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Knowledge, Attitudes and Behaviour Towards Diabetes Mellitus Among Diabetic Patients at Ndola Teaching Hospital

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ABSTRACT

Diabetes Mellitus is among the non-communicable diseases with high morbidity and mortality in Zambia and worldwide. The aim of this study was to determine the knowledge levels about Diabetes Mellitus, establish attitudes and behaviors towards Diabetes Mellitus among the Diabetic patients. **METHOD**: The study was a cross sectional study that was conducted at Ndola Teaching Hospital, Ndola, Zambia. Random probability sampling was used. The statistical tests used in the analysis of the data were SPSS Version 20. **RESULTS:** 194 respondents took part in the study giving a response rate of 91.1%.Overall: in terms of knowledge depth, 57(29.4%) had poor knowledge and 137(70.6%) had good knowledge on the various aspects of diabetes. Attitudes; 104(53.6%) had positive and 90(46.4%) had negative attitudes respectively. Furthermore in terms of behaviors' towards diabetes, 120(61.9%) participants had good behavior and 74(38.1%) had bad behavior towards diabetes respectively. **CONCLUSION:** Our study shows that diabetic patients both in and out patients at Ndola Teaching Hospital do not have much knowledge about various aspects of DM. Hence there is need for patient information, education and communication about diabetes through health education and promotion, not limited to the hospital but also within the general population, as part of the strategies to prevent, manage and control Diabetes mellitus.

Key words: Diabetes mellitus, knowledge, behavior, attitude, Ndola teaching hospital, Zambia.

Introduction

Diabetes mellitus is increasingly becoming one of the most common and major non communicable chronic disease burden worldwide [1, 2].About 382 million people were affected by diabetes in 2013 and this is expected to rise to 592 million by 2035[2].The prevalence of diabetes for African region in people above 18 years according to [3] was 7.1% and [4] estimate that of undiagnosed diabetes was 80% in African region. Many Africans and other third world countries have little or no knowledge about diabetes and its detrimental complications.

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According [5], it was only 50.8% participants that knew of condition diabetes and [6] also stated that only few participants knew diabetes. The prevalence of diabetes is increasing due to aging, changed life styles, and [8] estimated the prevalence of diabetes in Zambia at 3.1%.

Further [9] found the prevalence of diabetes of 4.0% in Lusaka urban district in Zambia. According to [12] it is important that patients are knowledgeable about diabetes mellitus, its complications, risk factors and other various aspects.

[13] had estimated 12.1 million people in Sub Saharan African region with diabetes mellitus and projected the number to rise to be over 23.9 million by 2030.The sub Saharan unit prevalence of diabetes mellitus was 2.4%.These reports signify the continuing increase and it's estimated that the diabetic population in African will double from that of 2013 by 2035.In a study conducted at Korlie-Bu Teaching Hospital, Ghana, by

[12] reviewed that only 103(26.4%) patients knew the type of diabetes mellitus they were suffering from. Knowledge on the ocular effects of diabetes mellitus was low and only 15(3.8%) know that it could affect ocular refraction with no patient knowing that diabetes could cause cataracts and diabetic retinopathy.

In a cross sectional study by[11] it was found that among the diabetic patients attending the medical out-patient department of Royal Victoria Teaching Hospital (RVTH),Banjul, out of the 199 patients only 47% knew what diabetic mellitus was.53% of the participants had no knowledge what the causes of diabetes were and about 50% had no idea of the methods of preventon.67% knew that diabetes mellitus can result to loss of sight while 46.5% knew that diabetes mellitus can cause poor wound healing. Few respondents knew that diabetes mellitus can lead to kidney failure (13.5%), skin sepsis (12.0%), heart failure (5.5%) and stroke (4.5%).close to 50% of the respondent did not know how diabetes mellitus can be prevented. In the study it showed that the majority of patients attending medical out-patient department at Royal Victoria Teaching Hospital had poor knowledge on several aspects of diabetes mellitus. Hence, there is need for conscious efforts towards improving the level of awareness through health education and promotion, not limited to the hospital but also within the general Sub-Saharan region, as part of strategy to prevent, manage and control diabetes mellitus.

