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Tuberculosis in Zanzibar

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Table of Contents

ACKNOWLEDGEMENT.....	3
ABBREVIATIONS.....	8
EXECUTIVE SUMMARY	9
SECTION ONE	12
1 INTRODUCTION	12
2 LITERATURE REVIEW.....	13
2.1 Literature on KAP of the community	13
2.2 Literature on KAP of health care workers	14
3 PROBLEM STATEMENT.....	16
4 RATIONALE	16
5 OBJECTIVES	17
5.1 Main objective.....	17
5.2 Specific objectives	17
SECTION TWO	18
6 METHODS	18
6.1 Study design.....	18
6.2 Study area	18
6.3 Study population.....	18
6.3.1 Inclusion criterion.....	18
6.3.2 Exclusion criteria.....	18
6.4 Sampling size and sampling plan	18
6.4.1 Household sampling plan	18
6.4.2 Sample size for households.....	19
6.4.3 Sample size for health care workers.....	20
6.5 Data collection procedures	20
6.6 Statistical analysis	20
6.7 Ethical consideration	21
6.8 Survey limitations	21
6.9 Community consultations.....	22

SECTION THREE.....	23
7 RESULTS – COMMUNITY SURVEY.....	23
7.1 Description of the community study participants.....	23
7.2 Sources of TB information and TB perception.....	25
7.3 Knowledge on symptoms, transmission, prevention, treatment and people at risk of getting TB.....	26
7.3.1 Knowledge of TB by characteristics of study participants.....	29
7.3.2 Knowledge of TB treatment.....	38
7.3.3 Knowledge of TB risk groups.....	38
7.4 TB attitudes and stigma.....	39
7.5 Practice towards TB symptoms.....	39
7.5.1 TB and HIV relationship.....	41
7.6 Health seeking behavior of study participants.....	42
8 RESULTS – HEALTH CARE WORKERS.....	44
8.1 Description of the health care workers.....	44
8.2 Knowledge of TB symptoms, modes of TB transmission and prevention.....	47
8.3 Attitude towards TB.....	49
8.4 Practice on TB.....	50
8.4.1 TB and HIV relationship.....	51
SECTION FOUR.....	52
9 DISCUSSION.....	52
9.1 Community respondents.....	52
9.2 Health care workers.....	53
9.3 Recommendation.....	54
10 REFERENCES.....	55
11 APPENDICES LIST.....	58

List of tables

Table 1. A summary of the sampling plan and the sampling techniques used	19
Table 2. Socio-demographic characteristics of the study participants from the community in the KAP study, Zanzibar, 2016.	24
Table 3. The source of TB information of the study participants, Zanzibar, 2016.	25
Table 4. TB symptoms as reported by the study participants grouped by all symptoms reported, classical TB symptoms and level of knowledge, Zanzibar, 2016.	28
Table 5. Assessment of knowledge of TB transmission and prevention Zanzibar, 2016.....	29
Table 6. Good knowledge of TB symptoms as defined by number of symptoms reported by the study participants, Zanzibar, 2016.....	31
Table 7. Baseline characteristic of study participants and knowledge of TB transmission , Zanzibar, 2016.	33
Table 8. Knowledge of TB prevention among the study participants, Zanzibar, 2016.....	34
Table 9. Combined knowledge of symptoms, transmission and prevention among the study participants.....	36
Table 10. Factors associate good knowledge of TB symptoms among the study participants	37
Table 11. Knowledge on who can get TB, Zanzibar, 2016.	38
Table 12. Self-assessment risk of getting TB, reaction and who to talk to.	39
Table 13. Proportion of participant’s decision, timing and reasons for TB care seeking, Zanzibar, 2016.	40
Table 14. Community regards and general feeling on TB patients, Zanzibar, 2016.	41
Table 15. Community practices toward TB and HIV, Zanzibar, 2016.....	42
Table 16. Baseline Characteristics of health care workers interviewed, Zanzibar, 2016.....	45
Table 17. Health education issues with the health care workers	46
Table 18. Source of TB information for health care workers, Zanzibar, 2016.	46
Table 19. Table of reported symptoms, number of classical symptoms and levels of symptoms knowledge as reported by HCW, Zanzibar, 2016.	48
Table 20. Knowledge on TB transmission and prevention, Zanzibar, 2016.	49
Table 21. The HCW feeling and regard towards TB patients, Zanzibar, 2016.	49
Table 22. HCW Reaction of knowing to have TB and who to talk to, Zanzibar, 2016.	50
Table 23. The HCW practice if they get TB symptoms, Zanzibar, 2016.	50
Table 24. HCWs Attitude toward HIV testing among TB patients, Zanzibar, 2016.	51

List of figures

Figure 1. The proportion of study participants included in the KAP study, 2016, Zanzibar. .	23
Figure 2. Perception of the seriousness of TB diseases by the study participants as a general and at district Zanzibar, 2016.....	26
Figure 3. Symptoms of TB as reported by the community respondents, Zanzibar, 2016. ...	26
Figure 4. Levels of good knowledge of TB symptoms by education level, Zanzibar, 2016. .	30
Figure 5. Levels of good knowledge on TB symptoms by region, Zanzibar, 2016.	30
Figure 6. TB transmission knowledge of community respondents by age groups, Zanzibar, 2016.	32
Figure 7. A comparison of districts survey on the knowledge of TB related symptoms, TB transmission and TB prevention, Zanzibar, 2016.....	35
Figure 8. The proportion of participants with knowledge that TB is curable and on treatment of TB, Zanzibar, 2016.....	38
Figure 9. The health-seeking behaviour of the study participants. A). The proportion of where study participants go if they are sick, or to treat a general health problem. B). The proportion of the number of times they visit the health facility, Zanzibar, 2016.....	43
Figure 10. The frequency distribution of education levels among HCW interviewed, Zanzibar, 2016.	44
Figure 11. HCW perception of seriousness of TB in general in the country and at the district, Zanzibar, 2016.	47

