MINISTRY OF HEALTH ZANZIBAR

NCD Survey Report

Main findings from the National Non-Communicable Disease Risk Factor Survey 2011

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This report summarizes the descriptive findings of the 2011 Zanzibar National Non Communicable Disease Risk Factor Survey (National NCD risk factor survey), which was conducted by Ministry of Health Zanzibar. Funding and technical assistance were provided by the Danish International Development Assistance (DANIDA), World Health Organisation (WHO) regional and head quarter, Copenhagen School of Global Health (CSGH). Local costs were partly covered through in-kind contributions from Stone Town Traders (STT), Azam Marine Coastal ferries, and AfDB.

Additional information about the 2011 National NCD risk factor survey may be obtained from the NCD unit, Ministry of Health , Po Box 236, Zanzibar, Tanzania. Fax: +255 24 2231987 E-mail afyasmz @ zanlink.com , or by visiting the homepage of the Ministry of Health at www.zanhealth.go.tz following the link 'NCD survey'.

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Reading guide:

Result tables appearing in the text are identified by a plain table number and title (for instance 'Table 40 - Mean Heart Rate').
To increase readability of the report only few tables appear in the text. The rest of result tables of interest to the reader are found in annex IV. These tables are referred to by 'A' and table number (for instance 'Table A-20' referring to table A-20 'Previously diagnosed with HTN').
The term 'gender' is referring to biological classification (sex) and not to cultural constructions. Female/women, as well as male/men are used interchangeably, both referring to biological categories.

Being aware of the difference between screening results and diagnosis, the terms 'raised BP' and 'Hypertension', 'raised FBG' and 'Diabetes' etc have however been used interchangeably to describe survey results in order to make the text more reader-friendly.

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List of Abbreviations

AMA	American Medical Association
BMI	Body Mass Index
BP	Blood Pressure
CI	confidence intervals
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Disease
DALYs	Disability Adjusted Life Years
DASH	Dietary Approaches to Stop Hypertension
DBP	diastolic blood pressure
DHS	Demographic and Health Survey
DM	Diabetic Mellitus
EpiData	Database for Epidemiological Data
EpiInfo	Statistical Package for Epidemiological Data
eSTEPS	electronic version of STEPs
ETS	Environmental Tobacco Smoke
FBG	Fasting Blood Glucose
GHQ	General Health Questionnaire
GIT	Gastrointestinal Tract
HCW	health care workers
HDL	High Density Lipoprotein
HIV	Human Immunodeficiency Virus
HSPS	Health Sector Programme Support
HTN	Hypertension
IDF	International Diabetes Federation
IQR	Inter Quartile Range (25% to 75%)
IFG	Impaired Fasting Glucose
LDL	Low Density Lipoprotein
MDG	Millennium Development Goals
MET	Metabolic Equivalent
METS	minutes measured in MET (see Questionnaire chapter)
MMH	Mnazi Mmoja Hospital
mmol/L	Millimol per litre (measuring unit)
MoH	Ministry of Health
NCD	Non Communicable Disease
NCDs	non communicable diseases sharing
OR	Odds Ratio
PA	Physical Activity
PDA	Personal Digital Assistant
PHC	primary health care
PHCC	primary health care centres
PHCU	primary health care units
PPS	probability proportionate to size
PSU	primary sampling units
RR	Relative Risk
RTA	road traffic accident
SBP	Systolic Blood Pressure
SPSS	Statistical Package for data analysis

SRS	Simple Random Selection
STEPs	Stepwise Approach to Surveillance of NCD risk factors
TB	Tuberculosis/Trouble Breathing
TDHS	Tanzania Demographic and Health Survey
USD	US Dollar
WC	waist circumference
WHO	World Health Organization
WHR	Waist Hip Ratio
YLD	years lost to disability
ZAMREC	Zanzibar Medical Research and Ethical Council
GHQ-12	General Health Questionnaire 12

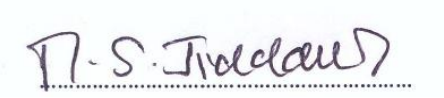
Foreword

It is with great pleasure that I am able to present the report from the first national Non-Communicable Disease Risk Factor Survey in Zanzibar.

In the last decade we have seen an increase in Non-Communicable diseases such as Diabetes, Hypertension, obesity and injuries. However, we have not had any reliable population based data from Zanzibar on prevalence of these diseases and their risk factors. Public awareness also seems to be low.

With the National Non-Communicable Disease Risk Factor Survey conducted in June-July 2011, and the present survey report, we are for the first time able to come with an estimate on the magnitude of selected risk factors and diseases. This will serve the purpose of planning, rational allocation of resources, inter-sector collaboration and advocacy.

It is my sincere hope that both national and international partners will join hands with Ministry of Health in order to fight this new threat to health and development that the non-communicable diseases poses.



Dr. Mohamed S. Jiddawi
Principal Secretary
Ministry of Health
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Acknowledgement

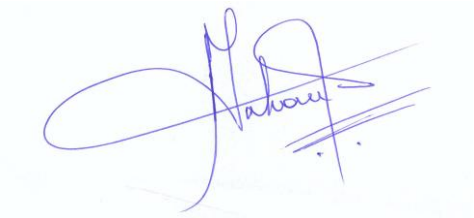
This Survey Report from the first National NCD risk factor study in Zanzibar is a product of both financial and technical inputs from multiple contributors. The Ministry of Health would like to thank the Danish International Development Agency (DANIDA) and the World Health Organization (WHO) for the technical and financial support given at different stages of the survey.

The preparation and production of the Survey Report would not have been possible without Principal Secretary Dr. Mohammed Jiddawi, Ministry of Health, and the now-retired Senior Health Advisor, Danida Health Sector Programme Support, Zanzibar, Dr. Bou Peters, and their continuous support.

The Ministry of Health is highly appreciative of the support given by various departments and programmes in the Ministry as well as the following organisations: Copenhagen School of Global Health, IdC foundation, Helse Bergen, and WHO Head Quarter. The contribution of these organisations made the survey and the production of this report possible.

A special thanks goes to the survey's dedicated Technical Team consisting of Dr Faiza Kassim (principal investigator), Mr. Ali Hassan, Dr. Salma Masauni, Ms. Miskiya Mohammed, and Jutta Adelin Jorgensen. Our sincere thanks also goes to Dr. Alisalad Abdikamal and Ms. Melanie Cowan, Dr. Giovanna Paltrinieri, and Dr. Ingvar Bjelland for assisting at various parts of the exercise.

The Ministry of health would like to express its heartfelt gratitude to all data collectors, drivers, Shehas and to the survey participants; without their participation and contributions the survey would not have been possible.



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Executive Summary

Chronic non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, chronic obstructive pulmonary disease and diabetes have become a major public health problem globally, and is an emerging problem in developing countries to a degree where WHO calls it an epidemic. The growing challenges threaten economic and social development as well as health and well being of people. Surveillance is essential to quantify and track NCDs and their determinants, and it provides the foundation for advocacy, national policy and action.

Ministry of Health Zanzibar planned to conduct a National NCD survey in 2011 to get prevalence on risk behaviour and selected NCDs. Also risk behaviour and prevalence of injuries, and mental health status was assessed. The survey was the first of its kind in Zanzibar.
Multi-stage sampling with stratification was used to include all districts in Zanzibar. 2772 residents aged 25 to 64 years were sampled of which 98.2% was enrolled in the study. Unified and standardized protocols and tools were used. The field survey was conducted from June to July 2011 and each participant underwent a face to face interview, physical measurements and blood sample test. The completion rate was 94% among the enrolled participants.
Information on NCD risk factors including tobacco use, alcohol consumption, diet, physical activity and road traffic behaviour were collected. Body height and weight, waist circumference and blood pressure were measured. Blood samples were collected to test blood glucose, cholesterol and triglyceride. Control measures were applied to ensure the quality of the surveillance work.

The overall prevalence of HTN was 33%. Prevalence of obesity measured as BMI > 30 m^2/kg was found to be 14.3% whereas if determined by waist-hip ratio (WHR) it was found to be 33% among men and 72.6% among women. Prevalence of obesity was significant higher in urban than in rural areas, whereas prevalence of hypertension was the same across all strata.

Results showed an overall prevalence of raised combined risk for NCD (three or more of the risk factors smoking, insufficient intake of fruits and vegetables, sedentary lifestyle, overweight/obesity and raised BP) to be 24.2% with slightly higher prevalence in urban than in rural areas.
Prevalence of DM was 3.7% in the surveyed population, and IFG was found to be at 2.8 %. Raised levels of Cholesterol and triglyceride, which also raises the total risk of NCDs, were found at respectively 24.4% and 5.7%. With few exceptions, women in the 45-64 years age group had worst risk indicators in all categories.

Prevalence of accidents leading to injuries within the last year was 13.2% with 4.5% of the population having been injured in a RTA and 9.9% in other accidents, mainly work related and of the types fall injury or cut wounds. The prevalence of protective behaviour on the road such as always wearing seat belt (5.9%) or helmet (15.7%) was assessed. Permanent disabilities due to accidents and injuries were not assessed.
The prevalence of self reported symptoms of anxiety/depression was 6.8 % when using a relatively high cut-off for positive symptoms. This was significantly higher than the prevalence of those already diagnosed with a mental disease (any diagnosis) which stood at 1.6%.

The results of the survey give invaluable information on the situation of selected NCDs and risk factors in Zanzibar and directions for interventions as well as future studies to undertake.

Background

Rationale of the survey

The burden of chronic diseases

In 2005 the major chronic, non communicable diseases sharing the same risk factors (CVD, DM, COPD, cancers) accounted for 60% of all deaths and was estimated to account for 20% of the global burden of disease according to WHO.[i] Data suggests that 80% of all deaths due to NCDs occur in low and middle income countries.[ii] Deaths due to diabetes in sub-Saharan Africa has increased from 2.2-2.5% in 2000 to an estimated 6% of total mortality in 2010[iii], and the absolute and relative mortality rates are highest in the 20-39 year age group which is the most economically productive population.[iv] This is a threat to socio-economic development and seen in 2009 by the World Economic Forum as the fourth most severe global risk that could occur.[v] Likewise, the burden of NCD is one of the obstacles for low and middle income countries to achieve the Millennium Development Goals (MDG). [vi]

Furthermore, injuries account for 9% of deaths and 16% of disabilities worldwide, and among young people road traffic injuries are the leading cause of death among young people age 15-29 years[vii].

Mental diseases are rather neglected in the global public health agenda, despite their impact on wellbeing as well as productivity and their nature of potentially being severely disabling.
In 1990 the World Bank estimated that neuropsychiatric disorders formed 10.5% of global burden of disease (DALYs) and suggested that this could rise to 15% in 2020. They comprise five of the 10 leading causes of disability, and account for 28% of years of life lived with a disability. Depression alone is expected to rise from the fourth to being leading cause of global disease burden as measured by DALYs by 2030, and is already the leading cause of years lost to disability (YLD). [viii]

Risk factors for chronic diseases

A limited number of health risk behaviours, such as tobacco smoking, high intake of salt and saturated fats, low intake of fruits and vegetables, and physical inactivity, are linked to chronic diseases especially CVD, DM, COPD and cancers.[ix] These behaviours are linked to physiological risk factors such as hypertension and blood lipid disorders. In order to reduce the subsequent morbidity and mortality attributable to chronic diseases, the major strategies for prevention and control are to reduce the prevalence of risk behaviours related to NCD in the entire population, and to control raised risk factors among high risk individuals to reduce complications of these conditions.
There are indicators pointing towards mental illness/stress being linked to higher risk of CVD, and worse control of chronic diseases[x].

Zanzibar context

Zanzibar, a part of the United Republic of Tanzania, is composed of two Islands Unguja and Pemba surrounded by some smaller Islets in the Indian Ocean. The Union Government is responsible for external matters such as army, police and foreign affairs. Zanzibar is autonomous in internal matter such

as related to health, education, business, agriculture, tourism etc and has a House of Representatives, a president, and its own ministries such as Ministry of Health (MoH).

The population of Zanzibar was in 2011 estimated to be 1.3 million with the annual growth rate of 3.1 percent[xi]. It is the one of the most densely populated countries in Africa with 370 people per square kilometre. The proportion of the population below the age of 15 years is 43%, and only 4% is above the age of 65 years.[xii] A large proportion of the population is racially mixed with influence from India, the Arab peninsula, Europe and continental Africa. The health sector consists of mainly public facilities but private facilities are increasing in urban area, mainly providing out patient services. There are 131 public primary health care units (PHCU), mainly delivering services for maternal health, child health, and acute infectious diseases, some of the PHCUs however provide additional services. There are furthermore 4 primary health care centres (PHCC) also named 'Cottage Hospitals' with delivery and dental services, 3 district hospitals, and 1 referral hospital, Mnazi Mmoja Hospital (MMH) in Unguja.

Use of herbal medicine and services from traditional healers are widely used in all of Zanzibar, and the National Health Policy emphasises and acknowledges the importance of the traditional health sector.

The health status of people of Zanzibar is similar to other African countries in terms of poverty and communicable disease that account for a large part of the burden of disease, and the health system is organised for the treatment of acute rather than chronic diseases. HIV, TB, and malaria prevalence are low while respiratory infections, diarrhoeal diseases, and malnutrition are very common.

However, in Zanzibar Non communicable diseases (NCDs) are considered to be increasing in recent years. There is not any population based data available to support the reported increase.
Admission to hospitals due to Diabetes, Cardio Vascular Diseases, and chronic lung diseases [xiii] increased much in recent years. In 2009 these diagnosis constituted 3,094 out of a total of 10,715 admissions to medical wards in hospitals in Zanzibar.[xiv] In 2011 this had risen to 9,021 out of a total of 20,434 admissions to medical wards.[xv]
In Zanzibar, CVD accounts for between 13-18% of all recorded causes of death in hospital.[xvi]

Screening, prevention activities, diagnosis, and management of Diabetes and Hypertension at primary health care (PHC) level are basically non-existing in Zanzibar despite the fact that 95% of the population lives within 5 km of a staffed PHC facility.
The Zanzibar Health Policy of 1999 emphasised the use of integrated primary health care approaches to prevent, control and manage all diseases, communicable and non-communicable, and the Health Sector Strategic Plan 2007-11 had among its targets to establish a baseline on Diabetes and other NCDs, to increase awareness and create community mobilisation on prevention and control of NCD, and to integrate prevention and management of the most common NCD in all hospitals, PHCC and selected PHCU.[xvii]

There is currently no programme in the health sector specifically addressing prevention and management of diabetes or other NCDs. Focus is still largely on acute infections or treatment at hospital level, and services for NCDs are not available at PHC level. Awareness in the general population seems to slowly be rising but with misconceptions on causes, symptoms, and proper management, and health workers on PHC level are not aware of prevention, rational screening, early detection, and control of the diseases and risk factors.

In Zanzibar, no population surveillance of NCD and risk factors is taking place, and estimates of the actual burden of NCD are un-precise. Ministry of Health therefore decided to carry out a survey using the WHO STEPwise approach to chronic disease risk factor surveillance (STEPS).
Apart from the shared risk factors for CVD, DM, COPD and cancers, also risk behaviour and prevalence related to accidents, as well as mental health was assessed in the present survey
The present survey was the first of its kind and the outcome does not only estimate the size of the problem, and project future trends, but is expected to be the base for effective and efficient planning and intervention at all levels.

Previous NCD surveys in Zanzibar

No previous survey on NCD and risk factors has been undertaken in Zanzibar.
Available data on diseases and risk factors are derived from DHS, screening exercises, and facility based health information systems. In 2004, 26.9 percent of women in Zanzibar, and 40 percent of women living in urban area, were overweight or obese, a known risk factors for type 2 diabetes .[xviii] In 2009 the prevalence of low birth weight stood at 4.9% indicating that the coming generation also is at risk.

The estimated diabetes prevalence in Zanzibar stands at 7 % and IFG at 11%. These estimates are based on (random) screening of selected population groups. It is assumed that more than half of the diabetes cases are undetected.[xix] For Hypertension the estimate is a prevalence of 25 % in the adult population (age > 25 yrs), at least half of which are undiagnosed, and more frequent in younger women than men[xx].

Survey participants and methods

Overall Survey Organization

The survey was conducted in 2011 under the auspices of the Ministry of Health of the Revolutionary Government of Zanzibar with technical and financial support from WHO Afro and WHO Geneva, Danida HSPS IV, Copenhagen School of Global Health and in kind contribution from local business corporations.

The survey took place in June and July 2011, followed by data cleaning and analysis. One Principal Investigator and five assistant researchers coordinated the survey on site, checked completed questionnaires daily, and organised logistics. The six data collection teams consisted each of six interviewers, one supervisor, one laboratory technician and one driver. Interviewers were either health care workers or professional interviewers familiar with household surveys such as DHS. The sample size was calculated to be 2800 participants (see the annexed 'Survey Data Collection Report' for details on study and sample designs). Each interviewer did on average 3 – 4 interviews a day and was assisted on site by local village guides.

Selected households were invited to participate to the survey through personal invitation (home visit) or written invitation sent few days in advance. The household members were asked to remain home till the interviewer arrived and selected the member of household to participate in the survey. Step one and two were performed in the house, while step 3 was performed at a study centre appointed by the local leader and central to the study participants the next morning as from 7:00 am.

Participants were informed that they should report fasting since midnight except for pure water. Antihypertensive medicine should be taken, while hypoglycaemic drugs should not be taken before blood sample was drawn.

The laboratory technician would when possible make telephone calls to participants not showing up in order to set up a new time for blood collection if the participant wished to partake in step 3.

Ethical clearance and informed consent

The survey was approved by Zanzibar Medical Research Ethical Committee (ZAMREC), Ministry of Health, after technical and ethical reviews. Participants were informed about the study, given opportunity to ask questions and free to participate.

Participants were asked to sign an informed consent form. Illiterate participants were encouraged to have the consent form read by someone else than the interviewer, and signed by thumb print. The participants were informed that they could interrupt the interview at any stage without any repercussion would they not like to continue participation.

Confidentiality was strictly observed and only the participant and interviewer were present in the room at the time of the interview.

All participants were given a copy of their anthropometric and biochemical results. Participants were also given a short written message on normal value range, as well as advise on action to take in regard to out of range results.

All participants who completed step 3 (biochemical tests) were given a small token of appreciation (a bag of washing powder) which they had not been informed about beforehand.

Sampling framework and methodology

The sampling frame consisted of a random sample of the entire population aged 25-64 years. It was not possible to draw a simple random sample since individual data including names, age and address of residence were not available.
Instead a multi stage sampling framework with stratification was applied, consisting of random and cluster sampling techniques. The ten districts in Zanzibar were considered as different strata, and the total number of primary sampling units, PSU, was allocated proportionately across all strata. Each district is divided into smaller clusters (shehia). These clusters are themselves divided into smaller clusters called zones which typically consist of 100-300 households. Zones smaller than that were merged to make up one larger cluster, and zones much larger were split in smaller clusters.

At the first stage clusters were selected using Simple Random Selection, SRS, from the list of clusters (shehia) within each district. At the second stage clusters (zones) were randomly selected using probability proportionate to size (PPS). At the third stage households were randomly selected from the household lists provided by the administrative leader of the Shehia. Resources allowed for 28 households to be selected from each shehia. The household lists were complete and included households with no eligible participants for the survey. Therefore an extra 7 households were sampled

at third stage in each cluster for replacement in case a selected household had no eligible participants and had to be changed. This was done before data collectors went to the cluster. Finally participants were selected from the household using Kish method. .

Initially eligible participants who were away from home on average 3 or more nights a week were excluded from the eligible sample together with those who due to severe physical or mental illness could not cooperate to the participation.

Intensive efforts by re-visit (on the same day) and telephone calls were made throughout the survey period to contact eligible participants who did not respond.

At the end of the survey, intensive efforts were made by telephone call to convince, once more, the nonparticipants to participate during a final two-week period where, instead of home visits, the participants would meet up in a study centre fasting, having blood tests done followed by interview and anthropometric measurements.

2772 Households were sampled for the survey. Out of the targeted households 2723 (98.2 % of target) were eligible and were enrolled in the survey.
Out of the enrolled households 97.6% delivered one participant who completed the first two steps (questionnaire and anthropometric measurements). The rest refused (2.1%), or were not responding to the invitation (0.2%). Out of those who completed the first two steps, 94 % (n=2499) did step 3 and hence completed the survey.[xxi]

Survey Tool

The survey-tool used in this research exercise was adapted from the WHO STEPwise approach to chronic disease risk factor surveillance (STEPS) instrument. This is a sequential process tool consisting of three 'steps' of information gathering. The three steps can be elaborated as follows:

Step One was a structured questionnaire gathering socio-demographic information, information on key behavioural factors, previous history of injuries, hypertension and diabetes, and self-reported mental wellbeing.
Step Two was anthropometric measurements following agreed order (BP and heart rate, height, weight, waist and hip circumference)
Step Three consisted of biochemical measurements of fasting blood glucose, triglyceride, and cholesterol levels.

Both core and expanded items at each step of the STEPS modules were used. For injuries, the relevant part of the 'injury and violence' optional STEPs module was used, and for mental wellbeing GHQ-12 was used. All questionnaires had been translated into Swahili and piloted before data collection started.

Data collectors administered the questionnaire during household visits and recorded results by using a PDA. The software (eSTEPS) was designed to show only one question and all its possible answers at a time in one screen view, and also provided various filters and validation procedures (e.g. proceed to next question only if an optional answer is entered; range of valid values; skipping questions not relevant etc).

Most participants could answer the questionnaire within 30 minutes. An English version of the questionnaire is provided in Annex II.

At the end of the day, the completed participant records were downloaded from PDA and stored in EpiData at a server in Ministry of Health. The records were checked for errors and corrected the following day in collaboration with the interviewer.

Data Analysis

To take into account the complex design of the survey, a weighting factor was applied to each participant record to adjust for varying probabilities of selection and on representativeness in the stratum 20-year age sex groups.
In the national analysis the population weights were calculated by comparing the overall age-sex structure of the sample versus that of the national population. For the strata-specific analysis, the age-sex structure of the sample from each stratum was compared to that of the entire target population of the strata and weights calculated.

Data cleaning was conducted in Ministry of Health Zanzibar. Data analysis was conducted in Ministry of Health with technical support from WHO Geneva. Data were analysed using EpiInfo software for windows version 3.5.1. Exception was the GHQ-12 (mental health) which was analysed using SPSS version 18.0.
Weighted percentages, means and 95% confidence intervals for these percentages and means were computed using statistics appropriate to the study's design.

Questionnaire

Part One –

Socio-economic and demographic characteristic

Questions on ethnicity (not race), marital status, household size, educational background, employment and income were asked in the introduction of the questionnaire.

Tobacco use

Use of tobacco products was recorded as per response of the participant to the questionnaire. The two main categories of tobacco products were tobacco for smoking and smokeless tobacco

Smoking status was as self reported either current smoker or non-smoker.
Current smokers were either daily smokers (smoking every day), or non-daily smokers (smoking within the past 12 months but not smoking every day).

Use of smokeless tobacco was recorded separately, and the respondents status was like with tobacco for smoke either daily users, or non-daily users.

Following areas are covered in the result section:

Alcohol Consumption

Consumption of alcohol was recorded as per response of the participants to the questionnaire. The four categories for alcohol use was current drinker (who consumed alcohol within the past month), drank in the past 12 months but not within the last month, abstainer for the past 12 months, and lifetime abstainer.
The amount of alcohol consumed was measured as number of standard units of alcohol.[xxii] The participants were shown show-cards which illustrated examples of one standard drink.

Dietary Habits

The intake of fruits and vegetables, and the type of cooking oil used in the household was recorded as per participants' response to the questionnaire. The participants were asked to estimate the intake of vegetable and fruit in standard servings which is equal to for instance one carrot, one orange, one piece of pineapple, one tomato, half a glass of fruit juice, or one cup of spinach or other green leafy vegetables.[xxiii] The participants were showed show-cards which illustrated examples of one serving of fruit or vegetable.
A cut-off of five servings of fruits and vegetable a day was used as to indicate low/increased risk of getting metabolic disorders and/or cancer of the GIT.

Physical Activity

Physical activity participation was measured by asking survey participants to report on the amount of time they spend doing different types of physical activity during work, transport and leisure time.

For the purposes of the survey, vigorous activity was defined as more than 10 minutes at a time of any of the activities listed in annex III and similar activities, for instance ploughing, sawing hardwood, or playing football.

Moderate physical activity was defined as more than 10 minutes at a time of any of the activities listed in annex III for instance gardening, washing clothes by hand, drawing water or cycling.

Low physical activity which corresponds to the resting metabolic rate was defined activities listed in annex III such as Secretarial or office work, watching TV, playing cards, or weaving traditional mats.

Physical activity was converted to METminutes for the purpose of measurement and comparability. The term MET is an abbreviation for metabolic equivalent and is used to reflect the intensity of the specific physical activity.
MET is the ratio of a person's working metabolic rate relative to the resting metabolic rate. One MET is defined as the energy cost of sitting quietly, and is equivalent to a caloric consumption of 1 kcal/kg/hour. It is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active, and eight times as high when vigorously active.