Studies emphasize the importance of knowledge of diabetes mellitus its complications and risk factors among patients so that they is prevention of these complications of the disease which are killing million of the patients, according to [12].Diet modification, alcohol modification and change in lifestyle especially those indulging in western culture kind of lifestyle and nutrition levels high energy fat foods are some factor that the patients should know for management and prevention of the disease.

To find out the depth of knowledge among diabetic patients, attitudes and behavior towards diabetes mellitus, we carried out a cross sectional study among diabetic Patients both in and out patients; to determine the depth of knowledge, establish attitudes and behaviors towards diabetes mellitus at Ndola Teaching Hospital.

Methodology

Study Design

The study was a cross sectional study, conducted with the use of structured questionnaires. It was conducted between periods of 1-2 months in 2017.

Study Site

The study was conducted at Ndola Teaching Hospital, in the city of Ndola, Copperbelt, Zambia. The hospital has the bed capacity of 851 beds and 97 bay cots, and it is the second largest health institution in Zambia. It is the referral Centre for the northern part of the country and serves a population of 503 649 in Ndola district.

Study Population

All diabetic patients coming for review or admitted in the wards with diabetes and its detrimental complications were enrolled into the study, after they had met the following criteria; adult male or female, aged 16 years and above, gave written consent. All those aged below 16 years old, not willing to give written consent and had previous participation in the study were excluded from the study.

Sample Size and Sampling Method

The total number of participants was 194 out of a sample of 213 calculated using Epi Info versions 7.0, with a population size of 480, expected frequency at 50%, confidence limits at 5% and confidence level was at 95%.

Data Collection

Permission to conduct the study at Ndola Teaching Hospital was obtained from the Senior Medical Superintendent. Objectives of the study were explained to the participants before enrollment into the study. Written informed consent was obtained from each patient before enrollment into the study. Data collection tool used in the study was the questionnaire which had questions concerning social demographic factors, knowledge, attitudes and behaviors towards diabetes. A questionnaire was administered to the patient before the study and for those patients that couldn't understand English the questions were asked in Bemba (local language).

Data Management

Data was entered using Microsoft Excel 2010.Data was then exported to IBM SPSS Version 20.0 for analysis.

Ethical Consideration

The study was reviewed and ethically approved by the Health Research and Ethics Committee of Tropical Diseases Research Centre (TDRC) at Ndola Teaching Hospital. This was done to ensure the participants were

protected and assure that the information was accurate as possible. All the participants were informed of what the study was prior to assessment and all necessary information was gladly accepted. Ethical principles were considered which included autonomy, non-malfea science, justice and confidentiality. Participants were provided information about the study, information provided included the purpose of the study, what the study was about, what the study involved and the use of the results obtained in the study and the benefits of the participants and also it was stated that no payment will be made to the participants.

Results

Out of the 213 participants who were approached to take part in the study, 194 (91.4%) actually took part in the study. Out of 194,137(70.6%)respondents scored average knowledge on the six sub scales. Table 1 shows the sample description of social demographic factors associated with sex. It was noted that they were significant associations between knowledge ,attitude, behavior and education with sex. According to table 2 which illustrates the various scores obtained by respondents on various aspects of knowledge on diabetes ,It was noted that major knowledge gaps were in areas related to diabetes been a condition with high blood sugar levels , detrimental complications ,effects of alcohol and smoking and diet control been important regarding diabetes treatment.165(85.1%)participants didn't know that diabetes is associated with high blood sugar levels,105(54.1%)participants were not aware of the organ damage caused by the condition,149(76.8%)participants were not knowledgeable about the types of foods to avoid when diabetic and 165(85.1%)participants did not know that alcohol and smoking can worsen their condition. Figure 1.0: illustrates the graphical presentation of overall percentage and frequency allocation on knowledge depth: 57(29.4%) scored poor whilst 137(70.6%)scored good regarding various knowledge parameters. Table 3; illustrates factors associated with patient's knowledge depth, it was noted that education, behavior, attitudes and sex were strongly associated. 37(64.9%) respondents who had never been to school scored poorly on knowledge parameters. Low diabetes knowledge was associated with male gender and could be a risk factor for development of diabetic- related complications. Table 4; illustrates the percentage distribution of patient's attitudes towards diabetes; generally attitudes towards diabetes were good. However it was noted that 141(72.7%) respondents had negative attitudes towards practicing regular exercises for their glycemic control as means of management of diabetes. Figure 2.0: illustrates the graphical presentation of overall percentage and frequency allocation on attitudes: 90(46.4%) respondents had negative and 104(53.6%) respondents had positive attitudes respectively. Furthermore among the factors associated with attitudes as illustrated in table 5, education was a factor and it was established that 66(73.3%) respondents who had never been to school had negative attitudes towards diabetes, behavior was also a factor that was associated, occupation and age were also factors noted to be strongly associated with 75(83.3%) in the age group of 41-70 exhibiting negative attitudes towards diabetes. Table6; illustrates the percentage distribution of patient's behavior towards diabetes on various behavior parameters, it was established that 165(85.1%) respondents exhibited negative behavior towards intake of alcohol and smoking. In addition 149(76.8%) respondents also had negative behavior towards their diet control. It was established that participants' demonstrated good behavior in terms of complying with appointments. Figure 3.0: illustrates the graphical presentation of overall percentage and frequency allocation on behavior towards diabetes in general: 74(38.1%) respondents had negative and 120(61.9%) respondents had positive attitudes towards diabetes respectively. There were significant associations between behavior with sex, attitudes, knowledge and marital status as tabulated in table 7. It was noted that negative behavior towards diabetes was associated more with the male sex with 50(67.6%) male respondents exhibiting negative behavior towards diabetes.