ABBREVIATIONS

ACSM	Advocacy Communication and Social Mobilization
AIDS	Acquired Immune Deficiency Syndrome
aOR	Adjusted Odds Ratio
BCC	Behavioural Change Communication
DOTS	Directly Observed Treatment Short course
eCRF	Electronic Case Report Forms
FBO	Faith Based Organization
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HIV	Human Immunodeficiency Virus
HCW	Health Care Workers
IEC	Information Education Communication
KAP	Knowledge Attitude and Practice
NGO	Non-Governmental Organization
ODK	Open Data Kit
OR	Odds Ratio
PCF	Passive Case Finding
PPS	Probability Proportional to Size
TB	Tuberculosis
USA	United States of America
WHO	World Health Organization
ZIHTLP	Zanzibar Integrated HIV, TB and Leprosy Programme

EXECUTIVE SUMMARY

Introduction: The global burden of tuberculosis is escalating causing significant morbidity and mortality. In the year 2015, around 10.4 million TB patients were notified and 1.8 million TB patients died. TB, as from 2015, is a leading cause of mortality in the world from an infectious disease agent. TB burden is concentrated in sub-Saharan Africa where the epidemic of Human Immunodeficiency Virus (HIV) burden is high and drives TB burden. Early TB case detection and treatment remains to be the hallmark of TB control. Zanzibar notified 684 TB patients in 2014 which are far less from the 1,612 TB cases in a year estimated to be notified based on the 2013 TB prevalence survey. The survey also estimates the prevalence rate at 124 TB cases per 100,000 populations per year. The discrepancy signifies only half of the TB patients are diagnosed and treated and the rest continue to transmit TB or succumb to death. The current TB diagnosis modality remains passive, i.e. presumptive TB patients have to visit the health facility at their own accord to get TB diagnosis. Passive case finding (PCF) is dependent of the community and health care workers (HCW) on good knowledge, attitude and practice (KAP) on TB. However, Zanzibar has not done any study to measure the KAP levels that are fundamental in improving case detection. The health care workers form an integral part of the TB diagnosis and care.

Objective: was to determine the knowledge, attitude and practice of Zanzibar community and HCW on TB so as to guide in the development and implementation of TB Advocacy Communication and Social Mobilization (ACSM) activities in the future.

Methods: We conducted a cross-sectional descriptive study using structured questionnaires to assess TB KAP at the community level and HCW in Zanzibar. The structured questionnaire was administered to adult (≥ 15 years) from the selected household. A questionnaire was adapted from the validated tool of the World Health Organization (WHO). We used descriptive and analytical analysis. All analyses were done using Stata version 14.2.

Key findings

Community Survey: We interviewed a total of 3204 community survey from all the five regions and in the 10 districts. The region of Mjini Magharibi (1519 [47.4%]) had the most number of participants and from the Magharibi district (977 [30.5%]). The largest socio-

demographic groups were age group between 15-24 with 1,035 (32.3%), females 2,094 (65.4%) and having at least a college education 1,667 (52.0%).

The respondents mostly (82.2%) perceived TB to be a very serious disease. Cough was the commonest symptoms reported in 1484 (46.3%) of the community respondents. Only 95 (3%) of the respondents could report at least 3-5 of the TB related symptoms. The level of overall knowledge of TB symptom, transmission and prevention was low

KAP in the community

- 82.2% perceived TB to be a very serious disease.
- Only 3% of the respondents could mention four to five symptoms.
- 46.3% of respondents associated cough as symptom of TB
- Only 29.9% of respondents had good knowledge of TB.

at 29.9% (958 respondents), and good knowledge was associated with advanced education level. The perceived risk of getting TB among community respondents was high at 81.9%. Over 97% of the respondents would go to the health facility if they suspect to have TB. Stigma levels are low, with only 7.1% and 4.1% would feel shameful and shy respectively if they found out they had TB.

Health care workers: A total of 228 health care workers were interviewed. Of whom 45.2 % (103) were of age 25-34. There are more females (64.5%) HCW than males (35.5%). More than a third (35.5%) of health care workers interviewed are working in Magharibi district while 19.3% come from Wete district. More than a half of health care workers interviewed (75%) hold a diploma level of education. 54.8 % of health workers have not received any training on TB though 74.1% of health workers provide health education as part of their duty at the health facility.

Only (5.5%) of the HCW mentioned all the five classical TB symptoms listed by the WHO. The overall knowledge on TB symptoms, transmission and prevention among the HCW was 82.0% (187). The HCW reported community attitude towards TB patient are the desire to

KAP in HCW

- Only 5.5% of HCW mentioned five symptoms of TB
- Over 80% of the HCW overall good knowledge of TB (symptoms, transmission and prevention).

help (92.1%) and support (50.9%). Over 75% all the HCW would seek for medical attention once they feel sick with TB related symptoms.

Conclusion: TB is regarded as a serious disease in the community. However, only few community members could rightly identify TB symptoms. There is overall good attitude towards TB patients exemplified by the community desire to help and offer support. Though there are few reported stigma related attitude such as shameful disease and a person would not come near to the TB patient. Once sick, the respondents would likely go to the health facility for health checkup. The knowledge on TB symptoms, transmission and prevention was low in the community. The community should receive interventions that are targeting all aspects of TB knowledge to ensure effective delivery of the message.

SECTION ONE

1 INTRODUCTION

In 2015 globally, almost 1.8 million people died from tuberculosis (TB) from an estimated 10.4 million TB patients (1). TB now is the leading cause of death from an infectious disease surpassing deaths caused by HIV (2,3). Early diagnosis and effective treatment of TB are critical to reduce TB mortality and control the spread of TB in the communities (2). The Directly Observed Treatment Short course (DOTS) strategy recommended by the World Health Organization in 1994 (4,5), has proved to be one of the most effective public health interventions (5).

Early TB diagnosis and treatment cascade is influenced by patient, health care and health system factors. TB diagnosis has remained largely a passive case finding (PCF) strategy, whereby the presumptive TB patients, those individuals exhibiting signs and symptoms, to voluntarily reach the health care facility for TB diagnosis. Therefore, health seeking behavior of the community is key to diagnose TB and linking TB patients to care for TB and other comorbidities associated with TB. The community level of knowledge, attitude and practice (KAP) is then crucial in the TB continuum of care with respect to TB diagnosis and treatment. Additionally, HCW workers have to have a sound KAP to be able to identify presumptive TB patients and offer appropriate clinical care. Globally, cultural variations from many communities with respect to TB, may influence the community's knowledge, attitude, practice (KAP) and create potential stigma that may negatively influence TB care (6).

