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Submitted in partial fulfillment of the requirements of the Masters Degree in Medicine (Public Health) in the Health Sciences Faculty, University of Zimbabwe, Harare

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August 2014

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DECLARATION

I certify that this dissertation is my original work and submitted for the Master in Public Health program. It has not been submitted in part or in full to any university and or any publication.

Student:

Signature ___________________________ Date __________________

Dr. Tapera Saravoye

I having supervised and read this dissertation i am satisfied that this is the original work of the author in whose name it is being presented. I confirm that the work has been completely satisfactory for presentation in the examination.

Academic Supervisor:

Signature ___________________________ Date __________________

Professor S. Rusakaniko

Chairman:

Signature ___________________________ Date __________________

Professor S. Rusakaniko
Abstract

**Background:** Diabetes is a chronic condition which often causes severe long term complications which compromise quality of life and burdens health care systems and can cause permanent disability and even death. The incidence of diabetes and the associated complications in Harare as reported through surveillance data has been on the increase. In order to reduce disease burden due to diabetes chronic complications, prevalence and risk factors for diabetes chronic complications must be determined through studies.

**Methods:** A total of 284 diabetics attending diabetic clinics at Parirenyatwa and Harare Central Hospitals were enrolled in this cross sectional analytic study. Interviewer administered questionnaires were used to collect data. The occurrence of diabetes chronic complications and their associated risk factors were analyzed. Written informed consent was sought and obtained from all the respondents.

**Results:** Overall, prevalence of diabetes chronic complications was high with 45% of respondents having at least one diabetes chronic complication. Significant risk factors associated with diabetes chronic complications were: age>50 years (OR=4.34, p<0.001); duration with diabetes>10 years (OR=2.36, p<0.001); type 2 diabetes (OR=1.96, p=0.006); poor control of blood sugar (OR=2.30, p<0.001); poor compliance to medication (OR=1.72, p=0.024); being obese or overweight (OR=1.90, p=0.008); low physical activity (OR=2.27, p=0.001); high LDL-Cholesterol (OR=2.34, p=0.001) and hypertension (OR=1.88 p=0.009). After logistic regression, independent risk factors were as follows: low physical activity (adjusted OR=1.90, p =0.029); duration >10 years with diabetes (adjusted OR=5.34, p<0.001); high LDL-Cholesterol (adjusted OR=1.84, p=0.039) and type 2 diabetes (adjusted OR=6.48, p<0.001).

**Conclusion:** Overall prevalence of diabetes chronic complications was high but comparable to other studies. Several demographic, patho-physiologic and life-style related risk factors associated with diabetes chronic complications were identified. There is need to comprehensively address all risk factors in order to reduce diabetes chronic complications.

**Acknowledgements**
I wish to extend my most profound gratitude to my supervisor Professor S. Rusakaniko for his supervision throughout the study. I would also like to thank Dr Mangwiro and Dr Mafundikwa for allowing me to conduct this study at their diabetic clinics and for their encouragement.

I would like to appreciate all the assistance that I got from staff at both diabetic clinics during data collection. I would also want to thank all the respondents who volunteered to participate in the study. Without their participation, this study would not have been successful.

Last but certainly not least, I would like to thank my wife Emma for her unwavering support.

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1. DM: Diabetes Mellitus
2. HbA1c%: Glycated Hemoglobin percentage
3. LDL-C: Low Density Lipoprotein-Cholesterol
4. HDL-C: High Density Lipoprotein-Cholesterol
5. BMI: Body Mass Index
6. DFS: Diabetic Foot Syndrome
7. EGFR: Estimated Glomerular Filtration Rate
8. MDRD: Modification of Diet in Renal Disease
9. MET: Metabolic Equivalence
10. WHO: World Health Organization
11. ART: Antiretroviral Therapy
12. HIV: Human Immunodeficiency Virus
13. AIDS: Acquired Immune Deficiency Syndrome

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Chapter 1

1.1. INTRODUCTION

Diabetes is a chronic disease which results from either failure of the pancreas to produce enough insulin or when the body fails to effectively use the insulin it produces. Insulin hormone regulates blood sugar metabolism. There are two main types of diabetes mellitus. Type 1 diabetes often results from the body's failure to produce insulin due to a variety of reasons. Insulin therapy is required for this type of diabetes. Type 2 diabetes is a result of insulin hormone resistance. Treatment for this type of diabetes is oral medicines to control blood sugar.

Hyperglycemia is a manifestation of uncontrolled diabetes and in time leads to damage to many of the body's systems, particularly the nerves and blood vessels. Diabetes long term complications often reduce the quality of life of patients increasing burdens to health care systems and if untreated early can lead to permanent disability and even death. Chronic complications of diabetes mellitus are categorized as microvascular and macrovascular or a combination of both. Common diabetes complications include heart disease, stroke, peripheral artery disease, neuropathies (damage to nerves), nephropathy (damage to kidneys), retinopathy (damage to eyes), cataracts and erectile dysfunction (among men).

Global disease burden of diabetes mellitus

The World Health Organization estimated that in 2013, nearly 382 million people had diabetes globally, and type 2 diabetes was responsible for up to 90% of the cases. According to the same organization, in 2011 diabetes resulted in 1.4 million deaths globally, making it the 8th leading cause of death. The total number of people with diabetes is predicted to increase to 592 million by 2035. Majority of diabetes deaths (80%) occur in developing countries. The highest increase in incidence of diabetes will occur in developing countries probably due to urbanization and lifestyle changes. Type 2 diabetes is now a global health problem due to population growth, aging population, rapid urbanization and rising prevalence of physical
inactivity and obesity. However, the morbidity and mortality caused by diabetes mellitus can be reduced through regular and thorough screening of complications and their effective early treatment.

**Management of diabetes at Harare and Parirenyatwa Hospitals**

Harare and Parirenyatwa Central Hospitals each has a diabetic clinic. These clinics were established to offer specialized treatment and care to diabetic patients in Zimbabwe. Treatment of diabetes is usually oral medication and or insulin injections. In addition to treatment, patients are also prescribed a diabetic diet and are encouraged to maintain a lean weight and to exercise regularly.

Patients are monitored in order to diagnose, prevent and treat diabetes chronic complications. They are referred for ophthalmic examination by eye specialists at Sekuru Kaguvi Hospital (SKH) at Parirenyatwa at least once a year. The purpose of this examination is to diagnose and treat diabetic related eye complications such as retinopathy, cataracts, glaucoma and blindness. Early forms of retinopathy are treated at Sekuru Kaguvi Eye Hospital using laser therapy. At the diabetic clinics, patients are also routinely screened for peripheral neuropathy, diabetic foot syndrome, stroke, heart disease and other diabetes chronic complications and are offered appropriate prevention and treatment services. Diabetic patients are also routinely monitored for physiological parameters such as lipid profile tests, renal function tests and glycated hemoglobin test for long term control of blood sugar.

**Screening for diabetes mellitus in Harare**

The commonest test for screening for diabetes mellitus is a random blood sugar test. Unfortunately some diabetics in Harare present late with complications and with no history of having been screened for diabetes.

**1.2. PROBLEM STATEMENT**
The incidence of diabetes and the associated complications in Harare as reported through surveillance data has been on the increase as shown in Figure 1.

*Figure 1: New cases and complications of diabetes mellitus reported in Harare, 2010-2013*

<table>
<thead>
<tr>
<th>Year</th>
<th>New diabetic cases</th>
<th>Diabetic cases with cataracts</th>
<th>Diabetic cases with diabetic foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>400</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>2011</td>
<td>500</td>
<td>400</td>
<td>300</td>
</tr>
<tr>
<td>2012</td>
<td>600</td>
<td>500</td>
<td>400</td>
</tr>
<tr>
<td>2013</td>
<td>700</td>
<td>600</td>
<td>500</td>
</tr>
</tbody>
</table>

As shown in figure 1, there was an increase in the number of new diabetic cases seen at Parirenyatwa and Harare Central hospitals between 2010 and 2013. There was also an increase in number of diabetics diagnosed with cataracts and diabetic foot. In addition to this increase, surveillance data from the National Health Information at head office shows that the number of deaths due to diabetes at both Harare and Parirenyatwa hospitals increased from 86 deaths in 2012 to 141 deaths in 2013. Overall prevalence of diabetes chronic complications and the associated risk factors among diabetic patients in Harare is not known. It is therefore necessary to determine prevalence and risk factors for chronic diabetic complications as findings can inform diabetic patients and health care workers to better prevent and manage such risk factors, improving the quality of life of diabetics and preventing severe disability and death.

*Chapter 2*
2.1. LITERATURE REVIEW

Chronic complications of diabetes mellitus

Cardiovascular disease is responsible for the majority of cases of diabetic macro vascular complications. Other macro vascular manifestations are cerebrovascular accidents (stroke) and peripheral vascular disease. The easiest screening test for peripheral vascular disease is palpation of peripheral pulses. Absence of peripheral pulses on palpation is clinically significant for occlusive artery disease. More reliable and complex methods such as angiography, continuous waveform Doppler scan and colour duplex ultrasound are unavailable in most developing countries.