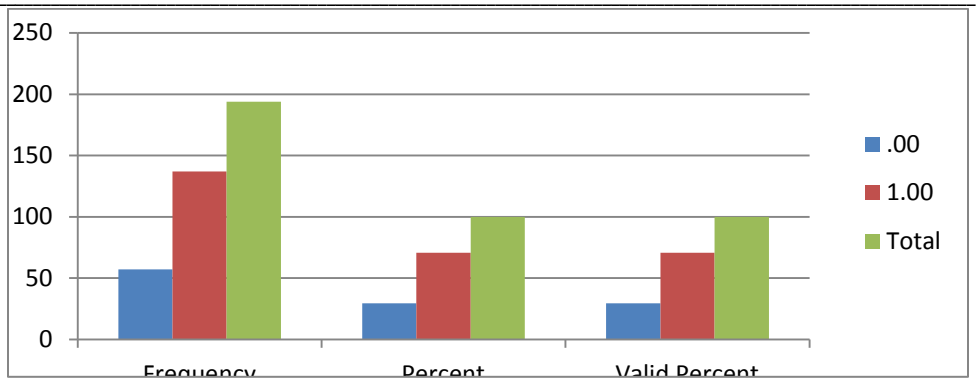
Table 1: Sample Description

Factors		Total n (%)	Male N(%)	Female N(%)	P-value
Age	15-20	1(0.5%)	0(0%)	1(0.9%)	0.189
	21-30	11(5.7%)	7(8.3%)	4(3.6%)	
	31-40	38(19.6%)	20(23.8%)	18(16.4%)	
	41-70	144(74.2%)	57(67.9%)	87(79.1%)	
Marital status	Married	75(38.7%)	23(27.4%)	52(47.3%)	0.000

	Single	65(33.5%)	34(40.5%)	31(28.2%)	
	Divorced	33(17.0%)	10(11.9%)	23(20.9%)	
	Separated	19(9.8%)	15(17.9%)	4(3.6%)	
	widow	2(1.0%)	2(2.4%)	0(0.0%)	
Religion	Catholic	67(34.5%)	26(31.0%)	41(37.3%)	0.255
	Protestant	43(22.2%)	16(19.0%)	27(24.5%)	
	other	84(43.3%)	42(50.0%)	42(38.2%)	
Education	Not attended school				0.000
	1-7	114(58.8%)	40(47.6%)	74(67.3%)	
	Secondary/tertiary	48(24.7%)	37(44.0%)	11(10.0%)	
		32(16.5%)	7(8.4%)	25(22.7%)	
Occupation	Employed	56(28.9%)	11(13.1%)	45(40.9%)	0.000
	Non-employed	67(34.5%)	46(54.8%)	21(19.1%)	
	Self-employed	71(36.6%)	27(32.1%)	44(40.0%)	
Knowledge	Poor	57(29.4%)	43(51.2%)	14(12.7%)	0.000
	good	137(70.6%)	41(48.8%)	96(87.3%)	
Attitude	Negative	90(46.4%)	35(41.7%)	55(50.0%)	0.249
	Positive	104(53.6%)	49(58.3%)	55(50.0%)	
Behavior	Negative	74(38.1%)	50(59.5%)	24(21.8%)	0.000
	positive	120(61.9%)	34(40.5%)	86(78.2%)	