2 LITERATURE REVIEW

2.1 Literature on KAP of the community

Overall, poor knowledge on TB, negative driven attitude and improper practice to presumptive TB patients are linked to poor health seeking behavior and increase in stigma that hampers TB diagnosis and care (6). Stigmatizing and discriminating attitudes has been found to be common in many geographical settings such as India (7), Sudan (8), Ghana (9) and Tanzania (10). Improper knowledge and the associated stigma on TB may result into multiple health-seeking behavior to the individuals, a practice resulting to increase cost of care and delay in TB diagnosis (11).

A systematic review summarizing 83 studies across 35 countries including 17 countries from 22 TB high burden countries, reported results of cultural variations that are affecting stigma on TB and hence TB control (6). Both proper knowledge and unfounded beliefs of TB causes have been reported in developed countries e.g. United States, Viet Nam and Russia and other developing countries such as Tanzania, Malawi and South Africa (6). The unfounded believes regarding TB transmission were associated with negative attitudes towards TB in Colombia and TB being caused by foodborne illness as a result of sharing utensils were reported in Uganda and Peru (6).

A community-based cross-sectional survey conducted in 2009 in the Gilgel Gibe field research area reported little knowledge about TB among adults (≥ 15 years) presumptive TB patients (12). The attitude such as 'dirty' disease is believed to affect poor people; patients with TB feel less respected by others or inferior were observed in Ethiopia (12). Or similarly as the punishment from god as seen in a study in Tanzania (10) or satan and witchcraft (15.9%) were thought to be causes of TB (12).

The appropriate knowledge on TB has been associated with good TB control and vice versa could be true. For instance the study from India showed only 17% (95% CI 15.6–18.0) of the respondents had appropriate knowledge regarding TB with even lower levels observed amongst females, rural areas and respondents from low income groups (7). In Tanzania a study done in Simanjiro, 67% (95% CI: 0.56–0.78) of the population knew about TB, 80%

(95% CI: 0.71–0.89) knew about the symptoms, and 67% (95% CI: 0.57–0.77) knows it is treatable (10).

In a case-control study in Sudan assessing KAP on TB reported for both cases and controls, over 50% said that they did not/would not hide their TB disease and about two thirds of both said they did not/would not isolate themselves because of the disease (8). Stigma is also common in many settings. A study by Ahmed et al, from Sudan reported about 50% of the patients had experienced different levels of stigma (8). Whereas in India, the level of stigma was as high as 73% (95% CI: 71.4–74.2) and 98% (95% CI 97.4–98.3) had discriminating attitude (7).

2.2 Literature on KAP of health care workers

Health care workers are crucial in TB control as they are involved in TB diagnosis and treatment. Therefore, having appropriate knowledge, attitude and practice and no stigma to TB patients will remarkably improve TB control especially in high burden setting. The opposite of good KAP may interfere with appropriate care and treatment-seeking for presumptive TB patients (13).

The TB knowledge on symptoms has been relatively good among health care workers in many settings such as Bangladesh (13) or Peru (14). The workers in Bangladesh had knowledge of symptoms of pulmonary TB (72%) and free- of-cost sputum test (86%) and drug treatment (88%) (13). Similarly, Peru reported good knowledge on TB and transmission of 81% correct was achieved for the epidemiology and transmission section (14). However, there were low and alarming scores of knowledge on treatment with an average of 60% correct; average diagnostic score of 61% correct in Peru (14). Also in Bangladesh, there was superficial knowledge regarding causation (4%) and mode of transmission (48 %); treatment duration (43%) and consequences of incomplete treatment (11%) was poor. Thirty-one percent were afraid of the disease, 21 % would feel embarrassed (and less dignified) if they would have TB, and 50% were afraid of isolation if neighbours would come to know about it (13).

ZIHTLP needs to determine community KAP levels to effectively implement the TB control strategy. The current information education and communication and behavioral change communication (IEC/BCC) has the generic information that may not necessary reflect addressing the issues in the general public. Therefore, it is presumed that there is a gap in IEC/BCC strategy that will be addressed by conducting a KAP study.

3 PROBLEM STATEMENT

Knowledge, attitude and practice and stigma are some of the reasons hampering TB diagnosis and care (6). Poor knowledge of TB has been shown to lead to increased multiple inappropriate health seeking behavior; negative attitude that leads to stigma and improper practice that will block the pathway to care for presumptive TB patients. These three components alone or in combination may delay TB diagnosis resulting to increased TB transmission and advanced or worsened clinical conditions. ZIHTLP conducted community KAP levels to effectively implement the TB control strategy. The current information education and communication and behavioral change communication (IEC/BCC) has the generic information that may not necessary reflect addressing the issues in the general public. Therefore, it is presumed that there is a gap in IEC/BCC strategy that will be addressed by conducting a KAP study.

4 RATIONALE

Understanding levels of good knowledge, attitude and practice of TB in the community has been shown to improve TB control (15). The community is likely to have low or no stigma to TB if there are targeted communication strategy addressing the issues in the communities with cultural sensitivity by the TB programs (6). The effects of KAP may affect treatment adherence to diagnosed TB patients and may improve TB treatment outcome (10) by involving the community in the TB care (9). KAP survey data are essential to the TB program as suggested by World Health Organization (WHO)(15) in the following areas:

- i. To help in planning, implementing and evaluating ACSM of the TB program
- ii. To identify knowledge gaps, cultural beliefs, or behavioural patterns that may facilitate understanding and action, as well as pose problems or create barriers for TB control efforts.
- iii. To assess communication processes and sources that are key to defining effective activities and messages in TB prevention and control.
- iv. To identify needs, problems and barriers in programme delivery, as well as solutions for improving quality and accessibility of services.

5 OBJECTIVES

5.1 Main objective

To determine the knowledge, attitude and practice of Zanzibar community on TB so as to guide the development and implementation of TB Advocacy, Communication and Social Mobilization (ACSM) activities in the future.