Erectile dysfunction, which occurs when a man can no longer get or keep an erection firm enough for sexual intercourse is a result of both micro vascular and macro vascular complications. Psychological factors and side effects of antihypertensive medicines may also be etiological factors for erectile dysfunction among diabetics.

Diabetes is also associated with renal disease. Diabetic nephropathy is the kidney disease that occurs as a result of diabetes induced damage to kidneys. It is the commonest cause of chronic renal failure globally and in the sub-Saharan region and causes renal failure in one third of patients who require dialysis.

Diabetic retinopathy results from diabetes induced damage to the retina and if untreated early can lead to irreversible blindness.

Another complication of diabetes mellitus is cataracts and cataracts are among the earliest complications of diabetes mellitus and remain the leading cause of blindness globally and in the sub-Saharan region. Cataracts occur at an earlier age and are up to 5 times more common in patients with diabetes.

Prevalence of diabetes mellitus in Africa

While communicable diseases such as AIDS, malaria, and tuberculosis have continued to pose more significant havoc in sub-Saharan Africa, it is now obvious that non-communicable diseases such as diabetes mellitus are adding to the multiple disease burdens. Sub-Saharan Africa is experiencing an increasing prevalence of diabetes among other non-communicable diseases. The prevalence of diabetes in Africa has
been widely reported and varies between 1% and 20%. In Zimbabwe, the prevalence of diabetes was estimated to be 10% among people aged 25 years or more\textsuperscript{12}.

**Prevalence of diabetes chronic complications**

Diabetic chronic complications can cause disability and premature death. As the prevalence of diabetes continues to increase, complications of diabetes are also likely to increase\textsuperscript{2, 3}. There are huge variations in prevalence of diabetes complications across the globe mainly due to the differences in methods used\textsuperscript{3}.

Among Asian countries, the prevalence of diabetic retinopathy was 23.7\% in India\textsuperscript{13} and 21.2\% in Sri Lanka\textsuperscript{14}. In a study by Wijesuriya\textsuperscript{14} et al in Sri Lanka in 2011, prevalence of diabetes chronic complications were: neuropathy (28\%), heart disease (5.4\%); stroke (0.8\%); peripheral vascular disease (0.1\%) and nephropathy (33.3\%).

Among European countries, Norway\textsuperscript{15} had a prevalence of retinopathy of 11\% in persons with known diabetes while in Poland\textsuperscript{16} it was 41.5\%. Furthermore, in Poland, the prevalence of peripheral neuropathy was 29\%, nephropathy was 17\% and diabetic foot syndrome was 8.3\%.

A multinational observational study\textsuperscript{17} on diabetes long term complications, involving Asia, Africa, Europe and South America showed that complication rates were 27\% for macro vascular complications and 53.5\% for micro vascular complications\textsuperscript{17}.

In some African countries the prevalence of retinopathy was as follows: 7\% in Kenya\textsuperscript{18}; 63\% in South Africa\textsuperscript{19}; 32.5\% in Malawi\textsuperscript{21} and 25\% in Nigeria\textsuperscript{22}. Prevalence of neuropathy was 27\% in Cameroon\textsuperscript{23} and 10\% in Tanzania\textsuperscript{24}. Prevalence of nephropathy was 33\% and 27\% in two separate studies done at Parirenyatwa diabetic clinic in Zimbabwe\textsuperscript{20, 34}.

In a study by Raoeid\textsuperscript{25} et al in Benghazi in Lybia in 2010, prevalence of long term diabetic complications among diabetics was as follows: cataracts (13\%); diabetic peripheral artery disease (15\%); diabetic retinopathy (31\%) and diabetes related heart disease (15\%).

In sub-Saharan Africa, renal complications of diabetes are usually under diagnosed due to scarcity of resources. In a study by Janmohamed\textsuperscript{24} et al in Tanzania, prevalence of diabetic renal disease among
diabetics was 83.7%. However, most of these patients were unaware of their condition and only 1.3% had a prior diagnosis of diabetic nephropathy. In a cross sectional study by Ngassa et al in South Africa, the prevalence of diabetes nephropathy was 33.6%.

Risk factors associated with diabetes chronic complications

Several studies have been carried out to identify factors associated with diabetes chronic complications in both the developing and developed countries. In a study by Wijesuriya et al in Sri Lanka in 2011, significant risk factors for diabetes chronic complications were: poor blood glucose control; hypertension; obesity and high Low Density Lipoprotein-Cholesterol.

In a cross sectional hospital based survey by Li et al in China, significant risk factors for diabetes chronic complications were: high Low Density Lipoprotein-Cholesterol; high HbA1c%; lack of exercise and longer duration of diabetes mellitus.

In Europe, in a study in Italy by Nicolucci et al, risk factors for diabetes chronic complications were: male sex; age >50 years; hypertension and having type 2 diabetes.

In a study in Poland by Kozek et al, risk factors for diabetes chronic complications were: Diabetes duration, age, high Low Density Lipoprotein-Cholesterol, cigarette smoking and alcohol consumption.

In a study in Germany by Muller et al, there were significant associations between diabetic foot syndrome and duration of diabetes as well as high blood pressure. However, smoking was not associated with diabetes related chronic complications. In a study done by Klag et al in the United States of America, hypertension was an independent risk factor for kidney failure among diabetic patients. Interventions for preventing diabetes related renal disease must also target management of hypertension.

In across sectional study by Janmohamed et al in Tanzania, older age was associated with diabetes chronic complications. In a cross sectional study by Ngassa et al in South Africa, risk factors for diabetes chronic complications were: longer duration with diabetes, male sex, raised triglycerides and hypertension.

Studies have reported association between use of protease inhibitors (Anti Retro Viral drugs) and developing type 2 diabetes. However, the clinical presentation and range of complications of diabetes in HIV positive
individuals receiving ARV therapy are not different to those in individuals not on ARV therapy. Glover et al in Malawi reported association between diabetes chronic complications with poor blood glucose control (high Hb1c %), but found no association between ARV therapy and diabetes chronic complications. We noted that previous studies in Zimbabwe were focusing on one or two chronic complications of diabetes. We thus set out to determine the prevalence and risk factors for several diabetes chronic complications in the Zimbabwean context, specifically in Harare.

**Research questions**

1. What is the prevalence of diabetes chronic complications in Harare?
2. What are the risk factors for diabetes chronic complications in Harare?

**2.2. Objectives**

**Broad objective**

To determine the prevalence and risk factors for diabetes chronic complications in Harare, 2014.

**Specific objectives**


**Chapter 3**

**METHODS**
3.1. Study Design

An analytical cross sectional study was carried out. The occurrence and risk factors for diabetes chronic complications among all the respondents were analyzed. A conceptual framework was used to identify potential risk factors for diabetes chronic complications. The chronic complications analyzed were: diabetic nephropathy; renal failure; diabetic foot syndrome (includes diabetic ulcers and critical limb ischemia); amputation; stroke; heart failure; retinopathy; blindness and erectile dysfunction (among males).

The risk factors for diabetes chronic complications that were analyzed are shown in figure 2.

Figure 2: Conceptual framework: Risk factors for diabetes chronic complications in Harare, 2014. (Conceptual framework adapted from Kozek E\textsuperscript{16} et al 2003)
3.2. Study setting

The study was conducted at Parirenyatwa and Harare Central Hospitals’ diabetic clinics.

Study population

The study population was patients with confirmed diabetes mellitus attending the diabetic clinics at Parirenyatwa and Harare Central Hospitals.

Inclusion criteria: We included patients aged 18 years and above with confirmed diabetes mellitus who were attending the adult diabetic clinics at Harare and Parirenyatwa Central Hospitals.

Exclusion criteria

We excluded all those with confirmed diagnosis of diabetes but who were below 18 years of age. We also excluded all who had not had any of the following performed: HbA1c %, serum creatinine, lipid profile and recent ophthalmic examination by an eye specialist.

3.3. Sample size calculation
Sensitivity testing for sample size calculation

In order to calculate optimal sample size, three different studies on prevalence of diabetic chronic complications were used. The highest sample size (optimal sample size) was then chosen and the different sample sizes calculated are shown in table 1.

Table 1: Sensitivity testing for optimal sample size calculation.

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Sample size</th>
<th>Sample size, assuming 10% non-response rate</th>
<th>Description of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.33</td>
<td>240</td>
<td>264</td>
<td>Mafundikwa et al. Prevalence of diabetic nephropathy among diabetics at Parirenyatwa</td>
</tr>
<tr>
<td>0.22</td>
<td>186</td>
<td>205</td>
<td>Elbagir et al. Pattern of long term complications in Sudanese diabetic patients, 1995.</td>
</tr>
</tbody>
</table>

Sample size calculation was based on Dobson’s formula \[ n = z^2 p (1-p)/d^2 \]. The minimum sample size based on test statistic \( z = 1.645 \) and assuming a prevalence of diabetic nephropathy \( p = 0.33 \) from a cross sectional study by Mafundikwa et al, and an absolute precision \( d \) of 5%, assuming 10% non-response/refusal rate, the minimum sample size calculated was 264.

