FACTORS ASSOCIATED WITH HOSPITAL ADMISSIONS AMONG REGISTERED DIABETES MELLITUS PATIENTS IN GURUVE AND MAZOWE DISTRICTS, MASHONALAND CENTRAL PROVINCE, ZIMBABWE.

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By

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Abstract

Introduction

Diabetes mellitus is among the top five chronic conditions contributing to Out Patients Department attendance in Mazowe and Guruve Districts. This study sought to identify the contributory factors that are associated with the increase in hospital admissions among diabetes mellitus patients in Guruve and Mazowe Districts so as to inform interventions.

Methods: The study was an analytic cross-sectional study. A census of all the 202 registered patients attending diabetes mellitus review appointments at Guruve, Howard, Concession and Mvurwi hospitals was done. Interviewer-administered pretested questionnaires were used to collect data. Epi info version 3.5.1 was used to create frequencies, proportions and prevalence odds ratios to determine associations. Logistic regression analysis was done to identify independent risk factors and to control for confounding variables. Ethical approval was sought from all relevant authorities while informed consent was obtained from all study participants.

Results: Of the 202 study sample**,** 43.6% had an admission history due to diabetes mellitus. Being female [POR 2.43 (95%CI: 1.25-4.73)], being unemployed [POR 1.97 (95%CI: 1.09-3.56)] and being less educated (primary level and below)[POR 2.56 (95%CI: 1.38-4.77) were statistically significant risk factors for hospitalisation due to diabetes mellitus.

Those patients on insulin [POR 2.93 (95%CI: 1.33-6.48)], those resident in communities where diabetes was not discussed at public meetings and gatherings [POR 3.73 (95%CI: 1.68-8.28)], those with longer duration on treatment for diabetes (4+ years) [POR 2.30 (95% CI: 1.30-4.41)], older cases (>1 year) [POR 3.04 (95%CI: 1.47-6.28)] and support group members [POR 4.77 (95% CI: 1.50-15.18)] had a higher likelihood of getting hospitalised and this was statistically significant.

Insulin medication [AOR 2.74 (95% CI: 1.22-7.27) p= 0.0168], low educational level (primary and below) [AOR 2.74 (95% CI: 1.34-5.58) p= 0.00570], having long been diagnosed with diabetes (1year+) [AOR 3.06 (95% CI: 1.38- 6.79) p=0.00570] and residing in areas where there is no diabetes mellitus education at community level [AOR 3.86(95% CI: (1.60-9.32) p=0.00260], were independent factors associated with hospital admissions due to diabetes

mellitus in Guruve and Mazowe districts that remained statistically significant after logistic regression analysis.

Conclusion and Recommendations

Independent predictors of hospitalisation due to diabetes were type of treatment, level of education, community based health education and time lapse after diabetes diagnosis. In addition to provision of adequate services and supplies to diabetes mellitus clients, the District Health Executive needs to take an ecological approach towards the inclusion of the wider family and community support structure in effecting lifestyle modifications among diabetes mellitus clients that is conducive to sustain control measures.

Key Words

Diabetes Mellitus, Admissions, Insulin, Guruve, Mazowe, Howard, Mvurwi, Concession

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Abbreviations

AOR	Adjusted Odds Ratios
AIDS	Acquired Immunodeficiency Syndrome
BMI	Body Mass Index
CI	Confidence Interval
DHE	District Health Executive
DM	Diabetes Mellitus
DMO	District Medical Officer
HIV	Human Immune Virus
NCDs	Non Communicable Diseases
P/A	Physical Activity
POR	Prevalence Odds Ratio
PMD	Provincial Medical Director
VHWs	Village Health Workers
WHO	World Health Organization
TB	Tuberculosis

Chapter 1: Background

1.1.1 Introduction

Diabetes mellitus is a chronic condition that occurs when the pancreas is no longer able to produce adequate insulin, or when the body can no longer effectively use the insulin it produces leading to an increased concentration of glucose in the blood[1]. This often leads to organ damage paving way for various complications attributed to diabetes to set in.

Diabetes presents in three forms; type 1 which is characterized by lack of insulin production by the body, type 2 which is characterized by the body`s inability to effectively use the insulin it produces to regulate blood sugar levels and thirdly gestational diabetes, which occurs in pregnancy and usually precedes the development of type 2 diabetes.

1.1.2. Global and regional burden of diabetes mellitus

At global level, an estimated 57 million deaths were recorded in the year 2008 alone with almost two thirds of these attributed to chronic diseases, composing mainly diabetes, cardiovascular diseases, cancer, and terminal lung diseases[2]**.** The estimated global prevalence of diabetes is around 6.4% and notably of those affected, the majority live in the developing world[2]. It is also projected that the increasing burden of diabetes mellitus in the 3rd world countries will go beyond two-thirds between the year 2010 and 2030.

There is already a substantial burden of chronic diseases in the Sub-Saharan Africa countries. This is so since there is evidence over the past years of marked increases in the prevalence of diabetes mellitus in several African countries, including Zimbabwe especially in urban settings[2].

Mainous et al, (2006) cite evidence from previous studies documenting significant shortfalls in the management of individuals with diabetes[3]. Thus, diabetes mellitus is becoming a widespread epidemic of public health importance, primarily because of the increasing incidence and prevalence of type 2 diabetes.

Diabetes mellitus is reported to be the number one cause of renal failure globally. Furthermore lower limb amputations are found to be more than 10 prevalent in diabetic people than in people without diabetes mellitus with more than 50% of all non-traumatic lower limb attributed to the condition.[1]. These often result in frequent incidences of hospitalisations especially in the terminal stages of the condition.

1.1.3. The burden of Diabetes Mellitus in Zimbabwe

The disease burden in Zimbabwe the previous three decades has been dominated by malaria, perinatal and nutritional disorders and the raging epidemic of HIV/AIDS which also fuelled Tuberculosis. The growing burden of chronic conditions in Zimbabwe and the developing world in general increases the overburden to the already overwhelmed health service delivery system due to the mentioned conditions above.

According to the Zimbabwe STEP-wise survey (2005), the prevalence of diabetes among the adult population is 10%[4], a figure that could surpass the global estimated prevalence, considering that a large number of people are reported not to be aware that they have the condition. Evidence

was established confirming that a sizeable number of Zimbabweans have adopted poor habits and behaviours (lack of exercise, smoking, alcohol consumption and having fatty diet) which affect their health by increasing their risk of developing diabetes mellitus.

Diabetes ranks in the top five non communicable disease conditions reported in all outpatients follow up visits in the country.

1.1.4. Burden of diabetes mellitus in Guruve and Mazowe Districts

There is a total of 582 registered diabetes mellitus patients in Guruve and Mazowe districts. There has been an almost two-fold increase in the number of outpatient follow up visits in the 25+ age range in the two districts from 1329 visits in 2010 to 2616 visits in 2011. This is consistent with a more than a two-fold increase in hospital admissions in the two districts combined from 74 admissions in 2006 to 175 admissions in 2012. This has created more workload for the already burdened health delivery system coupled with a high number of admissions due to diabetes mellitus as highlighted. It had not been established what is causing this increasing trend.

1.1.5. Diabetes control in Mazowe and Guruve Districts

In Guruve and Mazowe districts, the control of diabetes is largely limited to medical treatment ahead of primary prevention and rehabilitation efforts. In Guruve district, diagnosis and management are centralized at Guruve Hospital; the main referral centre in the district, where a medical officer is resident and anti diabetic drugs can be dispensed. Patients, therefore suspected to be having diabetes mellitus at any of the 19 rural health facilities are referred to the district hospital for diagnosis and management but nonetheless entered into the respective clinic chronic

register should they be diagnosed to be having the condition. The hospital keeps its chronic register where patients within its catchment area are registered. The district register therefore consists of the sum of the patients in the chronic registers of the 20 health facilities in the district. However there is no specific diabetes mellitus clinic review day reserved for such patients such that management of the condition is intergrated into the daily routine of the outpatient functions.

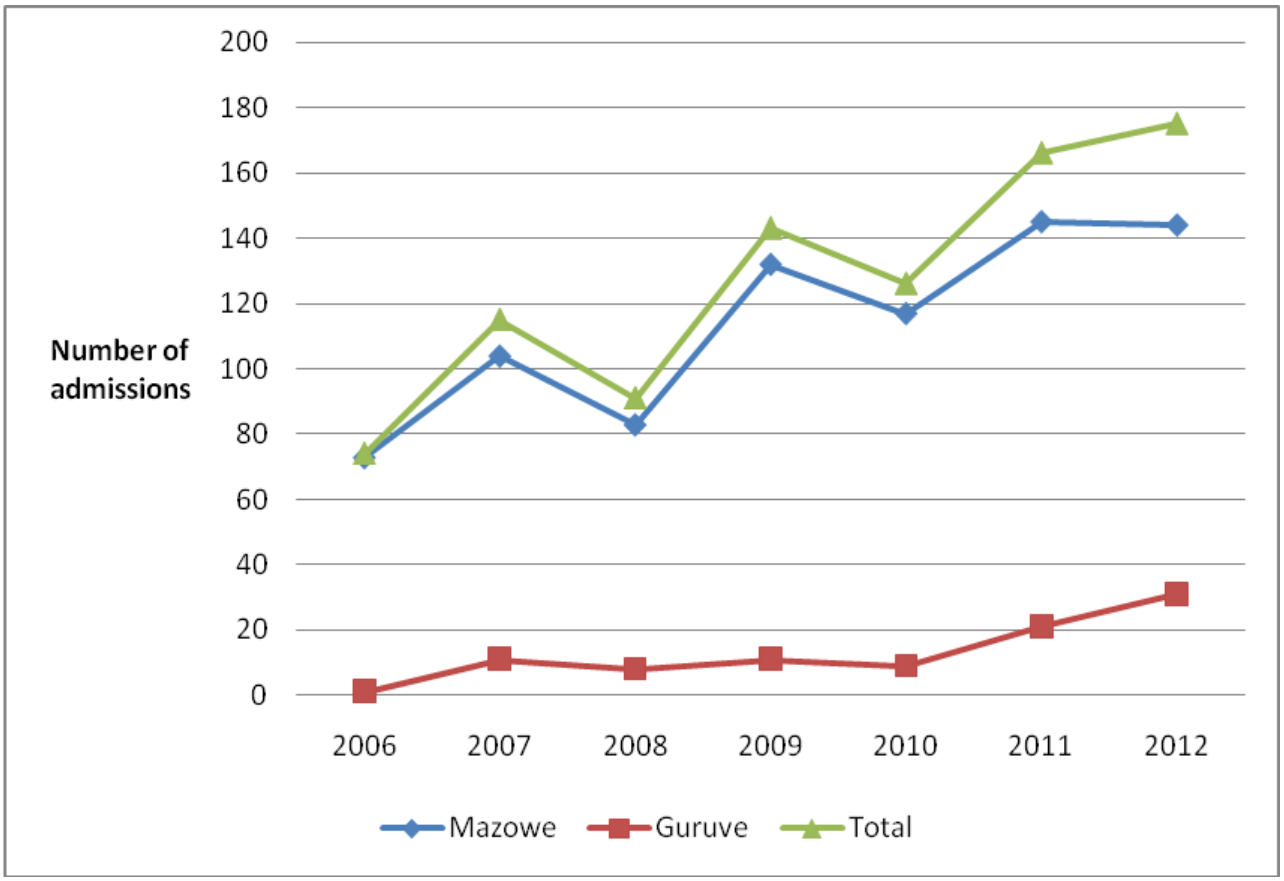
In Mazowe district, there are three diagnostic and main treatment centers, i.e. Howard Hospital, Mvurwi Hospital and Concession district hospital which serve other 28 rural health facilities. Chronic registers for diabetes mellitus clients are kept at each of these facilities for the clients they serve. However, though Concession and Mvurwi use the diabetes clinic review day to manage their patients, adherence to this protocol is more evident in the former(Concession Hospital)