5.2 Specific objectives

The specific objectives of the KAP study include:

1. To assess the level of knowledge on TB among Zanzibar community and health care workers
2. To assess the attitude on TB among Zanzibar community and health care workers
3. To assess practice related to TB prevention and treatment of TB among Zanzibar community and health care workers.

SECTION TWO

6 METHODS

6.1 Study design

The KAP study was a cross-sectional study that assessed the knowledge, attitude and practice on TB of the general community and health care workers in Zanzibar.

6.2 Study area

The study was conducted in Zanzibar covering eleven districts in all the five regions of Zanzibar Unguja and Pemba islands. The five regions in Zanzibar include Kaskazini Unguja, Kusini Unguja, Mjini Magharibi from Unguja Island and Kaskazini Pemba and Kusini Pemba from Pemba Island. Zanzibar has a population of 1,303,569 people of which men are 630,677 (48.4%) and 672,892 (51.6) are women (16). The detailed sampling plan is explained in the sample size and sampling plan (Sampling size and sampling plan).

6.3 Study population

6.3.1 Inclusion criterion

- We included men and women of 15 years and above from the selected household in the community.
- Health care workers working in health care facilities from the selected Shehia. If the selected Shehia had no health care facility, then a health care facility from adjacent Shehia was selected.

6.3.2 Exclusion criteria

- A household with a TB patient who is currently on TB treatment
- A household who had a TB patient treated for TB in past one year.

6.4 Sampling size and sampling plan


6.4.1 Household sampling plan

We used a multi-stage sampling techniques as describe in international guidelines to have a representative sample size of adult household members. The following were considered

during the cluster sampling procedure. The sampling plan for the study is summarized in Table 1.

- i. The population of each Shehia was based on the 2012 national census (16), and was assumed that the population has remained the same to the 2012 census.
- ii. We used probability to proportional to size sampling (PPS) to select the Shehias which are shown in Appendix 1.

Table 1. A summary of the sampling plan and the sampling techniques used

	Stage	Sampling technique	Levels	Description
	1	Purposive to include all	Regions	Geographical representation with all the five regions are selected.
	2	Purposive to include all	Districts	Geographical representation with all 10 districts were selected.
	3	Cluster sampling as sampling frame	Shehia	A probability proportional to size (PPS) was used to select Shehias.
	4	Random as sampling units	Household members	A random sample of household will be selected from Shehias. Each Shehia will then have a minimum of 30 households. Additional 50% of the households were added as a reserve to replace any household that may be excluded.

6.4.2 Sample size for households

The sample size estimation was calculated using cluster sampling sample size web on the <http://www.openepi.com>. Assuming the target population size of 1,303,569; estimating 50% of the population with event of interest; to select 30 clusters (Shehia) from a total of 331 Shehia in Zanzibar (16); an estimated design effect of 2; significance level of test 0.05, two-sided and a 95% confidence interval, then we needed minimum sample size of 780 household to be included in to be interviewed. Taking into account the non-respondent of 20%, additional 156 household to be included, resulting to 936 households were included in the survey. Assuming each household has a minimum of three adult eligible for inclusion into the study, then a total of 2,808 ≥ 15 years respondents were required to be interviewed from the households.

6.4.3 Sample size for health care workers

Assuming the target population size of health care workers of 250 from the selected Shehia; 50% of health care workers with desired level of knowledge; an estimated design effect of 1 for a random sample; significance level of test 0.05, two-sided and a 95% confidence interval; then using the sample size calculator (<http://www.openepi.com>); we needed a minimum sample size of 150 interviews for health care workers. Taking into account an estimated non-respondent value of 20%; then additional 30 health care workers; we added to sum to 180 health care workers.

6.5 Data collection procedures

The community understanding, sensitization and responsiveness is key to successful conduction of the study. The ZIHTLP involved the Shehas of the selected Shehias by sending the introduction letters and asked for their support and contribution. The Shehas were consulted prior to the start of the study and participated in the sampling of the household.

The study team adapted the international validated data collection tools of World Health Organization (WHO) (15) and developed questionnaires for the general community and health care workers. The tools covered questions on knowledge, attitude and practice thematic areas. We used electronic data case report forms (eCRF) to administer the questionnaires. We used the open source data collection kit, open data kit (ODK, <https://opendatakit.org/>) and developed the eCRF. In addition, data management were done using the eManagement tool to track data entry during the data collection process (17).

Each Shehia had a minimum of 3 enumerators who were led by the team lead. The team leader coordinated data collection at the Shehia level. The ZIHTLP staff and other stakeholders were the supervisors and who ensured data quality in terms of supervising data collection process, adherence to GCP and interviews.

6.6 Statistical analysis

Data cleaning was done prior to data analysis and categorization. We used descriptive and analytical statistical analysis to analyses study participants'. The categorization of the continuous data will be according to published categories in the guidelines and peer reviewed

published articles. Quantification of knowledge, attitude and practice levels was done and grouped as per guidelines (15). All the quantitative analyses were done using Stata version 14.0 (Stata Corp; Texas, USA). Qualitative data were summarized using thematic areas.

6.7 Ethical consideration

The survey complied with good clinical practice and adhered to the laws and regulations of the Zanzibar Revolutionary Government. The protocol was approved by the Zanzibar Medical Research Ethical Committee. We observed the following:

- All study participants gave written informed consent prior to conducting an interview.
- An assent form was given by respondents aged 15-17 years under the supervision of the guardian adult (≥ 18 years) from the same household.
- Data access and management:
 - The server was password protected and was only accessed by study team having usernames and password.
 - The usernames and password was not shared by any third part not involved in the conduct of the study.
 - The data in the server was be encrypted.

6.8 Survey limitations

The survey had the following limitations:

- i. The population estimates per each Shehia is based on the 2012 census which may have changed.
- ii. There are additional administrative units that have been added since 2012 national census such as number of districts have increased from 10 in 2012 to 11 in 2016. The results will apply to geographical/administrative units as reported in the 2012 national census.
- iii. Refusal rate was not documented, however we estimated to be less than 2%.

6.9 Community consultations

The community understanding, sensitization and responsiveness were key to the success implementation of the KAP study. The ZIHTLP did the following:

- i. Introductory letters were sent to all Shehia that have been sampled in this study. The introductory letters summarized the objectives of the study and what the contributions will be expected from Shehas.
- ii. Shehas were consulted prior to the start of the study and participated in the sampling of the household.