3.4. Sampling and data collection tools

This cross sectional study was carried out at Parirenyatwa and Harare Central Hospitals’ diabetic clinics. Study participants were recruited sequentially as they came to the clinics for routine care until the sample size was reached. Participants were selected from both hospitals on a ratio of 1:1. A pre-tested, interviewer administered questionnaire was used to collect data on demographics and risk factors for diabetes.
complications from participants. Only chronic complications that developed after diagnosis of diabetes mellitus were considered in the study. A review of patient cards and hospital records was done to objectively assess patho-physiological risk factors for diabetes and to confirm specialist physician’s diagnosis of some diabetes related chronic complications. Determination of retinopathy was based on the results of the last examination by an eye specialist as was blindness.

Determination of nephropathy and renal failure was based on Estimated Glomerular Filtration Rate (EGFR), using the most recent serum creatinine results. EGRF is calculated using the MDRD (Modification of Diet in Renal Disease) study equation: 

\[ 186 \times \left( \frac{\text{creatinine}}{88.4} \right)^{1.154} \times \text{(age-0.203)} \times (0.742 \text{ if female}) \times (1.21 \text{ if black}) \]

EGFR is a better way of determining kidney function without necessarily doing a 24 hour urine collection\(^\text{31}\). The MDRD equation is reported to be more accurate than the Cockroft-Gault equation\(^\text{31}\) for calculating GRF. GFR is the best parameter of overall kidney function and should be measured or estimated in all diabetic patients. An EGFR of > 60 ml/minute is considered normal kidney function; 15-59.99 ml/minute is diagnostic of nephropathy and < 15 ml/minute is diagnostic of kidney failure\(^\text{31}\).

Determination of level of physical activity was done using the STEP wise\(^\text{39}\) approach to Surveillance of Chronic Diseases and Risk Factors Assessment tool. The level of physical activity was classified as high, moderate and low. A set of standard questions were asked on respondents’ physical activities and those activities were converted to Metabolic Equivalences (MET). The Metabolic Equivalence was then used to classify level of physical activity.

Determination of Diabetic Foot Syndrome (DFS) was based on having non traumatic foot ulcer, gangrene, absence of peripheral pulse or as diagnosed by a physician in the last 12 months. Latest results of glycated haemoglobin and lipid profile test results were used to determine long term control of blood sugar and lipid abnormalities respectively. The researcher also performed physical examination on all study participants to determine obvious physical complications like stroke and amputation and to check for peripheral pulse (posterior tibial artery). Weight was measured using a standard bath room scale and height was measured using a rigid tape. Blood pressure was measured using a standard automated BP machine.
3.5. Data Analysis
Epi info version 3.5.1 was used to generate frequencies, proportions, means, odds ratios and their P values and confidence intervals. Logistic regression analysis was done to come up with independent factors associated with diabetes chronic complications, while simultaneously controlling for multiple confounding variables.

3.6. Permission to conduct the study
Permission to conduct the study was sought and obtained from the Health Studies Office, Clinical Director of Parirenyatwa Hospital, Harare Central Hospital’s Ethics Committee, Joint Research Ethics Committee and the Medical Research Council of Zimbabwe.

3.7. Ethical considerations
The purpose of the study was clearly explained to each and every participant. Participants were assured that there were no financial costs, injuries or risks which were expected during the study. Their participation was voluntary and not coerced. Participants were free to discontinue with the study at any moment without any negative consequences. Participants were also given information on who they could contact should they at any time have any queries about their rights with regards to the study. No names or addresses of participants were used during the study. All the information concerning the study was kept in privacy and confidentiality was maintained. Written informed consent was obtained from the respondents who participated in the study. Participants with obvious risk factors like poorly controlled blood glucose were counseled by the nursing staff in the outpatients department.

Chapter 4
4.1. RESULTS
We interviewed 284 respondents from Harare and Parirenyatwa Hospitals’ diabetic clinics with half the respondents from each clinic.

The occurrence of diabetes chronic complications among the respondents from Parirenyatwa hospital’s diabetic clinic was assessed and the results are shown in the table 2.

Table 2: Prevalence of diabetes chronic complications among the respondents from Parirenyatwa hospital’s diabetic clinic in Harare, 2014

<table>
<thead>
<tr>
<th>Complication</th>
<th>Prevalence, n=142 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephropathy</td>
<td>42 (30.3)</td>
</tr>
<tr>
<td>Erectile dysfunction among male respondents (n=67)</td>
<td>20 (29.9)</td>
</tr>
<tr>
<td>Retinopathy</td>
<td>37 (26.1)</td>
</tr>
<tr>
<td>Diabetic foot syndrome</td>
<td>25 (17.6)</td>
</tr>
<tr>
<td>Cataracts</td>
<td>21 (14.8)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>9 (6.3)</td>
</tr>
<tr>
<td>Stroke</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Renal failure</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Amputation</td>
<td>2 (1.4)</td>
</tr>
<tr>
<td>Blindness</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Among the 142 respondents from Parirenyatwa hospital’s diabetic clinic, 64 (45%) had at least one diabetes chronic complication while 78 (55%) had no single diabetes related chronic complication. The prevalence of specific diabetes chronic complications among all respondents from Parirenyatwa hospital’s diabetic clinic (in descending order was as follows): nephropathy (30.3%); retinopathy (26.1%); diabetic foot syndrome (17.6%); cataracts (14.8%); heart failure (6.3%); stroke (2.1%); renal failure (2.1%); amputation (1.4%) and blindness (0%). Among the 67 male respondents, 20 (29.9%) reported erectile dysfunction.

The occurrence of diabetes chronic complications among the respondents from Harare hospital’s diabetic clinic was assessed and the results are shown in the table 3.

Table 3: Prevalence of diabetes chronic complications among the respondents from Harare hospital’s diabetic clinic, 2014

<table>
<thead>
<tr>
<th>Complication</th>
<th>Prevalence, n=142 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erectile dysfunction among male respondents (n=66)</td>
<td>24 (36.4)</td>
</tr>
<tr>
<td>Nephropathy</td>
<td>39 (27.5)</td>
</tr>
<tr>
<td>Retinopathy</td>
<td>29 (20.4)</td>
</tr>
<tr>
<td>Diabetic foot syndrome</td>
<td>24 (16.9)</td>
</tr>
<tr>
<td>Cataracts</td>
<td>22 (15.5)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>8 (5.6)</td>
</tr>
<tr>
<td>Stroke</td>
<td>4 (2.8)</td>
</tr>
<tr>
<td>Renal failure</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Blindness</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Amputation</td>
<td>1 (0.7)</td>
</tr>
</tbody>
</table>

Among the 142 respondents from Harare hospital’s diabetic clinic, 65 (45.8%) had at least one diabetes chronic complication while 77 (54.2%) had no single diabetes related chronic complication. The prevalence of specific diabetes chronic complications among all respondents from Harare hospital’s diabetic clinic (in descending order was as follows): nephropathy (27.5%); retinopathy (20.4%); diabetic foot syndrome (16.9%); cataracts (15.5%); heart failure (5.6%); stroke (2.8%); renal failure (2.1%); blindness (2.1%) and amputation (0.7%). Among the 66 male respondents, 20 (29.9%) reported erectile dysfunction.

4.1.3. Demographic factors associated with diabetes chronic complications in Harare (Parirenyatwa and Harare Central Hospitals’ diabetic clinics)
Among the 284 respondents from the two diabetic clinics, 129 (45%) had at least one diabetes chronic complication while 155 (55%) had no such complications. Demographic characteristics of respondents with at least one diabetes chronic complication were compared with those without any diabetes chronic complications and the results are shown in table 4.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Have diabetes complication, n=129 (%)</th>
<th>Have no diabetes complication, n=155 (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>18-28</td>
<td>6 (4.7)</td>
<td>11 (7.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>29-39</td>
<td>5 (3.9)</td>
<td>17 (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>5 (3.9)</td>
<td>31 (20)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50-60</td>
<td>67 (51.9)</td>
<td>66 (42.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td>46 (35.7)</td>
<td>30 (19.4)</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4: Demographic factors associated with diabetes chronic complications in Harare, 2014*
The median age for those with diabetes related complications was 57 (Q₁=52; Q₃=64) and 52 (Q₁=43; Q₃=59) for those without complications and the difference was statistically significant (p<0.001). Among the demographic characteristics examined, age was significantly associated with diabetes chronic complications (Odds ratio of 1.16 and p<0.001). The rest of the demographic factors were comparable among those that developed diabetes complications and those that did not (p>0.05).

### 4.1.4. Risk factors for diabetes chronic complications in Harare (Parirenyatwa and Harare Central Hospitals’ diabetic clinics)
We carried out bivariate analysis in order to determine risk factors associated with diabetes chronic complications. The analysis was done on all potential risk factors on our conceptual framework. Odds Ratios were the measure of association used and table 5 shows the results.