- Moderate PA (work and leisure domain) = 4.0 METS
- Vigorous PA (work and leisure domain) = 8.0 METS
- Transport related walking/cycling = 4.0 METS

The participants were placed in the following categories (simplified)[xxiv] as per total levels of activity reported:

- Inactive: <600 METminutes/week
- Moderately active: 600-1500 METminutes/week
- Highly active: ≥1500 METminutes/week

Moderately active translates in to meeting while highly active means having exceeded the minimum recommendations for weekly physical activity.

Anthropometric measurements

Height, weight[xxv], waist and hip circumference were measured for each participant.
The results of BMI, weight, waist and hip measurements from pregnant women (n=103) were not recorded.

Body Mass Index (BMI) was calculated for each participant as (weight in kilogram)/(height in meter)² and categorised as per risk level[xxvi] as follows

Underweight	BMI <18.5	
Normal weight	18.5≥ BMI <25	
Overweight	25 ≤ BMI ≤30	increased risk
Obese	BMI > 30	substantially increased risk

Waist circumference were recorded and participant placed in one of the three risk categories below[xxvii]

Waist circumference <94 cm (M); <80 cm (W)	
Waist circumference >94 cm (M); >80 cm (W)	Increased risk
Waist circumference >102 cm (M); >88 cm (W)	Substantially increased risk

M, men; W, women

Waist-to-hip ratio (WHR) was calculated for each participant and recorded for each sex-age group using the cut-off below

Waist–hip ratio ≥0.90 (M); ≥0.85 (W)	Substantially increased risk

M, men; W, women

Blood Pressure and Heart Rate

Three readings of BP and heart rate after 15 min of rest was done using an electronic BP meter (Omron) with a middle sized cuff on left arm. The mean of the second and third reading was used for analysis. The participants which could not have their BP measured due to upper arm circumference size[xxviii], was recorded as out of range. Measurement between 40/30 mmHg and 300/200 mmHg was recorded. Previous history of hypertension, as well as antihypertensive medication used and lifestyle advises given by health care worker, was recorded before BP measurement.

Blood Tests

Biochemical tests for glucose, cholesterol and triglyceride were performed on a different day than the interview and anthropometric measurements due to fasting requirements. A point-of-care instrument (Accutrend Plus from Roche) was used in order to be able to provide results to the participants on the same day of their attendance, and to reduce suspicion and rumour about blood sampling. The instrument was calibrated daily before use.

Blood Sugar

The participants were during the first day also asked questions about their history of diabetes and treatment for diabetes.
A reported diagnosis of diabetes was recorded if the fasting blood sugar (FBG) had been measured and a doctor or health worker had told the participant that they had diabetes. Participants with a reported diagnosis of diabetes were asked if they were currently receiving insulin, oral drugs or had received special dietary and lifestyle advices from a doctor or health care worker.

Whole blood capillary glucose was measured for each available fasting participant. [xxix]

To assess the diabetes status of the surveyed population, the total proportion of participants with raised fasting blood glucose was calculated and was categorised as belonging to either of the following three categories[xxx] (based on IDF criterions):

- Diabetes:
  Previously diagnosed by a health care worker and currently on medication
  OR FBG ≥ 6.1 mmol/L without being on treatment.
- Pre-diabetes:
  Impaired Fasting Glucose with FBG ≥ 5.6 and <6.1 mmol/L
- Normal blood glucose levels
  FBG below 5.6 mmol/L[xxxi]

During analysis those who had un-recordable high or low measurements were included with highest recordable value (33.3 mmol/L) respectively lowest (1.1 mmol/L) in order to include these in the analysis.

Blood Lipids

Analyses for blood lipids were conducted on fasting participants only.
The cut-off for raised total cholesterol was set at 5.0 mmol/L.
The cut-off for raised triglycerides was set at 2.0 mmol/L

Part Two - Optional Modules

All participants were presented to the optional modules (outside STEPS) and were hence asked questions related to Injuries and to Mental Health.

Injuries

Questions related to road traffic behaviour and previous accidents and injuries were recorded. Question on injuries needing medical attention but not on chronic disability deriving from these injuries was asked.

Mental Health

Question on previous diagnosis of mental illness, and current mental wellbeing was asked using the GHQ-12 questionnaire. The interviewers had varying skills in probing on this part of the questionnaire.

The questionnaire concentrated on two fundamental groups of problems: inability to carry out one's normal "healthy" functions, and the appearance of new phenomena of a distressing nature. It focuses on break in normal functioning and not on permanent traits.

The 12 questions on current mental wellbeing were presented to the participant who was give four possible answers ranging from 'better than usual' to 'much worse than usual' (see Annex II for full version of response options).
The standard scoring method which was used was the 'GHQ method'. Scores for the first two types of answers were '0' (positive) and for the two others – '1' (negative).
The cut-off between healthy/normal and potential mental illness was set at a total score of 4 or above out of 12 points obtainable[xxxii].

Results - Part One

Socio-demographic characteristics

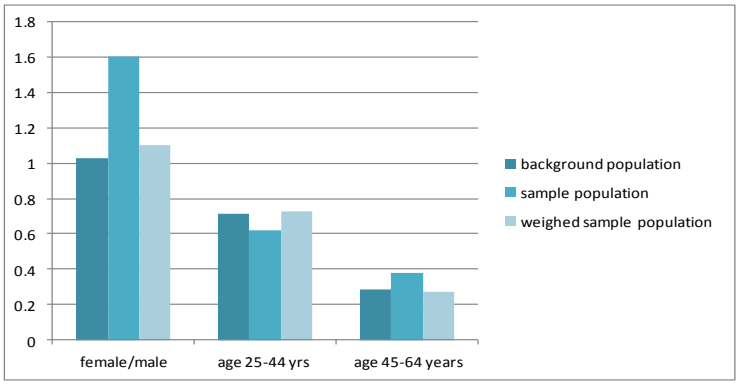
Personal	Home	Work
• Age • sex • ethnicity	• Civil status • Size of household	• Income • Education • Employment

The population composition in Zanzibar is estimated at 1.316.00 (2011) with 51% female and 49% male. The urban and rural population is 32% respectively 68%.
22% of the population is in the age range 25-44 years while 9% are in the range 45–64 years. 43% is under 15 years of age[xxxiii].

Results

Tabel 1: Socio-demographic characteristic of the study participants. Zanzibar, July 2011

	number	proportion	proportion (WT)	confidence
Sex				**Standard Error**
Male	1012	38.3	47.6	1.9
Female	1627	61.7	52.4	1.9
Total number participants	2639			
Age group				**95% CI**
25-44 years	1630	61.8	72.9	69.9-76.0
45-64 years	1009	38.2	27.1	24.0-30.1
Ethnic group				
African	1536	93.1		
Arab	62	4.5		
Mixed	24	1.6		
Indian	8	0.8		
Marital status				
Never married	166	6.3		
married	2088	79.2		
separated/divorced	244	9.3		
widow/widower	138	5.2		
cohabiting	2	0.1		



Graph 1: Age groups and female-to-male ratio in the background population and sample population before and after weighing.
The age groups 25-44 years and 45-64 years as proportion of the total age group 25-64 years.

The table above describes the age and gender breakdown of the surveyed population and its relation to the overall sampling frame. Female were unintentionally over-sampled compared to men. There was also a significant oversampling of the older population over the younger. The weight which was put on the sampled groups compensates to a large extend for this. Only weighted data was used in the analysis unless otherwise clearly stated.
The majority (93.1%) of the sample defined themselves as African, followed by Arab (4.5%). This refers to a distinct ethnic identity and hence does not capture any risk as per biology (race).

Tabel 2: Socio-demographic characteristic of the study participants (cont.)

	number	proportion (WT)	
nb of adults > 18 yrs in the household			**95% CI**
1-2	1403	46.5	43.4-49.6
3-4	917	36.6	33.3-39.8
5 or above	316	17	13.2-20.7
Education level	proportion		
Less than primary s	46.6		
Primary school	22.7		
Secondary school	25.5		
High school	1.6		
above high school	2.7		
Paid work			
yes, employee	15.3		
yes, self employed	46.6		
no	38.2		
Average monthly income (household)			
< 30 USD	62.8		
> 30 USD	37.2		

The majority of the participants were or had been married, while only 6.3% were single never married. The number of adults (>18 years) residing in the same household were for 83.0% of the population between one and four.

The mean annual per capita income calculated as household income divided by number of adult household members above 18 years were 679.000 Tsh or 425 USD.[xxxiv]

The mean number of years spent on formal schooling was 6.7 years.

In total 46.6% of the study population has no formal or less than primary schooling. The figure is higher for women at 51.8% against men at 40.8%, and it was also seen that it was higher for the older age group at 57.0% against the younger at 41.8%.

4.3% of the population had completed higher education[1] with 5.8% of the men and 3.3% of the women.

The majority of the population was self-employed with 69.5% of the men against 32.3% of the women, or unpaid with 9.5% of the men against 56.0% of women. Among the latter group the majority of men were retired or homemakers, while the majority of women were homemakers
(See Annex IV for tables).

[1] Education following form four (form six/A-level, college, university etc)

Tobacco Use

Following areas of interest will be covered below:

Smoking	Smokeless tobacco use	Second hand smoking
• daily smoking • non-daily smoking • mean consumption • starting age • tobacco products used	• Daily use • Non-daily use • Mean consumption • Products used	• At home • At work

Results

Table 3	Percentage of current smokers								
Age Group (years)	Men			Women			Both Sexes		
	n	% Current smoker	95% CI	n	% Current smoker	95% CI	n	% Current smoker	95% CI
25-44	569	14.1	9.3-18.8	1061	0.1	0.0-0.2	1630	6.4	4.0-8.7
45-64	442	15.7	11.8-19.7	566	2.8	0.5-5.0	1008	9.8	7.2-12.4
25-64	**1011**	**14.6**	**10.9-18.3**	**1627**	**0.7**	**0.2-1.2**	**2638**	**7.3**	**5.4-9.2**

Table 4	Smoking status						
Age Group (years)	Both Sexes						
	n	Current smoker				% Does not smoke	95% CI
		% Daily	95% CI	% Non-daily	95% CI		
25-44	1630	5.6	3.4-7.8	0.8	0.0-1.5	93.6	91.3-96.0
45-64	1008	8.4	6.1-10.6	1.5	0.5-2.5	90.2	87.6-92.8
25-64	**2638**	**6.4**	**4.5-8.2**	**1.0**	**0.4-1.6**	**92.7**	**90.8-94.6**

Overall 7.3% of the study population was currently smoking, with a significant gender difference between men at 14.6% (CI±3.7) against women at 0.7% (CI±0.5).
There was no significant difference in prevalence of smoking between the two age groups for men, while among women smoking was significantly more common in the older age group with 2.8% (CI±2.2) against 0.1% (CI±0.1) in the younger age group.
However, the total number of female smokers were very low (n=12).

Most of the current smokers were daily smokers, with 12.7% (CI±3.5) of men smoking daily and 1.9% (CI±1.2) non-daily smokers. There was no significant difference between the two age groups.
In total 6.4% (CI±1.8) were daily smokers while 1.0% (CI±0.6) were non-daily smokers, and 92.7% (CI±1.9) did not smoke.

Table 5	Manufactured cigarette smokers among daily smokers								
Age Group (years)	Men			Women			Both Sexes		
	n	% Manu-factured cigarette smoker	95% CI	n	% Manu-factured cigarette smoker	95% CI	n	% Manu-factured cigarette smoker	95% CI
25-44	78	98.7	96.3-101.2	2	68.4	0.0-140.7	80	98.6	96.1-101.1
45-64	73	97.0	96.2-100.2	8	16.3	0.0-50.9	81	87.7	76.3-99.2
25-64	**151**	**98.2**	**96.2-100.2**	**10**	**20.7**	**0.0-59.3**	**161**	**94.7**	**89.8.5-99.6**

Table 6	Mean age started smoking								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean age	95% CI	n	Mean age	95% CI	n	Mean age	95% CI
25-44	78	21.3	19.8-22.8	2	29.5	21.6-37.5	80	21.4	19.9-22.8
45-64	73	23.5	21.5-25.4	8	23.8	10.5-37.1	81	23.5	21.5-25.5
25-64	**151**	**22.0**	**20.9-23.2**	**10**	**24.3**	**11.5-37.1**	**161**	**22.1**	**21.0-23.3**

The most used tobacco product for smoking among men were manufactured cigarettes (98.2%, CI±2.0), and the mean number of cigarette consumed per day among daily smoking men was 5.8 (CI±1.9) (table A-11) with no significant difference between the two age groups.
Overall the mean age of starting smoking daily was 22.1 years (CI±1.1).

Table 7	Ex-daily smokers among all respondents								
Age Group (years)	Men			Women			Both Sexes		
	n	% ex daily smokers	95% CI	n	% ex daily smokers	95% CI	n	% ex daily smokers	95% CI
25-44	569	9.6	6.9-12.3	1061	0.7	0.0-1.3	1630	4.7	3.5-5.9
45-64	442	24.0	17.7-30.3	566	4.8	2.8-6.7	1008	15.2	11.9-18.5
25-64	**1011**	**14.0**	**11.2-16.9**	**1627**	**1.6**	**0.9-2.3**	**2638**	**7.5**	**6.3-8.7**

Table 8	Mean years since smoke cessation								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean years	95% CI	n	Mean years	95% CI	n	Mean years	95% CI
25-44	28	13.5	11.4-15.7	4	15.4	14.0-16.8	32	13.7	11.8-15.7
45-64	85	24.5	22.0-27.0	29	23.1	19.7-26.5	114	24.3	22.0-26.5
25-64	**113**	**20.3**	**18.0-22.7**	**33**	**21.103**	**17.8-24.4**	**146**	**20.4**	**18.3-22.5**

Results shows that an equal proportion of the population is ex-smokers, with 14.0% (CI±2.8) of men and 1.6% (CI±0.7) of women being ex-smokers. Mean years since smoke cessation were 13.7 years (CI±2.0) among the young age group and 24.3 years (CI±2.3) among the older age group with no statistical significant gender difference.

Table 9	Current users of smokeless tobacco								
Age Group (years)	Men			Women			Both Sexes		
	n	% Current users	95% CI	n	% Current users	95% CI	n	% Current users	95% CI
25-44	569	4.3	1.9-6.7	1060	2.6	1.4-3.8	1629	3.4	2.1-4.7
45-64	442	4.0	1.9-6.0	566	8.3	4.9-11.7	1008	5.9	4.0-7.9
25-64	**1011**	**4.2**	**2.4-6.0**	**1626**	**3.9**	**2.6-5.3**	**2637**	**4.1**	**2.9-5.3**

Table 10	Mean times per day smokeless tobacco is used by daily smokeless tobacco users by type											
Age Group (years)	Both Sexes											
	n	Snuff by mouth	95% CI	n	Snuff by nose	95% CI	n	Chewing tobacco	95% CI	n	Betel, quid	95% CI
25-44	40	3.8	2.7-4.8	37	0.2	0.0-0.5	36	0.4	0.3-1.1	35	0.04	0.0-0.1
45-64	49	3.1	2.1-4.1	45	0.2	0.0-0.5	45	0.5	0.0-0.9	45	0.03	0.0-0.1
25-64	**89**	**3.5**	**2.7-4.2**	**82**	**0.2**	**0.1-0.4**	**81**	**0.4**	**0.0-0.9**	**80**	**0.04**	**0.0-0.1**

Overall 4.1% (CI±1.2) of the study population reported currently using **smokeless tobacco**, with no significant difference between men (4.2%, CI±1.8) and women (3.9%, CI±1.3). There were a significant difference in use between the younger and older women among whom 2.6% (CI±1.2) respectively 8.3% (CI±3.4) use smokeless tobacco.

Most of the users were daily users with 3.4% (CI±1.6) daily users vs. 0.8% (CI±0.7) non-daily users. 3.0% (CI±0.9) of the study population currently not using smokeless tobacco daily had previously been daily users of smokeless tobacco.

The most used smokeless tobacco product was snuff by mouth. Mean times per day it was consumed among daily users was 3.5 (CI±0.7) with no significant gender difference

Table 11	Ex-daily smokeless tobacco users								
Age Group (years)	Men			Women			Both Sexes		
	n	% Ex daily users	95% CI	n	% Ex daily users	95% CI	n	% Ex daily users	95% CI
25-44	569	2.9	1.4-4.4	1060	1.6	0.8-2.4	1629	2.2	1.3-3.0
45-64	442	5.4	2.7-8.2	566	5.0	2.5-7.5	1008	5.2	3.2-7.3
25-64	**1011**	**3.7**	**2.3-5.1**	**1626**	**2.4**	**1.5-3.3**	**2637**	**3.0**	**2.1-3.9**

An equal proportion of the survey population were ex-users of smokeless tobacco, with 3.7% (CI2.3-5.1) of men and 2.4% (CI1.5-3.3) of women.

Table 12	Exposed to ETS at home on 1 or more of the past 7 days								
Age Group (years)	Men			Women			Both Sexes		
	n	% Exposed	95% CI	n	% Exposed	95% CI	n	% Exposed	95% CI
25-44	535	17.3	12.2-22.3	985	17.2	12.8-21.6	1520	17.2	13.9-20.6
45-64	413	14.0	9.9-18.1	523	13.5	9.9-17.1	936	13.8	11.2-16.4
25-64	**948**	**16.2**	**12.5-20.0**	**1508**	**16.3**	**12.7-19.9**	**2456**	**16.3**	**13.6-19.0**

Table 13	Exposed to ETS in the workplace on 1 or more of the past 7 days								
Age Group (years)	Men			Women			Both Sexes		
	n	% Exposed	95% CI	n	% Exposed	95% CI	n	% Exposed	95% CI
25-44	516	41.9	35.2-48.6	911	17.8	13.5-22.1	1427	29.0	23.5-34.4
45-64	396	37.7	30.7-44.7	494	15.2	11.6-18.8	890	27.6	23.0-32.0
25-64	**912**	**40.6**	**35.1-46.1**	**1405**	**17.2**	**13.7-20.7**	**2317**	**28.6**	**24.1-33.0**

Exposure to second hand smoke during the last week showed that 16.3% (CI±20.7, no gender difference) of the study population had been exposed at home, and 28.6% (CI±4.5) at work place with a gender difference of men 40.6% (CI±5.5) against women 17.2% (CI±3.5).

Interpretation of data

As anticipated proportion of men smoking was higher than that of women. The data indicates that tobacco smoking might not be a public health concern among women in reproductive age since only 2 out of 1061 women in the age 25-44 years were currently smoking.
The use of smokeless tobacco was equal across the gender groups with overall proportion of 4.1% among the study population. The proportion of women in reproductive age using smokeless tobacco was less than in the three other groups.

A proportion of the population equal to the proportion which smokes / uses smokeless tobacco are ex-smokers / ex-users of smokeless tobacco. This indicates a higher exposure to the risk of tobacco use than reflected in the proportion of current users, and also it indicates a rather encouraging (spontaneous) cessation rate in the population to which a cultural resentment against tobacco smoking is likely to have contributed.
Data also showed that with smoked tobacco as well as smokeless tobacco, the majority of current users are using tobacco daily. With no lower limit or threshold above which tobacco is expected to be harmful, daily use of tobacco indicates a higher exposure and hence, due to the expected linear relation between exposure and risk, a higher risk of developing tobacco related conditions[xxxv].

The proportion of people being exposed to tobacco smoke at their work place within the past week was high with 40.6% of men being exposed. The gender difference on ETS reflects the gender difference in employment with high proportion of women not working outside the home.
Interestingly, the proportion of people being exposed to second hand smoking at work places were much larger than the proportion being exposed at home. This opens up to reconsider the current tobacco control legislation since eliminating tobacco smoking in public places and work places are possible to do via regulation.

Alcohol Use

The following areas of interest are covered in this chapter

Alcohol consumption	Amount	Frequency
• Within the past month • Within the past year • Ever consumed alcohol	• Over time • At one event (binge drinking) • Without food	• Of drinking days per month • Of binge drinking days

Results

Table 14	Alcohol consumption status								
	Men								
Age Group (years)	n	% Current drinker [2]	95% CI	% Drank in past 12 months[3]	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
25-44	569	3.7	1.8-5.5	2.8	0.0-5.7	10.2	5.8-14.7	83.3	77.7-88.9
45-64	442	1.8	0.6-3.1	0.6	0.0-1.2	11.2	7.1-15.3	86.4	81.8-90.9
25-64	**1011**	**3.1**	**1.7-4.5**	**2.1**	**0.1-4.2**	**10.6**	**6.8-14.3**	**84.2**	**79.7-88.8**

Table 15	Alcohol consumption status								
	Women								
Age Group (years)	n	% Current drinker	95% CI	% Drank in past 12 months	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
25-44	1061	0.4	0.1-0.7	0.9	0.0-2.0	1.7	0.7-2.6	97.0	95.5-98.6
45-64	566	0.5	-0.1-1.0	0.3	0.0-0.5	3.4	1.5-5.3	95.9	93.9-97.9
25-64	**1627**	**0.4**	**0.1-0.7**	**0.8**	**0.0-1.6**	**2.1**	**1.1-3.0**	**96.8**	**95.4-98.1**

Table 16	Alcohol consumption status								
	Both Sexes								
Age Group (years)	n	% Current drinker	95% CI	% Drank in past 12 months	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
25-44	1630	1.9	0.9-2.8	1.8	0.0-3.6	5.5	3.7-7.4	90.8	88.1-93.6
45-64	1008	1.2	0.5-1.9	0.4	0.1-0.8	7.7	5.1-10.2	90.7	87.9-93.5
25-64	**2638**	**1.7**	**1.0-2.4**	**1.4**	**0.1-2.7**	**6.1**	**4.5-7.8**	**90.8**	**88.5-93.1**

[2] in the past 30 days [2] but not in the past 30 days

Overall the proportion of the study population who were consuming alcohol within the last month was 1.7% (CI ±0.7), while 90.8% (CI±2.3) had never consumed alcohol.
There was a significant gender difference with more women being lifetime abstainers with 96.8% (CI±1.2) against men 84.2% (CI±4.5) and no significant difference between the age groups.
Due to the low number of women consuming alcohol within the past year (n=20) the results for women has been omitted from some of the tables below.

Table 17	**Mean number of standard drinks per drinking occasion among current drinkers**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	29	1.7	1.3-2.1	7	2.0	0.7-3.2	36	1.7	1.3-2.1
45-64	13	1.274	0.9-1.6	3	1.0	---	16	1.2	0.9-1.5
25-64	**42**	**1.6**	**1.3-1.9**	**10**	**1.7**	**0.7-2.6**	**52**	**1.6**	**1.3-1.9**

Table 18	**Mean maximum number of drinks in one occasion among current drinkers**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean maximum number	95% CI	n	Mean maximum number	95% CI	n	Mean maximum number	95% CI
25-44	29	7.8	4.4-11.2	7	5.9	3.5-8.2	36	7.6	4.5-10.6
45-64	13	4.1	1.6-6.5	3	6.7	0.0-15.0	16	4.5	2.0-7.0
25-64	**42**	**7.1**	**4.2-10.0**	**10**	**6.1**	**3.2-9.1**	**52**	**7.0**	**4.3-9.6**

Table 19	**Frequency and quantity of drinks consumed in the past 7 days**						
Age Group (years)	**Men**						
	n	% Drank on 4 or more days	95% CI	% consumed 5 or more drinks on any day	95% CI	% consumed 20 or more drinks in 7 days	95% CI
25-44	27	33.3	3.2-63.5	45.7	19.0-72.4	31.8	1.3-62.2
45-64	12	71.1	39.0-103.2	5.5	0.0-15.1	15.4	0.0-37.2
25-64	**39**	**40.5**	**16.1-64.8**	**38.1**	**13.8-62.4**	**28.7**	**2.1-55.2**

Among those who consumed alcohol within the last month (n=52), the mean number of standard drinks consumed per drinking occasion was 1.6 drinks (CI±0.3) with no significant gender difference. The mean maximum number of standard drinks consumed during one drinking occasion was 7.0 drinks (CI±2.6) with no significant gender difference.

The percentage of men who drank during the last week (n=39) and consumed equal to or more than 20 standard units of alcohol were 28.7%.

52.6% (CI±23.0) of responding men (n=42) stated usually drinking alcohol with meals, while 34.1% (CI±21.5) stated never drinking alcohol with meals.

Table 20 **Mean number of drinking occasions in the past 30 days among current (past 30 days) drinkers**

Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	29	4.5	2.2-6.9	7	4.0	1.9-6.1	36	4.5	2.3-6.6
45-64	13	8.9	2.7-15.1	3	2.9	0.1-5.7	16	7.8	2.8-12.8
25-64	**42**	**5.3**	**3.2-7.5**	**10**	**3.7**	**1.8-5.5**	**52**	**5.1**	**3.2-7.0**

Table 21 **Mean number of times with five/four or more drinks during a single occasion in the past 30 days among current drinkers**

Age Group (years)	Men			Women		
	n	Mean number of times	95% CI	n	Mean number of times	95% CI
25-44	28	1.3	0.5-2.0	7	0.8	0.2-1.3
45-64	12	3.7	0.0-10.1	3	0.7	0.1-1.3
25-64	**40**	**1.7**	**0.3-3.1**	**10**	**0.7**	**0.3-1.2**

Mean number of days during the past month where alcohol was consumed was overall 5 days (CI±1.9)

Binge drinking: The number of days in the last month when men (n=40) drank more than 5 standard drinks in one occasion were on average 1.7 days (CI±1.4) and for female (n=10) the number of days drinking more than 4 standard drinks at one occasion was 0.7 days (CI ±0.45).