1.2. Problem Statement

Complications arising as a result of diabetes mellitus, not only put a strain on the human resources capital to deal with them but also on the broader health-care resources.

The current scenario and trend on hospital admissions in Guruve and Mazowe district depicts an increasing demand for these health care resources as shown on the graph below:

Figure 1: Hospital admissions due to diabetes mellitus (2006-2012)



Source: Admission Registers, Guruve & Mazowe districts

Consistent with the National Health Strategy for Zimbabwe (2009-2013) report for the country, Diabetes Mellitus ranks among the top five outpatients follow up non communicable conditions in Guruve and Mazowe districts. Outpatient follow up diabetic visits have almost doubled with Guruve district having an increase from 1329 in 2010 to 2616 visits in 2011 in the 25+ years age range. This has created more workload for the already burdened health system coupled with a high number of admissions due to diabetes mellitus as highlighted above. It has not been established what is causing this increasing trend. Focusing on the specific underlying contributory factors will help focus a targeted approach that is backed by evidence which help strengthen the health system to reverse this trend.

Chapter 2: Literature Review

2.1. Introduction

Diabetes mellitus is a non- communicable disease with multi-organ involvement complications, emanating from the body`s inability to regulate optimum blood sugar levels. Several studies to the effect of identifying risk factors for developing diabetes mellitus have been done internationally, with very few having been done at the local level. Until recently it was believed as a disease which occurs mainly in developed countries; however more recent findings show occurrence of new cases of diabetes mellitus in developing countries[5]. Evidence indicate an increase in the prevalence of lifestyle related diseases such as hypertension and diabetes mellitus with not much effort being made in making communities understand the role of social or personal determinants of health such as lifestyles and education [4]**.** This is against a background characterized by a deliberate focused attention by health systems on communicable conditions such as HIV, TB and Malaria at the neglect of the overgrowing epidemic of non communicable conditions**.** Taking note that diabetes mellitus has complications that affect other vital organs such as kidneys thus proliferating other life threatening conditions, focused interventions on self-care become of paramount importance.

2.2. Hospitalization

A population-based cohort study of type 2 diabetes mellitus conducted in Sweden reported that the annual rate of hospitalization among type 2 diabetes ranged from 12% to 16%.[6] Close to 60% of the total costs of hospitalization could be attributed to inpatient care[6]. The increasing incidence of type 2 diabetes mellitus has also been associated with earlier onset of complications, thus creating further demands on the health delivery system[7]. This trend translates into overburden of the already stressed health delivery system that is struggling to cope with the burden of other preventable epidemic prone communicable conditions of public health significance. However being a chronic condition, the goal of treatment efforts as in other such conditions is to prevent or delay as best possible the onset of complications that come up with degenerative diseases.

A study conducted in the U.S. provided evidence that hospitalizations for chronic medical conditions like diabetes may be prevented if patients received access to timely and appropriate outpatient treatment[8]**.** Furthermore, hospitalizations due to such conditions as diabetes mellitus whose complications can be avoided through early and prompt diagnosis are considered an indicator to measure the quality of outpatient services since they could have been easily prevented and controlled by primary health care.[9] This calls for the need to explore the quality of outpatient services in Guruve and Mazowe districts.

2.2.1 Diabetes Mellitus; Type 1

Type 1 diabetes mellitus, a relatively rare form of diabetes mellitus emanates from the inability of the body to naturally produce its own insulin. This leads individuals affected to solely depend on insulin administered by injection, thus being the only way to ensure survival of related complications and even death. The American Diabetes Association Report of 2002 notes ketoacidosis as the most common of complications arising from inadequate insulin and accounts for the majority of hospital admissions and mortality among type 1 diabetes mellitus clients[10]. This signifies the importance of insulin therapy in the admission status of patients and resultantly their survival.

2.2.2 Diabetes Mellitus; Type 2

According to the World Health Organization, type 2 diabetes contributes 90% to the global burden of diabetes mellitus, mostly affecting individuals who are overweight and emanating from the body`s inability to use insulin [11]. Means of controlling weight therefore become important areas of focus in patients with type 2 diabetes. In addition to controlling weight, adherence to oral medication is highly important once diagnosed. The CDC National Diabetes Fact Sheet, 2007, attributed premature mortality and morbidity related to amputations, cardiovascular disease, blindness and kidney conditions, to be as a result of type 2 diabetes[12]. This brings to fore the public health importance of diabetes mellitus due to the extensiveness of the above-highlighted complications.

However, common to these two categories, type 1 and type two, is the fact that their control depends largely on patient self care management practices that include but nonetheless not

limited to blood glucose control by following prescribed diet and weight loss activities and adherence to prescribed medication.

2.3. Risk factors for complications and hospital admissions

Although regular physical activity (PA) has been documented among other initiatives as significant in preventing or delaying diabetes and its complications most people with type 2 diabetes are inactive[13], which is actually a cause for concern.

Consistent with this, significant association has been established between social support and adherence to advised physical exercise [14]. The same is shared by Kneckt MC et al. who found significant association between self-esteem and self management practices among type 1 diabetes mellitus patients[15,16]. This highlights the logic of directing efforts to promote physical activity on developing self efficacy and fostering social support from family members, friends, and health care providers. Encouraging mild or moderate PA may be most beneficial to adoption and maintenance of regular PA participation. This is well documented evidence in studies in the developed countries. However, there is need to generate evidence of the various subpopulations at risk of such predisposing factors fuelling diabetes mellitus complications in a developing setup as the Zimbabwean situation that may have a diverse culture and socio-economic dynamics.

Finally, the emerging importance of sedentary behaviours in determining metabolic risk suggests that future interventions may also benefit from attempting to decrease sitting time and periods of extended sedentary activity[17]. This is overwhelming evidence of the significance of determining

the occupational patterns that may be contributing to risks of deterioration due to diabetes mellitus in the local setup. This raises the need to explore the prevalence of such predisposing factors in determining their weighted contribution towards complications that leads into hospitalization**.**

There is also evidence that there is positive correlation between the risk of type 2 diabetes and consumption of saturated fat and trans-fat and the reverse with polyunsaturated fat from vegetable sources[18,19].

Exploration of attitudes towards vegetable intake among local diabetes mellitus patients as well as the available social support system or the lack thereof towards this becomes significant.

In a study to determine the relative effect of self-management practices on Blood sugar control in type 2 diabetic patients in Mexico[20], a setting comparable to the Zimbabwean one in terms of level of socio-economic development diet was the only effective self-management practice. However there is need for the current study to explore the current practice with regards to the practice of health education concerning specific diet to be followed and determining the level of adherence to the prescribed diet.

However there are disparities in terms of the quality of healthcare services offered in Mexico and Zimbabwe, which prompts the current study to determine other risk factors to diabetes mellitus complications` significance on the Zimbabwean situation under the same research methodology of cross-sectional nature.

The same background is shared by the findings of Anderson BJ et al that for those already suffering from type 2 diabetes, adherence to treatment, diet, exercise, foot care and having

regular eye examinations were significantly associated with suffering fewer complications while improving health outcomes[21]. Therefore, risk factors for complications of diabetes mellitus that leads to hospitalisation are well documented. However, determining their prevalence at a localized level translates into locally consumable evidence that thrives on programme objectivity and efficiency rather than on generalization of interventions.