### Table 5: Risk factors for diabetes mellitus related chronic complications in Harare, 2014

<table>
<thead>
<tr>
<th>Variable</th>
<th>Has diabetes complication, n=129 (%)</th>
<th>Has no diabetes complication, n=155 (%)</th>
<th>OR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50</td>
<td>113 (87.6)</td>
<td>96 (61.9)</td>
<td>4.34</td>
<td>2.34-8.04</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≤50</td>
<td>16 (12.4)</td>
<td>59 (38.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Duration with diabetes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>78 (60.5)</td>
<td>61 (39.4)</td>
<td>2.36</td>
<td>1.46-3.80</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≤10 years</td>
<td>51 (39.5)</td>
<td>94 (60.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of DM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 2</td>
<td>82 (63.6)</td>
<td>73 (47.1)</td>
<td>1.96</td>
<td>1.22-3.16</td>
<td>0.006</td>
</tr>
<tr>
<td>Type 1</td>
<td>47 (36.4)</td>
<td>82 (52.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Poor (HbA1c% &gt;7)</td>
<td>Good (HbA1c% ≤7)</td>
<td>Odds Ratio</td>
<td>95% CI</td>
<td>p-value</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------</td>
<td>---------------</td>
<td>---------</td>
</tr>
<tr>
<td>Blood sugar control</td>
<td>72 (55.80)</td>
<td>55 (35.5)</td>
<td>2.30</td>
<td>1.42-3.71</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Compliance to medication</td>
<td>68 (52.7)</td>
<td>61 (39.4)</td>
<td>1.72</td>
<td>1.07-2.76</td>
<td>0.024</td>
</tr>
<tr>
<td>Good (missed &lt;3 doses/week)</td>
<td>61 (47.1)</td>
<td>94 (60.6)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>66 (51.2)</td>
<td>55 (35.5)</td>
<td>1.90</td>
<td>1.18-3.07</td>
<td>0.008</td>
</tr>
<tr>
<td>Overweight/Obese</td>
<td>63 (48.80)</td>
<td>100 (64.5)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>68 (52.7)</td>
<td>51 (32.9)</td>
<td>2.27</td>
<td>1.40-3.68</td>
<td>0.001</td>
</tr>
<tr>
<td>Low (less than 600 Met minutes per week)</td>
<td>61 (47.3)</td>
<td>104 (67.1)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High/Moderate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDL-Cholesterol</td>
<td>60 (46.5)</td>
<td>42 (27.1)</td>
<td>2.34</td>
<td>1.43-3.84</td>
<td>0.001</td>
</tr>
<tr>
<td>High LDL-C</td>
<td>69 (53.5)</td>
<td>113 (72.9)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal LDL-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>70 (54.3)</td>
<td>60 (38.7)</td>
<td>1.88</td>
<td>1.17-3.02</td>
<td>0.009</td>
</tr>
<tr>
<td>Yes</td>
<td>59 (45.7)</td>
<td>95 (61.3)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV</td>
<td>19 (14.7)</td>
<td>18 (11.6)</td>
<td>1.31</td>
<td>0.66-2.63</td>
<td>0.437</td>
</tr>
<tr>
<td>Positive</td>
<td>110 (85.3)</td>
<td>137 (88.4)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>16 (12.4)</td>
<td>12 (7.7)</td>
<td>1.69</td>
<td>0.77-3.71</td>
<td>0.190</td>
</tr>
<tr>
<td>Yes</td>
<td>113 (87.6)</td>
<td>143 (92.3)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cigarettes</td>
<td>11 (8.5)</td>
<td>9 (5.8)</td>
<td>1.51</td>
<td>0.61-3.78</td>
<td>0.372</td>
</tr>
<tr>
<td>Yes</td>
<td>118 (91.5)</td>
<td>146 (94.2)</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respondents aged more than 50 years were 4.34 times more likely to develop diabetes complications when compared to those aged ≤50 (p<0.001). Other significant risk factors for diabetes chronic complications were: duration with diabetes of more than 10 years (OR=2.36, p<0.001); type 2 diabetes (OR=1.96, p=0.006); poor control of blood sugar/high HbA1c% (OR=2.30, p<0.001); poor compliance to medication (OR=1.72, p=0.024); being obese or overweight (OR=1.90, p=0.008); high LDL-Cholesterol (OR=2.34, p=0.001); hypertension (OR=1.88 p=0.009) and low physical activity (OR=2.27, p=0.001). Low physical activity was classified as having less than 600 Met minutes per week of exercises. Consuming alcohol, smoking cigarettes and being HIV positive were not associated with diabetes chronic complications.
4.1.5. Independent risk factors associated with diabetes chronic complications in Harare (Parirenyatwa and Harare Central Hospitals’ diabetic clinics).

Multivariate analysis was done using logistic regression in order to identify independent risk factors for diabetes chronic complications while simultaneously controlling for multiple confounders. All risk factors with a p value of less than 0.25 (after bivariate analysis) were selected for analysis and table 6 shows the results.

*Table 6: Independent risk factors associated with diabetes chronic complications in Harare, 2014*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adjusted OR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low physical activity (&lt;600 Met minutes/week)</td>
<td>1.90</td>
<td>1.07-3.38</td>
<td>0.029</td>
</tr>
<tr>
<td>Duration &gt; 10 years with diabetes</td>
<td>5.34</td>
<td>2.30-12.40</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High LDL-Cholesterol</td>
<td>1.84</td>
<td>1.03-3.27</td>
<td>0.039</td>
</tr>
<tr>
<td>Type 2 diabetes mellitus</td>
<td>6.48</td>
<td>2.92-14.40</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Independent risk factors were as follows: low physical activity (adjusted OR=1.90, p =0.029); duration > 10 years with diabetes (adjusted OR=5.34, p<0.001); high LDL-Cholesterol (adjusted OR=1.84, p=0.039) and type 2 diabetes (adjusted OR=6.48, p<0.001).

4.1.6. Patient management at diabetic clinics at Parirenyatwa and Harare hospitals

Clinicians at both clinics are managing to routinely screen patients for most complications. This is commendable since selective testing (among symptomatic patients only) rather than screening will likely miss most complications and physiological changes which in some instances are asymptomatic. For example, all patients routinely undergo physiological tests for renal function, HbA1c% and lipid profile tests. In addition all patients are encouraged to undergo annual ophthalmic examination by eye specialists. However
a review of respondents’ notes revealed that calculation of BMI (Body Mass Index) and the subsequent counseling according to the BMI was not being routinely done. It also showed that patients were not being routinely screened for foot lesions at the two clinics (patients were only examined if they had complains). It was further observed that even though renal function tests were routinely done at both clinics, no calculation of Estimated Glomerular Filtration Rate (EGFR) was done. This is worrying as GFR is the best parameter of overall kidney function and should be determined for every diabetic patient in order to diagnose diabetic nephropathy early and institute treatment before renal failure sets in. These issues show that even at tertiary care setting, sometimes clinicians do not offer comprehensive care to diabetics.

It was noted that all oral diabetic medicines and insulin were readily available at Pharmacies in Harare, including at the two hospitals under study. Most patients (89%) also had glucometers which they were using to measure their glucose levels at home.

4.2. DISCUSSION

Overall, prevalence of diabetes complications was high with nearly half of diabetics (45%) having at least one diabetes chronic complication. Given the prevalence of diabetes estimated to be 10% among people aged 25 years and above in Zimbabwe\textsuperscript{12}, and that the population aged 25 years and above was 38.9\% of the total population in 2012 (according to census\textsuperscript{32} results), it can be estimated that 508 082 diabetics (out of 1 306 124 diabetics) have at least one chronic complication in Zimbabwe. While diseases such as AIDS, malaria and TB continue to threaten Zimbabwe’s health care system, communicable diseases such as diabetes are certainly adding to these multiple disease burdens in the country\textsuperscript{4}.

Prevalence of nephropathy

A cross sectional study on prevalence of diabetic nephropathy at Parirenyatwa hospital by Mafundikwa\textsuperscript{20} et al reported a prevalence of diabetic nephropathy of 33\% which is comparable to the 27.5 and 30.3\% from
our study. Another cross sectional study carried out at Parirenyatwa hospital’s diabetic clinic reported a prevalence of diabetic nephropathy of 27.2% which again is comparable to the prevalence reported in our study. A cross sectional study on long term complications among diabetics in Sudan by Elbagir et al reported a prevalence of nephropathy of 22%. In a cross sectional study on diabetes nephropathy in South Africa, the prevalence of diabetes nephropathy was 33.6% which again is consistent with our findings.

Prevalence of retinopathy, cataracts and blindness

In our study, the prevalence of retinopathy among respondents at the two clinics was 26.1 and 20.4%. Similar prevalence was reported in India, Sri Lanka, Nigeria and Burkina Faso. In Malawi however, the prevalence of retinopathy was much higher at 32.5%. A study done at Parirenyatwa hospital by M C Bartels et al showed a prevalence of retinopathy of 36%. Visual impairment in diabetic retinopathy occurs due to diabetes induced macular edema and diabetic retinopathy and can lead to irreversible blindness if not treated early. Prevalence of cataracts among the two clinics in our study was 15.5 and 14.8%. This was similar to the prevalence reported in Libya. Cataracts are among the earliest complications of diabetes mellitus. They remain the leading cause of blindness, occurring at an earlier age and have been reported to be up to 5 times more frequent in patients with diabetes. However, the pathogenesis of diabetic cataract development is not fully understood. It is however important to note that many diabetic patients with cataracts have undergone surgical operations at Sekuru Kaguvi Hospital (SKH) at Parirenyatwa and have their sight restored.

