources of health-related information and education for the people within the locality (Agbana et al., 2020). The finding was in line with the findings of Mumu et al. (2014) and Agbana et al. (2020) who reported average knowledge of risk factors for T2DM for respondents. The finding also corroborated the findings of Ola et al. (2021) who reported good knowledge of risk factors associated with diabetes mellitus type II among civil servants in Oyo State, Nigeria.

The finding disagreed with the findings of Ndibuagu et al. (2015) who reported poor level of knowledge of risk factors for T2DM among respondents in a rural community; and Ahmed et al. (2018) who reported low level of knowledge of risk factors among respondents. The findings could be attributed to unavailability of health information to the rural respondents. The public should be provided with information on diabetes mellitus and its risk factors to enhance prevention of the disease. The findings of the study have implications for health educators to increase educative exercises on diabetes mellitus type II and associated factors. Sustained increase in knowledge of risk factors of T2DM among civil servants would enable them assess the susceptibility and take adequate actions to promote their health and reduce their risk to the disease.

The findings in Table 3 showed that civil servants aged 59 years and above had high knowledge of risk factors for T2DM as well those aged below 30 years, while those aged 30-39years, 40-49years, and 50-59years had average knowledge of risk factors for T2DM. The findings for the corresponding hypothesis presented in Table 7 showed no statistically significant association with knowledge of risk factors for T2DM possessed by civil servants based on age. The results were expected and hence, not surprising. This is due to the fact that the respondents are majorly middle-aged and are expected to have gathered knowledge as they advanced in age. In addition, the respondents belong to a risk-population to diabetes mellitus type II by age as increasing age is reported a risk factor for T2DM (Ekpeyoung et al., 2013), hence it is expected they have knowledge on this disease. Though age was not found to be statistically significant, it is worthy of note that the oldest group and the youngest group had more knowledge than others. The finding is in line with the findings of Shawahna et al. (2021) who reported that age was not a statistically significant factor for knowledge. The finding disagrees with the findings of Ola et al. (2021) who found age to be a factor influencing knowledge of risk factors of T2DM as the study found age to be statistically significant while the present study did not. These findings have implications for the ministry of health in organizing health seminars targeting the middle aged.

The findings in Table 4 showed that female civil servants had high knowledge of risk factors for T2DM while their male counterparts had average knowledge of the risk factors for Diabetes Mellitus Type II. The corresponding hypothesis in Table 8 showed no statistically association between the level of knowledge of risk factors for T2DM and gender among civil servants. The findings were not surprising hence, expected. The findings were in line with the findings of Mumu et al. (2014) who reported higher knowledge of risk factors of T2DM among women than their male counterparts. Though, the study found the difference between both genders to be statistically significant, which this present study did not report. Also, the finding was in line with the findings of Ubangha et al. (2016) who reported that female

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respondents had more knowledge than the male respondents. In addition, the study did not find gender to be a statistically significant factor with regards to knowledge. However, the finding of this study disagrees with the findings of Ahmed et al. (2018) who reported that male respondents had more knowledge than their female counterparts. Further, the finding was not consistent with the finding of Xu et al. (2016) who found gender to be statistically associated with level of knowledge. The findings have implications for health promoters in planning and implementing health programmes to pay attention to population especially, the men.

The findings in Table 5 showed that civil servants with highest education as M.Sc. had very high knowledge of risk factors for T2DM, while their colleagues with HND and B.Sc. had high knowledge of risk factors of T2DM, whereas those with NCE and OND had average knowledge of risk factors of T2DM. The corresponding hypothesis in Table 9 showed no statistically significant association between the level of knowledge of risk factors for T2DM and educational qualification among civil servants. This result was not surprising; rather it was expected because education is seen to bring about enlightenment and exposure. As one attains higher education, it is expected to commensurate with knowledge of other life concerns. This finding is in line with the findings of Ahmed et al. (2014) and Mumu et al. (2014) who reported educational status to be positively correlated with knowledge. Nevertheless, this finding disagrees with the findings of Xu et al. (2016) and Ola et al. (2021) who reported knowledge among respondents to be independent of educational status. These results have implications for non-governmental organizations interested in health promotion to channel resources in increasing knowledge of risk factors for T2DM especially among the population with less education. Also, the findings have implications for educators with respect to introducing knowledge on diabetes mellitus and its risk factors among other non-communicable diseases in schools.

The findings in Table 6 showed that civil servants that have a relative/friend with T2DM and those without any family/friend with diabetes mellitus had high knowledge of risk factors for T2DM. The corresponding hypothesis in Table 10 showed that there was no significant association between the level of knowledge of risk factors for T2DM and a relative/friend with T2DM. This result was unexpected, hence surprising because having a relative or friend with diabetes mellitus should expose an individual to more information regarding risk factors of T2DM than those without a family history or relative with diabetes mellitus as reported in different studies. This finding disagrees with the findings of Mumu et al. (2014), Xu et al. (2016), and Ubangha et al. (2016) who reported that people with relative/friend with diabetes mellitus possess more knowledge of risk factors of diabetes mellitus type II than those without any family history or relative with T2DM. Also, these studies reported the difference between the level of knowledge possessed by people with a relative/friend with diabetes mellitus and those without any relative/friend with diabetes mellitus to be statistically significant. The finding has implication for health educators in sensitizing the population on risk factors of diabetes mellitus type II.

Conclusion

The study findings have shown that civil servants in Langtang South LGA, Plateau State had high knowledge of risk factors for T2DM. Age, gender educational qualification, and having a relative/friend with T2DM do not play important roles in possessing knowledge of risk factors for T2DM. However, the high level of knowledge of risk factors for diabetes mellitus type 2 needs to be possessed so as to reduce the prevalence of type 2 diabetes. Ministry of Health at both State and Local Government levels, health educators, NGOs should carry out seminars enlightening the population on risk factors for diabetes mellitus

type II especially, those aged between 30-59 years. Mass media should ensurie continuous awareness on risk factors for T2DM.

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