Result interpretation

The population predominantly confess to Islam which prohibits the use of alcohol. As expected prevalence of alcohol consumption was low compared to surrounding country-levels[xxxvi], and the data has to be interpreted with caution since the number of respondents was low. It is difficult to verify the Zanzibar data since alcohol sold reflects tourism, not only local consumption, and there is a strong general aversion and social stigma against alcohol consumers.
Some risk factors are considered gendered, and as with tobacco smoking, alcohol consumption is salient for men. Interventions could target men and focus on healthy drinking (limit for intake over time, as well as per drinking episode) and has to be weighed against the socio-cultural stigma against alcohol consumption.

Fruit, vegetable and cooking oil use

The following areas of interest are covered in this chapter

Fruit and vegetable	Cooking oil	Geographical differences
• Mean consumption (pieces/day) • Mean consumption (times/week) • Proportion consuming recommended amounts	• Types of oil used • Proportion using oil high in saturated fats	• Fruit and vegetable intake among rural vs. urban residents.

Results

More tables are found in Annex IV

Table 22	**Number of servings of fruit and/or vegetables on average per day**								
Age Group (years)	**Both Sexes**								
	n	% no servings	95% CI	% 1-2 servings	95% CI	% 3-4 servings	95% CI	% ≥5 servings	95% CI
25-44	1630	27.9	23.4-32.4	57.3	52.8-61.7	12.8	10.5-15.2	2.0	1.2-2.8
45-64	1006	31.1	26.8-35.4	54.1	49.5-58.6	12.5	9.9-15.2	2.3	1.0-3.7
25-64	**2636**	**28.7**	**25.1-32.4**	**56.4**	**53.0-59.9**	**12.7**	**10.9-14.6**	**2.1**	**1.4-2.9**

Table 23	**Mean number of servings of fruit and/or vegetables on average per day**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean number	95% CI	n	Mean number	95% CI	n	Mean number	95% CI
25-44	569	1.7	1.6-1.9	1061	1.7	1.6-1.9	1630	1.7	1.6-1.9
45-64	442	1.8	1.6-1.9	564	1.6	1.5-1.7	1006	1.7	1.6-1.8
25-64	**1011**	**1.7**	**1.6-1.9**	**1625**	**1.7**	**1.6-1.8**	**2636**	**1.7**	**1.6-1.8**

Table 24	**Less than five servings of fruit and/or vegetables on average per day**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	% < five servings	95% CI	n	% < five servings	95% CI	n	% < five servings	95% CI
25-44	569	98.0	96.9-99.1	1061	98.0	96.9-99.1	1630	98.0	97.2-98.8
45-64	442	96.9	94.5-99.2	564	98.6	97.6-99.6	1006	97.7	96.3-99.0
25-64	**1011**	**97.6**	**96.5-98.8**	**1625**	**98.1**	**97.2-99.0**	**2636**	**97.9**	**97.1-98.6**

The survey observed that mean consumption of fruit and/or vegetable among the total study population was 1.7 servings per day (CI± 0.1). There was no significant difference between the age- or sex groups.

There was a significant difference in mean daily consumption of fruit versus vegetable with 1.0 serving (CI±0.1) of fruit against 0.7 serving (CI±0.0) of vegetable for the overall survey population.

The mean number of days a week when fruit was consumed was 3.9 days (CI±0.2) with men at 4.1 days (CI±0.2) against women 3.7 days (CI±0.2). The mean number of days per week when vegetable was consumed stood at 2.8 days (CI±0.1). There was a small however significant difference between Urban Unguja with 3.0 days per week (CI±0.2) against Pemba 2.5 (CI±0.2) (table A-15).

Overall 97.9% of the total study population consumed less than five combined servings of fruit and vegetables per day with no difference between the age-sex groups, and 28.7% (CI±3.7) had no daily intake of fruit/vegetable (table 22).
There was a small although significant difference between Urban and Rural Unguja with 98.8 (CI±0.9) respectively 95.6 (CI±2.2) of the population consuming less than five combined servings of fruit and vegetables per day (table A-16).

Type of oil or fat most often used for meal preparation in household							
				n = 2499			
Type	Vegetable oil	Coconut oil	Butter or Ghee	Margarine	Sunflower oil	Maize/Corn oil	Any kind
%	47.5	35.4	2.1	0.5	8.0	0.1	6.5
95% CI	43.5-51.5	31.5-39.2	1.3-2.9	0.1-1.0	6.0-10.0	0.0-0.1	3.2-9.8

Table 25	**Mean number of meals eaten outside a home**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	mean	95% CI	n	mean	95% CI	n	mean	95% CI
25-44	556	1.4	1.1-1.7	1001	0.6	0.4-0.8	1557	1.0	0.8-1.2
45-64	428	1.2	0.8-1.6	537	0.5	0.4-0.7	965	0.9	0.7-1.1
25-64	**984**	**1.4**	**1.1-1.6**	**1538**	**0.6**	**0.4-0.7**	**2522**	**1.0**	**0.8-1.1**

The most common type of cooking oil used was vegetable oil 47.5% (CI±4.0) followed by coconut oil 35.4% (CI±3.9) and sunflower oil 8.0% (CI±2.0)

The mean number of meals consumed per week that was not prepared at home was overall 1.0 meals (CI±0.2) with a significant difference between men 1.4 meals (CI±0.2) against women 0.6 meals (CI±0.1).

Result interpretation

The mean intake of fruits and/or vegetables at an average of 1.7 servings a day is surprisingly low considering the size of the agriculture sector in Zanzibar. The average number of days per week when fruit is consumed is 3.9 and 2.8 for vegetables, which means both quantity and frequency is rather low. Furthermore, a large proportion 28.7% (CI±3.7) had no daily intake of fruit/vegetable.
When stratifying the dietary habits across the 3 strata a significant difference in fruit and vegetable consumption is seen across the Unguja strata with a higher proportion in Rural Unguja consuming five or more combined servings of fruits and vegetable a day than in Urban Unguja or Pemba.
A small difference was seen between Urban and Pemba in number of days where vegetables were consumed, however, practically it is attributed little importance due to the low amount consumed.

There was no difference between the proportion of population consuming five servings or more a day in Urban Unguja and Pemba. There is no obvious explanation for this other than a generally low consumption, and interpretation of these findings would require further studies to be undertaken.

Availability and cost of fat- and carbohydrate rich food such as chips, French fries and fried chapatti against especially the cost of fresh vegetable might be a contributing factor to the dietary lifestyle found. Furthermore the results opens the question whether the agricultural sector is well developed and diversified, and whether supplementary cultivation for household use is done on an individual scale.

The type of cooking oil used by 47.5% of the population is vegetable oil, which for most common brands that the research team could identify contained 100% palm oil (when the contents were listed). 82.9% of the study population hence used cooking oil rich in saturated fats (palm oil or coconut oil). Bearing in mind the ongoing discussion of coconut oil's effect on health outcome regarding CVD risk the findings still requires some consideration.

Physical Activity

The following areas of interest are covered in this chapter

Level of physical activity	Types of physical activity	Geographical differences
• Mean and median time spent being active (METminutes) • Proportion having high, moderate or low levels of activity	• During work, transport or leisure time • Vigorous or non-vigorous activity	• Urban versus rural • Unguja versus Pemba

Results

Table 26 **Mean minutes of total physical activity on average per day**

Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	n	Mean minutes	95% CI
25-44	563	309	273-346	1052	171	154-187	1615	233	216-251
45-64	441	276	247-305	564	182	154-210	1005	233	212-254
25-64	**1004**	**299**	**271-327**	**1616**	**174**	**159-188**	**2620**	**233**	**218-248**

Table 27 **Median minutes of total physical activity on average per day**

Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Median minutes	25%-75%	n	Median minutes	25%-75%	n	Median minutes	25%-75%
25-44	563	249	135-437	1052	107	30-296	1615	189	51-364
45-64	441	255	100-399	564	107	26-300	1005	180	53-366
25-64	**1004**	**249**	**116-422**	**1616**	**107**	**29-296**	**2620**	**189**	**51-364**

Mean time spent The total daily time spent on work related physical activities was on average 209 min (CI±22) for men and 131 min (CI±13) for women. The time spent on transport activities were for men 57 min (CI±6) against women 39 min (CI±4). Women did on average hardly engaged in physical recreational activities (4 min per day, CI±2) whereas men spent 33 min (CI±8)(tables A 8-10).
While the mean time spent in daily physical activity was 233 minutes (table 26), the **median** time spent in daily physical activity was lower at 189 min (IQR 51-364).

Table 28 **Composition of total physical activity**

Age Group (years)	**Both Sexes**						
	n	% Activity from work	95% CI	% Activity for transport	95% CI	% Activity during leisure time	95% CI
25-44	1559	55.6	52.5-58.7	36.6	32.9-40.4	7.7	5.8-9.7
45-64	954	54.9	50.6-59.2	38.7	34.8-42.7	6.4	4.3-8.4
25-64	**2513**	**55.4**	**52.5-58.3**	**37.2**	**33.8-40.6**	**7.4**	**5.7-9.1**

Composition – the results suggest that both male and females undertake the majority of their physical activity during work related activities. For the overall study population 55.4% (CI±2.9) of physical activity came from work with a gender difference of men 58.9% (CI±3.6) against women 52.1% (CI±3.5).
For men, activity from leisure time accounts for 12.1% (CI±2.3) of physical activity against 3.0% (CI±1.3) for women.

Table 29	**Level of total physical activity**						
Age Group (years)	**Men**						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
25-44	563	5.4	3.1-7.8	12.8	7.2-18.4	81.8	74.6-88.9
45-64	441	11.9	8.3-15.5	11.8	7.7-16.0	76.3	71.4-81.1
25-64	**1004**	**7.4**	**5.6-9.3**	**12.5**	**8.7-16.4**	**80.0**	**75.2-84.9**

Table 30	**Level of total physical activity**						
Age Group (years)	**Women**						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
25-44	1052	26.4	21.5-31.2	23.4	19.7-27.1	50.3	45.4-55.2
45-64	564	28.2	21.1-35.4	19.9	15.3-24.4	51.9	45.1-58.7
25-64	**1616**	**26.8**	**22.2-31.4**	**22.5**	**19.5-25.6**	**50.7**	**46.4-55.0**

Table 31	**Level of total physical activity**						
Age Group (years)	**Both Sexes**						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
25-44	1615	16.9	13.3-20.6	18.6	15.7-21.6	64.5	59.2-69.8
45-64	1005	19.3	15.5-23.2	15.5	12.7-18.4	65.1	61.0-69.3
25-64	**2620**	**17.6**	**14.5-20.7**	**17.8**	**15.6-20.0**	**64.6**	**60.4-68.9**

The results indicate that overall 64.6% (CI±4.2) of the population had high levels of physical activity in their combined work, transport, and leisure time with significant gender differences of men at 80.0% (CI±4.9) against women at 50.7% (CI±4.3).
17.6% (CI±3.1) of the study population was having low levels of physical activity. There was a significant gender difference where 7.4% (CI±1.8) of men versus 26.8% (CI±4.6) of women had low levels of physical activity. There was no difference between the age groups among women, whereas the proportion of elder men having low level of physical activity (11.9%, CI±3.6) was significantly higher than among young men (5.4%, CI±2.4).
If combining the moderate and high levels of physical activity[xxxvii] we found that 92.6% (CI±1.7) of men against 73.2% (CI±4.5) of women meet or exceed the requirements of daily physical activity (Table A-24).

Table 32-1	No vigorous physical activity								
Age Group (years)	Men			Women			Both Sexes		
	n	% no vigorous activity	95% CI	n	% no vigorous activity	95% CI	n	% no vigorous activity	95% CI
25-44	563	29.3	20.7-37.9	1052	72.6	66.0-79.2	1615	53.1	45.5-60.7
45-64	441	37.1	29.9-44.3	564	64.0	57.5-70.6	1005	49.4	44.0-54.7
25-64	**1004**	**31.7**	**24.9-38.6**	**1616**	**70.6**	**64.8-76.4**	**2620**	**52.1**	**45.9-58.3**

Table 32-2	Level of total physical activity						
	Both Sexes						
stratum	n	Low Level	95% CI	Moderate level	95% CI	High level	95% CI
Urban Unguja	857	26.6	22.0-31.3	23.3	19.6-27.1	50.1	44.1-56.0
Rural Unguja	753	13.2	9.7-16.7	14.3	10.0-18.7	72.5	65.8-79.2
Pemba	1010	7.1	5.0-9.1	11.9	9.5-14.2	81.1	77.7-84.4
TOTAL	**2620**	**17.6**	**14.3-20.9**	**17.8**	**15.4-20.1**	**64.6**	**59.9-69.4**

Overall 52.1% (CI±6.2) of the study population did no vigorous activities at all, with a significant difference between men 31.7% (CI±6.8) against women 70.6% (CI±5.8).

There was a significant difference seen between the strata with Pemba having the highest proportion of population with high physical activity level at 81.1% (CI±3.3) and Unguja Urban with the lowest level at 50.1% (CI±6.0).
More tables can be found in Annex IV.

Result interpretation

A high proportion of work in Zanzibar is still very labour intensive, such as fishing and farming, construction, and various day labour activities. Active transportation by walking or cycling contributes substantially to the total physical activity and is expected to contribute to the proportion of the study population having moderate or high levels of physical activity (82.4%, CI±3.0).

This assumption is supported by the finding that the major proportion of physical activity came from work related activities and activities that were non-vigorous.
With more men working outside the home than women amongst whom many are housewives, the amount of physical activity derived from transport are expected and seen to be higher for men than for women. Among the strata there was a clear trend seen where levels of physical activity were lowest in Urban Unguja with 52.2%, followed by Rural Unguja 72.5%, and on top was Pemba where 81.1% of the population had high levels of physical activity.
The difference seen between rural Unguja and Pemba could be due to better infrastructure and public transport in Unguja, reducing the need for active transportation.

The results indicate a need for identifying socio-cultural or knowledge/behaviour barriers for women engaging in more physical activities, with focus on the health gain for especially elderly women if this barrier is overcome.

Anthropometric measurements

Body Mass Index (BMI)	Waist Hip Ratio (WHR)	Risk profile
• Proportion of under and overweight • Proportion of obesity	• Proportion of increased WHR	• As per BMI • As per WHR • As per waist circumference (WC)

Results

More tables are found in annex IV

Table 33	**BMI classifications**								
Age Group (years)	**Men**								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% BMI 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
25-44	568	7.0	3.0-11.0	62.4	56.5-68.2	23.1	18.9-27.3	7.5	4.0-11.0
45-64	440	8.8	5.6-12.0	60.9	55.3-66.4	22.2	17.1-27.3	8.1	4.5-11.8
25-64	1008	**7.6**	4.8-10.3	61.9	57.6-66.3	22.8	19.7-25.9	7.7	5.0-10.4

Table 34	**BMI classifications**								
Age Group (years)	**Women**								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% BMI 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
25-44	956	8.9	6.5-11.3	51.6	47.1-56.0	21.6	17.8-25.4	17.9	12.9-22.9
45-64	556	11.1	7.3-15.0	37.4	31.4-43.3	21.8	17.2-26.4	29.7	22.2-37.3
25-64	1512	9.5	7.2-11.7	**48.0**	44.2-51.8	21.7	18.8-24.6	20.9	17.0-24.7

Table 35-1	**BMI classifications**								
Age Group (years)	**Both Sexes**								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% BMI 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
25-44	1524	8.0	5.8-10.2	56.7	53.4-60.0	22.3	19.4-25.3	12.9	9.8-16.0
45-64	996	9.9	7.4-12.3	50.2	45.5-54.9	22.0	18.7-25.4	17.9	13.6-22.3
25-64	2520	8.5	**6.9-10.2**	54.9	**52.0**-57.8	22.2	20.1-24.4	14.3	11.8-16.9

Overall the mean BMI stands at 24.3 (CI±0.3) with significant differences between men and women. The mean BMI for men is 23.4 kg/m² (CI±0.3), while for women it is 25.2 kg/m² (CI±0.4). While the mean BMI for men is the same for both age groups, for women there is a borderline significant difference between

the younger age group (24.8, CI±0.5) and the older age group (26.3, CI±0.4) indicating increasing BMI with increased age for women.

The proportion of the study population which was classified as normal weight was 54.9% (CI±4.9) with a significant gender difference among men 61.9% (CI±4.3) against women 48.0% (CI±3.8). Likewise, the overall proportion of BMI ≥ 25 kg/m² (overweight or obesity) stood at 36.6% (CI±2.6) with men 30.5% (CI±3.3) against women 42.6% (CI±3.4). There was a significant difference between urban and rural areas in BMI (Tables 35-2, A-30).

The overall proportion of obesity was 14.3% (CI±2.3) with significant gender differences with men 7.7% (CI±2.7) against women 20.9% (CI± 3.8). There was a significant difference between urban and rural areas with 21.1 % (CI±6.0) against 9.9% (CI±2.8) respectively 7.4 %(CI±2.6).

Table 35-2	BMI classification (per stratum)								
	Both sexes								
stratum	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% BMI 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
Urban Unguja	834	6.8	3.8-9.8	47.5	42.1-52.9	24.7	21.0-28.3	21.1	15.1-27.1
Rural Unguja	726	6.2	3.8-8.6	61.4	56.7-66.2	22.4	18.8-26.1	9.9	7.1-12.7
Pemba	960	13.0	10.3-15.7	61.3	57.2-65.3	18.4	15.7-21.1	7.4	4.7-10.0
TOTAL	2520	8.5	6.8-10.2	54.9	51.8-58.0	22.2	20.1-24.4	14.3	11.6-17.0

Table 36	**Risk of metabolic complications as per WHR**				
	n	% normal	95% CI	% Substantially increased risk	95% CI
Men (>0.90)	1004	66.0	62.0-70.1	34.0	30.0-38.0
Women (>0.85)	1519	27.0	23.9-30.2	73.0	69.8-76.1

The mean waist-to-hip ratio among men was 0.88 (CI±0.01) against 0.89 (CI±0.01) among women (table A-26). The proportion of the female study population which had a WHR above 0.85 stood at 73.0% (CI±3.2) while the proportion of men who had a WHR of above 0.90 was 34.0% (CI±4.0).

Table 37	**Risk of metabolic complications as per waist circumference**						
	n	% normal	95% CI	% Increased risk[4]	95% CI	% substantially increased risk	95% CI
Men	1009	86.7	83.2-90.1	13.3	9.9-16.8	3.7	2.3-5.2
women	1516	36.6	33.0-40.2	63.4	59.8-67.0	42.4	39.4-45.4

There was a significant difference in mean waist circumference with men at 82.0 cm (CI±0.9) and women at 87.9 cm (CI±1.4) (table A-28) The proportion of participants with substantially increased risk of metabolic complications as per waist circumference above 102 cm (men) and 88 cm (women) were 3.7 % (CI±1.5) respectively 42.4 %(CI± 3.0) (table 37).

15.2% (CI±2.7) of women was found to have a waist circumference above 102 cm (table A-29).

[4] Increased risk includes here those with substantially increased risk

Result interpretation

The proportion of overweight or obesity was expected to be high. The Tanzania Demographic and Health Survey conducted every 6 years have shown an increasing proportion of overweight or obesity over time among women; in TDHS 2010 it stood at 30.4% of women in Zanzibar, while 11.7% were obese (n=295). There is no previous population based study on BMI, waist circumference or WHR done to confirm these findings.
The results showed that only just above half of the population is normal weight while the rest is either over- or underweight. Especially among women the distribution between the categories is skewed, with different public health concerns regarding underweight and overweight.

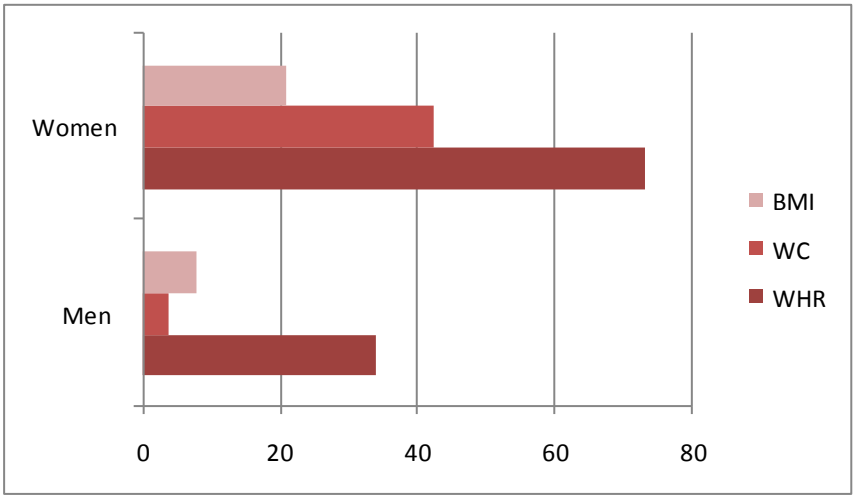


Figure 2 Proportion of the population having **substantial increased risk** of metabolic complications as per Body Mass Index, Waist Circumference and Waist-Hip-Ratio. Cut-offs for substantial increased risk for men (M) and women (W): BMI > 30 kg/m²; Waist circumference >102 cm (M) and >88 cm (W), and Waist–hip ratio ≥0.90 (M) and ≥0.85 (W).

The proportion of the population being at substantially increased risk of metabolic complications as estimated from an increased waist circumference (WC) was 3.7% among men and 42.4% among women. The proportion of the population at risk for metabolic complications as estimated from their WHR was high, with 34% of men and 73 % of women having a substantially increased risk.
The same proportion being at substantially increased risk as estimated from BMI was 7.7% for men and 20.9% for women.

Despite discussion on the exact cut-off points for WHR as indicator for risk of metabolic complications it is generally accepted that waist circumference and WHR is a more exact risk prediction of metabolic risk than BMI,[xxxviii] especially in women. In this population we noticed a large difference in prevalence of risk depending on using BMI or WHR where both men and women's risk more than tripled using WHR instead of BMI.

Blood Pressure and Heart rate

Raised blood pressure	Heart rate	History of hypertension
• Mean • Proportion with raised BP • Proportion with moderate/severely raised BP	• Mean heart rate • Proportion with heart rate > 90 bpm	• Previous checked BP • Previously diagnosed with HTN • On treatment and well-controlled • Lifestyle advices given

The prevalence of hypertension (HTN) was calculated to include those (few) currently on antihypertensive medication and those either with a systolic blood pressure ≥140mmHg and/or a diastolic blood pressure ≥90mmHg. Moderate to severe hypertension was defined as currently on medication for hypertension or having a systolic blood pressure ≥160mmHg and/or a diastolic blood pressure ≥100mmHg.
Results from pregnant women were included in the analysis. They did not differ significantly from the overall result.[xxxix]

Results

More tables are found in Annex IV.

Table 38 **SBP ≥140 and/or DBP ≥ 90 mmHg or currently on medication for raised blood pressure**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	568	27.1	20.9-33.2	1054	19.3	15.3-23.3	1622	22.8	18.5-27.1
45-64	440	59.3	52.4-66.3	556	62.4	57.3-67.6	996	60.7	56.6-64.9
25-64	**1008**	**37.0**	**31.4-42.7**	**1610**	**29.4**	**25.5-33.2**	**2618**	**33.0**	**28.9-37.2**

Table 39 **SBP ≥160 and/or DBP ≥ 100 mmHg or currently on medication for raised blood pressure**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	568	8.7	5.4-12.1	1054	10.0	6.9-13.1	1622	9.4	6.9-12.0
45-64	440	33.2	26.5-39.9	556	35.9	30.0-41.8	996	34.4	30.0-38.9
25-64	**1008**	**16.3**	**12.4-20.1**	**1610**	**16.0**	**13.3-18.8**	**2618**	**16.2**	**13.5-18.9**

The overall prevalence of hypertension in the study population was 33% (CI±4.2) with a higher prevalence among men of 37.0 % (CI±5.7) as compared to women of 29.4% (CI±3.8). The prevalence of hypertension among younger men age 25-44 contributed to this non-significant gender difference in prevalence.

Among all 45-64 years old 60.7% (CI±4.1) had raised blood pressure. Among men age 45-65 years 59.3% (CI±7.0) had hypertension**,** and 33.2%(CI±6.7) had moderate to severe hypertension. Among women in the same age-group 62.4% (CI±5.1) had hypertension and 35.9% (CI±5.9) had moderate to severe hypertension.

Overall the data suggests increasing systolic and diastolic pressures with increasing age.
There was a statistically significant age and gender difference in systolic blood pressure with young men having higher mean systolic blood pressure (130mmHg, CI±2.3) than young women (122mmHg, CI±2.5), and the older age group higher (148mmHg, CI±2.5) than the younger age group (125mmHg, CI±2.2). There was no difference in mean systolic BP among older men and older women (table A-31).