The prevalence of blindness was 2.1% in this study. This was much higher than the 0.1% reported in China. However the study in China was limited to type 2 diabetes patients while our study included both type 1 and type 2.

Prevalence of diabetic foot syndrome and amputation

The prevalence of diabetic foot syndrome among the two clinics in our study was 17.6 and 16.9%. Sensory neuropathy is the primary cause of diabetic foot syndrome while lower limb arterial diseases are also important etiological factors. A cross sectional study in South Africa reported prevalence of diabetic foot
syndrome at 36.6%. However the study in South Africa included all foot problems since diagnosis of diabetes was made while we limited the duration to the previous 12 months and this could have underestimated our prevalence. Relatively very low prevalence was reported in China (0.7%) and this could be because in the study in China, they only looked at diabetic foot ulcers which underestimated the prevalence. The prevalence of diabetic foot syndrome reported in our study could also be an underestimate of the true prevalence of diabetic foot syndrome as studies have shown that Doppler diagnosis is much more sensitive than the clinical methods that we used. The prevalence of amputation among the two clinics in our study was 1.4 and 0.7%. Similar prevalence was reported in South Africa. Amputations have been shown to be 15 times more frequent in diabetic patients than in the general population. Even when amputation has been done, the remaining leg or foot and the patient’s life can be saved by regular monitoring. The diabetic association of Zimbabwe is currently making efforts to establish diabetic foot clinics at Parirenyatwa and Harare central hospitals in order to improve foot care among diabetics with the ultimate aim of reducing amputations.

Prevalence of heart failure

The prevalence of heart failure among the two clinics in our study was 6.3 and 5.6%. Assessment for myocardial infarction was not done as electrocardiograms are not routinely done at the two clinics. Lack of diagnostic facilities like coronary angiography limits the study of coronary artery diseases in Zimbabwe. In a cross sectional study done in Libya, prevalence of heart conditions (including heart failure, angina and myocardial infarction) was 13%. A study in Burkina Faso reported a prevalence of 8.7% and the study included myocardial infarction, heart failure and angina unlike our study where we only looked at heart failure. The development of heart failure among diabetics is a consequence of diabetes induced coronary artery disease, cardiomyopathy and sometimes increased susceptibility to hypertension mediated heart muscle damage.

Prevalence of stroke
The prevalence of stroke among the two clinics in our study was 2.1 and 2.8%. This prevalence is consistent with results of other studies in Sudan\textsuperscript{45}. Prevalence of stroke among diabetics may appear low because of the mortality associated with this complication.

**Prevalence of erectile dysfunction among male diabetics**

In our study, the occurrence of erectile dysfunction among the male respondents from the two clinics was 36.4 and 29.9%. The erectile dysfunction was self-reported and was diagnosed when a man could no longer get or keep an erection firm enough for sexual intercourse. Erectile dysfunction tends to occur at an earlier age in diabetics when compared to non diabetics\textsuperscript{48}. Studies elsewhere showed prevalence of erectile dysfunction among diabetics of 34%\textsuperscript{48} which is comparable to our study findings. Among male respondents with erectile dysfunction, 67% did not seek treatment for their condition, despite the availability of treatment. Diabetic micro vascular and macro vascular complications coupled with psychological and situational factors contribute to erectile dysfunction. Erectile dysfunction can also be a side effect of medicines commonly prescribed to men with diabetes, such as antihypertensive and antidepressants\textsuperscript{5, 6}.

**Risk factors associated with chronic diabetes complications**

This study identified several risk factors for diabetes chronic complications which were also identified in literature.

**Age**

Being older than 50 years was a significant risk factor for diabetes chronic complications. This is consistent with results of other studies\textsuperscript{16, 17, 24, 26, 27, 40, 41, 42, 49}. Old age is a non-modifiable risk factor.

**Duration with diabetes**

Duration with diabetes was significantly associated with diabetes chronic complications. This is consistent with results of other studies\textsuperscript{26, 27, 28, 34, 49}.

**Type of diabetes**

Type 2 diabetes was an independent risk factor for diabetes complications and similar findings were reported in other studies\textsuperscript{27}. Type of diabetes is another non-modifiable risk factor, however literature has shown that
the incidence of type 2 diabetes can be reduced through lifestyle changes, reducing obesity and increasing level of physical activity\textsuperscript{4}.

**Glycated hemoglobin (HbA1c) percentage**

Poorly controlled blood sugar was a significant risk factor for diabetes chronic complications. Similar findings were reported in Africa, Asia and Europe\textsuperscript{14, 17, 26, 30, 31}. The fact that nearly half of respondents (45\%) had high HbA1c \% implies that there is poor control of blood sugar. Control of blood glucose requires a combination of using correct dose of medication, being adherent to treatment and carefully controlling calorie intake and physical activity.

**Compliance to medication**

Missing at least 3 doses of medication per week was a significant risk factor for diabetes chronic complications. Poor compliance to medication can lead to poor control of blood sugar, increasing the risk of diabetes chronic complications. Since diabetes is a lifelong condition, diabetics have to be on medication for a very long duration and this can sometimes lead to treatment fatigue.

**Body Mass Index (BMI)**

Being overweight or obese was significantly associated with diabetes chronic complications. Similar findings were reported in other studies in Africa and Asia\textsuperscript{14, 17}.

**Physical activity**

Low physical activity (that is less than 600 Met minutes per week) was an independent risk factor for diabetes chronic complications. Similar findings were reported in China\textsuperscript{26}. In our study, 42\% of respondents were classified as low physical activity.

**LDL-Cholesterol**

High Low Density Lipoprotein-Cholesterol (LDL) was an independent risk factor for diabetes chronic complications. Similar findings were reported in other studies\textsuperscript{16, 17, 26, 31, 49}.

**Hypertension**
Being hypertensive was significantly associated with diabetes chronic complications. Similar findings were reported in several other studies\textsuperscript{14, 17, 27, 28, 29, 31, 49}. In our study, nearly half of respondents were hypertensive (46\%) and this shows the high burden of hypertension among diabetics.

**Alcohol consumption, smoking and HIV status**

Alcohol consumption was not associated with diabetes chronic complications. However, studies elsewhere found an association with alcohol consumption\textsuperscript{16}. In our study, only 28 respondents (9.9\%) reported consumption of alcohol and this could have underestimated any possible association. Smoking was not associated with diabetes complications. Similar finding were made in Germany\textsuperscript{28}.

There was also no association with HIV status. Similar findings were reported in Malawi\textsuperscript{25}. Studies elsewhere have demonstrated an association between HIV and development of type 2 diabetes mellitus, however the clinical presentation and complications of diabetes in HIV infected patients were similar to those in patients who are HIV negative\textsuperscript{30}.

**4.3. Conclusion**

The overall prevalence of diabetes chronic complications was high. The prevalence of individual diabetes chronic complications was high and comparable to regional and local prevalence from previous studies. Complications with high prevalence were: nephropathy; retinopathy; diabetic foot syndrome and cataracts and these are increasing disease burden in Harare. These complications are a result of several risk factors that were identified in this study. Among demographic factors analyzed, age (>50 years) was significantly associated with diabetes chronic complications. Significant patho-physiologic risk factors associated with diabetes chronic complications were: poorly controlled blood sugar levels (high Hb1c %); high Low Density Lipoprotein-Cholesterol; hypertension; having type 2 diabetes mellitus and duration with diabetes greater than10 years. Life-style related factors which were significantly associated with diabetes chronic complications were: low physical activity; being obese or overweight and poor compliance to medication.
After adjusting for confounding using multivariate analysis, independent risk factors for diabetes chronic complications were: low physical activity; high Low Density Lipoprotein-Cholesterol; duration with diabetes greater than 10 years and having type 2 diabetes mellitus. In order to reduce prevalence of diabetes chronic complications, all the risk factors identified will need to be comprehensively addressed.

4.4. Recommendations

1. Physicians at Parirenyatwa and Harare hospitals’ diabetic clinics should intensify screening of diabetics for chronic complications as early diagnosis and treatment can prevent severe disability and death.

2. Diabetics and the general population in Harare should be encouraged to adopt healthier lifestyles, particularly weight reduction among obese and overweight individuals through physical activities and eating low calorie, high fibre diet since physical inactivity, obesity and high Low Density Lipoprotein-Cholesterol were all risk factors for diabetes complications. The health promotion officers at Harare and Parirenyatwa should spearhead this campaign.

3. More studies on risk factors for diabetes related chronic complications should carried out in Zimbabwe by Public Health Officers particularly in rural settings as such literature is scarce in Zimbabwe.

4.5. Study Limitations

We carried out an analytic cross sectional study and the retrospective nature of our study design makes it impossible to draw any conclusion about causal relationship between risk factors identified and the development of diabetes chronic complications. It is also important to state that respondents were consecutively sampled as they reported for care at the diabetic clinics. This consecutive sampling could affect the impacts of the study, particularly generalization.
REFERENCES


34. Erisi Mafuratidze, Kurai Chako, Danai Tavonga Zhou. Over 27% of Type 2 Diabetic Patients Studied at Parirenyatwa Diabetic Clinic in Zimbabwe has Evidence of Impaired Renal Function. *International Journal of Scientific and Technology Research.* 2014; 3(3).