SECTION THREE

7 RESULTS – COMMUNITY SURVEY

7.1 Description of the community study participants

The study interviewed total of 3,204 community members from all the five regions and in the 10 districts as per 2012. The number of respective interviews per region and district are shown in Appendix 2. The region of Mjini Magharibi (1519 [47.4%]) had the largest proportion of the participants and followed by Magharibi district (977 [30.5%]) as shown in Appendix 2. The largest age-group was between 15-24 years with 1035 (32.3%) study participants, and 2094 (65.4%) were females. Most of the study participants had at least a college education level in 1667 (52.0%); most of them were married 1841 (57.5%) and did not have any form of income generating activity 1925 (60.1%). The detailed distribution of the study participants' characteristics are shown in Table 2.

Figure 1. The proportion of study participants included in the KAP study, 2016, Zanzibar.

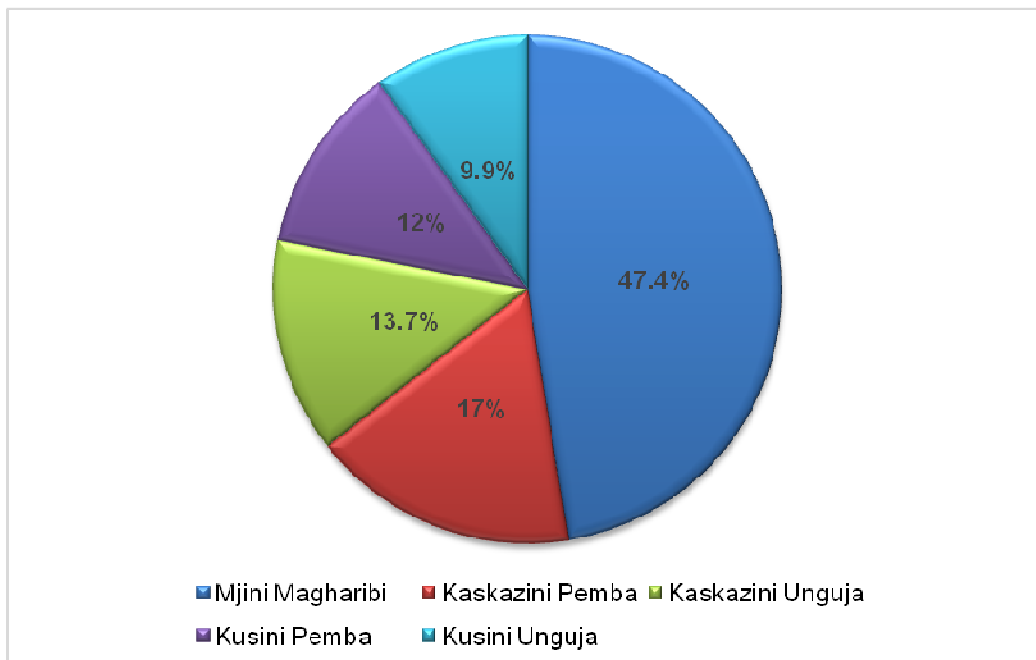


Table 2. Socio-demographic characteristics of the study participants from the community in the KAP study, Zanzibar, 2016.

Characteristics	No (%)
Age (median, IQR in years)	33 (22-50)
Age groups (years)	
15-24	1035 (32.3)
25-34	636 (19.9)
35-44	457 (14.3)
45-54	465 (14.5)
55-64	327 (10.2)
>=65	284 (8.9)
Sex	
Female	2094 (65.4)
Male	1110 (34.6)
Education Level	
No formal education	40 (1.2)
Primary	95 (3.0)
Ordinary level	308 (9.6)
Advanced level	264 (8.2)
College	1667 (52.0)
University	786 (24.5)
Madrassa	44 (1.4)
Marital status	
Cohabiting	18 (0.6)
Divorced	290 (9.1)
Married	1841 (57.5)
Single	1055 (32.9)
Income generating activity	
No	1925 (60.1)
Yes	1279 (39.9)
Region	
Mjini Magharibi	1519 (47.4)
Kaskazini Pemba	546 (17.0)
Kaskazini Unguja	438 (13.7)
Kusini Pemba	385 (12.0)
Kusini Unguja	316 (9.9)
District	
Magharibi	977 (30.5)
Mjini	542 (16.9)
Kaskazini A	328 (10.2)
Micheweni	302 (9.4)
Wete	244 (7.6)
Kati	218 (6.8)
Chake Chake	194 (6.1)
Mkoani	191 (6)
Kaskazini B	110 (3.4)
Kusini	98 (3.1)

7.2 Sources of TB information and TB perception

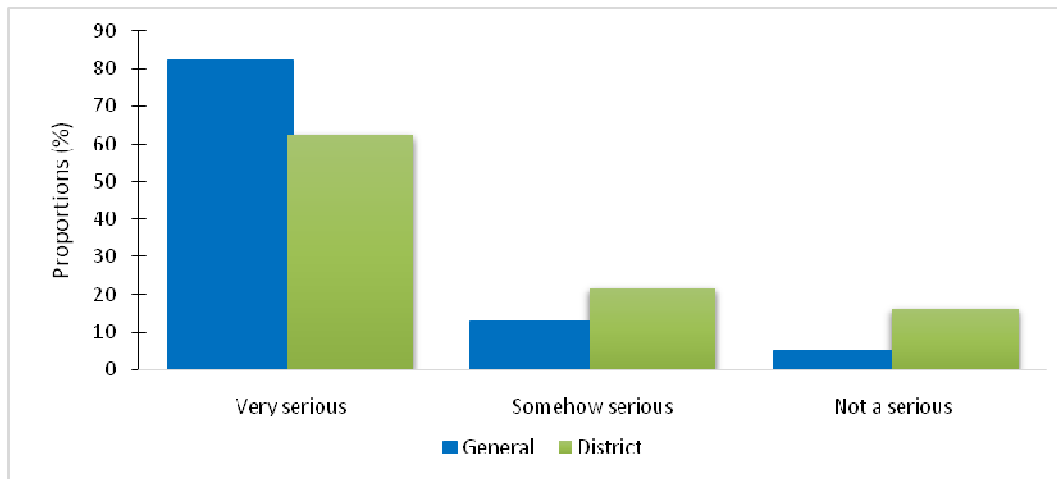
Majority (44 %) of the study participants cited that radio was their source of Information on TB whereas 29.9% of participants were informed by health workers and 29% of study participants were informed on TB by their family member. Only 0.8 participants were informed on TB by religious leaders (Table 3).