Table 40	Mean heart rate (beats per minute)								
Age Group (years)	Men			Women			Both Sexes		
	n	mean	95% CI	n	mean	95% CI	n	mean	95% CI
25-44	568	70.6	69.4-71.9	1054	81.4	80.5-82.2	1622	76.5	75.6-77.4
45-64	440	70.7	69.2-72.3	557	78.2	76.6-79.8	997	74.1	72.9-75.2
25-64	**1008**	**70.7**	**69.6-71.7**	**1611**	**80.6**	**79.9-81.4**	**2619**	**75.9**	**75.2-76.6**

Mean heart rate were 75.9 beats/min while 3.5% of the total study population had a rate at rest above 100 beats/minute. There was a small difference seen between age groups (RR 0.979, 95% CI 0.96 - 0.996) when it came to mean heart rate with increasing heart rates at increased age.

Table 41	Respondents with treated and/or controlled raised blood pressure						
Age Group (years)	Both Sexes						
	n	% On medication and SBP<140 and DBP<90	95% CI	% On medication and SBP≥140 and/orDBP≥90	95% CI	% Not on medication and SBP≥140 and/orDBP≥90	95% CI
25-44	356	12.3	6.1-18.6	2.1	0.6-3.5	85.6	79.1-92.1
45-64	586	3.2	0.9-5.5	8.1	5.0-11.3	88.7	85.0-92.4
25-64	**942**	**7.8**	**3.9-11.7**	**5.1**	**3.0-7.1**	**87.1**	**82.5-91.7**

Table 42	Currently taking blood pressure drugs prescribed by doctor or health worker among those previously diagnosed with hypertension								
Age Group (years)	Men			Women			Both Sexes		
	n	% taking meds	95% CI	n	% taking meds	95% CI	n	% taking meds	95% CI
25-44	13	22.7	0.0-50.1	115	10.0	3.1-16.9	128	11.7	4.9-18.6
45-64	71	25.9	9.5-42.4	145	23.6	14.8-32.4	216	24.5	15.2-33.8
25-64	**84**	**25.3**	**11.3-39.3**	**260**	**16.6**	**10.9-22.3**	**344**	**19.1**	**13.2-25.0**

Only a small fraction of those who had raised BP in the survey were on medication;
Across age and gender a total of 12.9% of participants with raised BP were on medication and 7.8% (CI±3.9) had a BP within the target of 140/90 mmHg or below (Table 41).

Among those who previous to the survey been diagnosed with HTN an overall 19.1% (CI±5.9) was on antihypertensive medication. The highest proportion was found among elderly men with 25.9% (CI±16.4) of diagnosed currently using medication, and the lowest proportion of hypertensive individuals currently on medical treatment was found among younger women with 10.0% (CI±6.9) of those previously diagnosed (table 42). [xl]

Table 43	Blood pressure measurement and diagnosis								
	Men								
Age Group (years)	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	569	70.9	63.3-78.4	27.3	19.8-34.8	1.1	0.2-1.9	0.8	0.0-1.5
45-64	442	52.3	44.6-60.0	31.6	24.0-39.3	8.7	4.5-12.9	7.3	4.3-10.3
25-64	**1011**	**65.1**	**58.5-71.8**	**28.7**	**21.9-35.4**	**3.4**	**1.9-5.0**	**2.8**	**1.7-3.9**

Table 44	Blood pressure measurement and diagnosis								
	Women								
Age Group (years)	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	1061	28.3	21.5-35.0	62.2	53.8-70.7	3.0	1.7-4.4	6.5	4.3-8.6
45-64	566	36.0	29.5-42.4	34.8	29.0-40.6	7.5	4.5-10.5	21.7	16.1-27.3
25-64	**1627**	**30.1**	**24.2-36.0**	**55.8**	**48.0-63.6**	**4.1**	**2.7-5.5**	**10.1**	**7.5-12.6**

53.2% of the study population had had their BP measured at some stage (table A-35) with a significant difference between men (65.1%, CI±6.6) **not** having had their BP measured compared to women (30.1% CI±5.9).
Of those who had had their blood pressure measured, 19.5% (CI±4.7) had been told by a HCW that they suffered from high blood pressure (table A-33). Among the 45-64 years old the figure was 40% (±6.5). Of those ever diagnosed with hypertension (n=344), 63.6% (CI±6.2) had been diagnosed within the last 12 months (table A-34).

Of those who had raised BP > 140/90 mmHg in the survey 54% had previously had their BP measured and 46% had already been diagnosed with HTN. 13% of those with a previous diagnosis of HTN were neither on medication nor had raised BP when measured during the survey (for having high BP and a previous HTN diagnosis: RR 3.7, CI±0.7).

The typical advices given to those diagnosed with hypertension had been to reduce intake of salt (66.9%, CI±7.3), to increase exercising (42%, CI±6.8), and to lose weight (30.2%, CI±7.5)(tables A 36-39). Among those previously diagnosed 19.1% were as previously mentioned taking medication (Table 42). Only 13.3% (CI± 4.0) claimed to have consulted a traditional healer for the condition, while 16.9% (CI±4.9) was using herbal/traditional medicines to lower the blood pressure (Tables A 41-42).

Table 45	SBP ≥140 and/or DBP ≥ 90 mmHg or currently on medication for raised blood pressure		
	Both Sexes		
stratum	n	SBP>=140 and/or DBP>=90 or currently on meds	95% CI
Urban Unguja	850	30.6	22.8-38.4
Rural Unguja	756	38.2	33.7-42.8
Pemba	1012	32.8	29.0-36.5
TOTAL	**2618**	**33.0**	**28.9-37.2**

Across the three strata no significant difference in prevalence of raised blood pressure was seen. The prevalence of having been diagnosed with hypertension and being on treatment was lowest in Pemba but the difference between the strata was not significant (table A-43).

Result interpretation

The data suggested that an increase in age was associated with increased prevalence of hypertension, a trend which is generally well established. The prevalence of hypertension was found to be high with one third of the adult population between 25 and 64 years estimated to have raised blood pressure, and one in six has moderate to severe hypertension, and these results are in line with the World Health Statistics 2012 where it is estimated that one third of the world's adults have hypertension.[xli]

The prevalence of HTN was higher than expected, and higher than found among the 53.2% of the study population who had gone to measure BP before the survey (only 19.5% of those who ever had measured BP was diagnosed with HTN[xlii]) which could be due to various bias (people checking BP are more healthy and concerned about their health than those who do not check etc) or due to good procedures when diagnosing (several measurements on different days). The latter is however not supported by observations of practices in health facilities.

Screening exercises in 2010-11 of various community groups suggested an overall prevalence of HTN at around 21% with just over half of them not diagnosed before the screening[xliii]. The equipment and procedure applied for this survey could be of a better quality than the screening exercises, as well as the sampling size and sampling method. This could contribute to the different result obtained.

Nearly half of the study population and more than half of the elderly men had never had their BP measured. It was seen that around half of those with raised BP in the survey were not aware of their condition due to not having measured their BP, and this was especially common for men. Among those who had previously been diagnosed, use of medical treatment was low with only 19.1% taking blood pressure drugs as prescribed by health service provider.

The data indicates lack of proper management of HTN including education on life style interventions to reduce blood pressure, especially regarding smoke cessation, weight loss, increase in physical activity, and encourage DASH-diet[xliv], as well as low compliance to medical treatment of hypertension and achievement of treatment goals.
It is out of the scope for this report to suggest reasons for this. However, availability and affordability of antihypertensive drugs to the general population could be one of the causes and would need further investigation.

Combined risk

The combined risk is calculated as the sum of the five above mentioned risk factors of smoking, lack of adequate intake of fruits and vegetables, overweight/obesity, lack of adequate amount of physical activity, and raised blood pressure.
Having zero risk factors is considered low risk, while having three to five risk factors is considered as being at raised risk.

Results

Table 46	Summary of Combined Risk Factors						
	Men						
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	561	0.9	0.1-1.7	83.8	80.0-87.5	15.3	11.6-19.0
45-64	433	0.4	0.0-1.1	69.0	63.2-74.9	30.5	24.7-36.3
25-64	**994**	0.8	0.2-1.3	79.2	76.2-82.2	20.0	17.0-23.1

Table 47	Summary of Combined Risk Factors						
	Women						
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	930	0.5	0.0-1.1	77.4	73.6-81.2	22.1	18.2-25.9
45-64	530	0.2	0.0-0.5	52.3	45.1-59.5	47.5	40.3-54.7
25-64	**1460**	0.5	0.1-0.9	71.2	67.8-74.6	28.4	25.0-31.8

Table 48	Summary of Combined Risk Factors						
	Both Sexes						
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	1491	0.7	0.2-1.2	80.4	77.5-83.3	18.9	16.0-21.7
45-64	963	0.4	0.0-0.7	61.6	56.7-66.5	38.1	33.2-43.0
25-64	**2454**	0.6	0.2-1.0	75.2	72.7-77.7	24.2	21.7-26.7

When combining the individual risk factors an overall of 24.2% of the study population is at raised risk, with a significant difference between gender with men at 20.0% (CI±3.0) against women at 28.4% (CI±3.4), as well as age groups (younger age group 18.9% (CI±2.9) against older age group 38.1% (CI±4.9).

Table 49	**Summary of Combined Risk Factors**						
	Both sexes						
stratum	n	0 risk factors	95% CI	1-2 of the risk factors	95% CI	3-5 of the risk factors	95% CI
Urban Unguja	806	0.0	0.0-0.0	70.4	65.7-75.1	29.6	24.9-34.3
Rural Unguja	713	1.8	0.4-3.2	75.6	71.4-79.9	22.6	18.2-27.0
Pemba	935	0.7	0.1-1.3	82.1	77.8-86.5	17.2	12.8-21.6
TOTAL	**2454**	**0.6**	**0.2-1.0**	**75.2**	**72.6-77.8**	**24.2**	**21.6-26.8**

There is an overall difference between rural and urban population with a significant difference between the proportion in Urban which was a raised risk 29.6% (CI±4.7) against the proportion in Pemba 17.2% (CI±2.6).
The prevalence of the female population at raised risk in Urban Unguja was found at 36.7% (CI±6.7) which was more than double that in Pemba with 16.8% (CI±5.1)(Table A-44).
Taking into account that BMI and not WHR was used for calculating combined risk, the prevalence may be higher than the one found in this analysis.

Biochemistry

Glucose	Cholesterol	Triglyceride
• Mean fasting blood glucose • Proportion with DM • Proportion with IFG • Previous history of diabetes	• Proportion with raised cholesterol levels	• Proportion with raised levels of triglycerides

Blood Glucose

Result

More tables are found in Annex IV.

Table 50	**Mean fasting blood glucose (mmol/L)**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	516	4.3	4.2-4.4	1001	4.2	4.0-4.5	1517	4.3	4.1-4.4
45-64	399	4.7	4.4-5.1	528	4.7	4.5-4.8	927	4.7	4.5-4.9
25-64	**915**	**4.4**	**4.3-4.6**	**1529**	**4.3**	**4.2-4.5**	**2444**	**4.4**	**4.2-4.5**

Table 51	**Impaired Fasting Glycaemia (FBG ≥5.6 and < 6.1 mmol/L)**								
Age Group (years)	**Men**			**Women**[xlv]			**Both Sexes**		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	516	3.6	1.0-6.2	1001	1.5	0.7-2.5	1517	2.5	1.0-4.0
45-64	403	2.4	0.7-4.1	530	4.9	2.9-6.9	927	3.6	2.2-4.9
25-64	**919**	**3.3**	**1.3-5.2**	**1531**	**2.3**	**1.4-3.3**	**2444**	**2.8**	**1.6-3.9**

Table 52	**Raised blood glucose ≥ 6.1 mmol/L (= diabetes) or currently on medication for diabetes**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	521	2.0	0.5-3.4	1005	2.2	0.7-3.6	1526	2.1	1.0-3.2
45-64	408	8.1	4.2-12.1	530	8.6	5.5-11.7	938	8.4	5.9-10.8
25-64	**929**	3.8	2.0-5.7	**1535**	3.7	2.3-5.0	**2464**	3.7	2.6-4.9

The prevalence of diabetes in the survey population using the IDF diagnostic values as cut-off was **3.7 %** (CI±1.1) with 8.4% (CI±2.4) among the older age group and 2.1% (CI±1.1) among the younger age group having raised fasting glucose suggestive of diabetes. There was no significant difference between men and women. For both males and females, mean blood glucose levels increased significantly with increasing age.

Impaired fasting glucose prevalence: overall the study population had a prevalence of **IFG at 2.8 %** (CI±1.1) with age disparity of 3.6 % (CI±1.4) for the elder age group and 2.5 % (CI±1.5) for the younger age group.

The mean fasting blood glucose level of the overall study population was 4.4 mmol/L (CI±0.1)
There was no significant difference between males (4.4 mmol/L, CI±0.1) and females (4.3 ±0.2 mmol/L).

Table 54 **Blood sugar measurement and diagnosis**

Age Group (years)	Both sexes								
	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	1630	85.9	83.7-88.1	13.7	11.5-15.9	0.2	0.0-0.4	0.3	0.0-0.5
45-64	1008	71.5	66.8-76.3	23.1	19.0-27.3	3.2	1.4-5.0	2.2	0.9-3.4
25-64	**2638**	**82.0**	**79.9-84.2**	**16.2**	**14.2-18.3**	**1.0**	**0.5-1.5**	**0.8**	**0.4-1.2**

Table 55 **Currently taking insulin prescribed for diabetes among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	% taking insulin	95% CI	n	% taking insulin	95% CI	n	% taking insulin	95% CI
25-44	3	7.7	0.0-26.3	7	21.3	0.0-45.5	10	18.4	0.0-38.9
45-64	18	8.1	0.0-18.8	25	9.7	0.0-24.8	43	8.8	0.0-17.9
25-64	**21**	**8.0**	**0.0-18.5**	**32**	**12.9**	**0.1-25.7**	**53**	**10.4**	**2.0-18.9**

Table 56 **Currently taking oral drugs prescribed for diabetes among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	% taking oral meds	95% CI	n	% taking oral meds	95% CI	n	% taking oral meds	95% CI
25-44	3	0.0	0.0-0.0	7	10.7	0.0-33.0	10	8.4	0.0-25.4
45-64	18	40.2	1.4-79.1	25	22.8	3.4-42.1	43	32.6	7.6-57.6
25-64	**21**	**37.3**	**0.3-74.2**	**32**	**19.5**	**3.8-35.1**	**53**	**28.4**	**7.5-49.2**

The results showed that overall 18% (CI±2.1) of the study population had previously had their blood sugar measured, with 15.4% (CI±3.7) of men against 20.3% (CI±3.0) of women (table A-48). Among those who had their blood glucose measured 9.7% (CI±3.8) were told they had diabetes while 90.3% (CI±3.8) were assumed to have normal blood glucose levels. There was no significant gender difference in diagnosis (table A-49).

The proportion of people who had ever had their blood sugar checked was significantly lower in Pemba 90.8% (CI±2.6) and Rural Unguja 87.9% (CI±3.1) against Urban 73.3% (CI±2.2) both for men and for women. No significant difference in prevalence of Diabetes or IFG was found between the strata (tables A 47, 50-52).

Of those previously diagnosed with diabetes 28.4% (CI±20.9) were currently on oral anti diabetic medication while 10.4% (CI±8.4) were on insulin treatment.

Table 57 **Advised by doctor or health worker to have special prescribed diet among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	3	100.0	100.0-100.0	7	86.4	58.7-100.0	10	89.3	68.0-100.0
45-64	18	96.3	90.2-100.0	25	86.1	68.7-100.0	43	91.8	83.1-100.0
25-64	**21**	**96.5**	**91.0-100.0**	**32**	**86.2**	**71.4-100.0**	**53**	**91.4**	**83.1-99.7**

Table 58 **Advised by doctor or health worker to lose weight among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	3	68.9	4.6-100.0	7	62.9	17.5-100.0	10	64.2	26.7-100.0
45-64	18	45.8	7.4-84.3	25	36.6	10.4-62.8	43	41.8	20.1-63.4
25-64	**21**	**47.5**	**11.2-83.9**	**32**	**43.8**	**20.0-67.7**	**53**	**45.7**	**27.6-63.8**

Table 59 **Advised by doctor or health worker to stop smoking among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	3	76.6	19.4-100.0	7	16.1	0.0-39.7	10	29.0	0.0-61.1
45-64	18	62.1	27.6-96.6	25	5.9	0.0-13.3	43	37.5	14.9-60.1
25-64	**21**	**63.1**	**30.7-95.6**	**32**	**8.7**	**1.1-16.4**	**53**	**36.0**	**15.9-56.1**

Table 60 **Advised by doctor or health worker to start or do more exercise among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	3	100.0	100.0-100.0	7	86.4	58.7-100.0	10	89.3	68.0-100.0
45-64	18	78.8	59.0-98.5	25	76.4	54.3-98.6	43	77.7	63.1-92.4
25-64	**21**	**80.3**	**62.2-98.4**	**32**	**79.2**	**61.4-97.0**	**53**	**79.8**	**66.9-92.6**

The results above showed that overall 91.4% (CI±8.3) of the previously diagnosed participants had received advises on special diet, while 79.8% (CI±12.6) had received advises to exercise more. Less than half had received advises on weight loss or tobacco cessation.

Result interpretation

Overall the proportions of the study population having raised fasting blood glucose were found to be relatively low, both for IFG and DM, if comparing to other island states such as Mauritius, Seyshelles and islands in the Pacific.[xlvi] These states however are not in the same category of low income countries as Zanzibar. Prevalence estimates from an older study in Tanzania suggested a total prevalence of around 0.9 %.[xlvii] It is by nature difficult to compare these results due to differences in time, geographical and cultural differences between the two areas, however it is striking that the prevalence of raised fasting blood glucose in this survey being suggestive of Diabetes was moderately high with 3.7% of the total population.

Even though less than 20% of the population had ever measured their blood sugar, among the group of those who measured almost 10% had diabetes and an unknown number had IFG. This suggests that screening for DM might be done rationally based on risk factor profile and/or symptoms.

Two screening exercises in Zanzibar in 2010/11 with equal numbers screened at work places in Urban Unguja (n=350), and among local administrative leaders and religious leaders in Pemba (n=371) (using a higher cut-off at 7.0 mmol/L for capillary whole blood), showed a prevalence of DM at 11.1% respectively 10.5%, and for IFG 14% respectively 10.7%. It is likely that the sample in Unguja included urban residents with a certain level of education and permanent employment; while in Pemba it included mainly aged men which could contribute to the higher prevalence found in these screening exercises. When repeat testing is performed, approximately 75% of people with diabetes detected in epidemiological studies are confirmed to have clinical diabetes.[xlviii]

In general, for both males and females the prevalence of diabetes increased with increasing age with 8.4 % of the older study population (45-64 years) being diabetic.

The results are highly suggestive of a need to improve Diabetes screening availability, awareness and affordability, as well as the quality of the services offered by doctors/health care workers.

Lipids – Cholesterol and Triglyceride

Results

Table 61	Mean total cholesterol (mmol/L)								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	457	4.5	4.4-4.6	917	4.8	4.7-4.8	1374	4.7	4.6-4.7
45-64	362	4.7	4.6-4.8	483	5.0	4.9-5.1	845	4.8	4.8-4.9
25-64	**819**	**4.6**	**4.5-4.6**	**1400**	**4.8**	**4.8-4.9**	**2219**	**4.7**	**4.7-4.7**

Table 62	Total cholesterol ≥ 5.0 mmol/L or currently on medication for raised cholesterol								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	522	16.4	12.0-20.7	1007	26.4	23.4-29.3	1529	21.9	19.1-24.7
45-64	411	22.5	16.8-28.2	532	42.1	35.0-49.2	943	31.5	27.4-35.6
25-64	**933**	**18.2**	**15.0-21.4**	**1539**	**30.0**	**27.2-32.9**	**2472**	**24.4**	**22.1-26.7**

The mean cholesterol levels among all participants were 4.7 mmol/L (CI±0.0) with no gender difference but slightly higher levels among the older age group with 4.8 mmol/L (CI±0.1) against the younger 4.7 mmol/L (CI±0.1).
The proportion having raised cholesterol at or above 5 mmol/L was 24.4% (CI±2.3) with a significant gender difference of 18.2% (CI±3.2) of the men having raised levels against 30.0% (CI±2.9) of the women. There was also an overall significant difference between the age groups with 21.9% (CI±2.8) of the younger having raised cholesterol levels against 31.5% (CI±4.1) of the elder age group.

Table 63	Total cholesterol ≥ 5.0 mmol/L or currently on medication for raised cholesterol								
stratum	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
Urban Unguja	274	25.0	19.2-30.8	523	33.9	29.2-38.6	797	29.9	25.9-33.9
Rural Unguja	291	15.8	10.7-20.8	434	25.8	20.5-31.1	725	20.7	16.6-24.8
Pemba	368	10.3	6.6-14.0	582	26.7	23.0-30.4	950	18.9	16.3-21.5
TOTAL	**933**	**18.2**	**14.9-21.5**	**1539**	**30.0**	**27.1-32.9**	**2472**	**24.4**	**22.0-26.9**

There was a significant difference in prevalence of hypercholesterolemia between urban and rural areas with the lowest prevalence found in Pemba with 18.9 % (CI±2.6) against Urban Unguja 29.9 % (CI±4.0). The statistical significant difference in prevalence was recognised among men but not among women in the strata.

Table 64	Mean fasting triglycerides (mmol/L)								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	408	1.3	1.2-1.4	625	1.2	1.1-1.3	1033	1.3	1.2-1.3
45-64	320	1.3	1.2-1.4	428	1.3	1.2-1.5	748	1.3	1.3-1.4
25-64	**728**	**1.3**	**1.2-1.4**	**1053**	**1.3**	**1.2-1.3**	1781	**1.3**	**1.2-1.3**

Table 65	Respondents with fasting triglycerides ≥ 2.0 mmol/L								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	521	7.4	4.3-10.4	1005	4.0	2.2-5.8	1526	5.5	3.9-7.1
45-64	408	5.7	2.8-8.6	530	7.1	3.8-10.4	938	6.4	4.2-8.5
25-64	**929**	**6.9**	**4.6-9.1**	**1535**	**4.7**	**3.0-6.4**	**2464**	**5.7**	**4.4-7.1**

The mean triglyceride level was found at 1.3 mmol/L (CI±0.1) with no age- or gender difference.
5.7% (CI±1.4) of the overall population had raised triglyceride level above the cut-off at 2 mmol/L, with men at 6.9% (CI±2.2) against women at 4.7% (CI±1.7). The age-sex group with highest proportion of raised triglycerides were younger men with 7.4% (CI±3.0).
The difference in proportion of the population with fasting triglycerides ≥ 2.0 mmol/L was lowest in rural areas and highest in Urban however the difference was not statistically significant (table A-54).

Result interpretation

Surprisingly the highest level of triglyceride was found among young men. The prevalence found was however not significant different from the other subgroups. A diet consisting of low protein intake and high carbohydrate intake could be among the explanations for this but was not captured in this survey.

Only total cholesterol was measured in the study, and the HDL-LDL ratio hence not known.
The prevalence of hypercholesterolemia was relatively high with 24.4% of the studied population having hypercholesterolemia with cholesterol levels at or above 5 mmol/L. This cut-off point is rather low and levels below it is considered ideal; a cut-off at or above 6.2 mmol/L which is used in some countries would have showed only those with moderate raised levels and above and would have given a lower prevalence (table A-55 shows this). Due to comparability with risk factor surveys in other countries the lowest cut-off was used.

The difference in prevalence of hypercholesterolemia between the strata was observed and could be related to differences in especially body mass index,[xlix] dietary patterns as well as being related to levels of physical exercise[l]. It would take further research to narrow the potential mechanisms responsible for the differences in prevalence.

Results– Part Two

Injuries

Results

13.2% (CI±2.0) of the surveyed population had experienced some kind of accident either a road traffic accident or other kind of serious accident within the past 12 months (Table A-58).
More tables can be found in Annex IV.

Table 66	**Was involved in a road traffic accident within the last 12 months**						
	Men						
Age Group (years)	Was involved in a RTA				Needed medical attention		
	n	%	95% CI		n	%	95% CI
25-44	569	8.5	5.4-11.5		42	72.3	55.5-89.1
45-64	442	5.0	2.6-7.5		19	59.2	30.7-87.7
25-64	**1011**	**7.4**	**5.4-9.5**		**61**	**69.6**	**54.9-84.2**

Table 67	**Was involved in a road traffic accident within the last 12 months**						
	Women						
Age Group (years)	Was involved in a RTA				Needed medical attention		
	n	%	95% CI		n	%	95% CI
25-44	1061	2.0	0.9-3.1		17	69.3	43.7-94.9
45-64	566	1.5	0.3-2.7		8	82.5	53.9-100.0
25-64	**1627**	**1.9**	**1.0-2.8**		**25**	**71.8**	**49.9-93.6**

Table 68	**Was involved in a road traffic accident within the last 12 months**						
	Both sexes						
Age Group (years)	Was involved in a RTA				Needed medical attention		
	n	%	95% CI		n	%	95% CI
25-44	1630	4.9	3.6-6.3		59	71.6	56.8-86.5
45-64	1008	3.4	2.0-4.8		27	63.9	40.3-87.4
25-64	**2638**	**4.5**	**3.5-5.5**		**86**	**70.0**	**57.6-82.5**

4.5% (CI±1.0) of the population has been involved in a road traffic accident within the last year, with the highest proportion found among young men with 8.5% (CI±3.0). Overall 70.0% (CI±12.5) of those involved in an accident was in need of medical attention, with no difference between gender nor age groups.
The proportion of the population being involved in a RTA within the last year was highest in Urban Unguja and lowest in Pemba, however the difference was not statistically significant (table A-60).