DATA COLLECTION TOOLS

APPENDIX 1: ENGLISH QUESTIONNAIRE

Questionnaire no…………..

Date…………

Name of Hospital (a) Harare Central Hospital (b) Parirenyatwa Central Hospital

Part A: Demographic data

1. What was your age at your last birthday?..................in years

2. Sex (observe only)   (a) Female (b) Male

3. What is your marital status? (a) Single (b) married (c) divorced (d) widowed

4. What is the highest level of education that you attained?   (a) Never went to school (b ) Primary

   (c)Secondary   (d) Tertiary

5. What is your current Religion? (a) Orthodox (b) Traditional (c) Pentecostal (d) Apostolic (e) Muslim (f) None

6. Employment status? (a) Employed   (b) self-employed (c) Unemployed   (d) Retired   (e) Student (f) other (specify)..........................
7. Are there any of your family members who had or currently have diabetes mellitus? (a) Yes (b) No

8. If yes to question 7, did this family member(s) experience any chronic diabetes complications (a) yes (b) no

9. If yes to question 8, what complications did the family member experience? .................................................................

**Part B: Factors associated with diabetic complications**

10. For how long have you been known to have diabetes mellitus? ..........in years

11. What is the type of your diabetes? (a) Type 1, (b) Type 2. (Check hospital cards to confirm)

12. What medication are you taking for diabetes? (a) Insulin (b) Oral hypoglycemic (c) both insulin and oral hypoglycemic (d) Diet only (e) Other (specify).................................

13. Do you always take your medication as prescribed? (a) Yes (b) No

14. How often in the last one week did you fail to take your medication? (a) Once (b) Twice (c) Three times (d) Four or more times

15. Where you diagnosed with any chronic diabetes complication? (a) Yes (b) no [NB: Check cards and all records to verify the specific complications diagnosed]

16. If you were diagnosed with a diabetes complication, what was/were the specific complication(s) and when were you diagnosed? [Check cards and all records to confirm]..............................................................

**Smoking habits**

17. Do you currently smoke cigarettes? (a) Yes (b) no

18. If you don’t smoke currently, where you a smoker at some point in your life? (a) Yes (b) No

19. If you smoke cigarettes, for how many years have you been smoking?.........years.

20. If you smoke, how many cigarettes do you smoke per day on average?........

**Alcohol consumption**

21. Have you ever consumed any alcohol such as beer, wine, and spirits? (a) Yes (b) No

22. Do you currently drink alcohol? (a) Yes (b) No
23. Have you consumed any alcohol within the past 30 days? (a) Yes (b) No

24. During the past 1 month, on how many occasions did you drink at least one standard alcoholic drink? [A “standard drink” is defined as the amount of alcohol contained in standard glass of beer or wine.]

25. During the past 30 days, when you drank alcohol, how many standard drinks on average did you drink during one occasion?

26. During the last 1 month, how many times did you drink six or more standard drinks in a single drinking occasion?

Assessment of level of physical activity (Source: STEPwise\textsuperscript{39} approach to Surveillance of Chronic Diseases and Risk Factors Assessment Instrument-World Health Organization-Geneva).

I am now going to ask you about the time that you spend doing physical activities in a week.

(a) Work

27. Does your usual work involve vigorous-intensity activity [e.g. carrying or lifting heavy loads, or construction work or digging] for at least 10 mins continuously? (a) Yes (b) No

28. In a week, on how many days do you do vigorous intensity activities as part of your usual work?

29. Approximately, how much time do you spend doing vigorous-intensity activities at work on a day? (in minutes).

30. Does your work involve moderate-intensity activity [e.g. carrying light loads, brisk walking etc] for at least 10 mins continuously? (a) Yes (b) No

31. In a week, on how many days do you do moderate intensity activities as part of your usual work?

32. How much time do you spend doing moderate-intensity activities at work on a day?

(b) Travel

The following questions do not include the physical activities at work that you have mentioned. I will ask you about the usual way you travel. [For example going to work or going for shopping].
Do you walk or use a bicycle cycle for at least 10 minutes continuously to get to and from places? (a) Yes (b) No

33. If yes, in a week, on how many days do you walk or cycle for a minimum of 10 minutes continuously to go to and from places? (a) Yes (b) No

34. Approximately, how much time do you spend walking or cycling for travel on a day?..............minutes

(c) **Recreational activities**

The next questions do not include the work and transport activities that you have already mentioned above.

I will ask you about recreational activities, sports and fitness related exercises.

35. Do you do any vigorous intensity recreational, sports or fitness related exercises [e.g playing football or running] for at least 10 mins continuously? (a) Yes (b) No

36. In a week, on how many days do you do any of these exercises?...........

37. How much time do you spend doing these exercises on a typical day?....... minutes

38. Do you do moderate-intensity recreational, sports or fitness related exercises [e.g. very brisk walking, cycling or playing volleyball]? (a) Yes (b) No

39. If yes to question 38, in a week, on how many days do you do such exercises?........................days

40. How much time do you spend doing those exercises on a typical day...

**Hypertension**

41. Are you currently hypertensive? (a) Yes (b) No

42. If you are hypertensive, for how long have you been hypertensive.........in years?

43. If you are hypertensive, is your BP well controlled? (a) Yes (b) No. [Check hospital cards to confirm with last three results, including the one done on day of interview].

**Miscellaneous**

44. Is your blood sugar level well controlled? (a) Yes (b) No. (Check hospital cards to confirm level of HB 1C%, RBS). [NB. Good glycaemia control is Hb 1C<7%]
45. Have you ever been tested for HIV before? (a) Yes (b) No

46. If yes, are you at liberty to disclose your HIV status to me? (a) Yes (b) No,

47. If yes, what is your HIV status (a) Negative (b) positive

48. If HIV positive are you on anti-retroviral therapy? (a) Yes (b) No

49. If on ART, for how long have you been on treatment? (Specify) .........................in years

   a) < 36 months   b) > 36months

   [This section is for males only, if female, skip to question 50].

50. Are you currently experiencing erectile dysfunction? (a) Yes (b) No

51. If you are experiencing erectile dysfunction, how long have you been having this problem?.......in years

52. Have you sought treatment for this problem? (a) Yes (b) No and if yes what treatment did you seek?(specify)..............................

53. Is the erectile dysfunction now better? (a) Yes (b) No
APPENDIX 2: SHONA QUESTIONNAIRE

Questionnaire no……

Zuva………..

Zita re Chipatara (a) Harare Central Hospital (b) Parirenyatwa Central Hospital

GWARO REMIBVUNZO

Chikamu chokutanga

1. Mune makore mangani ekuzvarwa?....................

2. (a) Murume (b) mukadzi………………

3. Makaroorwa/ roora here? [ ] Ndakaroorwa [ ] Ndakafirwa [ ] Tiri kubika mapapoto [ ]
Handisati ndawanika [ ] Takarambana

4. Makagumira gwaro ripi kuchikoro? [ ] Handina kuenda kuchikoro [ ] Primary [ ] Secondary
[ ] Tertiary

5. Munopinda chitendero chipi?
   a) Apostolic b) Pentecostal c) Anglican d) Catholic e) zvimwe..........................................

6. Munoshanda here? (a) ndinoshanda (b) ndinozvishandira (c) Handishandi (d)Ndakabuda basa nekukura

7. Pane vemumhuri menyu vaimbova kana vatori nechirwere cheshuga here? (a) Hongu (b) Kwete

8. Kana varipo, pane vakamboita zvimwe zvirwere zvaikonzerwa nechirerwere cheshuga here? (a) Hongu (b) Kwete
9. Kana varipo vakaita zvirwere izvozvo, mungadoma zvirwere zvacho here?........................................................................................................... 

Chikamu chechipiri

10. Mava nemakore magani mabatwa chirwere cheshuga?..................

11. Makanzi chirwere chenyu cheshuga imhando ipi? (a) Type 1 (b) Type 2.

12. Munoshandisa mishonga ipi pachirwere cheshuga? (a) jekiseni (b) mapiritsi(c) majekiseni nemapiritsi (e) zvimwe............................

13. Munotora mushonga nguva dzese here? (a) Hongu (b) Kwete

14. Pasvondo rapfuura, makakanganwa kutora mushonga kangani? (a) Handina (b) Kamwe (c) Kaviri (d) Katatu zvichikwira.

15. Makambonzi mune chimwe chirwere chakakonzerwa neshuga here? (a) Hongu (b) Kwete [Ndichatarisa mabhuku enyu ndiongorere]

16. Kana makambobatwa chirwere ichocho chakanzi ndechipi?......................... [Ndichatarisa mabhuku enyu ndiongorere]

Zvekuputa fodya

17. Parizvino munoputa fodya here? (a) Hongu (b) Kwete

18. Kana musingaputi fodya parizvino, makammoiputa here? (a) Hongu (b) Kwete

19. Kana muchiputa fodya, mava nemakore mangani muchiputa?...

20. Kana muchiputa fodya, munoputa midzanga mingani pazuva?.....

Kumwa doro

21. Makambomwa doro here? (a) Hongu (b) Kwete

22. Parizvino munomwa doro here? (a) Hongu (b) Kwete

23. Pamazuva makumi matatu apfuura, makambomwa doro kangani?.....

24. Pamazuva makumi matatu apfuura, makambomwa mukombe wedoro umwe kana kupfuura kangani?.....

25. Pamazuva makumi matatu apfuura, makamwa mikombe yedoro mingani pazuva rimwe chete?.....
26. Pamazuva makumi matatu apfuura, makambomwa doro pazuva rimwe zvekudarika mikombe mitanhatu kangani?........