Table 3. The source of TB information of the study participants, Zanzibar, 2016.

Source of TB information	No (%)
Radio	1411 (44.0)
Health care workers	958 (29.9)
Family member	930 (29.0)
Television	738 (23.0)
Teachers	332 (10.4)
Leaflets	299 (9.3)
Do not remember	273 (8.5)
Advertisements	195 (6.1)
Newspaper and magazine	130 (4.1)
Religious leaders	25 (0.8)
Other	262 (8.2)

It was observed that, in general majority (82.2%) of the respondent's perceived TB disease as a very serious disease, while few (5%) responded as somehow serious disease. Whereas the perception of TB in study participants at their areas were graded much lower in a very serious category (see Figure 2).

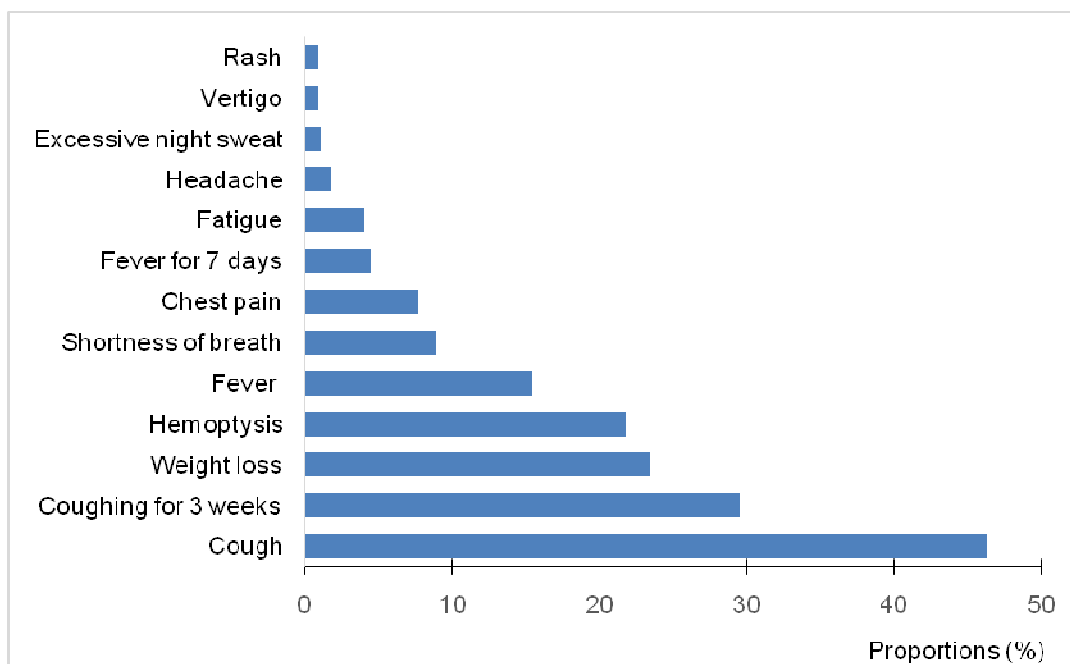
Figure 2. Perception of the seriousness of TB diseases by the study participants as a general and at district Zanzibar, 2016.



7.3 Knowledge on symptoms, transmission, prevention, treatment and people at risk of getting TB.

The commonest symptom reported was cough in 1484 (46.3%) followed by cough for 3 weeks (29.5%) and weight loss (23.4%).

Figure 3. Proportions of symptoms of TB as reported by the community respondents, Zanzibar, 2016.



Summary of symptoms reported by the community respondents and further categorization are shown in Table 4. We further grouped the symptoms that are similar i.e cough and coughing for 3 weeks as cough; and fever and fever for 7 days as fever, and regrouped these symptoms into five classical TB symptoms as recommended by WHO. The least mentioned symptom was excessive night sweat by 35 (1.1%) study participants.

The similar picture was observed when we analyzed for 983 study participants who mentioned only one symptom. Of interest, we observed 880 (27.5%) could not mention a symptom of TB. Meanwhile only two community respondents could mention all five TB related symptoms. Grouping the number of symptoms to levels of knowledge of symptoms, we observed only 95 (3.0) of the study participants could mentioned between 3-5 TB symptoms.

Table 4. TB symptoms as reported by the study participants grouped by all symptoms reported, classical TB symptoms and level of knowledge, Zanzibar, 2016.

Symptoms/categories	No. (%)
All symptoms reported by the study participants	
Cough	1484 (46.3)
Coughing for 3 weeks	945 (29.5)
Weight loss	751 (23.4)
Hemoptysis	697 (21.8)
Fever	495 (15.4)
Shortness of breath	281 (8.8)
Chest pain	247 (7.7)
Fever for 7 days	140 (4.4)
Fatigue	129 (4)
Headache	55 (1.7)
Excessive night sweat	35 (1.1)
Vertigo	30 (0.9)
Rash	26 (0.8)
Classical TB symptoms	
Cough (cough or cough for 3 weeks)	2136 (66.7)
Haemoptysis	697 (21.8)
Weight loss	751 (23.4)
Fever (fever or fever for 7 days)	603 (18.8)
Excessive night sweat	35 (1.1)
Study participants who mentioned only TB symptom (n=983)	
Cough	848 (86.27)
Haemoptysis	77 (7.83)
Weight loss	30 (3.05)
Fever	27 (2.75)
Excessive night sweat	1 (0.1)
Number of symptoms mentioned by study participants (WHO)	
None	880 (27.5)
One	983 (30.7)
Two	881 (27.5)
Three	365 (11.4)
Four	93 (2.9)
Five	2 (0.1)
TB symptoms knowledge categories	
No knowledge	880 (27.5)
Low knowledge	983 (30.7)
Moderate knowledge	1246 (38.9)
High knowledge	95 (3.0)

Definition:

No knowledge is defined as no any cardinal symptom of TB was mentioned by the study participants,

Low knowledge is when one to two cardinal symptoms of TB was/were mentioned,

Moderate knowledge is when study participants mentioned three to four cardinal symptoms of TB

High knowledge is when study participants mentioned five to six cardinal symptoms of TB

The transmission and prevention knowledge are presented in Table 5. We observed that 1640 (51.2%) of the study participants could correctly mention that TB was transmitted through airborne. A much lower number of participants 1107 (34.6%) said covering mouth while coughing could prevent TB. Few of study participants claimed that TB is transmitted through handshaking, eating same plate with TB patients and touching some of public items. However, majority (44.9%) of study participants do not know how TB infection can be prevented.