Table 2: Percentage distribution of patient's knowledge on various knowledge parameters regarding diabetes

	Knowledge		
Factors	**Total n (%)**	**Know n (%)**	**Don't know n (%)**
Knowledge parameters			
1. Increase in blood sugar levels	194(100%)	29(14.9%)	165(85.1%)
2. Causes systemic organ damage	194(100%)	89(45.9%)	105(54.4%)
3. Significance of adhering to treatment	194(100%)	150(77.3%)	44(22.7%)
4. Diet control	194(100%)	45(23.2%)	149(76.8%)
5. Effects of alcohol and smoking	194(100%)	29(14.9%)	165(85.1%)
6. Keeping up appointments importance	194(100%)	150(77.3%)	44(22.7%)



Key: blue; poor knowledge red; good knowledge

Fig 1: Graphical presentation of overall knowledge scores

Table 3: Factors associated with patient's knowledge depth regarding diabetes mellitus

Factors		Total n(%)	Poor n(%)	Good n(%)	P-Value
Education	Never been to school	114(58.8%)	37(64.9%)	77(56.2%)	0.533
	1-7	48(24.7%)	12(21.1%)	36(26.3%)	
	Secondary/tertiary	32(16.5%)	8(14.0%)	24(17.5%)	
Age	15-20	1(0.5%)	0(0.0%)	1(0.7%)	0.878
	21-30	11(5.7%)	4(7.0%)	7(5.1%)	
	31-40	38(19.6%)	11(19.3%)	27(19.7%)	
	41-70	144(74.2%)	42(73.7%)	102(74.5%)	
Religion	Catholic	67(34.5%)	17(29.8%)	50(36.5%)	0.562
	Protestant	43(22.2%)	15(26.3%)	28(20.4%)	
	other	84(43.3%)	25(43.9%)	59(43.1%)	
Occupation	Employed	56(28.9%)	15(26.3%)	41(29.9%)	0.871
	Non-employed	67(34.5%)	20(35.1%)	47(34.3%)	
	Self-employed	71(36.6%)	22(38.6%)	49(35.8%)	
Marital status	Married	75(38.7%)	17(29.8%)	58(42.3%)	0.018
	Single	65(33.5%)	17(29.8%)	48(35.0%)	
	Divorced	33(17.0%)	11(19.3%)	22(16.1%)	
	Separated	19(9.8%)	10(17.5%)	9(6.6%)	
	widow	2(1.0%)	2(3.5%)	0(0.0%)	
Sex	Male	84(43.3%)	43(75.4%)	41(29.9%)	0.000
	female	110(56.7%)	14(24.6%)	96(70.1%)	
Attitude	Negative	90(46.4%)	35(61.4%)	55(40.1%)	0.007
	positive	104(53.6%)	22(38.6%)	82(59.9%)	
Behavior	Negative	74(38.1%)	56(98.2%)	18(13.1%)	0.000
	positive	120(61.9%)	1(1.8%)	119(86.9%)	

Table 4: Percentage Distribution of Patient's Attitudes Towards Diabetes Mellitus On various Attitudes Parameters

	Attitudes		
Factors	**Total n (%)**	**Positive n (%)**	**Negative n (%)**
Attitudes parameters			
1.Practicing regular exercises	**194(100%)**	**53(27.3%)**	**141(72.7%)**
2.Seeking medical attention	**194(100%)**	**175(90.2%)**	**19(9.8%)**
3.Coming for reviews	**194(100%)**	**93(52.1%)**	**101(47.9%)**