2.3.1. Prevalence hospital admissions due to diabetes mellitus

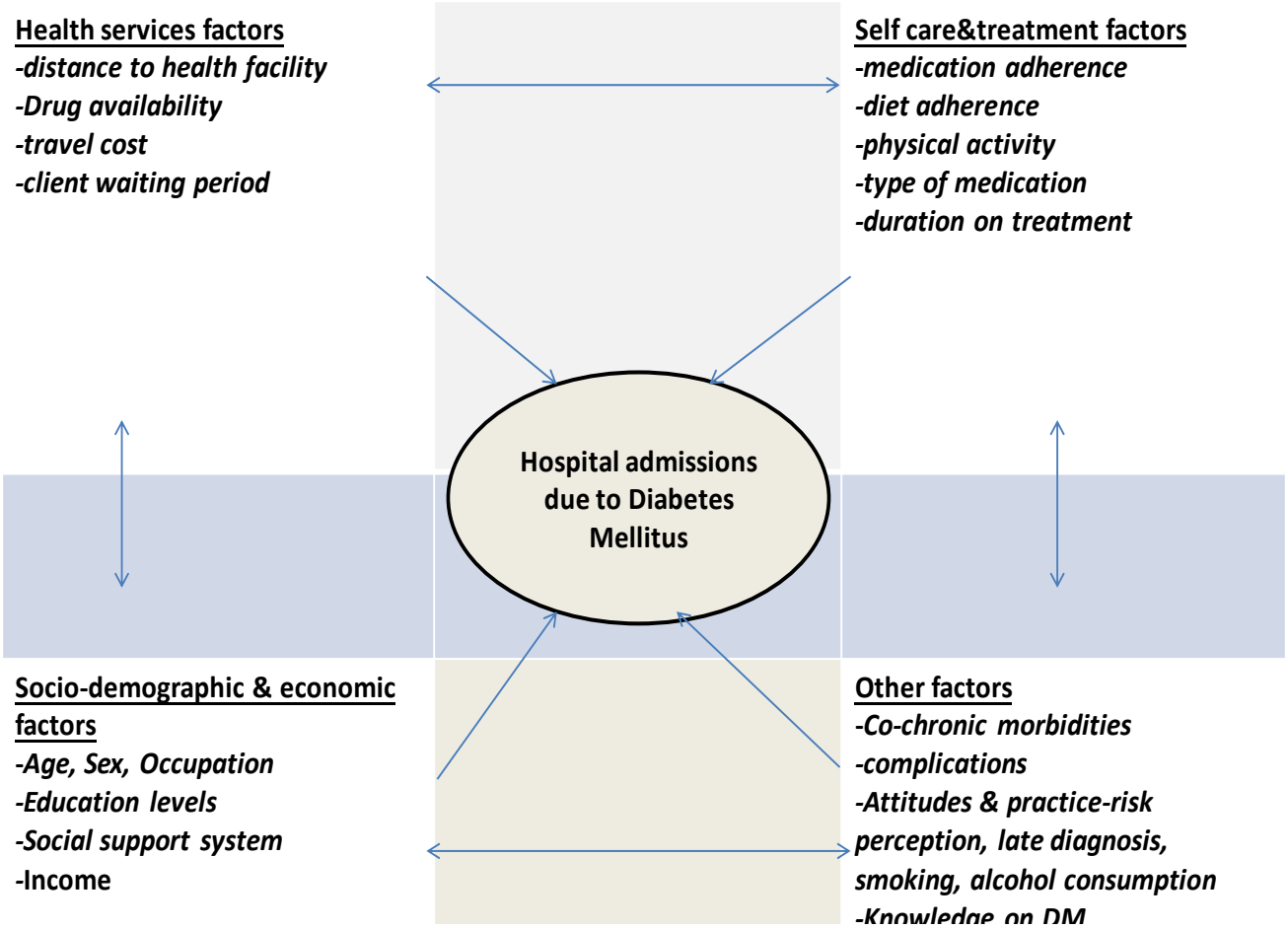
The increasing prevalence of diabetes will increase demand for hospital services, particularly for inpatient care.

A population-based cohort study of type 2 diabetes mellitus patients conducted in Sweden reported that the annual rate of hospitalization among type 2 diabetes ranged between 12% to 16% and inpatient care was the major contributor to annual costs of care[6]. 16% has been used in this study to come up with a minimum sample size.

Conceptual framework

There are several factors that could be associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe districts. Figure 2 below shows a conceptual framework adopted from the Health Systems Research module illustrating linkages between health services factors, self care & treatment factors, socio-demographic & economic factors and the outcome variable of interest, hospital admissions due to diabetes.

Figure 2: Diagram of conceptual framework



(adapted from Health Systems Research Guidelines)

Justification

In Zimbabwe, non-communicable conditions had not been prioritised at the same wavelength as communicable and infectious diseases, and as a result there had not been deliberate focussed attention by health service programming to the effect of addressing such conditions. The increasing prevalence of diabetes will increase demand for hospital services overall, and particularly for inpatient care. Therefore the realization of risk factors for hospitalization will help avert complications, human suffering and related costs. In view of this growing burden of diabetes mellitus, there is need to realize reliable evidence of the true extent of the magnitude of the underlying factors that fuel hospitalizations due to diabetes mellitus, accordingly influence policy and allocation of resources from the perspective of the operational level.

The results of the study will inform how best preventive & treatment programs may minimize the development of complications that will eventually require hospitalization.

Research Question

What are the factors associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe Districts?

Hypothesis:

H0: Economic, socio-demographic, treatment and health service related factors and knowledge and practices are not associated with hospital admissions due to diabetes mellitus among registered diabetes mellitus patients in Guruve and Mazowe districts.

H1: Economic, socio-demographic, treatment and health service related factors and knowledge and practices are associated with hospital admissions among registered diabetes mellitus patients in Guruve and Mazowe districts.

Study Objectives

Broad Objective

To determine factors associated with hospital admissions among registered Diabetes Mellitus patients in Guruve and Mazowe Districts (2013)

Specific Objectives

- To determine the prevalence of hospital admissions among registered diabetes mellitus patients in Guruve and Mazowe Districts.
- To determine the demographic factors associated with diabetes mellitus hospital admissions in Guruve and Mazowe districts.
- To determine the socio-economic factors associated with diabetes mellitus hospital admissions.
- To determine patient related factors influencing diabetes mellitus admissions
- To determine health service related factors that are contributing to hospital admissions among diabetes mellitus patients.

Operational Definitions

- Physical activity-defined as the movement of the body due to contractions made by skeletal muscles thus expending energy for 30 minutes per day in at least 5 days of the week, or more.
- Diabetes is defined as having a fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) or being on medication for raised blood glucose.
- Adherence is defined as wilful and active participation of a patient in the management of his or her condition by deliberate following through the informed choices agreed to, with the service provider.
- Urbanized residence is such area of stay comprised of piped water and electricity
- Health education refers to an educational session on diabetes mellitus covering risk factors and management of the condition given by a qualified health professional.
- Admissions refer to the hospitalization more than once of a diabetes mellitus patient for any duration as a result of the condition or its related complications.

Chapter 3: Methods

3.1. Study Type

An analytical cross-sectional study was conducted with all registered diabetes mellitus patients attending review visits at the four treatment sites being assessed their history of hospital admissions against their treatment related characteristics, health service related, socio-demographic and economic characteristics. Bivariate and multivariate analysis of these characteristics with outcome variable of hospital admissions due to diabetes mellitus was done to establish independent associations.

3.2. Study Setting*:*

The study was carried out in Guruve and Mazowe districts (two of eight districts) in Mashonaland Central Province at the following treatment sites: Guruve district hospital (Guruve district) and Concession hospital, Howard hospital and Mvurwi hospital (all three in Mazowe district).

3.3. Study population

The study population comprised of all registered diabetes mellitus patients in the two districts. There were a total of 582 registered diabetes mellitus patients in the two districts at the time of data collection.

3.4. Study Unit

A diabetes mellitus patient registered in Guruve or Mazowe district and receiving treatment at any of the four treatment centres, Guruve, Concession, Howard and Mvurwi hospitals.

3.5. Sampling Technique

There were 202 patients receiving treatment at the four treatment facilities in the two districts during the study period. A census of all registered diabetes mellitus patients receiving treatment in Guruve and Mazowe districts during the study period was done.

3.6. Sample Size

The statcalc function of Epi-info was used to calculate the minimum required sample size. This was done at 95% confidence level for a population survey, and assuming an annual hospitalization of up to 16% revealed by a population-based cohort study among diabetes mellitus patients in Sweden[6], a minimum sample of 152 patients was obtained.
However, for enhanced power of the study, a sample size of 202 patients was considered.

3.7. Inclusion criteria

The study included registered diabetes mellitus patients resident and receiving treatment in Guruve or Mazowe district during the study period and would have consented to participate in the study.

3.8. Exclusion criteria

The study excluded patients who were not resident in or not on treatment at treatment facilities in Guruve or Mazowe districts during the study period and those who did not consent to participate in the study.

3.9. Variables

3.9.1 Dependent Variable

- Hospital admissions due to diabetes mellitus

3.9.2 Independent Variables

Table 1: Independent variables

Demographic factors	Knowledge and practices	Self care/Treatment factors	Health service factors
• Age • Sex • Occupation • Residence (Rural/Urbanized) • Marital status • Level of education • Body Mass Index	• Health education • Causes of diabetes • Smoking • Diet adherence • Obesity	• Type of treatment (Diet/Oral/Insulin) • Duration of illness • Physical activity • High level of saturated fat intake • Alternative therapies • Alcohol consumption • Support from family members • Missed doses • Co-morbidity with Hypertension	• Management model(Diabetes clinic days) • Distance from hospital • Adequacy of supplies

3.10. Data Collection

An interviewer-administered questionnaire was used to collect data from the participants (See Annex 3). The questionnaire was administered in Shona language. The data collection exercise was done in a period of one month from 15 July to 16 August 2012.

3.11. Pretesting.

The data collection tool was pretested at Guruve district hospital and adjustments were done where seen necessary.

3.12. Data analysis

Epi Info version 3.5.1 was used to enter, clean and analyse data. Frequencies and proportions were generated. Prevalence odds ratios (POR) were used to determine strength of associations between the independent variables and the outcome of interest (hospital admissions due to diabetes mellitus). The outcome of interest was hospital admissions more than once attributable to diabetes mellitus and 95% confidence intervals for PORs were used to determine the significance of associations between independent variables and the outcome of interest. Multivariate analysis was performed to identify independent risk factors for factors associated with hospital admissions and to control for confounding variables. The Multivariate model initially included all variables with a p-value of 0.25 or less.

3.13. Permission to proceed with study

Permission to carry out the study was sought and granted by the Department of Community Medicine, The Provincial Medical Director for Mashonaland Central Province, and the District Medical Officers for Guruve and Mazowe districts.

3.14. Ethical considerations

Ethical approval for the protocol was sought from the Joint Research Ethics Committee and the Medical Research Council of Zimbabwe and was granted (See Annex 6 and 7). The study protocol was explained in full to all study participants in Shona (their local language). Written informed consent was obtained from all study participants using a consent form (See Annex 1 and 2). No one was forced, coerced or persuaded in any way to participate in this study. Study participants were allowed to terminate their participation at any time they felt like doing so. The consent forms and filled questionnaires were stored separately under lock and key by the Principal Investigator at Guruve district hospital where data analysis was done. Confidentiality was assured and maintained throughout the study.