Table 69	Always used seat belt when in a car during the last month								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	513	9.0	5.2-12.8	937	3.5	1.5-5.4	1450	6.0	4.2-7.7
45-64	393	9.1	4.9-13.2	494	1.5	0.3-2.8	887	5.6	3.2-8.0
25-64	**906**	**9.0**	**6.0-12.0**	**1431**	**3.0**	**1.4-4.6**	**2337**	**5.9**	**4.4-7.3**

Table 70	Always used a helmet when being on a motorbike/scooter during the last month								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	433	21.6	14.4-28.8	718	11.6	6.9-16.3	1151	16.5	11.4-21.5
45-64	327	21.7	13.3-30.0	371	2.7	1.1-4.4	698	13.5	8.6-18.3
25-64	**760**	**21.6**	**14.7-28.5**	**1089**	**9.5**	**5.9-13.2**	**1849**	**15.7**	**11.1-20.2**

Table 71	During the last month been a passenger in a vehicle with a driver who had consumed alcohol								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	461	3.8	1.0-6.6	854	4.7	2.1-7.2	1315	4.3	2.2-6.4
45-64	355	0.9	0.1-1.7	453	2.3	0.0-4.5	808	1.5	0.4-2.7
25-64	**816**	**2.9**	**1.0-4.8**	**1307**	**4.1**	**2.1-6.1**	**2123**	**3.5**	**2.0-5.1**

Risk reducing behaviour in traffic during the last month, such as driving or being transported in a car always using seat belt was found to be observed by 9.0% (CI±3.0) of men and 3.0% (CI±1.6) of women. Similarly, 21.6% (CI±6.9) of men and 9.5% (CI±3.7) of women always used helmet when on a motorbike/scooter during the last month.
3.5% (CI±1.5) of the total population had within the last month been passenger in a motorized vehicle where the driver had consumed alcohol.

Table 72	Had a serious accident other than RTA within the last 12 months								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	567	12.7	8.3-17.1	1057	6.7	4.5-8.8	1624	9.4	7.1-11.7
45-64	441	14.3	9.2-19.4	566	7.6	4.5-10.7	1007	11.2	8.1-14.4
25-64	**1008**	**13.2**	**10.1-16.2**	**1623**	**6.9**	**5.1-8.7**	**2631**	**9.9**	**8.0-11.8**

9.9% (CI±1.9) had experienced some kind of accident other than RTA, leading to injury needing medical attention. The proportion of men 13.2% (CI±3.1) was significant higher than the proportion of women 6.9% (CI±1.8) that had been involved in a serious accident over the last year. A small however significant difference was seen between the strata where the proportion of women having experienced a serious accident other than RTA within the last year was highest in Pemba with 10.6% (CI±4.2) against 6.5% (CI±2.5) in Unguja Urban and 2.6% (CI±1.4) in Unguja Rural (table in Annex IV).
The most common types of injuries were cut wounds 42.0% (CI±9.5), followed by fall accidents with 28.5% (CI±10). The location where the accident was taking place was most common at home 37.2% (CI±6.5) or at work 30.2% (CI±9.8), followed by accidents at the farmland with 21.1% (CI±6.8) (Annex IV).

Result interpretation

A high proportion of the population had within the last year experienced an accident either in the traffic 4.5% or elsewhere 9.9%, leading to injury of which the majority required medical attention. Data from police and facilities are less precise due to monitoring challenges, so these results give for the first time a clearer picture on the extent of the problem of accidents and injuries in Zanizbar.

The findings are not unlikely to correspond to a global trend where RTA is the leading cause of death in young people, and the highest rate of deaths and disabilities due to injuries are found in poorer nations.[li]

Preventative behaviour such as using seat belt or helmet was observed by a small proportion of the population. Certain challenges in using seat belt arises due to the substantial use of and types of public transport vehicles found. The low use of helmet highlights the need to reinforce the already existing legislation.
The difference in levels of severe injury other than RTA between women in Pemba against Unguja Rural has no apparent explanation.
The findings also call for more research into work place health/ occupational health policy with a relatively high proportion of injuries taking place at work.

Mental Health

The Mental Health module was designed to capture previous diagnosis of mental illness as well as screening for current mental illness in the spectrum of anxiety/depression.

Results

Analysis of data for this module was done using SPSS version 18.0

Table 73 **Having previous been diagnosed with mental illness by a health care worker**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	567	2.1	0.6 – 6.4	1061	1.8	0.9 – 3.8	1628	1.9	1.0 – 3.8
45-64	441	0.6	0.2 – 1.6	566	1.3	0.6 – 2.6	1007	0.9	0.5 – 1.6
25-64	1008	1.6	0.6 – 4.4	1627	1.7	0.9 – 3.1	2635	1.6	0.9 – 2.9

Table 74 **Previous diagnosis of Mental Illness**

Both sexes	
Diagnosis	n
Depression	3
Schizophrenia	1
Anxiety	25
Acute psychosis	4
Mental retardation	1
Epilepsy	1
Other	1
Don't remember	3
TOTAL	39

The prevalence of participants who had previously been diagnosed by a health care worker with a mental illness was found to be at 1.6% (CI 0.9-2.9) with more than half of them being diagnosed with anxiety (25 out of 39 diagnosed). 3 out the participants did not know or remember their diagnosis.

Table 75 **Proportion having a score above threshold for mental illness (anxiety/depression)**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	569	5.1	2.8-9.0	1061	8.9	6.6-11.8	1630	7.1	5.4-9.3
45-64	442	3.7	2.3-6.0	565	8.6	6.2-11.7	1007	5.9	4.5-7.7
25-64	1011	4.7	2.9-7.3	1626	8.8	6.9-11.1	2637	6.8	5.5-8.5

Table 76	**Proportion having a score above threshold for mental illness (depression/anxiety)**		
Both sexes			
stratum	n	≥ 4 points	95% CI
Urban Unguja	865	6.7	4.4-10.0
Rural Unguja	759	3.5	2.3-5.3
Pemba	1013	9.6	7.7-11.9

The results showed that the prevalence of mental illness in the general population stood at 6.8 % (CI 5.5-8.5) with significant gender difference. Among men the prevalence was 4.7% (CI 2.9-7.3) against women at 8.8% (CI 6.9-11.1). There was no difference in the gender groups between the age groups.
There was a significant difference between Unguja and Pemba with lowest prevalence in Rural Unguja at 3.5% (CI 2.3-5.3) against Pemba 9.6% (CI 7.7-11.9).

Result interpretation

The cut-off point between healthy and possible[lii] mental illness was set at the score 3 / 4. There is no golden standard for where the cut-off should be set. While some validation research suggests 2 / 3 [liii] as the optimal cut-off point, others suggest 3 / 4,[liv] and no research has suggested a higher cut-off.
While the specificity is rather high on the GHQ-12, the sensitivity is not in particular high.[lv]
Practically this means that the high threshold (four points) chosen in this survey as cut-off point for mental illness gives a high specificity and lower sensitivity, and it could result in a too low prevalence estimate compared to the real prevalence in the population.

The noticeable difference in prevalence of mental illness among population in the different strata was not recognised in prevalence of somatic morbidity or prevalence of risk factors (see previous chapters). Pemba[lvi] is by many considered being disadvantaged when it comes to possibilities for education, employment, and health services to mention a few. It is necessary to look further into the relationship between the mental health scores and socio-economical determinants of (mental) health in order to conclude on this finding.

Conclusions and recommendations

This report highlights the descriptive findings from the 2011 NCD risk factor survey in Zanzibar, which was the first of its kind. There is a need to further analyse the survey data to look into the complex relations between socio-economical determinants of health, risk behaviour, mental wellbeing and NCDs in order better to understand and intervene on population level.

The analysis presented in this report indicated that prevalence of use of alcohol in Zanzibar was low, while drinking and driving was found to be common with risk of inflicting harm not only on the drinker but also injuries to others due to causing road traffic accidents. It compromises road safety and hence incentive to use active methods of transportation.
Tobacco use was found to be near to non-existing among women in the reproductive age, while men had a relatively low prevalence of 14%, and the amount used daily was low. The issue of smokeless tobacco was equal among the gender with a low prevalence however with the adjacent health risk of developing especially oral cancers.
While religion in Zanzibar prohibits the use of alcohol, tradition prescribes limitations of use of tobacco and can be seen as health promoting.

The level of physical activity in the general population was found to be high, reflecting the condition of a large number of the population who cannot afford to pay for transportation by motorised vehicle, as well as a large agriculture sector mainly consisting of subsistence farming and clove and coconut plantations requiring manual labour for harvesting crops.
Despite the high levels of physical activity the level of overweight and obesity was noticeable especially among women and in urban area, and especially if WHR was used. The diet consisted of low intake of fruits and vegetables with 28.7% of the population not having a daily intake of fruits or vegetables, and only 2.1% having an intake at the recommended five pieces a day or above. A quarter of the population was found to be in the category 'substantially raised risk' of getting metabolic complications due to the combination of these risk factors.

The prevalence of HTN was found to be at a 'global' level with 33% of the surveyed population having raised blood pressure or HTN. Relatively high prevalence of HTN and dyslipidemia was found among the younger population indicating a risk of developing NCDs and complications such as heart failure, kidney failure or stroke at younger age. Prevalence of raised blood sugars suggesting Diabetes was moderately high with 3.7% of the total population, and 8.4% among the older population.

The survey results point in the direction that Zanzibar is in the relatively early stage of the NCD epidemic where behavioural risk factors and intermediate risk factors are high, while diseases are yet not developed to an extend seen in some wealthier countries in the region such as Seyshelles, Mauritius and South Africa.
Still, these diseases are already a heavy load on the health system where one out of six adult admissions to hospital, and one out of two admissions to medical wards, is due to the three diseases CVD, DM or chronic lung disease.

The magnitude of the problem is to be seen in the future unless effective strategies for prevention and health promotion will be developed and implemented.

The recommendations that follow are based essentially on the findings of the survey taking into consideration relevant resolutions and strategies adopted by the WHO.[lvii]

- The NCD unit in Ministry of Health should develop and make available health information on NCD, risk factors and protective behaviours at population level including schools.
- Intervention programmes focusing on primary prevention of diseases by controlling risk factors including hypertension should be developed and implemented.
- Activities related to early detection of diseases, their risk factors and complications should be expanded, strengthened and sustained. Focus should in particular be at those at highest risk in order to receive the highest gain.
- Ministry of Health should strengthen areas of the health system which needs strengthening in order to deliver quality services. This includes upgrading of diagnostic and treatment facilities with needed equipment, ongoing training of staff, further development and implementation of evidence based management protocols, and sustained supervision and early referral of complicated cases to higher level.
- Department of Preventative services should ensure the availability of services where the population is living through integration of chronic disease care including mental health services to primary health care level.
- A functioning NCD unit to work together with existing programmes to create synergies between different interventions and avoid mixed messages on e.g. salt intake to be reduced due to CVD risk or increased due to prevent iodine deficiency. The use of existing services such as RCH for NCD prevention and education should be stressed, for instance through education on exclusive breast feeding as good for the child's development as well as reducing the risk of CVD and DM later in adult life.
- MoH should take the lead in advocating and lobbying for healthier policies on food labelling, maximum content of salt, sugar and fats, regulation of tobacco advertisement and sale, ensure affordability of healthy foods such as fruits and vegetables, good infrastructure to facilitate active transportation and exercising in public space and reduce injuries in the traffic etc.
- All sectors including the private sector should be engaged to what level possible to fight NCDs and the determinants leading to poor health.
- Maintain surveillance through routine data collection, community based data, and surveys, to monitor the situation and effect of interventions.

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Annex I

National NCD risk factor survey Zanzibar 2011

Fact Sheet

A STEPs survey of chronic disease risk factors using a modified version of the surveillance tool STEPS (WHO)*** was carried out from June to July 2011 in Zanzibar, Tanzania. Step 1, Step 2 and Step 3 was carried out with core and expanded modules. Furthermore the STEPS module on injuries was used, and also the questionnaire containing GHQ-12 for mental health assessment was applied.

The STEPS survey in Zanzibar was a population (household) based survey of adults aged 25-64. A multi-stage cluster sample design with stratification was used to produce representative data for that age range in Zanzibar. 2800 households were sampled, and a total of 2639 adults participated in survey. **

Results for adults aged 25-64 years (incl. 95% CI)	Both Sexes	Males	Females
Step 1 Tobacco Use			
Percentage who currently smoke tobacco	7.3 (5.4-9.2)	14.6 (10.9-18.3)	0.7 (0.2-1.2)
Percentage who currently smoke tobacco daily	6.4 (4.6-8.2)	12.7 (9.2-16.3)	0.5 (0.0-1.0)
For those who smoke tobacco daily			
Average age started smoking (years)	22.1 (20.96-23.3)	22.0 (20.9-23.2)	-
Percentage of daily smokers smoking manufactured cigarettes	94.7 (83.8-99.6)	98.2 (96.2-100.2)	-
Mean number of manufactured cigarettes smoked per day (by smokers of manufactured cigarettes)	5.5 (4.7-6.4)	5.8 (4.8-6.7)	-
Step 1 Alcohol Consumption			
Percentage who are lifetime abstainers	90.8 (88.5-93.1)	84.2 (79.7-88.8)	96.8 (95.4-98.1)
Percentage who are past 12 month abstainers	6.1 (4.5-7.8)	10.6 (6.8-14.3)	2.1 (1.1-3.0)
Percentage who currently drink (drank alcohol in the past 30 days)	1.7 (1.0-2.4)	3.1 (1.7-4.5)	0.4 (0.1-0.7)
Percentage who engage in heavy episodic drinking (men who had 5 or more / women who had 4 or more drinks on any day in the past 30 days)	-	1.7 (0.6-2.8)	0.3 (0.04-0.5)
Step 1 Fruit and Vegetable Consumption (in a typical week)			
Mean number of days fruit consumed	3.9 (3.7-4.1)	4.1 (3.9-4.4)	3.7 (3.5-4.0)

Mean number of servings of fruit consumed on average per day	1.1 (1.0-1.1)	1.1 (1.0-1.2)	1.0 (0.9-1.1)
Mean number of days vegetables consumed	2.8 (2.7-3.0)	2.7 (2.5-2.9)	2.9 (2.8-3.0)
Mean number of servings of vegetables consumed on average per day	0.7 (0.7-0.7)	0.6 (0.6-0.7)	0.7 (0.7-0.8)

Results for adults aged 25-64 years (incl. 95% CI)	Both Sexes	Males	Females
Percentage who ate less than 5 servings of fruit and/or vegetables on average per day	97.9 (97.1-98.7)	97.6 (96.5-98.8)	98.1 (97.3-99.0)
Step 1 Physical Activity			
Percentage with low levels of activity (defined as < 600 MET-minutes per week)*	17.6 (14.5-20.7)	7.4 (5.6-9.3)	26.8 (22.2-31.4)
Percentage with high levels of activity (defined as ≥ 3000 MET-minutes per week)*	64.7 (60.4-68.9)	80.0 (75.2-84.9)	50.7 (46.4-55.0)
Median time spent in physical activity on average per day (minutes) (presented with inter-quartile range)	188.6 (51.4-364.3)	248.6 (115.7-422.1)	107.1 28.6-295.7)
Percentage not engaging in vigorous activity	52.1 (45.9-58.3)	31.8 (24.9-38.6)	70.6 (64.8-76.4)

Step 2 Physical Measurements			
Mean body mass index - BMI (kg/m^2)	24.3 (24.0-24.6)	23.4 (23.1-23.7)	25.2 (24.8-25.6)
Percentage who are overweight (BMI ≥ 25 kg/m^2)	36.6 (33.9-39.2)	30.5 (27.2-33.9)	42.6 (39.2-46.0)
Percentage who are obese (BMI ≥ 30 kg/m^2)	14.3 (11.8-16.9)	7.7 (5.0-10.4)	20.9 (17.1-24.7)
Percentage who are underweight (BMI < 18.5 kg/m^2)	8.5 (6.9-10.2)	7.6 (4.8-10.4)	9.5 (7.2-11.7)
Average waist circumference (cm)		82 (81.1-82.9)	87 (86.2-87.9)
Mean systolic blood pressure - SBP (mmHg), including those currently on medication for raised BP	131.3 (129-133.7)	135.0 (132.57-137.4)	128.0 (125.5-130.5)
Mean diastolic blood pressure - DBP (mmHg) , including those currently on medication for raised BP	78.0 (76.9-79.2)	78.2 (76.9-79.5)	77.9 (76.6-79.3)
Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)	33.0 (28.9-37.2)	37.0 (31.4-42.7)	29.4 (25.5-33.2)
Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg) who are not currently on medication for raised BP	87.1 (82.5-91.7)	88.5 (81.6-95.3)	85.5 (80.7-90.4)
Step 3 Biochemical Measurement			
Mean fasting blood glucose, including those currently on medication for raised blood glucose [choose accordingly: mmol/L or mg/dl]	4.4 (4.3-4.5)	4.4 (4.3-4.6)	4.4 (4.2-4.5)
Percentage with impaired fasting glycaemia as defined below capillary whole blood value ≥5.6 mmol/L and < 6.1 mmol/L	3.3 (1.3-5.2)	2.3 (1.4-3.3)	2.8 (1.6-3.9)
Percentage with raised fasting blood glucose as defined below or currently on medication for raised blood glucose capillary whole blood value ≥ 6.1 mmol/L	3.8 (2.0-5.7)	3.7 (2.3-5.0)	3.7 (2.6-4.9)
Mean total blood cholesterol, including those currently on medication for raised cholesterol mmol/L	4.7 (4.7-4.7)	4.6 (4.5-4.6)	4.8 (4.8-4.9)
Percentage with raised total cholesterol (≥ 5.0 mmol/L or ≥ 190 mg/dl or currently on medication for raised cholesterol)	24.5 (22.2-26.8)	18.2 (15.0-21.4)	30.0 (27.2-32.9)

Percentage with raised triglyceride (≥2.0 mmol/L)	6.9 (4.6-9.1)	4.7 (3.0-6.4)	5.7 (4.4-7.1)

Summary of combined risk factors *** current daily smokers; less than 5 servings of fruits & vegetables per day; low level of activity; overweight (BMI ≥ 25 kg/m^2); raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)			
Percentage with none of the above risk factors	0.6 (0.22-1.0)	0.8 (0.19-1.34)	0.5 (0.06-0.9)
Percentage with three or more of the above risk factors, aged 25 to 44 years	18.9 (16.0-21.7)	15.3 (11.6-19.0)	22.1 (18.3-25.9)
Percentage with three or more of the above risk factors, aged 45 to 64 years	38.1 (33.2-43.0)	30.5 (24.7-36.3)	47.5 (40.3-54.7)
Percentage with three or more of the above risk factors, aged 25 to 64 years	24.2 (21.7-26.7)	20.1 (17.0-23.1)	28.4 (25.0-31.8)

* For complete definitions of low and high levels of physical activity, other conditions are specified in the GPAQ Analysis Guide, available at: http://www.who.int/chp/steps/GPAQ/en/index.html
** For more information on design and methodology refer to 'National NCD survey 2011 Data Collection Report' by Ministry of Heatlh, RGoZ.
*** Additional information on the STEPWISE approach to surveillance is available at: www.who.int/chp/steps
Blank box indicates less than 50 respondents

Annex II

SURVEY INSTRUMENT

NATIONAL NCD RISK FACTOR SURVEY ZANZIBAR 2011

For Chronic Disease risk factor surveillance using an modified version of the surveillance tool STEPS (WHO) and including Mental Health and Injuries

Survey Information

Location and Date		Response	Code
1	Shehia ID	⌊__⌋⌊__⌋	I1
2	Shehia Name		I2
3	Interviewer ID	⌊__⌋⌊__⌋	I3
4	Date of completion of the instrument	⌊__⌋ ⌊__⌋ ⌊__⌋⌊__⌋ dd mm year	I4

✂ ---------- ✂

Participant Id Number ⌊__⌋⌊__⌋⌊__⌋⌊__⌋⌊__⌋⌊__⌋

Consent, Interview Language and Name		Response	Code
5	Consent has been read and obtained	Yes 1 No 2 **If NO, END**	I5
6	Interview Language *[Insert Language]*	English 1 *Kiswahili* 2	I6
7	Time of interview (24 hour clock)	⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins	I7
8	Family Surname	_____	I8
9	First Name		I9
Additional Information that may be helpful			
10	Contact phone number where possible		I10

Record and file identification information (I5 to I10) separately from the completed questionnaire.

Step 1 Demographic Information

CORE: Demographic Information			
Question		**Response**	**Code**
11	Sex (*Record Male / Female as observed)*	Male 1 Female 2	C1
12	What is your date of birth? *Don't Know 77 77 7777*	⌊_⌊_⌋ ⌊_⌊_⌋ ⌊_⌊_⌊_⌊_⌋ *If known, Go to C4* dd mm year	C2
13	How old are you?	Years	C3

		⌊_⌊_⌋	
14	In total, how many years have you spent at school or in full-time study (excluding pre-school)?	Years ⌊_⌊_⌋	C4

EXPANDED: Demographic Information			
15	What is the **highest level of education** you have completed? *[INSERT COUNTRY-SPECIFIC CATEGORIES]*	No formal schooling 1 Less than primary school 2 Primary school completed (P7) 3 Secondary school completed (form four) 4 High school completed (form six) 5 College/University completed 6 Post graduate degree 7 Refused 88	C5
16	What is your *[insert relevant ethnic group / racial group / cultural subgroup / others]* **background**?	African Arab Indian Chinese Mixed Do not know Refused 88	C6
17	What is your **marital status**?	Never married 1 Currently married (monogamous) 2 Currently married (polygamous) Separated Divorced Widowed Cohabitating Refused 88	C7
18	Which of the following best describes your **main work** status over the past 12 months?	Government employee 1 Non-government employee 2 Self-employed 3 Non-paid 4	C8

	[INSERT COUNTRY-SPECIFIC CATEGORIES] (*USE SHOWCARD)*	Student 5 Homemaker / Housewife 6 Retired 7 Unemployed (able to work) 8 Unemployed (unable to work) 9 Refused 88	
19	How many people older than 18 years, including yourself, live in your household?	Number of people ⌊__⌋⌊__⌋	C9

EXPANDED: Demographic Information, Continued			
Question		**Response**	**Code**
20	Taking **the past year**, can you tell me what the average earnings of the household have been? *(RECORD ONLY ONE, NOT ALL 3)*	Per week ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T1*	C10a
		OR per month ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T1*	C10b
		OR per year ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T1*	C10c
		Do not know	
		Refused 88	C10d
21	If you don't know the amount, can you give an **estimate** of the monthly household income if I read some options to you? Is it *(READ OPTIONS)*	< 10.000. Tsh 1 10.000. ≤ 49.000. Tsh 2 50.000 , ≤ 99.000 Tsh. Tsh 3 100.000., ≤ 500.000 mio. Tsh 4 More than 500.000. Tsh 5 Don't Know 77 Refused 88	C11

Step 1 Behavioural Measurements

CORE: Tobacco Use			
Now I am going to ask you some questions about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco.			
Question		**Response**	**Code**
22	Do you currently smoke any **tobacco products**, such as cigarettes, cigars or pipes? *(USE SHOWCARD)*	Yes 1 No 2 *If No, go to T6*	T1
23	Do you currently smoke tobacco products **daily**?	Yes 1 No 2 *If No, go to T6*	T2
24	How old were you when you **first started** smoking daily?	Age (years) ⌊_⌋⌊_⌋ *If Known, go to T5a* Don't know 77	T3

25	Do you remember how long ago it was? *(RECORD ONLY 1, NOT ALL 3)*	In Years ⌊_⌋⌊_⌋ *If Known, go to T5a*	T4a
		OR in Months ⌊_⌋⌊_⌋ *If Known, go to T5a*	T4b
		OR in Weeks ⌊_⌋⌊_⌋	T4c
26	On average, **how many** of the following do you smoke each day? *(RECORD FOR EACH TYPE, USE SHOWCARD)* *Don't Know 77*	Manufactured cigarettes ⌊_⌋⌊_⌋	T5a
		Hand-rolled cigarettes ⌊_⌋⌊_⌋	T5b
		Pipes full of tobacco ⌊_⌋⌊_⌋	T5c
		Cigars, cheroots, cigarillos ⌊_⌋⌊_⌋	T5d
		Other ⌊_⌋⌊_⌋ *If Other, go to T5other, else go to T9*	T5e
		Other (please specify): ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T9*	T5other