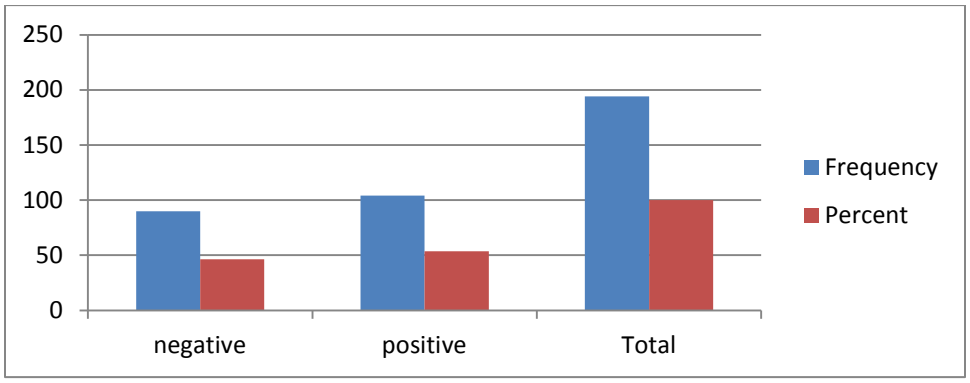


Fig 2: Graphical presentation of overall attitude scores

Table 5: Factors Associated With Patient's Attitudes towards Diabetes Mellitus

Factors		**Total n (%)**	**Negative n (%)**	**Positive n (%)**	**P-Value**
Behavior	**Negative**	**74(38.1%)**	**45(50%)**	**29(27.9%)**	**0.002**
	positive	**120(61.9%)**	**45(50%)**	**75(72.1%)**	
Education	**Never been to school**	**114(58.8%)**	**66(73.3%)**	**48(46.2%)**	**0.000**
	1-7	**48(24.7%)**	**11(12.2%)**	**37(35.6%)**	
	Secondary/tertiary	**32(16.5%)**	**13(14.4%)**	**19(18.3%)**	
Sex	**Male**	**84(43.3%)**	**35(38.9%)**	**49(47.1%)**	**0.249**
	female	**110(56.7%)**	**55(61.1%)**	**55(52.9%)**	
Occupation	**Employed**	**56(28.9%)**	**52(57.8%)**	**4(3.8%)**	**0.000**
	Non-employed	**67(34.5%)**	**18(20.0%)**	**49(47.1%)**	
	Self-employed	**71(36.6%)**	**20(22.2%)**	**51(49%)**	
Religion	**Catholic**	**67(34.5%)**	**33(36.7%)**	**34(32.7%)**	**0.000**
	Protestant	**43(22.2%)**	**4(4.4%)**	**39(37.5%)**	
	other	**84(43.3%)**	**53(58.9%)**	**31(29.8%)**	
Marital status	**Married**	**75(38.7%)**	**38(42.2%)**	**37(35.6%)**	**0.000**
	Single	**65(33.5%)**	**42(46.7%)**	**23(22.1%)**	
	Divorced	**33(17.0%)**	**8(8.9%)**	**25(24.0%)**	
	Separated	**19(9.8%)**	**1(1.1%)**	**18(17.3%)**	
	widow	**2(1.0%)**	**1(1.1%)**	**1(1.0%)**	
Age	**15-20**	**1(0.5%)**	**1(1.1%)**	**0(0.0%)**	**0.004**
	21-30	**11(5.7%)**	**6(6.7%)**	**5(4.8%)**	
	31-40	**38(19.6%)**	**8(8.9%)**	**30(28.8%)**	
	41-70	**144(74.2%)**	**75(83.3%)**	**69(66.3%)**	

Table 6: Percentage Distribution of Patient's Behaviour Towards Diabetes on Various Behaviour Parameters

Factors	Total n (%)	Positive n (%)	Negative n (%)
Behavior parameters			
1.Complying to treatments	194(100%)	150(77.3%)	44(22.7%)
2.Diet control	194(100%)	45(23.2%)	149(76.8%)
3.Intake of alcohol and smoking	194(100%)	29(14.9%)	165(85.1%)