Chapter 4: Results

Findings

A total of 202 diabetes mellitus patients registered and attending review appointments at Guruve, Howard, Concession and Mvurwi hospitals were interviewed.

4.1 Socio-demographic characteristics of participants

The Table below shows the socio-demographic characteristics of the study participants.

Table 2: Socio-demographic variables of 88 clients with admission history and 114 clients without admission history due to diabetes mellitus.

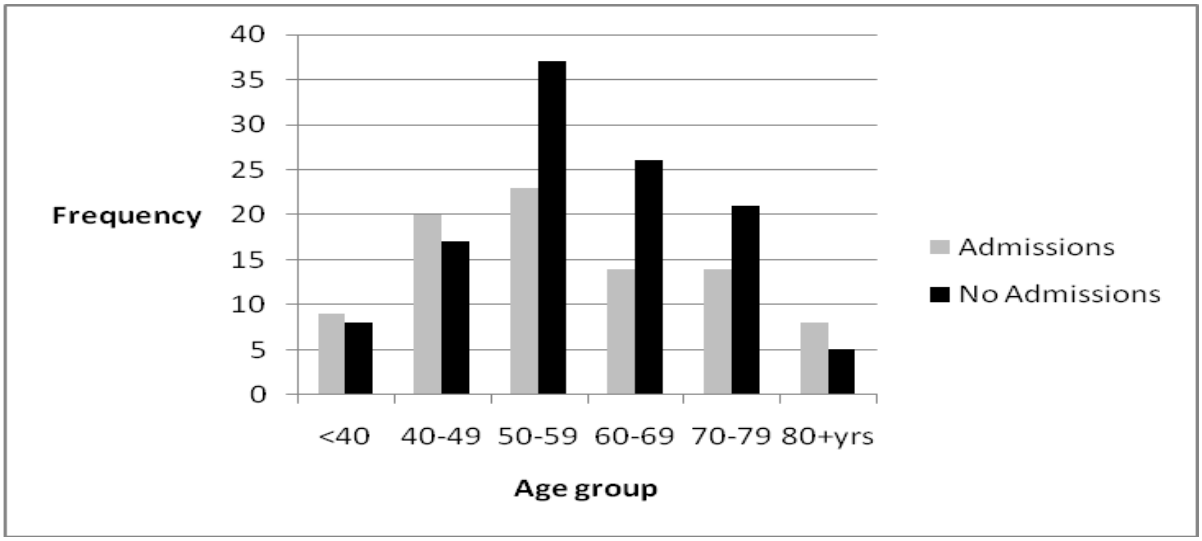
Variable	Frequency (N=202)	Proportion (%)
Sex		
Males	56	27.7
Females	146	72.3
Age (Years)		
Below 40 yrs	17	8.4
40-49	37	18.3
50-59	60	29.7
60-69	40	19.8
70-79	35	17.3
80 yrs and above	13	6.4

Marital status		
Married	147	72.8
Single	1	0.5
Widowed	48	23.8
Divorced	6	3.0
Education		
None	42	20.8
Primary	91	45.0
Secondary	56	27.7
Tertiary	13	6.4
Religion		
Apostolic	64	31.8
Pentecostal	99	49.3
Atheist	29	14.4
Traditional African	9	4.5
Distance to nearest health facility		
<5 km	66	32.7
5-10 km	61	30.2
> 10 km	75	37.1

Treatment Facility		
Concession	69	34.2
Mvurwi	46	22.8
Guruve	49	24.3
Howard	38	18.8
Occupation		
Formal	33	16.3
Informal	42	20.8
Unemployed	127	62.9
Family support		
Yes	144	71.6
No	57	28.4

Among the 202 sample, the admission prevalence was found to be 43.6%. While 146 (72.3%) of the participants used conventional medicine only, 26 (12.9%) reported complementing with traditional medicine and 30 (14.9%) complemented with faith healing for various ailments. By Body Mass Index (BMI), only 67 of the 202 respondents (33.2%) fell within the normal range while 71 (35.1%) were overweight, 58 (28.7%) were obese and 6 (3%) were underweight. Figure 3 below shows the distribution of study participants with history of admissions and those with no admissions by age group.

Figure 3: Distribution of admissions and non admissions by age group, Guruve and Mazowe Districts, 2013.



The majority of the respondents (85.1%) were in the 40-79year age group. The same age group also accounts for 71 (80.7%) of the total admissions, with the highest of 23 (26.1%) occurring in the 50-59 age range. The least number of admissions occurred in the 80+ years age group with 5 admissions. Of the 202 study participants, 164 (81.2%) are on oral tablets medication, 32 (15.8%) are on insulin and 6 (3%) are on dietary control. However, no statistically significant associations could be established between the independent age groups and the admission outcome as shown in Table 3 below.

Table 3. Age group associated with hospital admissions in Guruve and Mazowe, 2013.

Factor	Admissions n=88 (%)	Non-admissions n=114 (%)	Odds ratio	Confidence interval	P-value
<40years					
Yes	9 (10.2)	8 (7.0)			
No	79 (89.8)	106 (93.0)	1.51	0.56-4.09	0.576
40-49years					
Yes	20 (22.7)	17 (14.9)			
No	68 (77.3)	97 (85.1)	1.68	0.82-3.44	0.215
50-59years					
Yes	23 (26.1)	37 (32.5)			
No	65 (73.9)	77 (67.5)	0.74	0.40-1.36	0.413
60-69years					
Yes	14 (15.9)	26 (22.8)			
No	74 (84.1)	88 (77.2)	0.64	0.31-1.31	0.298
70-79years					
Yes	14 (15.9)	21 (18.4)			
No	74 (84.1)	93 (81.6)	0.84	0.40-1.76	0.779
<80years					
Yes	80 (90.9)	109 (95.6)			
No	8 (9.1)	5 (4.4)	0.46	0.14-1.45	0.288

Table 4: Age variations between 88 diabetes mellitus patients with admission history and 114 patients without history of admissions.

Variable	Admissions	Non admissions
Age	Median=56 (Q1=48; Q3=69)	Median=58 (Q1=51 ; Q3=68)

The median age among those clients with a history of hospital admissions due to diabetes mellitus was 56 years, slightly lower than that of those clients without an admission history due to diabetes mellitus at a median of 58years.

The middle half of all the observations in age among those clients with a history of admissions was found to be spread across 22 years, slightly greater than that among clients without a history of hospital admissions which was spread across 17 years.

4.2 Bivariate Analysis

Hospital admissions

Bivariate analysis was conducted to determine factors that are associated with at least two hospital admissions attributed to diabetes mellitus. The results are summarised in the tables 5, 6 and 7 below.

Table 5: Socio-demographic factors associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe, 2013.

Factor	Admissions n=88 (%)	Non-admitted n=114 (%)	Prevalence Odds ratio	95% Confidence interval	p-value
Sex					
Female	72 (81.8)	74 (64.9)			
Male	16 (18.2)	40 (35.1)	2.43	1.25-4.73	0.012*
Marital status					
Not Married	22 (25,0)	33 (28.9)			
Married	66 (75,0)	81 (71.1)	0.82	0.44-1.54	0.641
Employment status					
Not Employed	63 (71.6)	64 (56.1)			
Employed	25 (28.4)	50 (43.9)	1.97	1.09-3.56	0.035*
Education Status					
Not Educated	68 (77.3)	65 (57.0)			
Educated	20 (22.7)	49 (43.0)	2.56	1.38-4.77	0.004*
Residence type					
Urban	28 (31.8)	39 (34.2)			
Rural	60 (68.2)	75 (65.8)	0.90	0.50-1.62	0.836
Obese					
Yes	31 (35.2)	27 (23.7)			
No	57 (64.8)	87 (76.3)	1.75	0.95-3.24	0.101
Self referral for 1st diagnosis					
Yes	2 (2.3)	10 (8.8)			
No	85 (97.7)	103(91.2)	0.24	0.06-1.14	0.102

*****Statistically significant

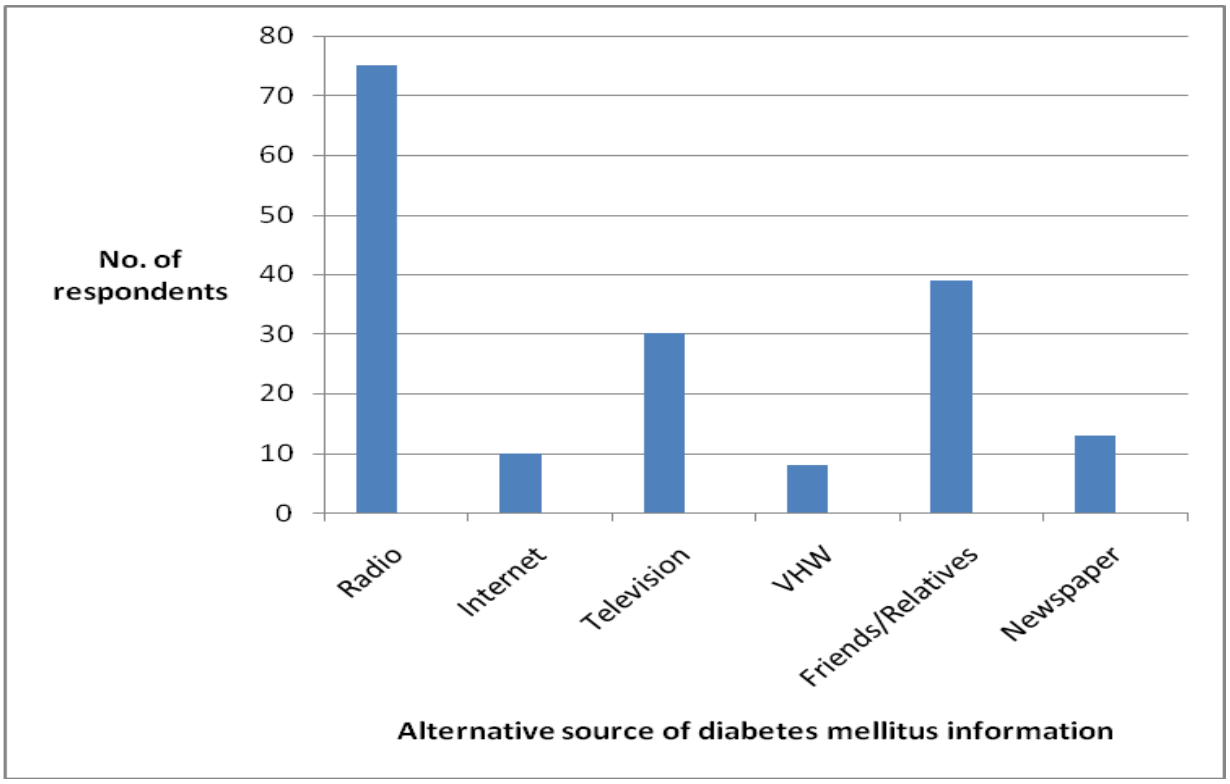
Being female was positively associated with hospitalisation due to diabetes mellitus with those who were female being 2.43 times more likely to be admitted due to diabetes compared to males and this was statistically significant(p=0.012). Being unemployed and less educated(primary level and below) were also found to be significant risk factors for hospitalisation due to diabetes mellitus with a 1.97 and 2.56 more likelihood of getting admitted compared to those who were employed and more educated respectively, p=0.033 and 0.0042 respectively.