EXPANDED: Tobacco Use			
Question		**Response**	**Code**
27	In the past, did you **ever** smoke **daily**?	Yes 1 No 2 *If No, go to T9*	T6
28	How old were you when you **stopped** smoking **daily**?	Age (years) Don't Know 77 ⌊_⌋⌊_⌋ *If Known, go to T9*	T7
29	How **long ago** did you stop smoking daily? *(RECORD ONLY 1, NOT ALL 3)* *Don't Know 77*	Years ago ⌊_⌋⌊_⌋ *If Known, go to T9*	T8a
		OR Months ago ⌊_⌋⌊_⌋ *If Known, go to T9*	T8b
		OR Weeks ago ⌊_⌋⌊_⌋	T8c
30	Do you **currently use** any **smokeless tobacco** such	Yes 1	T9

	as *[snuff, chewing tobacco, Tambuu, betel]*? *(USE SHOWCARD)*	No 2 *If No, go to T12*	
31	Do you **currently use smokeless tobacco** products **daily?**	Yes 1 No 2 *If No, go to T12*	T10
32	On average, how many **times a day** do you use …. *(RECORD FOR EACH TYPE, USE SHOWCARD)* *Don't Know 77*	Snuff, by mouth ⌊_⌋⌊_⌋	T11a
		Snuff, by nose ⌊_⌋⌊_⌋	T11b
		Chewing tobacco ⌊_⌋⌊_⌋	T11c
		Betel, quid ⌊_⌋⌊_⌋	T11d
		Tambuu ⌊_⌋⌊_⌋	T11e
		Bhangi ⌊_⌋⌊_⌋	T11f
		Other ⌊_⌋⌊_⌋ *If Other, go to T11other, else go to T13*	T11g
		Other (specify) ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T13*	T11other
33	In the **past**, did you **ever use** smokeless tobacco such as *[snuff, chewing tobacco, Tambuu or betel]* **daily**?	Yes 1 No 2	T12
34	During the past 7 days, on how many days did someone **in your home** smoke when you were present?	Number of days ⌊_⌋⌊_⌋ Don't know 77	T13
35	During the past 7 days, on how many days did someone smoke in closed areas **in your workplace** (in the building, in a work area or a specific office) when you were present?	Number of days Don't know or don't work in a closed area 77 ⌊_⌋⌊_⌋	T14

CORE: Alcohol Consumption			
The next questions ask about the consumption of alcohol.			
Question		**Response**	**Code**
36	Have you **ever** consumed an alcoholic drink such as beer, wine, spirits, tende, Gongo, Mataputapu, Chibuku, or Mnazi-tembo?	Yes 1 No 2 *If No, go to D1*	A1a
37	Have you consumed an alcoholic drink within the **past 12 months**?	Yes 1 No 2 *If No, go to D1*	A1b
38	During the past 12 months, **how frequently** have you had at least one alcoholic drink? *(READ RESPONSES, USE SHOWCARD)*	Daily 1 5-6 days per week 2 1-4 days per week 3 1-3 days per month 4 Less than once a month 5	A2
39	Have you consumed an alcoholic drink within the **past 30 days**?	Yes 1 No 2 *If No, go to D1*	A3
40	During the past 30 days, on how many **occasions** did you have at least one alcoholic drink?	Number Don't know 77 ⌊__⌋⌊__⌋	A4
41	During the past 30 days, when you drank alcohol, **on average**, how many **standard alcoholic drinks** did you have during one drinking occasion? *(USE SHOWCARD)* *Standards for local drinks have been developed*	Number Don't know 77 ⌊__⌋⌊__⌋	A5
42	During the past 30 days, what was the **largest number** of standard alcoholic drinks you had on a single occasion, counting all types of alcoholic drinks together?	Largest number Don't Know 77 ⌊__⌋⌊__⌋	A6
43	During the past 30 days, how many times did you have for **men**: **five or more** for **women**: **four or more** standard alcoholic drinks in a single drinking occasion?	Number of times Don't Know 77 ⌊__⌋⌊__⌋	A7

EXPANDED: Alcohol Consumption			
44	During the past 30 days, when you consumed an alcoholic drink, how often was it with meals? Please do not count snacks.	Usually with meals 1 Sometimes with meals 2 Rarely with meals 3 Never with meals 4	A8
45	During each of the **past 7 days**, how many standard alcoholic drinks did you have each day? *(USE SHOWCARD)* *Don't Know 77*	Monday ⌊__⌋⌊__⌋	A9a
		Tuesday ⌊__⌋⌊__⌋	A9b
		Wednesday ⌊__⌋⌊__⌋	A9c
		Thursday ⌊__⌋⌊__⌋	A9d
		Friday ⌊__⌋⌊__⌋	A9e
		Saturday ⌊__⌋⌊__⌋	A9f
		Sunday ⌊__⌋⌊__⌋	A9g

CORE: Diet			
The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year.			
Question		**Response**	**Code**
46	In a typical week, on how many days do you **eat fruit**? *(USE SHOWCARD)*	Number of days Don't Know 77 ⌊__⌋⌊__⌋ *If Zero days, go to D3*	D1
47	How many **servings** of fruit do you eat on **one** of those days? (*USE SHOWCARD)*	Number of servings ⌊__⌋⌊__⌋ Don't Know 77	D2
48	In a typical week, on how many days do you **eat vegetables**? *(USE SHOWCARD)*	Number of days Don't Know 77 ⌊__⌋⌊__⌋ *If Zero days, go to D5*	D3
49	How many **servings** of vegetables do you eat on one of those days? *(USE SHOWCARD)*	Number of servings ⌊__⌋⌊__⌋ Don't Know 77	D4

EXPANDED: Diet				
50	What type of **oil or fat is most often** used for meal preparation in your household? *(USE SHOWCARD)* *(SELECT ONLY ONE)* *Give examples of types of oil by using brand names*	Vegetable oil Coconut oil/coconut Butter or ghee Margarine Sunflower oil Corn oil Other None in particular None used Don't know	1 2 3 4 5 6 7 8 9 77	*If Other, go to D5 other*	D5
		Other	⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊		D5other
51	On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner.	Number Don't know 77	⌊_⌊_⌊		D6

CORE: Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment.. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
Question		**Response**	**Code**
Work			
52	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like	Yes 1	P1

	[carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?	No 2 *If No, go to P 4*	
53	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days ⌊__⌋	P2
54	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P3 (a-b)
55	Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads]* for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P 7*	P4
56	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days ⌊__⌋	P5
57	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P6 (a-b)
Travel to and from places			
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship.			
58	Do you walk or use a bicycle *(pedal cycle)* for at least 10 minutes continuously to get to and from places?	Yes 1 No 2 *If No, go to P 10*	P7
59	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days ⌊__⌋	P8
60	How much time do you spend walking or bicycling for travel on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P9 (a-b)

CORE: Physical Activity, Continued			
Question		**Response**	**Code**
Recreational activities			
The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure)*]*.			
61	Do you do any vigorous-intensity sports, fitness or recreational *(leisure)* activities that cause large increases in breathing or heart rate like *[running or football]* for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P 13*	P10
62	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational *(leisure)* activities?	Number of days ⌊__⌋	P11
63	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P12 (a-b)
64	Do you do any moderate-intensity sports, fitness or recreational *(leisure)* activities that cause a small increase in breathing or heart rate such as brisk walking*, [cycling, swimming, volleyball]* for at least 10 minutes continuously?	Yes 1 No 2 *If No, go to P16*	P13
65	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational *(leisure)* activities?	Number of days ⌊__⌋	P14
66	How much time do you spend doing moderate-intensity sports, fitness or recreational *(leisure)* activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P15 (a-b)

EXPANDED: Physical Activity
Sedentary behaviour
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. *(USE SHOWCARD)*

67	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P16 (a-b)

CORE: History of Raised Blood Pressure			
Question		**Response**	**Code**
68	Have you ever had your blood pressure measured by a doctor or other health worker?	Yes 1 No 2 *If No, go to H6*	H1
69	Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension?	Yes 1 No 2 *If No, go to H6*	H2a
70	Have you been told in the past 12 months?	Yes 1 No 2	H2b

EXPANDED: History of Raised Blood Pressure			
71	Are you currently receiving any of the following treatments/advice for high blood pressure prescribed by a doctor or other health worker?		
	Drugs (medication) that you have taken in the past two weeks	Yes 1 No 2	H3a
	Advice to reduce salt intake	Yes 1 No 2	H3b
	Advice or treatment to lose weight	Yes 1 No 2	H3c
	Advice or treatment to stop smoking	Yes 1 No 2	H3d
	Advice to start or do more exercise	Yes 1 No 2	H3e
72	Have you ever seen a traditional healer or sorcerer for raised blood pressure or hypertension?	Yes 1 No 2	H4
73	Are you currently taking any herbal or traditional remedy for your raised blood pressure?	Yes 1 No 2	H5

CORE: History of Diabetes			
Question		**Response**	**Code**
74	Have you ever had your blood sugar measured by a doctor or other health worker?	Yes 1 No 2 *If No, go to M1*	H6
75	Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes?	Yes 1 No 2 *If No, go to M1*	H7a
76	Have you been told in the past 12 months?	Yes 1 No 2	H7b

EXPANDED: History of Diabetes			
77	Are you currently receiving any of the following treatments/advice for diabetes prescribed by a doctor or other health worker?		
	Insulin	Yes 1 No 2	H8a
	Drugs (medication) that you have taken in the past two weeks	Yes 1 No 2	H8b
	Special prescribed diet	Yes 1 No 2	H8c
	Advice or treatment to lose weight	Yes 1 No 2	H8d
	Advice or treatment to stop smoking	Yes 1 No 2	H8e
	Advice to start or do more exercise	Yes 1 No 2	H8f
78	Have you ever seen a traditional healer for diabetes or raised blood sugar?	Yes 1 No 2	H9
79	Are you currently taking any herbal or traditional remedy for your diabetes?	Yes 1 No 2	H10

Injury

CORE: Injury			
The next questions ask about different experiences and behaviours that are related to road traffic injuries.			
Question		**Response**	**Code**
80	In the past 30 days, how often did you use a seat belt when you were the driver or passenger of a motor vehicle?	All of the time 1 Sometimes 2 Never 3 Have not been in a vehicle in past 30 days 4 No seat belt in the car I usually am in 5 Don't Know 77 Refused 88	V1
81	In the past 30 days, how often did you wear a helmet when you drove or rode as a passenger on a motorcycle or motor-scooter?	All of the time 1 Sometimes 2 Never 3 Have not been on a motorcycle or motor-scooter in past 30 days 4 Do not have a helmet 5 Don't Know 77 Refused 88	V2
82	In the past 12 months, have you been involved in a road traffic crash as a driver, passenger, pedestrian, or cyclist?	Yes (as driver) 1 Yes (as passenger) 2 Yes (as pedestrian) 3 Yes (as a cyclist) 4 No 5 *If No, go to V5* Don't know 77 *If don't know, go to V5* Refused 88 *If Refused, go to V5*	V3
83	Did you have any injuries in this road traffic crash which required medical attention?	Yes 1 No 2 Don't know 77 Refused 88	V4
The next questions ask about the most serious accidental injury you have had in the past 12 months.			

84	In the past 12 months, were you injured accidentally, other than the road traffic crashes which required medical attention?	Yes	1		V5
		No	2	*If No, go to V8*	
		Don't know	77	*If don't know, go to V8*	
		Refused	88	*If Refused, go to V8*	
85	Please indicate which of the following was the cause of this injury.	Fall	1		V6
		Burn	2		
		Poisoning	3		
		Cut	4		
		Near-drowning	5		
		Animal bite	6		
		Other (specify)	7		
		Don't know	77		
		Refused	88		
		Other (please specify)	└┴┴┴┴┴┴┴┘		V6other

CORE: Injury, Continued					
Question		**Response**			**Code**
86	Where were you when you had this injury?	Home	1		V7
		School	2		
		Workplace	3		
		Road/Street/Highway	4		
		Farm	5		
		Sports/athletic area	6		
		Other (specify)	7		
		Don't know	77		
		Refused	88		
		Other (please specify)	└┴┴┴┴┴┴┴┘		V7other

EXPANDED: Unintentional Injury					
The next questions ask about behaviours related to your safety and whether or not you drink alcohol while driving or being a passenger.					
Question		**Response**			**Code**
87	In the past 30 days, how often did you wear a helmet when you rode a bicycle or pedal cycle?	Always	1		V8
		Sometimes	2		
		Never	3		
		Did not ride in the past 30 days	4		
		Don't Know	77		

		Refused	88	
88	In the past 30 days, how many times have you driven a motorized vehicle when you have had 2 or more alcoholic drinks? *(USE SHOWCARDS)*	Number of times Don't Know Refused	⌊__⌋⌊__⌋ 77 88	V9
89	In the past 30 days, how many times have you ridden in a motorized vehicle where the driver has had 2 or more alcoholic drinks? *(USE SHOWCARDS)*	Number of times Don't Know Refused	⌊__⌋⌊__⌋ 77 88	V10

Mental Health

I should like to know if you have had any medical complaints and how your health has been in general over the past few weeks. Please answer ALL the questions on the following pages simply by underlining the answer you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past. It is important that you answer ALL the questions.

90	Have you ever been told by a health professional that you suffer from a mental or neurological disorder?	Yes 1 No 2 (skip Q1) Do not remember 3 (skip Q1) Refuses 4 (skip Q1)	G1
91	If so, which disease?	Depression 1 Bipolar Disorder 2 Schizophrenia 3 Anxiety disorder 4 Alcohol/drug misuse 5 Acute Psychosis 6 Mental Retardation 7 Epilepsy 8 None of the above mentioned 9 do not remember 77 Refuses 88	Q1
92	Have you recently been able to concentrate on whatever you're doing	Better than usual 1 Same as usual 2 Less 3 Much less than usual 4	G2

93	Have you recently lost much sleep over worry?	Not at all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G3
94	Have you recently felt that you are playing a useful part in things?	More so than usual 1 Same as usual 2 Less useful than usual 3 Much less than usual 4	G4
95	Have you recently felt capable of making decisions about things?	More so than usual 1 Same as usual 2 Less so than usual 3 Much less than usual 4	G5
96	Have you recently felt constantly under strain?	Not al all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G6
97	Have you recently felt you couldn't over-come your difficulties?	Not al all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G7
98	Have you recently been able to enjoy your normal day-to-day activities?	More so than usual 1 Same as usual 2 Less so than usual 3 Much less than usual 4	G8
99	Have you recently been able to face up to your problems?	More so than usual 1 Same as usual 2 Less so than usual 3 Much less than usual 4	G9
100	Have you recently been feeling unhappy and depressed?	Not al all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G10
101	Have you recently been losing confidence in yourself?	Not al all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G11
102	Have you recently been thinking of yourself as a worthless person?	Not al all 1 No more than usual 2 Rather more than usual 3 Much more than usual 4	G12
103	Been feeling reasonably happy, all things considered?	More so than usual 1 About same as usual 2 Less so than usual 3 Much less than usual 4	G13

Step 2 Physical Measurements

CORE: Height and Weight			
Question		**Response**	**Code**
104	Interviewer ID	⌊_⌊_⌊_⌋	M1
105	**For women:** Are you pregnant?	Yes 1 No 2 *If No, go to M2a*	M5
106	In which trimester are you?	First 1 Second 2 Third 3	X1
107	Device IDs for height and weight	Height ⌊_⌊_⌋ Weight ⌊_⌊_⌋	M2a M2b
108	Height	in Centimetres (cm) ⌊_⌊_⌊_⌋.⌊_⌋	M3
109	Weight *If too large for scale 666.6*	in Kilograms (kg) ⌊_⌊_⌊_⌋.⌊_⌋	M4
CORE: Waist			
110	Device ID for waist	⌊_⌊_⌋	M6
111	Waist circumference	in Centimetres (cm) ⌊_⌊_⌊_⌋.⌊_⌋	M7
CORE: Blood Pressure			
112	Interviewer ID	⌊_⌊_⌊_⌋	M8
113	Device ID for blood pressure	⌊_⌊_⌋	M9
114	Cuff size used	Small 1 Medium 2 Large 3	M10
115	Reading 1 (left arm)	Systolic (mmHg) ⌊_⌊_⌊_⌋	M11a
		Diastolic (mmHg) ⌊_⌊_⌊_⌋	M11b
116	Reading 2	Systolic (mmHg) ⌊_⌊_⌊_⌋	M12a

		Diastolic (mmHg) └┴┴┘	M12b
117	Reading 3	Systolic (mmHg) └┴┴┘	M13a
		Diastolic (mmHg) └┴┴┘	M13b
118	During the past two weeks, have you been treated for raised blood pressure with drugs (medication) prescribed by a doctor or other health worker?	Yes 1 No 2	M14

EXPANDED: Hip Circumference and Heart Rate			
119	Hip circumference	in Centimeters (cm) └┴┴┘.└┘	M15
120	Heart Rate		
	Reading 1	Beats per minute └┴┴┘	M16a
	Reading 2	Beats per minute └┴┴┘	M16b
	Reading 3	Beats per minute └┴┴┘	M16c

Step 3 Biochemical Measurements

CORE: Blood Glucose			
Question		**Response**	**Code**
121	During the past 12 hours have you had anything to eat or drink, other than water?	Yes 1 No 2	B1
122	Technician ID	└┴┴┘	B2
123	Device ID	└┴┘	B3
124	Time of day blood specimen taken (24 hour clock)	Hours : minutes └┴┘:└┴┘ hrs mins	B4
125	Fasting blood glucose	mmol/l └┴┘.└┴┘	B5
126	Today, have you taken insulin or other drugs (medication) that have been prescribed by a doctor or	Yes 1	B6

	other health worker for raised blood glucose?	No 2	
CORE: Blood Lipids			
127	Device ID	⌊__⌋⌊__⌋⌊__⌋	B7
128	Total cholesterol	mmol/l ⌊__⌋⌊__⌋ . ⌊__⌋⌊__⌋	B8
129	During the past two weeks, have you been treated for raised cholesterol with drugs (medication) prescribed by a doctor or other health worker?	Yes 1 No 2	B9

EXPANDED: Triglycerides and HDL Cholesterol			
130	Triglycerides	mmol/l ⌊__⌋⌊__⌋ . ⌊__⌋⌊__⌋	B10

Annex III

Categories of Physical Activity

Physical activity participation was measured by asking survey participants to report on the amount of time they spend doing different types of physical activity during work, transport and leisure time.

For the purposes of the survey, vigorous activity was defined as more than 10 minutes at a time of any of the following and alike:

- Ploughing
- Sawing hardwood
- Forestry (cutting, chopping, carrying wood)
- Cutting crops (sugar cane)
- Porter (kuli)
- Football
- Basketball
- Fast running

Moderate physical activity was defined as more than 10 minutes at a time of any of the following and alike activities:

- Cleaning (mopping, polishing, scrubbing, sweeping, ironing)
- Washing clothes by hand
- Gardening
- Weaving (cotton, kikoi)
- Labouring (pushing loaded wheelbarrow, operating jackhammer)
- Walking with load on head
- Drawing water
- Cycling
- Jogging
- Low-impact aerobics (e.g.'kata pressure')

Low physical activity which corresponds to the resting metabolic rate was defined as

- Secretarial or office work
- Driving car
- Watching TV
- Laying down
- Playing cards / bao
- ReadingPlaiting / braiding hair
- Decorating with henna
- Weaving (traditional mats and baskets)

Levels of Physical Activity

The full criteria for the classification of participants as either inactive, moderate active, or highly active are as follows:

- **High**

  A person reaching any of the following criteria is classified in this category:
  - Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET-minutes/week OR
  - 7 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 3,000 MET-minutes per week.

- **Moderate**

  A person not meeting the criteria for the "high" category, but meeting any of the following criteria is classified in this category:
  - 3 or more days of vigorous-intensity activity of at least 20 minutes per day OR
  - 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day OR
  - 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes per week.

- **Low**

A person not meeting any of the above mentioned criteria falls in this category.

Annex IV

Socio-demographic characteristics

Table A-1	Highest level of education							
Age Group (years)	**Men**							
	n	% No formal schooling	% Less than primary school	% Primary school completed	% Secondary school completed[5]	% High school completed[6]	% College/ University completed	% Post graduate degree completed
25-44	569	11.2	23.6	27.4	31.1	3.2	3.5	0
45-64	442	28.5	19.9	21.9	25.1	1.8	2.7	0
25-64	**1011**	**18.8**	**22.0**	**25.0**	**28.5**	**2.6**	**3.2**	**0**

Table A-2	Highest level of education							
Age Group (years)	**Women**							
	n	% No formal schooling	% Less than primary school	% Primary school completed	% Secondary school completed	% High school completed	% College/ University completed	% Post graduate degree completed
25-44	1061	22.3	23.2	23.9	26.5	1.1	2.7	0.2
45-64	566	45.8	17.8	16.1	18.4	0.5	1.4	0
25-64	**1627**	**30.5**	**21.3**	**21.2**	**23.7**	**0.9**	**2.3**	**0.1**

Table A-3	Employment status				
Age Group (years)	**Men**				
	n	% Government employee	% Non-government employee	% Self-employed	% Unpaid
25-44	569	11.4	8.8	73.6	6.2
45-64	442	14.0	7.9	64.3	13.8
25-64	**1011**	**12.6**	**8.4**	**69.5**	**9.5**

Table A-4	Employment status				
Age Group (years)	**Women**				
	n	% Government employee	% Non-government employee	% Self-employed	% Unpaid
25-44	1061	7.2	4.9	30.4	57.5
45-64	566	8.3	2.8	35.7	53.2
25-64	**1627**	**7.6**	**4.2**	**32.3**	**56.0**

[5] Secondary School / Form Four completed
[6] High School / Form Six completed

Table A-5	Unpaid work and unemployed						
Age Group (years)	Men						
	n	% Non-paid	% Student	% Home-maker	% Retired	Unemployed	
						% Able to work	% Not able to work
25-44	35	17.1	20.0	31.4	2.9	25.7	2.9
45-64	61	4.9	1.6	19.7	57.4	11.5	4.9
25-64	**96**	**9.4**	**8.3**	**24.0**	**37.5**	**16.7**	**4.2**

Table A-6	Unpaid work and unemployed						
Age Group (years)	Women						
	n	% Non-paid	% Student	% Home-maker	% Retired	Unemployed	
						% Able to work	% Not able to work
25-44	610	1.0	1.1	89.7	0	8.0	0.2
45-64	301	3.0	0	87.4	3.3	2.7	3.7
25-64	**911**	**1.6**	**0.8**	**88.9**	**1.1**	**6.3**	**1.3**

Table A-7	Unpaid work and unemployed						
Age Group (years)	Both Sexes						
	n	% Non-paid	% Student	% Home-maker	% Retired	Unemployed	
						% Able to work	% Not able to work
25-44	645	1.9	2.2	86.5	0.2	9.0	0.3
45-64	362	3.3	0.3	76.0	12.4	4.1	3.9
25-64	**1007**	**2.4**	**1.5**	**82.7**	**4.6**	**7.2**	**1.6**

Table A-8	
Mean annual per capita (above 18 yrs) income	
n	Mean
2161	**679.060**

Table A-9	Estimated household earnings				
n	% Quintile 1: Under $ 6	% Quintile 2: $ 6 -$ 30	% Quintile 3: $ 31 -$ 60	% Quintile 4: $ 61-$ 303	% Quintile 5: Over $ 304
285	**23.2**	**39.6**	**28.1**	**8.8**	**0.4**

Tobacco

Table A-10	Mean years since cessation (tobacco smoking)								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean years	95% CI	n	Mean years	95% CI	n	Mean years	95% CI
25-44	28	13.5	11.4-15.7	4	15.4	14.0-16.8	32	13.7	11.8-15.7
45-64	85	24.5	22.0-27.0	29	23.1	19.7-26.5	114	24.3	22.0-26.5
25-64	**113**	**20.3**	**18.0-22.7**	**33**	**21.103**	**17.8-24.4**	**146**	**20.4**	**18.3-22.5**

Table A-11	Mean amount of tobacco used by daily smokers by type								
Age Group (years)	Men								
	n	Mean # of manu-factured cigarette	95% CI	n	Mean #of hand-rolled cigarette	95% CI	n	Mean # of other type of tobacco	95% CI
25-44	78	5.8	4.6-7.1	78	0.4	0.0-1.0	78	1.2	0.1-2.2
45-64	73	5.6	4.6-6.6	73	0.1	0.0-0.2	73	1.1	0.3-1.9
25-64	**151**	**5.8**	**4.8-6.7**	**151**	**0.3**	**0.0-0.7**	**151**	**1.2**	**0.4-1.9**

Table A-12-1	Mean amount of tobacco used by daily smokers by type								
Age Group (years)	Both Sexes								
	n	Mean # of manu-factured cigarette	95% CI	n	Mean #of hand-rolled cigarette	95% CI	n	Mean # of other type of tobacco	95% CI
25-44	80	5.8	4.6-7.1	80	0.4	0.0-1.0	80	1.2	0.1-2.2
45-64	81	5.0	3.9-6.1	81	0.1	0.0-0.2	81	1.1	0.4-1.8
25-64	**161**	**5.5**	**4.7-6.4**	**161**	**0.3**	**0.0-0.7**	**161**	**1.2**	**0.4-1.9**