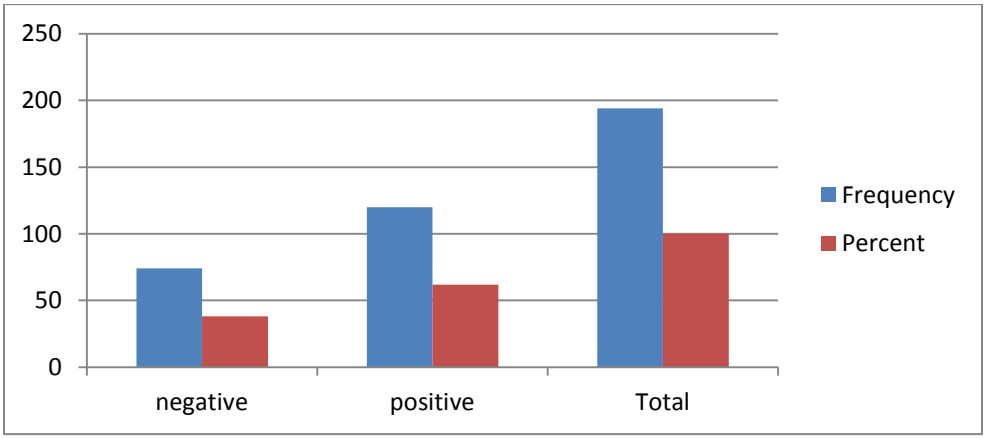


Fig 3: Graphical presentation of behavior scores

Table 7: Factors associated with Behavior

		Behavior			
Factors		Total n (%)	Negative n (%)	Positive n (%)	P-Value
Education	Never been to school	114(58.8%)	47(63.5%)	67(55.8%)	0.534
	1-7	48(24.7%)	17(23.0%)	31(25.8%)	
	Secondary/tertiary	32(16.5%)	10(13.5%)	22(18.3%)	
Knowledge	Poor	57(29.4%)	56(75.7%)	1(0.8%)	0.000
	good	137(70.6%)	18(24.3%)	119(99.2%)	
Sex	Male	84(43.3%)	50(67.6%)	34(28.3%)	0.000
	female	110(56.7%)	24(32.4%)	86(71.7%)	
Occupation	Employed	56(28.9%)	26(35.1%)	30(25.0%)	0.204
	Non-employed	67(34.5%)	26(35.1%)	41(34.2%)	
	Self-employed	71(36.6%)	22(29.7%)	49(40.8%)	
Marital status	Married	75(38.7%)	19(25.7%)	56(46.7%)	0.006
	Single	65(33.5%)	31(41.9%)	34(28.3%)	
	Divorced	33(17.0%)	11(14.9%)	22(18.3%)	
	Separated	19(9.8%)	11(14.9%)	8(6.7%)	
	widow	2(1.0%)	2(2.7%)	0(0.0%)	
Age	15-20	1(0.5%)	0(0.0%)	1(0.8%)	0.821
	21-30	11(5.7%)	5(6.8%)	6(5.0%)	
	31-40	38(19.6%)	15(20.3%)	23(19.2%)	
	41-70	144(74.2%)	54(73.0%)	90(75.0%)	
Attitude	Negative	90(46.4%)	45(60.8%)	45(37.5%)	0.002
	positive	104(53.6%)	29(39.2%)	75(62.5%)	

Discussion

To our knowledge this was the first study of its kind done at Ndola Teaching Hospital, Ndola, Zambia. The depth of knowledge of diabetes among diabetic patients in our study was generally not bad as majority of the respondents did not lack much knowledge regarding the disease and its various aspects. Many Africans and other third world countries have little or no knowledge about diabetes and its detrimental complications. According to [5], it was only 50.8% participants that knew of condition of diabetes and [6] also stated that only few participants knew diabetes. This may explain the results obtained in the study. According to the results, it showed that majority of the respondents had good knowledge generally, significant knowledge gaps were noted in areas related to diabetes been a condition with high sugar levels and detrimental complications with about 165(85.1%)respondents lacking knowledge on this aspect.149 (76.8%) respondents were lacking knowledge regarding the type of diet recommended for their glycemic control. Another area of concern was regarding awareness on effects of alcohol and smoking on the condition, 165(85.1%) respondents were not knowledgeable about this aspect. Respondents that had never been to school scored poorly on various parameters. Low knowledge levels were associated with the male sex. These reports can be supported by [10,11].

Regarding attitudes towards diabetes it was established that the respondents generally had good attitudes. However one area of keen interest were respondents showed negative attitudes was on practicing regular exercises for glycemic control, it was established that141(72.7%)respondents do not practice regular exercises for their glycemic control. Respondents that are had never been to school and those aged in the range of 41-70 were known to be unaware regarding this aspect.