Table 6: Sources of diabetes mellitus lifestyle modification related information associated with hospital admissions in Guruve and Mazowe, 2013.

Source of Information	**Admissions n=88**	**Non admitted n= 114**	**POR (95% Confidence interval)**	**p- value**
Verbal health education by health workers at health facilities on lifestyle modification				
Yes	87 (98.9)	105(92.1)		
No	1 (1.1)	9 (7.9)	7.46 (0.93-60.02)	0.062
Posters and Pamphlets				
Yes	20 (22.7)	29 (25.4)		
No	68 (77.3)	85 (74.6)	0.86 (0.45-1.66)	0.779

There is a 7.46 more likelihood of getting admitted due to diabetes mellitus among those that received verbal health education by health workers at health facilities on lifestyle modification than those that did not. This was however not statistically significant at p-value 0.062 and could be attributed to the sample size being small as evidenced by the 95% confidence interval width.

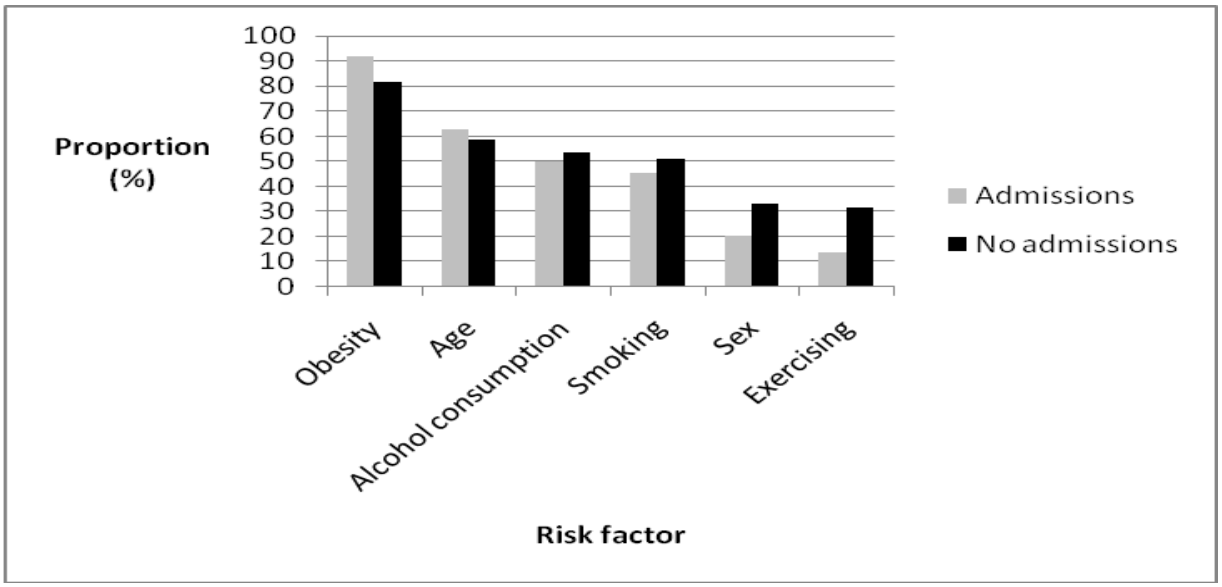
Figure 4: Alternative sources of diabetes mellitus information apart from health facility



Information aired through the radio regarding lifestyle modification on diabetes put radio first as the best alternative source of such information among respondents (37.1%) with Village Health workers accounting for the least alternative, mentioned only by 4% of the respondents.

The graph in Figure 5 below shows knowledge levels of diabetes and its risk factors among those with admission history and those without.

Figure 5: Knowledge of risk factors for diabetes mellitus by admission status



Identification of obesity and age as being risk factors for developing diabetes was comparable between those who had a history of admission and those that had none with the former being slightly higher. The reverse was true for alcohol, smoking and sex. Exercise was mistaken for a risk factor more in the non admitted group than the admitted.

Table7: Treatment related factors associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe, 2013.

Factor		Admissions n=88 (%)	Non-admissions n=114 (%)	Odds ratio	95% Confidence interval	P-value
Treatment type:	Insulin	21 (23.9)	11 (9.6)			
	Diet + oral tablets	67 (76.1)	103 (90.4)	2.93	1.33-6.48	0.011*
Missed doses:	Yes	19 (22.1)	23 (20.7)			
	No	67 (77.9)	88 (79.3)	1.09	0.55-2.15	0.954
DM issues not part of public health discussions:	Yes	79 (89.8)	80 (70.2)			
	No	9 (10.2)	34 (29.8)	3.73	1.68-8.28	0.001*
Duration of treatment:	4years+	52 (59.1)	44 (38.6)			
	<4years	36 (40.9)	70 (61.4)	2.30	1.30-4.41	0.006*
Diagnosis status:	Old(1yr+)	76 (86.4)	77 (67.5)			
	New(1yr<)	12 (13.6)	37 (32.5)	3.04	1.47-6.28	0.003*

Co-morbidity with hypertension	Yes	55 (62.5)	72 (63.2)			
	No	33 (37.5)	42 (36.8)	0.97	0.55-1.73	0.959
Support group member	Yes	13 (14.8)	4 (3.5)			
	No	75 (85.2)	110 (96.5)	4.77	1.50-15.18	0.009*
Sedentary lifestyle	Yes	18 (20.5)	15 (13.2)			
	No	70 (79.5)	99 (86.8)	1.70	0.80-3.59	0.231

*****Statistically significant

Those patients on insulin were found to have a 2.93 times more likelihood of getting admitted due to diabetes than their counterparts on dietary and oral medication control. This was statistically significant (p=0.011). Of the 202 study participants, 32 (15.8%) were on insulin medication while 164 (81.2%) were on oral tablets.

Patients who reported hailing from communities where diabetes was not discussed at public meetings and gatherings had a 3.73 times more likelihood of getting admitted due to the condition as compared to those who hailed from areas where diabetes education was incorporated in public gatherings. This was statistically significant (p=0.002).

Long duration on treatment for diabetes (4+ years) was found to be associated with a 2.30 times likelihood of getting admitted as a result of the condition with a significant p-value of 0.006.

Compared to newly diagnosed cases (1year<), older cases had a 3.04 times more likelihood of getting admitted at a significant p-value of 0.003. Support group members were 4.77 times more

likely to get admitted due to diabetes as compared to their counterparts who were not members. This was statistically significant with a p value of 0.009.

Table 8: Health services related factors associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe districts, 2013.

Factor		Admissions n=88 (%)	Non-admissions n=114 (%)	Odds ratio	Confidence interval	P-value
Hospital DM management model:	Routine	37 (42.0)	32 (28.1)			
	DM clinic reviews	51 (58.0)	82 (71.9)	1.86	1.03-3.35	0.054
Distance to hospital:	5km^{+}	58 (65.9)	78 (68.4)			
	<5km	30 (34.1)	36 (31.6)	0.89	0.49-1.61	0.821
Inadequate medical supplies:	Yes	58 (67.4)	65 (58.6)			
	No	28 (32.6)	46 (41.4)	1.47	0.81-2.64	0.259

Only hospital management model was statistically significant (p=0.054)in its association with hospital admissions with 1.86 times the odds of admissions in those on routine individual care as compared to those on clinic review model of care.

4.3 Logistic Regression Analysis to determine independent factors associated with hospitalisation due to diabetes mellitus.

Multivariate analysis was carried out to estimate the measures of association while at the same time controlling for a number of confounding variables. All the factors with p< 0.25 in the bivariate analysis were included in the logistic regression model.

The adjusted odds ratios (AOR) and 95% confidence intervals (95% CI) from the final model are presented in the table 8 below:

Table 9: Independent risk factors associated with hospital admissions due to diabetes mellitus in Guruve and Mazowe districts, 2013.

Risk factor	Odds ratio	95% C.I	P-value
On insulin(Yes/No)	2.74	1.22-7.27	0.017
Low level of education(Yes/No)	2.74	1.34-5.58	0.006
No DM education done at community level(Yes/No)	3.86	1.60-9.32	0.003
Diagnostic status(Yes/No)	3.06	1.38-6.79	0.006

The results show that insulin medication, low educational level (primary and below), having long been diagnosed with diabetes (1 year+) and residing in areas where there is no diabetes mellitus education at community level were independent factors associated with the likelihood of being hospitalized at least twice due to diabetes mellitus in Guruve and Mazowe districts.