Table 5. Assessment of knowledge of TB transmission and prevention Zanzibar, 2016.

Ways	No (%)
Transmission route	
Airborne	1640 (51.2)
Handshakes	162 (5.1)
Utensils	159 (5.0)
Eating same plate	108 (3.4)
Touch public items	39 (1.2)
Do not know	1251 (39)
Others	313 (9.8)
Reported means of TB prevention	
Covering mouth	1107 (34.6)
Avoid sharing utensils	248 (7.7)
Avoid hand shake	213 (6.6)
Hand washing	48 (1.5)
Good nutrition	18 (0.6)
Praying	19 (0.6)
Closing windows home	12 (0.4)
Do not know	1440 (44.9)
Others	505 (15.8)

7.3.1 Knowledge of TB by characteristics of study participants

It was observed that almost over three quarters of the study participants (88.3%) with advance education level had good knowledge of TB symptoms (see Figure 4), and more than three quarters (80.4%) of study participants with good knowledge of TB came from Kusini Unguja region (see Figure 5).

Figure 4. Levels of good knowledge of TB symptoms by education level, Zanzibar, 2016.

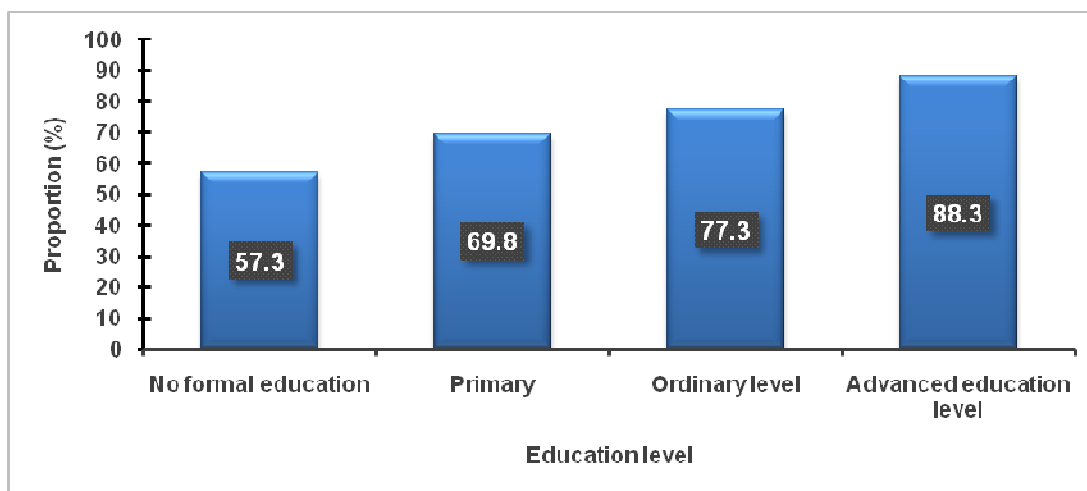
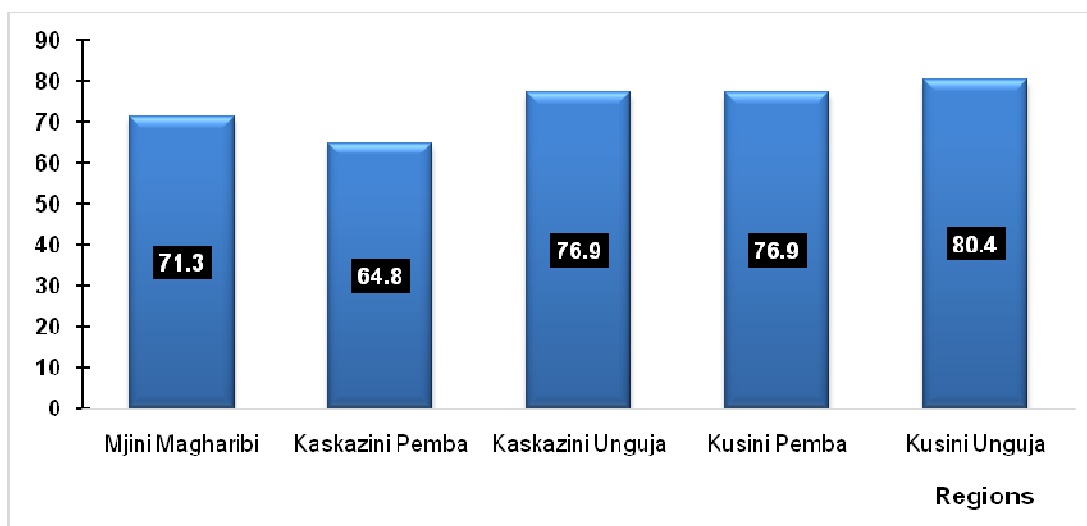


Figure 5. Levels of good knowledge on TB symptoms by region, Zanzibar, 2016.