Ongororo yemabasa anosimbisa muviri

Ndava kuda kubvunza nguva yamunotora muchiita mabasa.

Mabasa

27. Basa ramunoita rakaomarara zvakanyanya here? [muenzaniso: kutakura zvinorema, kuchera, kuvaka]
   (a) Hongu (b) Kwete

28. Pasvondo rimwe chete, munoita mabasa akoma zvakanyanya mazuva mangani?....... 

29. Pasvondo rimwechete, munotora maminetsi mangani muchiita basa rakaoma zvakanyanya?...

30. Munomboita basa rakaoma zvishoma here rakafanana nekufamba muchikasika kana kutakura zvisingaremi kwemaminetsi gumi kana kupfuura? (a) Hongu (b) Kwete

31. Pasvondo rimwechete, munoita basa rakaoma zvishoma kwemazuva mangani?...

32. Pazuva rimwechete, munotora maminetsi mangani muchiita basa rakaoma zvishoma?...

(b) Mafambiro amunoita kuenda kwakasiyana-siyana, kusanganisira kuenda kubasa

Mibvunzo inotevera inobvunza kubata kwenyu kumwe kusiri kwandambobvunza pamusoro apo. Ndava kuda kuziva mafambiro enyu kuenda kunzvimba dzakasiyana-siyana sekuenda kubasa, kukereke kana kuzvitoro. Munofamba here kana kuti munoshandisa bhasikoro kwekanguva kanosvika maminetsi gumi kana muchienda kubasa? (a) Hongu (b) Kwete

33. Pasvondo rimwechete munofamba kana kutasva bhasikoro mazuva mangani?....

34. Pazuva rimwechete munofamba kana kutasva bhasikoro kwemaminetsi mangani?...

(c) Mamwewo mabasa ekutandara

Zvandava kubvunza hazvisi zvandambobvunza pamusoro apo zvekuenda kubasa ne mafambiro enyu. Ndava kubvunza zvamunoita kusimbisa muviri uye muchitandara zvenyu makadekara.

35. Munoita zvekusimbisa muviri zvakaomarara here sekumhanya kana kutamba nhabvu? (a) Hongu (b) Kwete
36. Pasvondo rimwe, munoita izvi mazuva mangani?.. 

37. Pazuva rimwe, munoita izvi kwemaminetsi mangani?.. 

38. Munoita zvekusimbisa muviri zvakaoma zvishoma here sekufambisa kana kutasva bhasikoro? (a) Hongu (b) Kwete 

39. Pasvondo rimwe, munoita izvi ka kangani?.... 

40. Pazuva rimwe munoita izvi kwemaminetsi mangani?... 

**Chirwere che BP** 

41. Mune chirwere che BP here? (a) Hongu (b) Kwete 

42. Kana muine chirwere che BP, mava nemakore mangani muinacho?.. 

43. Kana muine chirwere che BP, BP yenyu iri kuita zvakanaka here? (a) Hongu (b) Kwete [Ndichatarisa mumabhuku enyu kuti ndione kuti ndizvo here]. 

**Imwewo mibvunzo** 

44. Shuga yenyu iri kugara yakaderera sezvinodiwa here? (a) Hongu (b) Kwete [Ndichatarisa mumabhuku enyu kuti ndione kuti ndizvo here]. 

45. Makamboongororwa ropa kutarisa HIV here? (a) Hongu (b) Kwete 

46. Kana makatorwa ropa, makasununguka here kundidzira kuti zvakamira sei? (a) Hongu (b) Kwete 

47. Kana makasununguka nditaurirei henyu kuti zvakamira sei? (a) Negative (b) positive 

48. Kana makanzi mune hutachiona hwe HIV, munomwa mapiritsi acho here? (a) Hongu (b) Kwete 

49. Kana muchimwa mapiritsi acho, mava nenguva yakadini muchiamwa?....... 

[Mibvunzo inotevera ndewevarume chete, kana muri mudzimai musapindure]. 

50. Muri kuita dambudziko rekusimba kwenhengo yenyu zvekutadza bonde here? (a) Hongu (b) Kwete 

51. Kana muine dambudziko iroro, mava nenguva yakadini?... 

52. Makambotsvaga rubatsiro here ne dambudziko iroro (a) Hongu (b) Kwete 

53. Parizvino zvava nane here? (a) Hongu (b) Kwete
APPENDIX 3: TOOLS FOR ANTHROPOMETRIC MEASUREMENTS

Questionnaire number................

1. (a) Weight...........kilograms
   (b) Height...........metres
   (c) Body Mass Index=weight/height$^2$ [kg/m$^2$]......................
   (d) Classification of BMI: 1. Underweight: <18.5kg/m$^2$
       2. Normal range: 18.5-24.99kg/m$^2$
       3. Overweight: 25-29.99kg/m$^2$
       4. Obese: >30kg/m$^2$

Results of investigations and examinations done [Check all patient cards and notes]

2. (a) Hb 1C %............................

   Comments: Poor glycaemic control (i) Yes [>7%] (ii) No [<or=7%]

   (a) Serum creatinine....................... 

   Serum urea....................

   Estimated Glomerular Filtration rate using the MDRD equation = [186 x (creatinine/88.4)$^{1.154}$ x (age-0.203) x (0.742 if female) x (1.21 if black)] =......................

   Classification of EGFR: Normal [>60]........

       Nephropathy [15-59]........

       Chronic renal failure [<15]........

   (c) Lipid profile results...............................................................

   Comments: High LDL-Cholesterol [>100] (i) Yes (ii) No
(d) Eye examination by specialist ophthalmologist [in the last 1 year]…………………………………………………………


(e) Stroke [in the last 1 year]……………………………………………………………………………………………………

Comments: Stroke (i) Yes (ii) No

(f) Results of foot examination-to be done by researcher (including peripheral pulses-tibial, popliteal, femoral pulses, diabetic foot syndrome, amputation in the last 1 year)………………………………………………


(g) Heart failure as diagnosed by physician in the last 1 year (i) Yes (ii) No
APPENDIX 4: TOOLS FOR ASSESSING PHYSICAL ACTIVITY

Calculation of metabolic equivalence

Metabolic equivalence was calculated using intensity of physical activity as shown in table 7.

Table 7: Calculation of Metabolic Equivalents (MET) of diabetic patients in Harare, 2014. (Source: STEP wise\textsuperscript{39} approach to Surveillance of Chronic Diseases and Risk Factors Assessment Instrument. World Health Organization)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Intensity of activity</th>
<th>MET value</th>
<th>MET-minutes/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work (e.g. construction related work, lifting loads or digging)</td>
<td>Moderate</td>
<td>4</td>
<td>............</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>8</td>
<td>............</td>
</tr>
<tr>
<td>Transport (e.g. walking, cycling)</td>
<td>Moderate</td>
<td>4</td>
<td>............</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>8</td>
<td>............</td>
</tr>
<tr>
<td>Recreational activity (e.g. playing volley ball, running or football)</td>
<td>Moderate</td>
<td>4</td>
<td>............</td>
</tr>
<tr>
<td></td>
<td>Vigorous</td>
<td>8</td>
<td>............</td>
</tr>
<tr>
<td>Total MET-minutes/week</td>
<td></td>
<td></td>
<td>............</td>
</tr>
</tbody>
</table>

Intensity of physical activity was measured in Metabolic Equivalents (MET), which is essentially the ratio of an individual’s working metabolic rate relative to his/her resting metabolic rate and was classified as shown in table 7. The MET-minutes per week were calculated by multiplying the MET value for each activity by the number of days the activity was done each week multiplied by number of the minutes spend performing each activity. The number of MET-minutes per week for each activity were then be added to get
the total number of MET-minutes per week which in turn were used to classify physical activity into high, moderate and low as per WHO STEP wise guidelines\(^\text{39}\).

**Classification of level of physical activity**

Classification of level of activity was assessed as shown in table 8.

*Table 8: Classification of Level of Physical Activity in Harare, 2014. (Source: STEP wise\(^\text{39}\) approach to Surveillance of Chronic Diseases and Risk Factors Assessment Instrument. World Health Organization)*

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description of level of physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>≥3 days of vigorous-intensity activity with a minimum of 1500 MET-minutes per week, or 7 days of moderate or vigorous intensity activity with a minimum of 3000 MET-minutes per week.</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>≥3 days of vigorous-intensity activity of ≥20 mins per day, or ≥5 days of moderate-intensity activity of ≥30 mins per day, or ≥5 days of moderate or vigorous-intensity activity with a minimum of 600 MET-mins per week.</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Any person who does not meet any of the above two criteria</td>
</tr>
</tbody>
</table>
CONSENT FORMS

APPENDIX 5: ENGLISH CONSENT FORM

Introduction


Principal investigator: Tapera Saravoye [MBchB (UZ)]

Phone number: 0772 889622

What you should know before you consent:

This consent is meant for you to familiarize yourself with the purpose, risks, and benefits of this research study.