Chapter 5: Discussion, Conclusion and Recommendations

Discussion

The study showed that longer duration of disease was associated with hospitalization and this is consistent with the findings of a study by Javier E et al; 2006 which also revealed longer duration to be associated with poor blood sugar control[20]

Findings from this study showed that those on insulin medication had a higher likelihood of hospitalization compared to their counterparts on oral and dietary control. Notably, only 8 (25%) of those on insulin got adequate monthly supplies of insulin and injections while 66 (40%) of their counterparts on dietary and oral tablets control were receiving adequate consignments of their medication. This brings to fore the significant contribution of provision of adequate medical supplies to insulin medication dependent clients, in determining their hospitalisation status. Furthermore, it can be argued that administration of insulin in the correct dosage is unlikely where there is inadequate supply of such consumables as syringes and insulin. This predisposes patients to extended periods of either over dosage or under dosage therefore predisposing them to impaired control which becomes conducive to hospitalisation. There is therefore a felt need to strengthen the health system to adequately supply such commodities which were reported to be often out of stock. It could not however be ascertained as to how many were type1 or type 2 among the respondents as such information was not recorded on the patients` records.

The majority of the respondents (67.8%) were aged between 40-69 years with median ages of those with a history of admissions and the non admitted being 55.5years and 58.57years respectively. This is consistent with the World health statistics 2011 which states that most

people with diabetes in low and middle income countries are middle-aged (45-64years) and not the elderly (65+)[22]. Notably, this represents the productive age group which is under threat due to the increasing incidence of diabetes which could affect family income due to considerable productive time being lost due to morbidity and treatment costs that are relatively expensive.

Of the 202 diabetes patients under study, 160 (89.2%) attained at least the primary level of education. This could have a significant role in the understanding of the disease and hence increasing compliance and adherence to prescribed lifestyle modification measures conducive to reduction of unplanned hospitalisation due to diabetes. Notably, those who attained primary education and below were more likely to be hospitalised compared to those who attained secondary level of education and beyond. This shows the importance of education in the management and control of diabetes mellitus.

The lack of health education on diabetes at community level was significantly associated with hospitalisation. This can be attributed primarily to the inherent lack of understanding of their condition and the requirements for proper care and treatment. This is consistent with findings by Flores Rivera in 1998 reporting lack of previous outpatient health education to be associated with outcomes conducive to hospital admissions[23].

Accessibility of health services remains a problem especially in rural and resettlement settings were patients have to travel long distances to access health care. This is further compounded by chronic shortages of medical supplies in treatment facilities which aid in making such important services inaccessible.

A limitation of this study, however, is that it is a cross-sectional design and thus examines patients at only a single point in time and thus cannot evaluate changes or improvements in lifestyle and related associated with hospitalization.

Conclusion

The prevalence of hospital admissions among registered diabetes mellitus patients in Guruve and Mazowe Districts is 43.6%.There were a higher proportion of females who had diabetes and history of hospital admissions secondary to diabetes mellitus but there is an insignificant association between gender and hospital admissions. Diabetes and admissions due to the condition were more common in the 40-69years age group and not in the very young and the very old. Having received health education on diabetes targeting the family support system and the community at large was highly protective against hospitalisation due to diabetes. Insulin therapy was strongly associated with hospitalisation.

Independent predictors of hospitalisation due to diabetes were type of treatment, level of education, community based health education and time lapse after diabetes diagnosis.

Recommendations

Based on the findings of this study, there is need to consider the following proposals and recommendations in order to reverse the increasing rate of hospitalisation due to diabetes mellitus. There is need for the District Health Executives (DHEs) of the two districts to ensure inclusion of the family support structure in lifestyle modification education and counselling sessions meant for diabetes mellitus clients. It is from the family support structure and the community at large that treatment supporters who will remind and assist them to take their medication and adhere to prescribed self care principles can be identified. This helps ensure sustainability of diabetes control efforts at individual, household and the community level at large.

There is also great need for treatment facilities to put in place and institute monthly diabetes mellitus clinic review dates as a standard of care principle. This does not only ensure hospitals an opportunity to prepare and provide a comprehensive package of follow up care and support for diabetes mellitus clients but also accord clients an opportunity to share experiences especially on lifestyle modification and self care practices.

Health education concerning lifestyle modifications to those conducive to proper diabetes mellitus management should be a continuous process that does not end at diagnosis of the condition only. Ensuring that health education is given to all patients as part of their treatment package and is sustained throughout the subsequent review visits should be the thrust of health promotion activities aimed at all diagnosed cases.

It should also be considered at policy level through the respective DMOs to advocate for the capacitating of clinics to store and dispense oral anti-diabetic drugs and insulin to increase accessibility to services by clients. There is also need for health promotion initiatives to strengthen and sustain community health education campaigns especially through capacitating the traditional roles of village health workers (VHWs) to improve community awareness of diabetes. This could promote early diagnosis therefore presenting opportunities for effective early interventions that help avoid preventable hospitalisation and improving the quality and length of productive life among diabetes mellitus clients.

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ANNEX 1: ENGLISH INFORMED CONSENT FORM

UNIVERSITY OF ZIMBABWE

Project Title: To determine factors associated with hospital admissions due to diabetes mellitus among registered diabetes mellitus patients in Mazowe and Guruve Districts.

Principal Investigator : Mr T Mzorodzi

Cell Number : 0775999748

What you should know about this study?

- I give you this consent so that you can read about the purpose, and benefits of this research study.
- The main purpose of this study is to seek knowledge that will help fellow patients in future.
- We do not promise you any physical benefits in return for you participation in this study.
- You have the right to refuse to take part or agree to take part in the study now or to change your mind later.
- Whatever you decide will not affect your regular care at the health facility.
- Please read this consent form carefully. Ask any questions before you make any decision.
- Your choice to participate in this study is voluntary.

Purpose of the Study

You are being asked to participate in a study to determine the underlying factors associated with hospital admissions among registered patients diagnosed with Diabetes Mellitus in Mazowe and Guruve Districts. This study intends to come up with recommendations that will help come up with programs that will help diabetes mellitus patients live long and healthy lives, free of complications.

Procedures and Duration

You are going to be asked questions related to diabetes mellitus treatment and self care practices. Your participation is expected to last for 30 minutes. Your patient card may also be reviewed for additional information concerning your experience with diabetes mellitus.

Risks and Discomfort

The study does not pose any risk to participants. Some questions may feel uncomfortable and inappropriate to respond to but we ensure confidentiality to whatever you tell us in the interview. You are however free to choose not to respond to questions that you may feel uncomfortable with.

Benefits of the Study

The study findings will also be used to improve diabetes mellitus interventions in Guruve and Mazowe districts. There is no monetary benefit or other material benefits obtained from participating in this study. This study is being conducted so as to help people with diabetes mellitus live long, healthy productive lives. This is the main reason for this study being conducted in Guruve and Mazowe districts. You will also be given information and education on

diabetes mellitus in addition to responding to any questions you might have concerning this condition. For additional help, you can be referred accordingly.

Confidentiality

If you consent to participate in this study through you signature on this form, information discussed can be accessed by my lecturers at the University of Zimbabwe or the Ministry of Health and Child Welfare or MRCZ only. Information from this study can be discussed at various forum for purposes of enhancing better management of diabetes mellitus. Information to do with your identity and your life will remain strictly confidential.

Costs/Benefits

There is no financial benefit for your participation in this study.

Risk/harm

In the event that you have suffered as a direct cause of this study, you will be attended to at this hospital and be exempted from paying any bills.

Consent

Declining to participate in this study won`t affect your relationship with health workers at this hospital. Should you decide to withdraw from this study at any point, it is your right to do so.

Questions

You are free to ask any questions you might have before you sign this form. Should you want some time to decide, you are free to do so.

Authorization

You are making a decision whether or not to participate in this study. Your signature as a participant indicate that you have read and understood the information provided above, have had all your questions answered and you have decided to participate in the study.

Name of participant …… ……

Date ……

Signature of participant ……

Signature of Research staff …….

You will be given a copy of this form to keep if you have any further questions concerning this study please feel free to contact the Medical Research Council of Zimbabwe on telephone 04-791792 or 04-791193

ANNEX 2: GWARO RECHITENDERANO

Tsvakiridzo yezvikonzero zvinoita kuti varwere vesugar vakawanda vabatwe muzvipatara nekuda kwechiwrere ichi mumatunhu anoti Guruve ne Mazowe kuMashonaland Central Province.

Muongorori : Mzorodzi Takura

Nhamba dzenhare: 0775999748

Zvamunofanira kuziva maererano neongororo ino:

- Tirikukupai gwaro remvumo rino kuti muzviverenge pamusoro pezvinangwa, zvakaipa uye zvakanakira ongororo ino.
- Chinangwa chikuru cheongororo ino ndechekutsvaga ruzivo runozobatsira pakubatsirwa kwenyu nevamwe varwere vachabatsirwa neramangwana
- Hatikuvimbisei kuti mune chinobatika chamuchawana pakupinda muongororo.
- Mune mvumo yekuramba kupinda muongororo kana kutanga mabvuma mozofunga kuramba ongororo yava pakati.
- Zvamunenge mafunga kuita hazvikanganise kubatsirwa kwenyu ramangwana.
- Tapota nyatsoverengai gwaro rino rechibvumirano zvakakwana. Bvunzai mibvunzo yose yamungava nayo musati masarura kupinda kana kusapinda muongororo.
- Kupinda kwenyu muongororo kuda kwenyu.

Chinangwa

Muri kukokwa kupinda mu ongororo yezvikonzero zvinosakisa kuti varwere veshuga vakawanda vabatwe muzvipatara nekuda kwechiwrere ichi mudunhu reGuruve neMazowe kuMashonaland Central Province**.** Ongororo ino inotarisirwa kuburitsa ruzivo rwunozobatsira kuronga zvirongwa zvekuti vanorwara nechirwere cheshuga vararame kwenguva refu uye zvisina matambudziko.

Maitirwo Nenguva Yeongororo

Kana magamuchira kupinda muongoro muchakurukurwa nemi, kwemaminitsi makumi maviri nemashanu. Khadhi renyu rekuchipatara richatariswawo kuti tione umwe umbowo pamusoro pemarapirwo amuri kuita chirwere cheshuga.

Njodzi Kana Kushungurudzika Kwamungasangana Nako

Mimwe mibvunzo yamuchabvunzwa inogona kunge ichinyadzisa kupindura nekuti inobata zvamunoita muhupenyu hwenyu zvakadai sekuputa kana kunwa doro . Hapana mumwe anozoudzwa zvamunenge mapindura pamibvunzo iyi. Kunyange zvakadaro, makasununguka kuramba kupindura mibvunzo yamusina kusununguka kupindura.