A-12-2	Smoking status						
Age Group (years)	Men						
	n	Current smoker				% Does not smoke	95% CI
		% Daily	95% CI	% Non-daily	95% CI		
25-44	569	12.3	7.9-16.8	1.7	0.0-3.4	85.9	81.2-90.7
45-64	442	13.6	9.8-17.4	2.1	0.4-3.9	84.255	80.3-88.2
25-64	**1011**	**12.7**	**9.2-16.3**	**1.9**	**0.6-3.1**	**85.4**	**81.7-89.1**

A-12-3	Smoking status						
Age Group (years)	Women						
	n	Current smoker				% Does not smoke	95% CI
		% Daily	95% CI	% Non-daily	95% CI		
25-44	1061	0.1	0.0-0.2	0	0	99.9	99.9-100.0
45-64	566	2.1	0.0-4.3	0.7	0.0-1.4	97.2	95.0-99.5
25-64	**1627**	**0.5**	**0.0-1.1**	**0.2**	**0.0-0.3**	**99.3**	**98.8-99.8**

Diet

Table A-13	Mean number of days fruit is consumed in a typical week								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
25-44	568	4.2	3.9-4.5	1050	3.8	3.6-4.1	1618	4.0	3.7-4.2
45-64	440	4.1	3.8-4.4	561	3.4	3.2-3.7	1001	3.8	3.6-4.0
25-64	**1008**	**4.1**	**3.9-4.4**	**1611**	**3.7**	**3.5-3.9**	**2619**	**3.9**	**3.7-4.1**

Table A-14	Mean number of days vegetables are consumed in a typical week								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	n	Mean number of days	95% CI
25-44	566	2.6	2.4-2.9	1057	2.9	2.7-3.0	1623	2.8	2.6-2.9
45-64	440	2.8	2.6-3.0	563	3.0	2.8-3.3	1003	2.9	2.8-3.1
25-64	**1006**	**2.7**	**2.5-2.9**	**1620**	**2.9**	**2.8-3.0**	**2626**	**2.8**	**2.7-2.9**

Table A-15	Mean number of days vegetables consumed in a typical week						
Both Sexes							
Stratum	Count	Mean	Std Error	Confidence Limits		Minimum	Maximum
				Lower	Upper		
Urban Unguja	862	3.0	0.1	2.8	3.2	0	7
Rural Unguja	756	2.8	0.1	2.5	3.1	0	7
Pemba	1008	2.5	0.1	2.3	2.7	0	7
TOTAL	2626	2.8	0.1	2.7	2.9	0	7

Table A-16	Less than five servings of fruit and/or vegetables on average per day					
Both Sexes						
stratum	n	% consuming 5 or more servings of fruit/veg on average/day	95% CI	% consuming < 5 servings of fruit/veg on average/day	95% CI	TOTAL
Urban Unguja	863	1.2	0.4-2.1	98.8	97.9-99.6	100.0
Rural Unguja	759	4.4	2.2-6.5	95.6	93.5-97.8	100.0
Pemba	1014	1.7	0.8-2.6	98.3	97.4-99.2	100.0
TOTAL	2636	2.1	1.3-2.9	97.9	97.1-98.7	100.0

Physical Activity

Table A-18	Mean minutes of work-related physical activity on average per day								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	n	Mean minutes	95% CI
25-44	563	212	185-239	1052	130	113-147	1615	167	155-179
45-64	441	201	175-228	564	131	107-156	1005	169	151-188
25-64	**1004**	**209**	**186-231**	**1616**	**131**	**116-145**	**2620**	**168**	**156-179**

Table A-19	Mean minutes of transport-related physical activity on average per day								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	n	Mean minutes	95% CI
25-44	563	57	49-65	1052	37	32-41	1615	46	41-51
45-64	441	58	49-66	564	47	40-54	1005	53	47-58
25-64	**1004**	**57**	**51-63**	**1616**	**39**	**35-43**	**2620**	**48**	**44-51**

Table A-20	Mean minutes of recreation-related physical activity on average per day								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	**n**	**Mean minutes**	**95% CI**
25-44	563	41	31-51	1052	4	2-6	1615	21	15-26
45-64	441	17	12-22	564	4	2-6	1005	11	8-14
25-64	**1004**	**33**	**26-41**	**1616**	**4**	**3-6**	**2620**	**18**	**14-22**

Table A-21	Composition of total physical activity						
Age Group (years)	Men						
	n	% Activity from work	95% CI	% Activity for transport	95% CI	% Activity during leisure time	95% CI
25-44	556	58.3	54.2-62.5	28.1	23.1-33.1	13.5	10.8-16.2
45-64	424	60.3	55.5-65.1	31.0	27.1-34.9	8.7	5.2-12.1
25-64	980	**58.9**	**55.3-62.5**	**29.0**	**24.8-33.2**	**12.1**	**9.8-14.4**

Table A-22	Composition of total physical activity						
Age Group (years)	Women						
	n	% Activity from work	95% CI	% Activity for transport	95% CI	% Activity during leisure time	95% CI
25-44	1003	53.3	49.4-57.1	43.9	40.1-47.7	2.8	1.4-4.3
45-64	530	48.3	41.5-55.0	48.2	41.8-54.6	3.5	1.5-5.5
25-64	**1533**	**52.1**	**48.6-55.6**	**44.9**	**41.3-48.5**	**3.0**	**1.7-4.3**

Table A-23	Total levels of physical activity						
	Both Sexes						
stratum	n	Low Level	95% CI	Moderate level	95% CI	High level	95% CI
Urban Unguja	857	26.6	22.0-31.3	23.3	19.6-27.1	50.1	44.1-56.0
Rural Unguja	753	13.2	9.7-16.7	14.3	10.0-18.7	72.5	65.8-79.2
Pemba	1010	7.1	5.0-9.1	11.9	9.5-14.2	81.1	77.7-84.4
TOTAL	**2620**	**17.6**	**14.3-20.9**	**17.8**	**15.4-20.1**	**64.6**	**59.9-69.4**

Table A-24	Meeting or exceeding recommended levels of physical activity								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	563	94.6	92.2-96.9	1052	73.6	68.8-78.5	1615	83.1	79.4-86.7
45-64	441	88.1	84.5-91.7	564	71.8	64.6-78.9	822	80.7	76.8-82.4
25-64	**1004**	**92.6**	**90.7-94.4**	**1616**	73.2	68.6-77.8	**2148**	82.4	79.4-85.5

Anthropometric measurements

Table A-26	Mean waist-to-hip ratio (WHR)					
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
25-44	568	0.87	0.858-0.872	959	0.88	0.878-0.891
45-64	441	0.90	0.896-0.908	559	0.92	0.908-0.926
25-64	**1009**	**0.88**	**0.871-0.882**	**1518**	**0.89**	**0.887-0.898**

Table A-27	Mean Body Mass Index (BMI) kg/m^2								
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	568	23.4	22.9-23.8	956	24.8	24.3-25.4	1524	24.1	23.7-24.5
45-64	440	23.4	22.9-23.9	556	26.3	25.3-27.4	996	24.7	24.2-25.3
25-64	1008	**23.4**	23.1-23.7	1512	25.2	24.7-25.6	2520	24.3	**24.0-**24.6

Table A-28	Mean waist circumference (CI)						
sex	count	Mean	Std error	95% CI		min	max
Men	1010	82.0	0.46	81.1-	82.9	35.6	174.0
Women	1523	87.9	0.73	86.4-	89.3	50.0	888.8
TOTAL	2533	85.0	0.44	84.1-	85.8	35.6	888.8

Table A-29	**Waist Circumference (WC)**	
sex	% WC < 101 cm	% WC ≥ 102 cm
Men	94.6	5.3
Women	83.5	16.5
TOTAL	89.0	11.0

Table A-30		BMI as per stratum							
		Women							
stratum	n	Underweight BMI <18.5	95% CI	Normal weight BMI 18.5-24.9	95% CI	Overweight BMI 25-29.9	95% CI	Obese BMI ≥ 30	95% CI
Urban Unguja	533	6.4	3.4-9.4	40.2	32.5-48.0	23.6	19.1-28.1	29.8	20.9-38.7
Rural Unguja	415	9.4	4.4-14.2	52.6	45.6-59.6	24.6	18.8-30.4	13.4	9.6-17.2
Pemba	564	14.6	11.1-18.1	57.3	51.5-63.1	16.4	12.5-20.2	11.7	7.2-16.2
TOTAL	**1512**	9.5	7.2-11.7	48	44.0-51.2	21.7	18.8-24.6	20.9	16.8-24.9

Blood Pressure

Table A-31	**Mean systolic blood pressure (mmHg)**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
25-44	568	130	127.3-131.8	1054	122	119.3-124.2	1622	125	123.1-127.5
45-64	440	147	143.5-150.8	553	148	144.9-151.9	993	148	145.2-150.2
25-64	**1008**	**135**	**132.6-137.4**	**1607**	**128**	**125.5-130.5**	**2615**	**131**	**129.0-133.7**

Table A-32	**Mean diastolic blood pressure (mmHg)**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
25-44	568	76	74.3-77.6	1054	76	74.1-77.1	1622	76	74.5-77.0
45-64	440	83	81.3-84.8	553	86	83.6-87.5	993	84	82.9-85.5
25-64	**1008**	**78**	**76.9-79.5**	**1607**	**78**	**76.6-79.2**	**2615**	**78**	**76.9-79.2**

Table A-33	**Previously measured blood pressure by a health care worker and diagnosed with HTN**				
	Both sexes				
Age Group (years)	n	Diagnosed with HTN	95% CI	Not diagnosed with HTN	95% CI
25-44	867	11.5	7.8-15.1	88.5	84.9-92.2

45-64	532	40.0	33.4-46.6	60.0	53.4-66.6
25-64	1399	19.5	14.7-24.2	80.5	75.8-85.3

Table A-34		**Diagnosed within HTN**			
Sex	n	Within the past 12 months	95% CI	Not within the past 12 months	95% CI
Men	84	44.9	31.0-58.7	55.1	41.3-69.0
Women	260	71.1	64.1-78.1	28.9	21.9-35.9
TOTAL	344	63.6	57.4-69.8	36.4	30.2-42.6

Table A-35	**Blood pressure measurement and diagnosis**								
	Both sexes								
Age Group (years)	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	1630	47.5	42.0-53.0	46.5	40.4-52.6	2.1	1.3-3.0	3.9	2.7-5.1
45-64	1008	44.8	38.9-50.8	33.1	28.3-37.9	8.2	5.7-10.6	13.9	10.7-17.1
25-64	**2638**	**46.8**	**41.9-51.6**	**42.9**	**37.4-48.4**	**3.8**	**2.6-4.9**	**6.6**	**5.1-8.1**

Table A-36	**Advised by doctor or health worker to reduce salt intake among those previously diagnosed**								
Age Group	**Men**			**Women**			**Both Sexes**		
(years)	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	52.9	20.6-85.2	115	57.8	43.8-71.7	128	57.1	44.6-69.6
45-64	71	77.2	65.5-88.9	145	72.2	61.4-83.0	216	74.2	65.0-83.4
25-64	**84**	**72.3**	**61.6-83.0**	**260**	64.8	55.8-73.8	**344**	66.9	59.6-74.3

Table A-37	**Advised by doctor or health worker to lose weight among those previously diagnosed**								
Age Group	**Men**			**Women**			**Both Sexes**		
(years)	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	33.6	3.3-63.9	115	23.7	13.0-34.4	128	25.1	15.2-34.9
45-64	71	41.9	24.6-59.3	145	28.9	16.0-41.7	216	34.0	22.3-45.8
25-64	**84**	**40.2**	**25.0-55.4**	**260**	26.2	18.5-34.0	**344**	30.2	22.7-37.7

Table A-38	**Advised by doctor or health worker to stop smoking among those previously diagnosed**								
Age Group	**Men**			**Women**			**Both Sexes**		
(years)	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	7.5	0.0-22.5	115	11.0	1.1-20.9	128	10.5	1.8-19.3
45-64	71	29.7	12.5-46.8	145	10.8	2.4-19.1	216	18.2	9.7-26.8
25-64	**84**	25.2	10.3-40.0	**260**	10.9	4.4-17.4	**344**	15.0	9.2-20.7

Table A-39	**Advised by doctor or health worker to start or do more exercise among those previously diagnosed**

Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	24.9	0.0-51.0	115	38.2	27.5-49.0	128	36.4	26.5-46.3
45-64	71	57.8	41.9-73.7	145	38.5	24.5-52.5	216	46.1	37.0-55.3
25-64	**84**	51.1	37.3-64.9	**260**	38.4	30.6-46.1	**344**	42.0	35.2-48.8

Table A-40	raised blood pressure				
	Women (excluding pregnant women)				
Age range	n	SBP<140 and DBP<90	95% CI	SBP>=140 and/or DBP>=90	95% CI
25-44	920	82.4	78.6-86.2	17.6	13.8-21.4
45-64	509.0	40.3	35.0-45.6	59.7	54.4-65.0
TOTAL	1429.0	72.1	68.5-75.6	27.9	24.4-31.5

Table A-41	Seen a traditional healer among those previously diagnosed								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	4.2	0.0-12.5	115	7.2	2.3-12.0	128	6.7	2.3-11.2
45-64	71	16.5	5.4-27.5	145	19.3	9.2-29.4	216	18.2	11.7-24.6
25-64	**84**	14.0	4.9-23.0	**260**	13.1	8.1-18.1	**344**	13.3	9.3-17.3

Table A-42	Currently taking herbal or traditional remedy for high blood pressure among those previously diagnosed								
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	13	2.7	0.0-8.2	115	11.1	4.5-17.6	128	9.9	4.2-15.7
45-64	71	9.3	0.1-18.4	145	30.4	19.0-41.7	216	22.0	14.7-29.4
25-64	**84**	**7.9**	**0.5-15.3**	**260**	**20.5**	**14.2-26.7**	**344**	**16.9**	**12.0-21.8**

Table A-43	Respondents with treated and/or controlled raised blood pressure						
	Both sexes						
stratum	n	On medicine and SBP<140 and DBP<90	95% CI	currently on medicine and BP raised	95% CI	not on medicine and BP raised	95% CI
Urban Unguja	289	9.8	2.2-17.3	6.6	2.5-10.7	83.6	74.6-92.7
Rural Unguja	304	10.6	3.7-17.5	4.7	1.6-7.9	84.7	76.8-92.6
Pemba	349	2.6	0.4-4.8	3.2	1.1-5.2	94.3	91.2-97.3
TOTAL	**942**	**7.8**	**3.9-11.7**	**5.1**	**3.0-7.1**	**87.1**	**82.5-91.7**

Table A-44	Combined raised risk (3-5 risk factors)
	Women

stratum	n	0 risk factors	95% CI	1-2 of the risk factors	95% CI	3-5 of the risk factors	95% CI
Urban Unguja	511	0.0	0.0-0.0	63.3	56.7-70.0	36.7	30.0-43.3
Rural Unguja	404	1.3	0.0-2.6	73.4	67.4-79.4	25.3	19.2-31.4
Pemba	545	0.6	0.0-1.6	82.6	77.5-87.6	16.8	11.7-21.9
TOTAL	**1460**	**0.5**	**0.1-0.9**	**71.2**	**67.6-74.8**	**28.4**	**24.8-32.0**

Blood glucose, cholesterol and triglyceride

Table A-45	**Blood sugar measurement and diagnosis**								
	Men								
Age Group (years)	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	569	90.1	86.6-93.5	9.7	6.3-13.1	0.1	0.0-0.2	0.1	0.0-0.4
45-64	442	72.3	64.8-79.7	22.2	14.6-29.9	4.3	1.2-7.5	1.2	0.0-2.7
25-64	**1011**	**84.6**	**80.9-88.3**	**13.6**	**9.9-17.3**	**1.4**	**0.4-2.4**	**0.5**	**0.0-1.0**

Table A-46	**Blood sugar measurement and diagnosis**								
	Women								
Age Group (years)	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
25-44	1061	82.4	79.3-85.6	17.0	13.7-20.3	0.3	0.0-0.6	0.3	0.0-0.8
45-64	566	70.7	64.9-76.5	24.2	19.0-29.4	1.8	0.5-3.0	3.3	1.1-5.5
25-64	**1627**	**79.7**	**76.6-82.7**	**18.7**	**15.5-21.9**	**0.6**	**0.2-1.0**	**1.0**	**0.4-1.7**

Table A-47	**Blood sugar measurement and diagnosis**								
	Both sexes								
Stratum	n	% Never measured	95% CI	% measured, not diagnosed	95% CI	% diagnosed, but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
Urban Unguja	865	73.3	69.2-77.5	23.9	20.3-27.6	1.5	0.4-2.5	1.3	0.4-2.1
Rural Unguja	759	87.9	84.8-91.0	11.0	8.0-14.1	0.6	0.0-1.2	0.4	0.0-0.9
Pemba	1014	90.8	88.2-93.4	8.4	5.9-11.0	0.5	0.1-0.9	0.3	0.0-0.5
TOTAL	2638	82.0	79.5-84.5	16.2	13.9-18.6	1.0	0.5-1.5	0.8	0.4-1.2

Table A-48	**Previous measured Blood Glucose level**				
Sex	n	Had BG measured	95% CI	Had not had BG measured	**95% CI**
Men	1011	15.4	11.7-19.1	84.6	80.9-88.3
Women	1627	20.3	17.3-23.4	79.7	76.6-82.7
TOTAL	2638	18.0	15.8-20.1	82.0	79.9-84.2

Table A-49	Previous measured Blood Glucose levels and diagnosed				
	n	Diagnosed with diabetes	95% CI	Not diagnosed with diabetes	95% CI
Men	158	11.9	4.5-19.3	88.1	80.7-95.5
Women	315	8.2	4.1-12.2	91.8	87.8-95.9
total	473	9.7	5.9-13.5	90.3	86.5-94.1

Table A-50	Blood glucose levels (mmol/L)						
	Men						
stratum	n	blood glucose <5.6	95% CI	blood glucose >=5.6 AND <6.1	95% CI	blood glucose >=6.1 or took meds today	95% CI
Urban Unguja	272	92.5	85.8-99.3	3.0	0.0-7.0	4.4	0.7-8.1
Rural Unguja	290	94.1	91.1-97.2	3.1	0.6-5.5	2.8	0.8-4.8
Pemba	367	92.5	89.2-95.8	3.7	1.0-5.8	3.8	1.6-6.1
TOTAL	929	92.9	89.7-96.2	3.2	1.3-5.2	3.8	2.0-5.6

Table A-51	Blood glucose levels (mmol/L)						
	women						
stratum	n	blood glucose <5.6	95% CI	blood glucose >=5.6 AND <6.1	95% CI	blood glucose >=6.1 or took meds today	95% CI
Urban Unguja	519	93.6	90.3-96.9	1.5	0.3-2.7	4.9	2.1-7.7
Rural Unguja	434	95.5	93.4-97.6	2.6	1.0-4.2	1.9	0.6-3.3
Pemba	582	93.5	90.8-96.3	3.6	1.6-5.6	2.9	1.5-4.3
TOTAL	1535	94.0	92.2-95.8	2.3	1.4-3.3	3.7	2.3-5.0

Table A-52	Blood glucose levels (mmol/L)						
	Both sexes						
stratum	n	blood glucose <5.6	95% CI	blood glucose >=5.6 AND <6.1	95% CI	blood glucose >=6.1 or took meds today	95% CI
Urban Unguja	791	93.1	89.0-97.3	2.2	0.0-4.4	4.7	2.3-7.1
Rural Unguja	724	94.8	92.9-96.8	2.8	1.6-4.0	2.4	1.2-3.6
Pemba	949	93.0	90.5-95.6	3.6	2.0-5.2	3.3	1.8-4.9
TOTAL	2464	93.5	91.4-95.6	2.8	1.6-4.0	3.7	2.6-4.9

Table A-53	Blood glucose levels (mmol/L)						
	Women (excluding pregnant women)						
agerange	n	blood glucose <5.6	95% CI	blood glucose >=5.6 AND <6.1	95% CI	blood glucose >=6.1 or took meds today	95% CI
25-44	910	95.8	93.8-97.8	1.8	1.5-3.6	2.4	0.8-4.0
45-64	528	86.6	83.0-90.2	4.8	2.8-6.7	8.6	5.5-11.7
TOTAL	1438	93.5	91.5-95.5	2.5	1.5-3.6	3.8	2.5-5.5

Table A-54	**Triglyceride levels** (mmol/L)

Both sexes					
stratum	n	triglycerides < 2.0	95% CI	triglycerides >= 2.0	95% CI
Urban Unguja	791	93.8	91.6-96.0	6.2	4.0-8.4
Rural Unguja	724	93.4	90.6-96.1	6.6	3.9-9.4
Pemba	949	95.7	94.0-97.4	4.3	2.6-6.0
TOTAL	2464	94.3	92.9-95.6	5.7	4.4-7.1

Table A-55	**Total cholesterol ≥ 6.2 mmol/L or currently on medication for raised cholesterol**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	522	2.5	0.5-4.6	1007	7.4	5.5-9.3	1529	5.2	3.9-6.6
45-64	411	2.4	0.8-4.0	532	12.1	8.4-15.9	943	6.9	4.8-9.0
25-64	**933**	**2.5**	**0.9-4.1**	**1539**	**8.5**	**6.9-10.1**	**2472**	**5.7**	**4.6-6.8**

Accidents and injuries

	fall	burn	poison	cutwound	near drown	animal bite	others	dont remen	refuses	total
TOTAL	72	25	1	115	1	4	31	1	1	251
Row %	28.539	11.3	0.102	41.995	0.157	1.524	15.604	0.736	0.042	100
LCL %	18.496	6.412	-0.1	32.433	-0.157	-0.211	9.214	-0.71	-0.043	
UCL %	38.581	16.189	0.304	51.558	0.472	3.259	21.993	2.183	0.128	

Table A-56 Types of accident other than RTA

	home	work	road	farm/field	sportsfield	other	total
TOTAL	92	56	26	68	7	1	250
Row %	37.189	30.25	7.831	21.115	3.541	0.074	100
LCL %	30.652	20.567	3.908	14.316	0.259	-0.072	
UCL %	43.726	39.932	11.754	27.914	6.824	0.22	

Table A-57 Place of accident other than RTA

Table A-58	**Had any type of accident within the last 12 months**[7]				
	Both sexes				
Age range	n	had accident	95% CI	didn't have accident	95% CI

[7] 'any type of accident' includes any road traffic accident (both those causing and not causing injury in need of medical attention) and any other type of accident (causing injury that needs medical attention).

25-44	1624	13.0	10.6-15.5	87.0	84.5-89.4
45-64	1007	13.6	10.5-16.8	86.4	83.2-89.5
TOTAL	2631	13.2	11.1-15.3	86.8	84.7-88.9

Table A-59	**Had an accident within the last 12 months**								
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
25-44	567	18.5	13.8-23.2	1057	8.6	6.1-11.0	1624	13.0	10.6-15.5
45-64	441	17.5	12.2-22.7	566	9.1	5.8-12.4	1007	13.6	10.5-16.8
25-64	**1008**	**18.2**	**14.4-21.9**	**1623**	**8.7**	**6.7-10.7**	**2631**	**13.2**	**11.1-15.3**

Table A-60	**Involved in RTA within the last 12 months**				
	Both sexes				
stratum	n	involved in crash	95% CI	not involved in crash	95% CI
Urban Unguja	865	4.9	3.5-6.3	95.1	93.7-96.5
Rural Unguja	759	4.9	2.8-7.0	95.1	93.0-97.2
Pemba	1014	3.6	1.8-5.4	96.4	94.6-98.2
TOTAL	2638	4.5	3.5-5.5	95.5	94.5-96.5

Table A-61	**Accident leading to injury[8] within the last 12 months**				
	women				
stratum	n	Experienced accident and injury	95% CI	No injuries	95% CI
Urban Unguja	560	6.5	4.0-9.1	93.5	90.9-96.0
Rural Unguja	446	2.6	1.2-4.0	97.4	96.0-98.8
Pemba	617	10.6	6.4-14.7	89.4	85.3-93.6
TOTAL	1623	6.9	5.1-8.7	93.1	91.3-95.0

Table A-62	**Accident leading to injury[9] within the last 12 months**				
	Both sexes				
stratum	n	Experienced accident and injury	95% CI	No injuries	95% CI
Urban Unguja	862	8.5	5.4-11.5	91.5	88.5-94.6
Rural Unguja	757	6.8	4.7-8.8	93.2	91.2-95.3
Pemba	1012	14.5	10.8-18.2	85.5	81.8-89.2
TOTAL	2631	9.9	8.0-11.8	90.1	88.2-92.0

[8] Injury needing medical attention only
[9] Injury needing medical attention only

MINISTRY OF HEALTH
ZANZIBAR

Zanzibar Non Communicable Disease Survey

Data Collection Report

Mr. Ali Hassan, Dr. Jutta Jorgensen, Dr. Faiza Kassim, Dr. Salma Masauni, Dr. Hassan Mkoko and Mr. Abdallah Mohammed.