In addition in terms of behavior towards diabetes it was established that respondents showed positive behavior regarding complying to treatments with 150(77.3%) having positive and 44(22.7%) been negative. However it was noted that 149(76.8%) respondents showed negative behavior towards diet control and restriction. Majority of the respondents were not restricting their diet as most of them they diet comprised of high fatty content, carbohydrate and other fast foods. 165(85.1%) of the respondents also showed negative behavior towards intake of alcohol and smoking.

Conclusion

In conclusion, in our study it was noted that the participants' demonstrated not much knowledge on various aspects of the condition, many participants were not aware that the condition is associated with high sugar levels and detrimental complications. Most participants were not aware that alcohol and smoking can worsen the condition. Life Modification in terms of diet control was also one area the participants were lacking knowledge. In addition participants' were also not aware that exercises were important regarding their glycemic control.

Therefore, participants should be empowered with the knowledge on life modification, diet control, effects of alcohol and smoking, importance of exercises and other various aspects of diabetes through health education and health promotion. The ministry of health should work in collaboration with hospital managements of various hospitals so as patients are educated about this deadly condition. This will ensure prevention, management of devastating and detrimental complications and hence reduce mortality and morbidity from diabetes countrywide.

We would like to recommend similar studies been done in other hospitals in order to map the distribution and depth of knowledge, attitudes and behaviors towards diabetes among the diabetic patients country wide in Zambia.

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References

1. Bos MAgyemang C,Prevalence and Complications of Diabetes mellitus in Northern Africa, a systemic review.BMC Public Health. 2013;13:387
2. LiS,GuOS,HeF,ZhangM,HeJ,YanY,DingY,ZhangJ,LiuJ,GuOH,XuS,and Ma R. Prevalence of diabetes mellitus and impaired fasting glucose, associated with risk factors in rural Kazakh adults

in Xinjiang,China.Int J Environ Res Public Health 2015; 12:554-565.

3. World Health Organization. Global Reports on Diabetes.World Health Organization 2016.
4. International Diabetes Federation.IDF Diabetes Atlas, Fifth Edition. International Diabetes Federation 2011.
5. Muninarayana C, Balachandra G, Hiremath SG, Iyengar K, Anil NS. Prevalence and awareness regarding diabetes mellitus in rural Tamaka, Kolar.Int J Diabetes Dev. Ctries.2010; 30:18-21.
6. Rema M,DeepaR,Mohan V. Prevalence of retinopathy at diagnosis among type 2 diabetic patients attending a diabetic centre in South India.Br J Ophthalmol.2000; 84:1058-1060.
7. Musenge EM, Alexey M, Mudenda B, Michelo C,Glycemic control in diabetic patients in Zambia: the Pan African Medical Journal pgs.2014; 19:354 PubMed.
8. Keeling A. International Diabetes Federation-The global voice of diabetes.EurEndocrinol 2009; 5:18-19
9. Nsakashalo-Senkwe M, Siziya S, Goma FM, SongoloP,MukonkaV,Babaniyi O. Combined prevalence of impaired glucose level or diabetes and its correlates in Lusaka Urban district, Zambia: a population based survey.Int Arch Med 2011;4:2
10. Foma MA,Saidu Y, OmokeleSA,Jafali J Awareness of Diabetes mellitus among diabetic patients in the Gambia; a strong case for health education and promotion, BMC Public Health .2013: 13:1124
11. Oveseri-Ogbomo GO, AbokyiS, KoffourGA, Abokyi E. Knowledge of diabetes mellitus and its associated ocular manifestations by diabetic patients : a study at Korle-Bu teaching hospital,Ghana Niger Med J.2013.54(4):217-223. PubMed
12. Charles Clark, Jr, MD and Anthony Lee MD.(1995) Drug therapy.Prevention and treatment of the complications of diabetes mellitus.N Engl J Med.1995;332:1210-1217
13. Shaw JE,SincreeRA,Zimmet PZ.Global estimates of the Prevalence of diabetes for 2010 and 2030.Diabetes Res ClinPract.2010; 94(3): 311-321.

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