Zvakanakira Kuva Muongororo

Hapana muripo wemari kana zvinhu wamuchapihwa muongororo ino. Ongororo irikuitwa kuti tibatsire kuronga hurungwa hwekuti varwere veshuga vararame hupenyu hwakareba pasinawo kurwararwara . Ndicho chinangwa chikuru che ongororo ino mudunhu reGuruve neMazowe uye Zimbabwe yose. Asiwo patichapedza kukurukura nemi, tichakupai dzidziso yezvekudzivirirwa nekurapwa kwechirwere cheshuga, uye kana mune rumwe rwubatsiro rwamungada pamusoro pechirwere ichi, tinokubatsirai nekukuudzai kwamungarwuwana.

Dzimwe Nzira Dziripo

Kana mawanikwa muine dambudziko kuburikidza nechirwere cheshuga monotumirwa kuna mazvikokota.

Kuvimbika Kweongororo

Kana mafunga kupinda muongoro kuburikidza nerunyorwa rwenyu tinogona kuzivisa vadzidzisi vedu paYunivhesiti yeZimbabwe kana bazi rezveutano muhurumende. Tinogona kukurukura zvabuda muongororo pamagungano akasiyanasiyana nechinangwa chekunakisa marapirwo echirwere cheshuga. Ve MRCZ kana Yunivhesiti vanogona kuda kuona mapepa ewongororo ino semutemo weongororo dzinoitwa munyika ino. Zvine chekuita nemazita kana hupenyu hwenyu hazvizoziviswa mumwe munhu. Tichavimba kuchengetedza zvine chekuita nehupenyu hwenyu muchivande..

Mumwe Muripo

Hapana chamunotarisirwa kubhadharwa kuburikidza neongororo ino.

Tombotiti Makuvara

Kurikuti makuvara nekuda kweongororo ino munozorapwa pachipatara chino. Mukurapwa kwenyu hamuna chamunobhadhara. Hapana mubhadharo wemari uchabuda muongororo ino.

Kusununguka Kupinda Muongororo

Kupinda muongororo isarudzo yenyu. Kuramba kwenyu hakukanganise hukama hwenyu nevashandi vechipatara chino. Kana mafunga kupinda mozofunga kubuda muongororo ikodzero yenyu.

Zvimwewo Zvinechekuita Neongororo

Kana mafunga kuzobuda muongororo ino ikodzero yenyu. Kubatsirwa kwenyu hakuzokanganiswa naizvozvo. Tinogona kukuburitsai muongororo ino kana taona zvakakodzera. Zvikaitika izvi tinokutaurirai.

Mibvunzo

Makasununguka kana muine mibvunzo musati maisa runyoro rwenyu pagwaro rino. Kana muchida kanguva kekumbofunga makasununguka.

Mvumo

Muri kutipa mvumo yekupinda muongororo. Runyorwa rwenyu riri kureva kuti manzwisisa ongororo huye mibvunzo yamungave nayo yapindurwa zvinokugutsai mukazvifungira kupinda muongororo.

_____ ____ /____ /____

Zita remupinduri (nyorai zvinooneka) Zuva

_____ _____ : _____

Chiratidzo chebvumirano chemupinduri Nguva

(*kana cheanotenderwa pamutemo)

_____Chiratidzo chearikutambira chibvumirano

Zvamungada Kuziva

- Muchapihwa rimwe gwaro rechitenderano chino kuti mugare naro.
- Kana muine imwe mibvunzo isina kupindurwa nemuongorori, kana mibvunzo yakananganа nekubatwa kwamaitwa muongororo ino, kana kodzero dzenyu, uye kana musina kubatwa zvakanaka sunungukai kubata veMedical Research Council of Zimbabwe panhamba dzerunhare dzinoti: **04-791792** kana **04-791193**

Annex 3: English Questionnaire

English Questionnaire

Date…… **Questionnaire** ☐

Number…….

Hospital: Guruve ☐ **Concession** ☐ **Howard** ☐ **Mvurwi** ☐

Introduction

Good Morning/Afternoon. My name is Takura Mzorodzi. I am a Public Health Officer attached to the PMD, MoHCW –Mashonaland Central Province. As part of my studies I am carrying out a study on **Factors associated with hospitalization among registered diabetes mellitus patients in Guruve and Mazowe districts**. I would greatly appreciate it if you spare some time to go through the questionnaire with me. I have a number of questions concerning diabetes control and your experiences with this condition. Your co operation will be greatly appreciated as it will help towards the reducing morbidity and mortality associated with diabetes mellitus. If you are willing to participate in this study, I will give you a separate document with more details regarding this study. You are supposed to read that document to fully understand the aim and procedures of the study. You will also sign that document as an indication of consenting to participate in the study.

Thank You!

Section A: Socio-demographic details	
1. How old are you? (Age at last birthday in	_____

years)	
2. Sex	1. Male 2. Female
3. At what type of residence do you stay?	1. Urban 2. Peri-urban 3. Rural/communal 4. Farming 5. Mining 6. Other, specify _____
4. What is you marital status?	1. Single 2. Married 3. Divorced 4. Widowed 5. Co-habiting
5. What is your highest level of education?	1. Never been to school 2. Primary 3. Secondary 4. Tertiary

6. What is your occupation?	1. Informal 2. Formal skilled 3. Not employed 4. Other, specify _____
7. What is your religious orientation?	1. Christian 2. Moslem 3. Traditionalist 4. Apostolic 5. None 6. Other specify_____
8. In addition to conventional medicine, what else do you use for treatment when you are not feeling well?	1. Traditional medicine 2. Faith Healing 3. Nothing else 4. Other, Specify.....
9. Have you ever smoked	1. Yes 2. No

10. Do you smoke now?	1. Yes 2. No *If No skip to question 12,*
11. For how long have you been smoking? (state number of years/ months)	_____
12. Do you take alcohol	1. Yes 2. No
13. How often have you been admitted/ hospitalized due to diabetes or related complications?	1. Never 2. Once 3. Twice 4. Thrice 5. More than thrice
Section B- Health Service related factors	
14. Distance of where you stay to this(your) treatment facility .....(kilometres)	1. <5km 2. 5-10km 3. >10km

15. Type of medication:	1. No therapy 2. Moderate oral, 3. High oral or low Insulin, 4. Moderate insulin, 5. High insulin (*If No therapy, skip to23.)*
16. How long after you arrived at the health facility did you have to wait for your resupplies the last time you attended	1. 30 minutes< 2. Between 30mins &1hr 3. Between 1hr & 2hrs 4. >2hrs
17. Do you always get a full supply of your drugs every time you go for resupply?	1. Yes 2. No If No why_____ _____
Section C-Treatment Related Factors	

18. Ever since you were put on medication for diabetes mellitus, did you suffer any adverse drug reactions?	1. Yes 2. No If yes, give detail _____ _____ _
19. Have you ever missed your resupply appointments,	1. Yes 2. No If yes, why? _____ _____
20. Have you ever missed your medication doses?(*If No skip to 22)*	1. Yes 2. No *If No skip to 23,if yes give reasons* _____ _____
21. Have you missed doses for more than 30 consecutive days?	1. Yes 2. No
22. Have you ever been prescribed/ given	1. Yes

advice for a special diet?	2. No
23. Were you given advice to lose weight?	1. Yes 2. No
24. Were you advised to carry out physical exercises/activities?	1. Yes 2. No
25. How long have you been on DM medication?	1. <1year 2. 1year to 3yrs 3. 4-7years 4. >7years
26. What are the signs and symptoms of diabetes mellitus that you know?	1. Headache 2. Dizziness 3. Poor vision 4. Polydispia 5. Fatigue 6.Body weakness 7. Chronic foot sores 8. Asymptomatic

	9. Other, specify _____ 10. Don't Know
27. In what form did health workers provide you advice/ instructions to modify lifestyle?	1. Verbal 2. Written 3. Other, specify_____
28. Apart from health workers 'advice, where else do you obtain information about Diabetes Mellitus?	1. Radio 2. News paper 3. Television 4. Community Health Workers 5. Friends/Family/ Community 6. none 7. Other, specify_____
29. Who accompanies you to a health facility for blood sugar checkups?	11. None 12. Spouse 13. Sibling 14. Child 15. Other, specify_____

30. Do you receive any support from your family to manage this condition?	1. Yes 2. No *If No, skip question 32*
31. What form of support do you receive	1. They prepare separate meals for me 2. Provide with medication 3. They remind me to : exercise/ eat prescribed food/ reduce alcohol intake/quit or reduce smoking/take medication **(***tick response mentioned)* 4. Other, specify_____
32. Are there support groups for diabetes mellitus patients in your area?	1. Yes 2. No *If No skip question 34*
33. Are you a member of any of these support groups?	1. Yes 2. No
34. Are health issues discussed at community/ church / other gatherings in your area?	1. Yes 2. No *If No skip question 36*

35. Do you discuss about diabetes mellitus at these gatherings?	1. Yes 2. No		
Section D-Knowledge, Attitudes and Practice			
36. Which of the following do you think is a risk factor for developing diabetes mellitus?	a. Obesity	No	Yes
	b. Age	No	Yes
	c. Sex	No	Yes
	d. Smoking	No	Yes
	e. Alcohol intake	No	Yes
	f. Exercise	No	Yes
37. Under what circumstances were you first diagnosed as having diabetes mellitus	1. Self referral 2. Provider initiated		
38. Are there other chronic conditions which you are suffering from?	1. Hypertension 2. Coronary Artery Disease		

..... Probe on the following	3. Psychiatric condition 4. Depression 5. Stroke 6. HIV 7. Other DM complications Others, list _____		
39. **Currently how often do you**	1. **Daily**	2. **Sometimes**	3. **Never**
1. Spend most of the day being inactive?			
b. Consume alcohol?			
c. Smoke cigarettes?			
d. Sprinkle salt on your food?			
e. Eat meals without fruits?			
f. Eat meals without vegetables?			
g. Eat food with high animal fats?			
h. Eat fast/ processed foods?			
40. **Anthropometry**	Height (M)_____		