8/22/2011

Survey Report for the First National NCD survey in Zanzibar, 2011

Table of Content

Introduction

Background

Many African countries are facing a double disease burden with rapid increasing number of non communicable diseases (NCD) added to the traditional burden of infectious diseases.[10] This imposes a great burden on the health systems as well as threats exacerbation of poverty and hampers economic growth.

In Zanzibar, only limited NCD surveillance is taking place and estimates of the actual burden of NCD are un-precise. The available routine hospital statistics indicate alarming increase in the prevalence of NCD, a situation that warrants for undertaking this survey. The Ministry of Health under the Revolutionary Government of Zanzibar in collaboration with Danida, Copenhagen School of Global Health and World Health Organization decided to conduct survey on NCD and associated risk factors. The survey was the first of its kind to be carried out in Zanzibar and the outcome is expected to estimate the size of the problem and project future trends, and to be the base for effective and efficient planning and intervention at all levels.

Rationale

Due to indications of increasing morbidity caused by NCDs captured through the routine surveillance, it is now crucial to create evidence for the magnitude of the problem of these diseases and associated risk factors. This will support sound planning and implementation of interventions at all levels, and will prompt the establishment of surveillance for monitoring and evaluation. The survey results will provide guidance in designing future strategies and interventions to combat NCDs in Zanzibar.

Goals

The goal is to determine the magnitude of common non communicable disease and associated risk factors in Zanzibar in order to plan and implement adequate, targeted interventions to better manage selected NCDs, and control the associated risk factors.

Objectives

The specific objectives of the survey are

1) To determine the prevalence of Diabetes Mellitus in the adult population in Zanzibar

2) To determine the prevalence of Hypertension in the adult population in Zanzibar

[10] J. C. Mbanya et al, Diabetes in sub-Saharan Africa, The Lancet 2010;375:2254-66

3) To determine the prevalence of injuries in the adult population in Zanzibar

4) To determine the prevalence of psychological morbidity in the adult population in Zanzibar

5) To determine the prevalence of most common risk factors (obesity, tobacco and alcohol use, lack of physical activity, inadequate diet, raised FBG, raised level of blood lipids, increased blood pressure).

6) Investigate potential links between morbidity and determinants of health (socio-economical, demographic factors, gender)

Study Design

Cross-sectional population based survey with a sample of a sufficient size with a power to determine the proportion of adults that are exposed to selected risk factors associated with NCDs; including those having raised BP, FBG or blood lipids, had experienced injuries or traumas in recent times, and/or were mentally unwell (anxiety-depression), as well as linking these conditions with one another and with the socio-demographic and economic information obtained.

Data collection tool

The survey-tool used in this research exercise was adapted from the WHO STEPwise approach to chronic disease risk factor surveillance (STEPS) instrument. This is a sequential process tool consisting of three 'steps' of information gathering. The three steps can be elaborated as follows:

Step one starts with gathering socio-demographic information, information on key behavioral factors and (self-reported) mental wellbeing by the use of questionnaires

Step two which was anthropometric measurements following agreed order (BP, height, weight, waist and hip circumference)

Step Three consists of biochemical measurements of fasting blood glucose, triglyceride, and cholesterol levels.

We used both core and expanded items at each step of the STEPS modules. For injuries, we used the relevant part of the 'injury and violence' optional STEPs module, and for

mental wellbeing we used the GHQ-12. All questionnaires had been translated into Swahili and piloted before data collection started.

Study population

People reported to be permanent residents (spending on average maximum 3 nights per week outside the house, and not holding an address in another place) in the selected households and fulfilled the inclusion criteria were enrolled into the survey. A person could only appear once in the study. Therefore we classified a husband practicing polygamy to be listed in the household of his first wife but not to be a member in the household of the following wives.

Inclusion/exclusion criteria:

Inclusion criteria was

- Age between 25 - 64 years
- Able to understand the information given by the interviewer about the study prior to the beginning of the interview
- Signing of the informed consent for accepting participation.

Exclusion criteria was

- Inability to understand or comprehend the information given by data collector
- Inability to communicate through verbal expression for consent and for responding to the questionnaires
- Severe/terminal illness that hinders participation in the survey.
- Age below 25 years or above 64 years

Quality assurance

Quality assurance measures were used to ensure consistency of interviewing and good quality data. This included:

- Thorough training of interviewers to understand and ask questions in a standard manner

- First 8 – 12 interviews the interviewers went in pairs and supervised each other. The interviewers were matched so that more experienced interviewers supported less experienced ones.
- Random supervised interviews by field supervisor
- Random observation of interview by other members of survey management team.
- Daily check of completed questionnaires
- Extraordinary data and reappearing patterns investigated further (checked with interviewer) on daily basis.
- Daily meetings with supervisors and data collectors
- Electronic recording of data to minimize error in data entering.
- Built-in control in PDA for out of range answers

Data management

Data was copied to extern hard disk on a daily basis using software EPIDATA (version 3.1)(double storage). Confidentiality of data was being ensured during the initial process of data collection and at all stages of data management.

Data analysis

Data will be analysed in Epi Info (version 3.5.1). Adjustments for multiple sampling levels, editing for response errors and inconsistencies, weighted to reduce bias and provide representative prevalence estimates will be done.

Sample Design

Sampling Frame

The target population is the entire population in Zanzibar whereby the whole of Zanzibar was selected as the survey site, and hence all districts included. The total population is estimated to be 1.2 million distributed unevenly between 10 districts. The sampling frame represented the entire population in Zanzibar.

Sample size estimation

Due to paucity of data, there was virtually an unknown population prevalence of NCD and as a rule of the thumb it was set at 50% in our sample size calculation. With a confidence interval of 95%, margin of error 0.05, and a **design effect** due to the complexity of the sample design by 1.50 (standard since no previous information on design effect is available), adjustment for number of **age-sex estimates** (four groups: 25-44 yrs and 45-64 years for male and female separately) and an expected **non-response rate** of 18%, the sample size was hence calculated to be **2,809** individuals in order to be representative.

The number of clusters at first level to be identified was 100 out of the total of 331. The sample size was adjusted to **2800** individuals for convenience.

Non-Response

The requirement of augmenting the survey sample size to adjust for estimated non-response was necessary to ensure that we had adequate individuals in the sample to have the power to make precise estimates. The estimated non-response rate of 18% used is at the high side considering previous household surveys conducted in Zanzibar which showed overall high respondent rates, if well planned. Adjusting for non-respondents does not, however, account for the error that is created by non-response, since non-responders are often different from responders with respect to key variables that are linked to the domains under study in the survey. Much effort, therefore, was made to minimize non-response. The overall non-response for this study, however, was less than half of the estimated 18% with only 2.2% refused participation of the whole survey exercise and 6% refused the final step (step 3) of the survey.

Sampling Technique

The sampling strategy used is a multi-stage cluster sampling with stratification. The ten districts are considered as different strata, and the total number of primary sampling units, PSU, is allocated proportionately across all strata. Each district is divided into smaller clusters. These clusters are the geographical and administrative units called Shehia[11]. The Shehia are divided into smaller clusters called zones (also called mitaa, vitongoji, or vijiji) which typically consist of 100-300 households. Zones smaller than

[11] The Shehia is led by a Sheha who is appointed, not elected.

that were merged to make up one larger cluster, and zones much larger were split in smaller clusters.

At the first stage clusters were selected using Simple Random Selection, SRS, from the list of clusters (Shehia) within each district. At the second stage clusters (zones) were randomly selected using probability proportionate to size (PPS). At the third stage households were randomly selected from the household lists provided by the administrative leader of the Shehia. The two last stages of sampling was done using the software STEPSsampling.xls from WHO. Finally participants were selected from the household using Kish method.

The household lists were complete and included households with no eligible participants for the survey. Therefore an extra 7 households were sampled at third stage in each cluster for replacement in case a selected household had no eligible participants and had to be changed. This was done before data collectors went to the cluster.

Resources allowed for 100 PSU which was why 2800/100 = 28 households were selected from each PSU (and disproportionate from each SSU).

Preparation for field work

After sampling at first stage, the selected cluster administrators were visited and informed about the study and asked to provide updated household summary lists (number of households per zone). After sampling on second stage they were asked to provide complete household lists. At this stage few clusters had to go over the sampling of SSU again because the updated lists did not correspond to the summary lists.

Before data collection in the field, the clusters were visited by survey coordinators and in Unguja selected household were visited and informed about participation in the study. If no eligible participants in a household, the household was exchanged with one from the extra-list. In Pemba, the cluster administrators were updated on household constellations hence they assisted the research team with information to the households.

In one of the PSU, it was not possible to obtain household lists for technical reasons, and we had to exclude this cluster from the study.

Data Collection

Data collection procedure and types of data collected

A structured questionnaire was used, based on WHO STEPwise approach to chronic diseases risk factor surveillance.. After getting behavioural and socio-demographic information, anthropometric measurements (BP, height, weight, waist and hip circumference) was done the same day. Answers were recorded electronically during interview using a Personal Digital Assistant (PDA).

Biochemical measurements (fasting blood glucose, triglyceride, and cholesterol levels) were done the next day at a central place in each study site according to appointment and were done by Laboratory technicians using dry chemistry for rapid and convenient results and to avoid suspicion surrounding sending away blood samples. Results were recorded electronically on site using a PDA, and participants received a paper copy of the results.

Every study site was visited one day for interviews. Sampled households/ participants were visited at least three times before recorded as non-respondent. The following day the site was visited for biochemical measurements. Laboratory technicians called participants who did not show up to ask them to set up appointment for the following day (at a new study site).

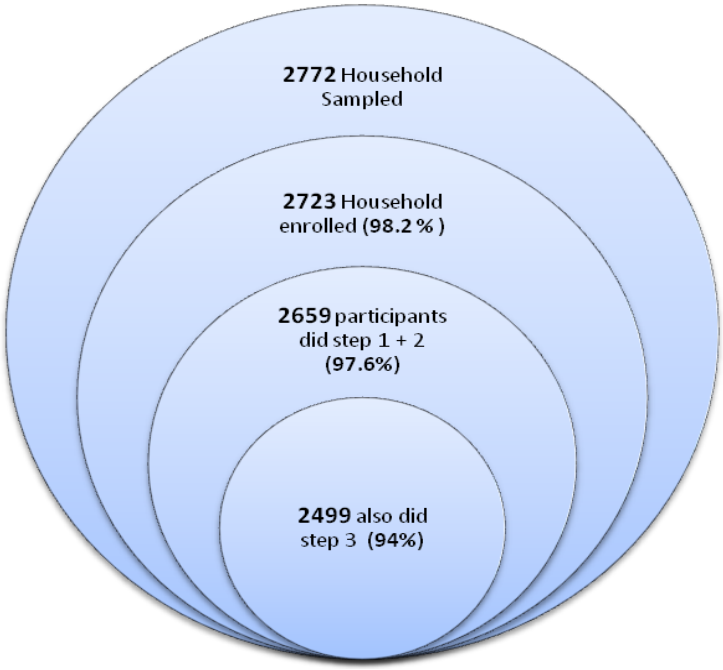
After all study sites had been visited call-backs were made to all eligible participants (non-respondents) who's number we had obtained. A time and place near the participants was identified for data collection. Participants met fasting and started with having blood sample drawn, afterwards the interviews and anthropometric measurements were conducted. Laboratory technicians continued biochemistry measurements for another few days.

Field Work Experience

Data collection started on 15.06.2011 in Unguja and Pemba simultaneously. The data collection was finalized on 13.07.2011 in Pemba and in Unguja on 14.07.2011. A total of 2772 households were targeted and visited, whereby 2723 (98.2 %) household were enrolled.[12] . In Unguja 1669 households were enrolled which accounts for 61 % of the total households enrolled for the survey while in Pemba 1054 households were enrolled

[12] Any house hold visited where there were eligible participants and which was informed about the survey is considered as enrolled whether decided to participate or not.

accounting for 39 % of the total enrolled households. Total response rate was generally good whereby 91 % of eligible participants completed all steps supposed to be done to complete data collection procedure. 98% of survey participants completed step 1 and 2 while only 2% refused to participate in the survey. A 6 % of the participants completed step 1 and 2 but did not go for step 3.



Explanation for the illustration:

2772 Households were sampled. Out of the targeted households 2723 (98.2 % of target) were eligible and were enrolled in the survey.

Out of the enrolled households 97.6% delivered one participant who completed the first two steps (questionnaire and anthropometric measurements). The rest refused (2.1%), or were not responding to the invitation (0.2%). Out of those who completed the first two steps, 94 % (nb=2499) did step 3 and hence completed the survey.

Field Work Challenges / Limitations

Low understanding on importance of participating in research, misperception among some of the participants on blood sampling for step 3 (fear of being tested for HIV) contributed substantially to the observed non-response. In addition, interviewers had only one day per study site resulting in limited ability to do follow up.

Shortage of AccuTrend glucose strips (Roche) which led to a sub-sample being tested with AccuChek (Roche) (nb = 409).

Geographical challenges in rural areas (large distances between selected households, islets, tide-dependent travel etc.).

Some cluster administrators (Sheha and/or Sheha's assistant) were not familiar with the location and number of households in their Shehia.

Ethical consideration

Due to the sensitivity of the survey whereby respondents were subjected to a number of anthropometric and biochemical measurements, ethical consideration was given its due importance.

Ethical clearance for research approval was sought from Zanzibar Medical and Research Ethical Committee and through district authorities where survey teams visited.

Informed consent was obtained from each participant prior to inclusion in the survey by signing a special written consent form. The form explained in brief about the survey and the rights of the participant to terminate participation at any time without this influencing ability to obtain health services. The data collector explained survey objectives and procedures prior to beginning of any survey process. Participants were given freedom to accept or reject participating and therefore the consent was voluntary without any coercion.

Confidentiality of all information obtained from respondents was being ensured at all levels by keeping the electronic questionnaires safe and secured. Participants suspected to have diabetes, hypertension or abnormal biochemical findings were ensured confidentiality and referred to nearest health facilities for follow-up; participants with high risk factors were counseled to modify their life style.

The Data Collection Team

A group of 39[13] interviewers (health workers or experienced data collectors/above 24 years/both sexes) was selected and trained for conducting the interviews. Furthermore six supervisors were selected. Experienced data collectors with previous research experience were selected in consultation with Public Health Laboratory, Pemba.

A five day training course was given to interviewers, laboratory technicians, and supervisors, including one day of piloting the survey tool in the field. All data collectors were extensively trained in taking informed consent, administering the questionnaire and PDA, perform anthropometric measurements, and interview procedures. Special attention has been given to the Mental Health (GHQ-12) module. In addition lectures was given on the background of NCDs. A detailed data collector manual was developed.

[13] 3 extra interviewers and 2 extra laboratory technicians was trained as reserves.

With respect to dispersed surveyed areas that were purposely designed to allow adequate heterogeneity, the data collection team consisted of 6 groups (Unguja 4 and Pemba 2), each group with 12 people as follows:

1 supervisor – communicate with the village guides and make appointments, ensure survey materials and supplies for the day are in place, supervise and assist interviewers and checking the completeness of questionnaires.

6 interviewers – conducting household interviews

1 laboratory technician - to conduct the biochemistry measurements at survey site

3 Village Guides – local people from village authority who were introducing the team to households. New guides were to be obtained in every surveyed cluster.

1 driver – who transported the team around the survey sites

Equipment and Reagents Used

Personal Data Assisted (PDA)

BP Machine (OMRON)

Weighing Machine (MOMERT)

Height Scale (Marked Wooden Scale)

Tape measure (local brand)

AccuChek and AccuTrend Plus (Roche) machines with their corresponding test strips (for measurement of blood glucose, cholesterol and triglycerides).

Data cleaning

As part of quality checks and preliminary process of data management, data collected were edited and cleaned electronically so as to maintain its reliability and minimize threats to validity of its subsequent results. The process involved the use of control checks and field reflections for ensuring completeness and consistencies.

The Survey Management Team

The core research team consists of NCD expert, Epidemiologist, International Health Expert, Health Advisor, experienced retired Zonal Medical Officer and Zonal Health Administrator. The following names represent the core survey team with their respective titles in the ongoing survey exercise.

Principal Investigator: Dr Faiza Kassim,

Assistant Principal Investigators: Dr. Salma Masauni and Mr. Ali Hassan.

Research Coordinators: Dr Mkoko Hassan and Mr. Abdallah Mohammed

Advisor and planner: Dr. Jutta Adelin Jorgensen

[i] Preventing Chronic Diseases : a vital investment. Geneva, Switzerland, WHO 2005
[ii] ECOSOC High-level segment 2009, Discussion Paper "Noncommunicable Diseases, Poverty and the Development Agenda"
[iii] J. C. Mbanya et al, Diabetes in sub-Saharan Africa, The Lancet 2010;375:2254-66
[iv] Global Status Report on NCD 2010. WHO, 2011
[v] WHO ECOSOC High-level segment 2009, discussion paper
[vi] David Stuckler et al, Drivers of Inequality in Millennium Development Goal Progress: A Statistical Analysis PLoS Medicine 2010;7; Issue 3; e1000241
[vii] Global report on road safety, WHO, 2011. Available at http://www.who.int/features/factfiles/roadsafety/en/index.html
[viii] The Global Burden of Disease, 2004 Update, WHO
[ix] Preventing Chronic Diseases : a vital investment. Geneva, Switzerland, WHO 2005
[x] Discussion Paper: Mental health, poverty and development, July 2009. ECOSOC Meeting 'Addressing non-communicable diseases and mental health: major challenges to sustainable development in the 21st century'.
Hamer, Mark, et al: Psychophysiological risk markers of cardiovascular disease. Neuroscience and Biobehavioral Reviews 35 (2010) 76–83.
[xi] 2002 Tanzania National Census
[xii] Report from HelpAged International, 2007
[xiii] COPD did not appear in the data set but is captured under asthma/bronchitis.
[xiv] Extracted from HMIS data set for 2009
[xv] Extracted from HMIS routine data captured for 2011. The total number of adult admissions to hospitals in 2011 was 61,031
[xvi] HMIS annual bulletin 2010
[xvii] Health Sector Reform Strategic Plan (2007-2011), Ministry of Health, Revolutionary Government of Zanzibar.
[xviii] Tanzania Demographic and Health Survey 2004-5
[xix] Based on screening in Unguja and Pemba in 2010 (n=721)
[xx] Female/Male ration taken from an unpublished thesis "The prevalence of high blood pressure and associated risk factors in South District, Unguja, Zanzibar: A cross-sectional survey" (Sharifa Awad, M. of Int. Health, Copenhagen University, 2008)
[xxi] See the annexed 'Survey Data Collection Report' for more details
[xxii] Definition of standard unit alcohol:
A drink was defined as the equivalent of one beer (~33cl), one 15 cl glass of wine, one 3? cl peg ('toti') of whisky, konyaki etc, or one 100 cl cup of homebrew (e.g. chimbu, mbege). It corresponds to around 15 ml of pure alcohol (ethanol). Drinking volume (in standard drinks) was calculated from the reported number of units of alcoholic beverages and content of alcohol of each beverage.
[xxiii] In Swahili there is a clear distinction between 'chakula' (litt. 'food') which is cassava, yams, potatoes, rice, plantains, maize etc, and 'mboga' (litt. 'vegetables') which is non-starch vegetables such as the one mentioned in the text. 'Matunda' (litt 'fruits') are the many kinds of fruits grown in Zanzibar, including avocado which is tree-growing and hence classified as fruit.
[xxiv] The full criteria for the classification of participants as either inactive, moderate active, or highly active are as follows:

- **High**

  A person reaching any of the following criteria is classified in this category:
  - Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET-minutes/week OR
  - 7 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 3,000 MET-minutes per week.

- **Moderate**

  A person not meeting the criteria for the "high" category, but meeting any of the following criteria is classified in this category:
  - 3 or more days of vigorous-intensity activity of at least 20 minutes per day OR

- 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day OR
- 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes per week.

- **Low**

A person not meeting any of the above mentioned criteria falls in this category.

[xxv] Max height 200 cm, max weight 125 kg, max waist and hip circumference 150 cm.
[xxvi] Risk of metabolic complications.
[xxvii] There are great variations in recommended cut-off points especially for waist circumference; less so for WHR. The cut-off points listed here are not officially the WHO recommendations but examples used in the WHO Expert Consultation on Obesity (2000).
[xxviii] It is difficult to measure BP with an electronic BP meter if the heart rhythm is irregular and possible was recorded as 'out of range'
[xxix] See product specification from Roche for the Accutrend Plus, including evaluation report, stating that capillary blood values measured using the Accutrend Plus corresponds to Plasma values using Hitachi Glucoquant-hexokinase as reference method.
[xxx] When repeat testing is performed, approximately 75% of people with raised fasting blood glucose levels ('diabetes') detected in epidemiological studies are confirmed to have clinical diabetes. Reference: WHO/IDF consultation report 'definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia' 2006
[xxxi] It is furthermore noted that IDF and WHO in the consultation report 'Definition and diagnosis of Diabetes Mellitus and Interim Hyperglycaemia' WHO, 2006, recommend to use capillary full blood values as plasma values on fasting individuals; only in postprandial glucose monitoring a conversion factor is applied.
[xxxii] There is no documentation for a 'fixed' cut off, both score ≥ 2 and ≥ 4 have been used in studies. M. M. Holi et al 'Comparison of the GHQ-36, the GHQ-12 and the SCL-90 as psychiatric screening instruments in the Finnish population' Nordic Journal of Psychiatry 2003 (vol. 57 No 3 pg 233-238), Nancy Hoeymans et al 'Measuring mental health of the Dutch population: a comparison of the GHQ-12 and the MHI-5' Health Qual Life Outcomes. 2004; 2: 23.
[xxxiii] Tanzania National Bureau of Statistics, population projections 2002-2012
[xxxiv] Interbank exchange rate as per 23.12.2011
[xxxv] Especially CVD, DM, cancers and for smoking tobacco, COPD.
[xxxvi] See STEPs reports from Zambia, Malawi, Mauritius. Available at www.who.int last seen 12th December 2011
[xxxvii] This figure reflects the % of people who have met (moderate levels) or exceeded (high levels) the minimum recommendations for weekly physical activity.
[xxxviii] Ronald P Stolk et al: Ultrasound measurements of intraabdominal fat estimate the metabolic syndrome better than do measurements of waist circumference. The Amerikan Journal of Clinical Nutrition, 2003.
[xxxix] Output tables for pregnant women can be found in Annex IV for comparison.
[xl] Obs that (n) of men in the younger age group is very small.
[xli] WHO 2012, see www.who.int
[xlii] HTN cut-off in health facilities in Zanzibar is BP ≥140/90 mmHg.
[xliii] Diagnosis of HTN cannot be made on a single day BP measurement; but for the cause of establishing estimated prevalence, both surveys and screening exercises use the single day measurement of raised BP as 'diagnostic'. Data from 721 individuals (non randomised) screened in various out-reaches during 2010 and 2011 by DAZ/DM clinic MMH/ MoH.
[xliv] Dietary Approaches to Stop Hypertension contains an increased intake of fruits and vegetables; reduced intake of saturated fats, and reduced salt intake.
[xlv] Pregnant women (n=103) included in the sample. When excluding them no effect was seen on the prevalence of IFG and raised FBG. See Table A-53.
[xlvi] NCD country profiles 2011, WHO. Last accessed on 10.01.2012 at http://whqlibdoc.who.int/publications/2011/9789241502283_eng.pdf
[xlvii] McLartyy et al, 1989, as quoted by Dr Mayige in the presentation 'NCDs in Tanzania - NCD Literature review GIZ' April 2012
[xlviii] Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia. A WHO/IDF consultation report, WHO 2006.
[xlix] Helmut Schroder et al: Relationship between body mass index, serum cholesterol, leisure-time physical activity, and diet in a Mediterranean Southern-Europe population. British Journal of Nutrition (2003), 90, 431–439
[l] Jaume Marrugat et al: Amount and Intensity of Physical Activity, Physical Fitness, and Serum Lipids in Men. American Journal of Epidemiology, Am. J. Epidemiol. (1996) 143 (6): 562-569

[li] Global status report on road safety. WHO, 2009.
[lii] The GHQ-12 is a screening and not a diagnostic tool as such. In consistency with the rest of the report the term 'mental illness' is used despite '*possible* mental illness' would be more correct.
[liii] For example Makowska, Z et al: THE VALIDITY OF GENERAL HEALTH QUESTIONNAIRES, GHQ-12 AND GHQ-28, IN MENTAL HEALTH STUDIES OF WORKING PEOPLE. Int. Journal of Occupational Medicine and Environmental Health, Vol. 15, No. 4, 353—362, 2002

Peter J. Chipimo, Knut Fylkesnes: Comparative Validity of Screening Instruments for Mental Distress in Zambia. Clinical Practice & Epidemiology in Mental Health, 2010, 6, 4-15

[liv] For example M. M. Holi et al.: Comparison of the GHQ-36, the GHQ-12 and the SCL-90 as psychiatric screening instruments in the Finnish population. Nordic Journal of Psychiatry 2003, Vol. 57, No. 3 , Pages 233-238

[lv] See ref. li

[lvi] Note that the survey was carried out before the Spice Islander ferry accident in September 2011 where an estimated 2000 people, mainly from Pemba, lost their lives.