- Participation in this study is on voluntary basis.
- There is no monetary benefit for participating in this study.
- The aim of this research is to gain knowledge on prevalence and risk factors for diabetes related chronic complications and this will help diabetic patients in Harare and this will help you and other diabetics.
- You are allowed to decline participation in this study now and even during the interview if you feel that you are no longer comfortable with continuing.
- There is no penalty for refusing to participate in this study.
- Please review this consent form carefully.
- Ask any questions before you make your decision.

Purpose
You are being asked to participate in a study on: Prevalence and Risk Factors for Diabetes Mellitus Related Chronic Complications in Harare, 2014. The aim of the study is to gain knowledge on prevalence and risk factors for diabetes related chronic complications in Harare.

**Procedures and duration**

We are going to be conducting interviewer administered interviews. During the interview we are going to ask you a set of 53 questions and this is expected to take at most 20 minutes of your time. You are allowed not to answer some of the questions if you are not comfortable with answering them. We will measure your weight, height and perform a physical examination on you. You are allowed to decline this examination if you feel uncomfortable at any moment during the examination.

**Voluntary Participation**

It’s important for you to know that participation in this study is voluntary and that refusal to participate does not have any negative consequences on you. You will still have access to the diabetic clinic services now and in future. You are allowed to decline participation at any time during the interview.

**Confidentiality**

We will not include your name on the questionnaire when you agree to participate in this study. Results of this study will be shared with Harare and Parirenyatwa Hospitals and the University of Zimbabwe. The purpose of this sharing is for the community in general to benefit as well from our findings.

**Risks**

We do not anticipate any physical risks due to participation in this study.

**Benefits**

We do not promise that you will receive financial or material benefits from this study. However your participation in this study may be a chance for you to know more about the risk factors for diabetes related chronic complications.

**Additional Costs**

There will be no further costs to you for your participation in this study.
Answers to Questions

Ask any questions with regards to this study that you have on areas that you don’t clearly understand.

Authorization

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

Name of research participant (print)  Date

Signature of respondent or legally authorized representative  Time

You will be given a copy of this consent form to keep

If you have any questions concerning this study or concerns beyond those answered by the investigator, including questions about the research, your rights as a research subject or research related injuries, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact Medical Research Council of Zimbabwe (MRCZ) on telephone 04-791792 or 791193.
APPENDIX 6: SHONA CONSENT FORM

TSAMBA YECHITENDERANO

Kutanga

Musoro weTsvakiridzo: Ongororo yehuwandu nezvikonzero zvezvirwere zvinounzwa nekuda kwekuva nechirwere cheshuga muguta re Harare, gore ra2014.

Muongorori: Tapera Saravoye [MBchB (UZ)]

Nhare: 0772 889622

E-mail: tsaravoye@gmail.com

Zvamunofanirwa kuziva musati mapinda mutsvakiridzo iyoyi:

- Tsamba yechitenderano iyi inobatsira kuti muve neruzivo rwune udzamu pamusoro pe tsvakiridzo
- Hamumanikidzwe kupinda muongororo iyi
- Hapana mari yamuchapiwa nekupinda muongororo iyi
- Tsvakiridzo iyi iri kuitwa kuti tigoziva zvimwe zvangokonzera gomarara rechibereko
- Munobvumirwa kuramba kuenderera mberi netsvakiridzo iyi nyangwe mavapakati payo
- Hapana zvakashata zvinoitika nyangwe mukaramba kupinda tsvakiridzo iyi.
- Bvunzayi mibvunzo yamunoda musati mapinda mutsvakiridzo iyi

Chinangwa chetsvakiridzo iyi

Murikukumbirwa kuti mupinde mutsvakiridzo ine musoro unoti: Ongororo yehuwandu nezvikonzero zvezvirwere zvinounzwa nekuda kwekuva nechirwere cheshuga muguta re Harare, gore ra2014. Tino tarisira kuwana zvinokenzera nehuwandu hwezvirwere zvinokonzerwa nekuda kwechirwere cheshuga kana tapedza ongororo iyi.

Zvatichange tichiita muongororo iyi

**Kupinda kwenyu mutsvakiridzo**

Zvakakosha kuti muzive kuti kupinda kwenyu mutsvakiridzo iyi kuda kwenyu uye hamumanikidzwe. Mukaramba zvenyu hapanas chakashata chinoitika kwamuri uye munobvumirwa kuuya kumakiriniki ezvekurapwa kwechirwere cheshuga nyangwe maramba kupinda mutsvakiridzo iyi.

**Kuvimbika kweongororo**

Patsvakiridzo iyoyi hapanapatinyora zita renyu. Zvichabuda muongororo iyi kuti tichazvirirawo kuzvipatara zve Harare neParirenyatwa uye neUniversity yeZimbabwe. Chinagwa chekutaurirana newamwe ndecekutani vanhu vemuguta reHarare vagobatsirikawo nezvinenge zvabuda muongororo iyi.

**Kushungurudzika**

Hapanas kushungurudzika kwatinotarisira mutsvakiridzo iyi. Tichakuongororai tichitarisa zvirwere zvingava zvakakonserwa nechirwere cheshuga pamuvi wenyu pamwe nokupima urefu neuremu hwenyu.

**Zvakanakira kuvamuongororo iyi**

Hapanas mari kana zvimwe zvinhu zvamunophwano mutsvakiridzo iyi asi kuvamo kwenyu mutsvakiridzo iyi kunobatsira kuti imi mugoziwa vzakawanda maererano nezvirewere zvinokonserwa nechirwere cheshuga.

**Mumwe muripo**

Hapanas mari dzamunotarisira kubhadhara kuti muvamuongororo iyi.

**Mibvunzo ingavapo**

Kana paine mibvunzo yamuinayo makasununguka kuibvunza.

**Kubvuma kwenyu kupinda mutsvagiridzo**

Mave pachidanho chekuti munyore kuti munoda kupinda here mutsvakiridzo kana kuti hamudi. Kana mukasaina apa zvinoreva kuti manzisisa zviri muchitenderano chino uye mapindirana nazvo kuti munoda kuva mutsvakiridzo iyi.
Zita remupinduri (nyorai nemavara makuru)  
Zuva

Runyoro rwechibvumirano rwemupinduri  
Zuva

Muchapihwawo imwe tsamba yeChitenderano yamuchanochengeta kumba

Kana mune mibvunzo isina kupindurwa nemuongorori zvichisanganisira mibvunzo pamusoro peongororo ino, kodzero dzenyu kana mibvunzo yakanangana nekubatwa kwamaitwa muongororo ino, kana kusabatwa zvakanaka kwamunengwe maitwa makasununguka kuridza nhare paboka reMedical Research Council of Zimbabwe panhamba dzerunhare dzinoti: 04-791792 kana kuti pa 791193.
APPENDIX 7: MRCZ APPROVAL LETTER
MRCZ APPROVAL LETTER

Ref: MRCZ/B/680

Dr. Tapera Saravaye
UZ-Medical School
Department of Community Medicine
Avondale
Harare

RE: Application For Ethical Review And Approval Of Study Entitled: Prevalence And Risk Factors For Diabetes Mellitus Related Chronic Complications In Harare, 2014

Thank you for the above titled proposal that you submitted to the Medical Research Council of Zimbabwe (MRCZ) for review. Please be advised that the Medical Research Council of Zimbabwe has reviewed and approved your application to conduct the above titled study. This is based on the following:

a) Study Protocol
b) English and Shona Adult Informed Consents Forms.
c) English and Shona Parental Informed Consent Forms.
d) English And Shona Assent Forms
e) Data Collection Tools

- APPROVAL NUMBER : MRCZ/B/680
- The above details should be used on all correspondences, consent forms and documents as appropriate.
- TYPE OF MEETING : Expedited review
- APPROVAL DATE : 13 August, 2014
- EXPIRATION DATE : 12 August, 2015

After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the MRCZ Offices should be submitted one month before the expiration date for continuing review.

- SERIOUS ADVERSE EVENT REPORTING: All serious problems having to do with subject safety must be reported to the Institutional Ethical Review Committee (IERC) as well as the MRCZ within 3 working days using standard forms obtainable from the MRCZ Offices.
- MODIFICATIONS: Prior MRCZ and IERC approval using standard forms obtainable from the MRCZ Offices is required before implementing any changes in the Protocol (including changes in the consent documents).
- TERMINATION OF STUDY: On termination of a study, a report has to be submitted to the MRCZ using standard forms obtainable from the MRCZ Offices.
- QUESTIONS: Please contact the MRCZ on Telephone No. (04) 791792, 791193 or by e-mail on mrcz@mrcz.org.zw.

Other:
- Please be reminded to send in copies of your final research results for our records as well as for the Health Research Database.
- You are also encouraged to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.

Yours Faithfully

[Signature]

MRCZ SECRETARIAT
FOR CHAIRPERSON
MEDICAL RESEARCH COUNCIL OF ZIMBABWE

PROMOTING ETHICAL CONDUCT OF HEALTH RESEARCH

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