	Weight (KG)_____ BMI (KG/M^2)_____
This is the end of our interview. Thank you for taking your time to participate in this study	

Annex4: Shona Questionnaire

Shona Questioannaire

Date…… **Questionnaire Number……..**

Hospital: Guruve ☐ **Concession** ☐ **Howard** ☐ **Mvurwi** ☐

Mangwanani/masikati akanaka. Zita rangu ndinonzi Takura Mzorodzi. Ndiri mudzidzi wezvekudzivirirwa kwehutano pavhasiti yeZimbabwe ndichibata ndiri mubazi rezveutano mudunhu re Mashonaland Central. Sechinangwa chezvidzidzo zvangu ndirikuita ongororo yemararamiro anoita vanhu vanorwa nechirwere cheshuga mudunhu reGuruve neMazowe. Ndingafara chaizvo mukandipawo nguva yenyu kuti tikurukure zviri pagwaro rangu rino. Ndine mibvunzo yakati kuti maererano nechirwere cheshuga sezvo mhinduro dzenyu dzichabatsira kusimudzira mararamiro evanaorwara neshuga. Kana mabvuma kupinda mutsvakiridzo ino, ndichakupai rimwe gwaro kuti muverenge zvizere maererano netsvakiridzo ino. Gwaro iri rinotsanangura zvinangwa uye maitirwo etsvakiridzo ino. Kana mapedza kuverenga gwaro iri, munokumbirwa kuzosaina pagwaro iroro kuratidza kutimunenge manyatsonzwisisa zvakananganga netsvakiridzo iyi, uye matendera kupinda mutsvakiridzo iyoyi.

Ndatenda!

Section A: Socio-demographic details	
1. Mune makore mangani ekuberekwa?	_____
2. Mukadzi/Murume (*zvinoonekwa nekutarisa munhu*)	3. Murume 4. Mukadzi

3. Munogara kupi?	1. Mudhorobha 2. Pedyo nedhorobha 3. Kumaruwa 4. Kumapurazi 5. Kumugodhi 6. kumwewo _____ _____
4. Makawanikwa/ kuwana here?	1. handina kuwana/ kuwanikwa 2. ndakawana/ wanikwa 3. takarambana 4. ndakafirwa 5. Ndinogara nemurume/mudzimai tisina kuwanana
6. Makasvika rugwaro rwupi pazvidzidzo?	1. handina kuenda kuchikoro 2. danho repuraimari 3. danho resekondari 4. koreji kana yunivhesiti
7. Munoshanda basa rei?	1. ndozvishandira 2. basa rekumukira rinemubhadharo

	3. handishande 4. zvimwewo_____
8. Mune chitendero chipi chamunotevera?	1. Chikristu chependekosita 2. chimoslem 3. chivanhu 4. chipositori 5. chimwewo_____
8. Kunze kwemushonga wechipatara, mune zvimwe zvamunobatsirika nazvo here kana musinganzwi zvakanaka?	1. Mushonga wechivanhu 2. Zvemweya 3. Kwete 4. Zvimwewo _____
9. Makamboputa fodya here?	1. Hongu 2. Kwete
10. Parizvino munoputa here?	1. Hongu 2. Kwete *Kana iri kwete endai kumubvunzo 12*

11. Mava nenguva yakareba sei muchiputa fodya? (makore kana mwedzi)	_____
12. Munonwa hwahwa here?	1. Hongu 2. Kwete
13. Makambobatwa kugara muchipatara nepamusaka pechirwere cheshuga here uye kangani?	1. Kwete 2. Kamwechete 3. Kaviri 4. Katatu 5. Kupfuura katatu
Section B- Health Service related factors	
14. Mufambo uripo kubva kwamunogara kuuya kuno kuchipatara .(mumakiromita)	1. <5km 2. 5-10km **3.** >10km
15. Mhando yemushonga wamunoshandisa:	1. Hapana 2. Mapiritsi chete, 3. Mapiritsi nekuzvibaya Insulin,

	4. Insulin pakati pemazuva, 5. Insulin nenguva dziri padyo *(Kana ari hapana enda kumubvunzo 22.)*
16. Panguva yapfuura yamakauya kumishonga yenyu kana rumwe rubatsiro nechirwere chesugar, makatora nguva yakareba sei masvika kuti mupedze kubatsirwa?	1.Pasi pemaminitsi 30 2.Pakati pe30mins ne1hr 3. Pakati pe1hr & 2hrs 4. Kupfuura 2hrs
17. Munosiwana mishonga yenyu yakakwana here nguva dzese dzamunouya muchiida pachipatara chino?	1. Hongu 2. Kwete Kana ari kwete, ipai zvikonzero _____ _____
Section C-Treatment Related Factors	
18. Kubva zvamakatanga kurapwa chirwere chesugar, mune mareactions amakamboita here kumishonga?	1. Hongu 2. Kwete Kana ari hongu, tsananguraayi _____ _____

19. Makambokundika here kuzotora mishonga panguva yakafanira?	a. Hongu b. Kwete Kana ari Hongu, tsananguraayi _____ _____
20. Pakunwa mushonga wenyu, pane pamakambochirika here*?(Kana ari kwete, enda ku 22)*	1. Hongu 2. Kwete *Kana ari kwete enda ku22,kana ari hongu ipai chikonzero* _____ _____
21. Makambochirika kunwa mishonga yenyu kwemazuva anopfuura makumi matatu here?	1. Hongu 2. Kwete
22. Makambowana dzidziso maererano nekudya kwakanaka kwamunofanirwa kunge muchidya here?	1. Hongu 2. Kwete
23. Makambopiwawo dzidziso maringe nekuchengetedza muviri/ huremu hwakanaka here?	a. Hongu b. Kwete

24. Makambodzidziswa nezvezvakanakira kugara muchigwinyisa muviri wenyu (ku*exerciser)* here?	a. Hongu b. Kwete
25. Mava nenguva yakareba sei kubva mabatwa/ muchirapwa chirwere cheshuga?	1.gore 2. gore kusvika makore matatu 3. makore mana kusvika manomwe 4. kupfuura makore manomwe
26. Ndezvipi zviratidzo zveDiabetes Mellitus zvamunoziva?	1.Kutemwa nemusoro 2. Kunzwa dzungu 3. Kusaona zvakanaka 4. Kunzwa nyota nenguva pfupi 5. Kusagadzikana 6. Kunzwa kuneta muviri 7. Kuita maronda mutsoka anononoka kupora 8. Hapana 9. Zvimwe domai _____

	10. Handizivi
27. Dzidziso dzamakawana maererano nekusandura mararamiro enyu zvinoenderana nechirwere cheshuga makaiwana nenzira dzipi?	1. Kutaurirwa nemuromo 2. Zvinyorwa 3. Zwimwewo, _____
28. Kunze kwevashandi vehutano, munowanepi rumwe ruzivo nezvechirwere cheshuga?	1. Rhedhiyo 2. Pepanhau 3. terevhizheni 4. vana mbuya utano vemunharaunda 5. Shamwari/ hama/ 6. Hapana 7. zvimwewo_____
29. Ndiyani anokuperekedzai kuchipatara kunoitwa ongororo yesugar nezvimwewo?	1. Hapana 2. Murume kana Mudzimai 3. Mukoma kana munin'ina 4. Mwana 5. Zvimwewo_____

	_____
30. Munowana rubatsiro kumhuri yenyu here pakurarama nechirwere cheshuga?	1. Hongu 2. Kwete *Kana ati kwete enda kumubvunzo 32*
31. Rubatsiro rwupi rwamunowana?	1. Vanondibikira kudya kunodzikisa sugar 2. Kunditengera mishonga 3. Vanondiyeuchidza kurarama hupenyu hunodzivirira nekudzikisa sugar 4. Zvimwewo_____ _____
32. Munharaunda menyu mune mapoka evanhu vanorwara neshuga here?	1. Hongu 2. Kwete *Kana ati kwete enda kumubvunzo 34*
33. Muri nhengo yerimwe remaboka aya here?	a. Hongu b. Kwete
34. Nyaya dzezvehutano dzinombo kurukurwawo here pamisangano yemunharaunda yenyu?	1. Hongu 2. Kwete

	Kana ati kwete enda kumubvunzo 36
35. Zvinokurukurwa izvi zvinosanganisawo chirwere cheshuga here?	1. Hongu 2. Kwete
Section D-Knowledge, Attitudes and Practice	
36. Ndezvipi panezvinotevera zvinokonzeresa kubatwa nechirwere cheshuga?	1. Kufuta Hongu Kwete 2. Zera Hongu Kwete 3. Kuva murume/mukadzi Hongu Kwete 4. Kuputa fodya . Hongu Kwete 5. Kunwa zvinodhaka Hongu Kwete 6. Kuita zvinosimbisa muviri Hongu Kwete
37. Muchizobatwa kuti mune chirwere cheshuga, makanga mazvifungira mega kuongororwa here kana kuti nevehutano?	1. Ndakazvifungira ndega 2. Yambiro nevehutano 3. Neshamwari/ hama 4. Zvimwewo _____ _____

	_____		
38. Mune zvimwe zvirwere zvingadai seizvi zvamunazvo here?	1. Chirwere chemwoyo 2. Chemutsinga 3. Pfungwa 4. Depression 5. Stroke 6. HIV 7. Zvimwewo _____ _____ _____ _____		
39. Parizvino munoita zvinotevera kangani	**Mazuva ose**	**Pano nepapo**	**Kana/ Kwete**
1. Kusaita mitambo/ mabasa anosimbisa muviri?			
2. Kunwa Doro?			
3. Kuputa fodya?			

4. Kuwedzera munyu muchikafu?			
5. Kudya michero?			
6. Kudya miriwo?			
7. Kudya mafuta enyama akawanda?			
8. Kudya chikafu chakagadzirwa nemishini?			
40. **Zviyero**	Hurefu (M)_____ Huremu (KG)_____ Kusimba (KG/M^2)_____		
Tasvika kumagumo ehurukuro yedu. Maita basa nguva yenyu nekupindura mibvunzo ino.			

Annex 5: PMD's Approval letter

Annex 6: Institutional Review Board approval (JREC)

Annex 7: Medical Research Council Approval