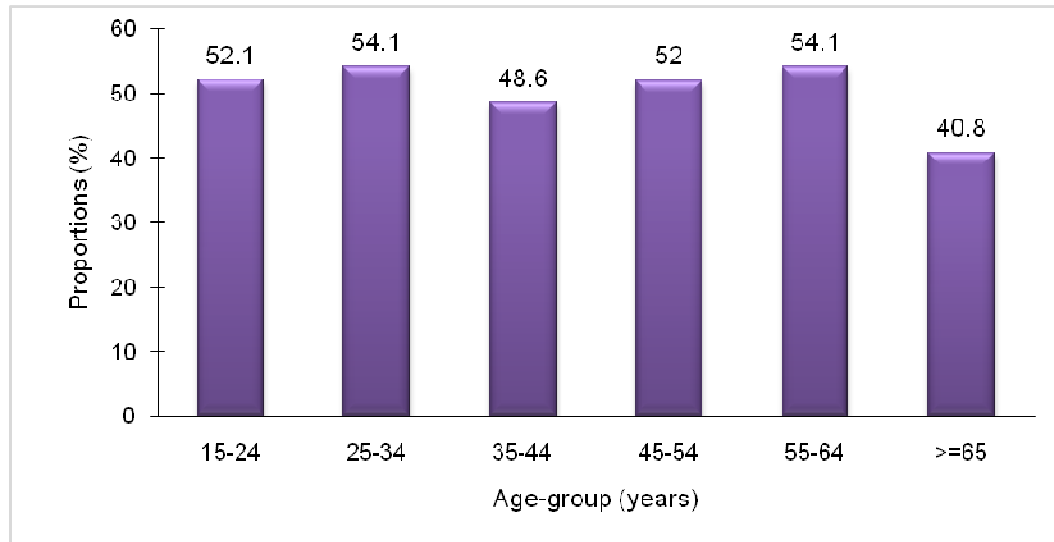
Men had good knowledge of TB symptoms compared to women study respondents in this study (74.9 versus 71.3, $p=0.031$). The districts with the largest number of participants with good knowledge of TB symptoms include Mkoani, followed by Kati and Kaskazini A with proportions of 90.1%, 82.6 and 78% Kaskazini A respectively (see Table 6).

Table 6. Good knowledge of TB symptoms as defined by number of symptoms reported by the study participants, Zanzibar, 2016.

Characteristics	Good knowledge of TB symptoms			p-value
	Total No	Yes No (%)	No No (%)	
Age groups (years)				0.12
15-24	1035	744 (71.9)	291 (28.1)	
25-34	636	452 (71.1)	184 (28.9)	
35-44	457	322 (70.5)	135 (29.5)	
45-54	465	360 (77.4)	105 (22.6)	
55-64	327	245 (74.9)	82 (25.1)	
>=65	284	201 (70.8)	83 (29.2)	
Sex				0.031
Female	2094	1493 (71.3)	601 (28.7)	
Male	1110	831 (74.9)	279 (25.1)	
Education level				<0.001
No formal education	572	328 (57.3)	244 (42.7)	
Primary	786	549 (69.8)	237 (30.2)	
Ordinary level	1667	1289 (77.3)	378 (22.7)	
Advanced education level	179	158 (88.3)	21 (11.7)	
Marital status				0.007
Single	1055	780 (73.9)	275 (26.1)	
Divorced	290	188 (64.8)	102 (35.2)	
Cohabit/married	1859	1356 (72.9)	503 (27.1)	
Income generating activity				0.002
No	1925	1358 (70.5)	567 (29.5)	
Yes	1279	966 (75.5)	313 (24.5)	
Region				<0.001
Mjini Magharibi	1519	1083 (71.3)	436 (28.7)	
Kaskazini Pemba	546	354 (64.8)	192 (35.2)	
Kaskazini Unguja	438	337 (76.9)	101 (23.1)	
Kusini Pemba	385	296 (76.9)	89 (23.1)	
Kusini Unguja	316	254 (80.4)	62 (19.6)	
Districts				<0.001
Magharibi	977	695 (71.1)	282 (28.9)	
Mjini	542	388 (71.6)	154 (28.4)	
Kaskazini A	328	256 (78.0)	72 (22)	
Micheweni	302	182 (60.3)	120 (39.7)	
Wete	244	172 (70.5)	72 (29.5)	
Kati	218	180 (82.6)	38 (17.4)	
Chake Chake	194	124 (63.9)	70 (36.1)	
Mkoani	191	172 (90.1)	19 (9.9)	
Kaskazini B	110	81 (73.6)	29 (26.4)	
Kusini	98	74 (75.5)	24 (24.5)	

The study participants with age groups 25-34 years and 55-64 years had the highest proportions of individuals with good knowledge on TB transmission as shown in Figure 6. The study participants with advanced education level, similar to symptoms knowledge, had highest number of individuals with good knowledge of TB transmission (75%) as shown in Table 7.

Figure 6. TB transmission knowledge of community respondents by age groups, Zanzibar, 2016.



The results of Table 7 summarize study participants' characteristics associated with knowledge level of transmission of TB. 73.4% of study participants from Kati district have good knowledge on transmission of TB while 38.1% of study participants from Chake Chake district have good knowledge on TB transmission.

Table 7. Baseline characteristic of study participants and knowledge of TB transmission, Zanzibar, 2016.

Characteristics	Good knowledge of TB transmission			p-value
	Total No	Yes No (%)	No No (%)	
Age groups (years)				0.004
15-24	1035	539 (52.1)	496 (47.9)	
25-34	636	344 (54.1)	292 (45.9)	
35-44	457	222 (48.6)	235 (51.4)	
45-54	465	242 (52.0)	223 (48.0)	
55-64	327	177 (54.1)	150 (45.9)	
>=65	284	116 (40.8)	168 (59.2)	
Sex				0.010
Female	2094	1037 (49.5)	1057 (50.5)	
Male	1110	603 (54.3)	507 (45.7)	
Education level				<0.001
No formal education	572	148 (25.9)	424 (74.1)	
Primary	786	357 (45.4)	429 (54.6)	
Ordinary level	1667	999 (59.9)	668 (40.1)	
Advanced education level	179	136 (76.0)	43 (24.0)	
Marital status				<0.001
Single	1055	585 (55.5)	470 (44.5)	
Divorced	290	121 (41.7)	169 (58.3)	
Cohabit/married	1859	934 (50.2)	925 (49.8)	
Income generating activity				<0.001
No	1925	914 (47.5)	1011 (52.5)	
Yes	1279	726 (56.8)	553 (43.2)	
Region				<0.001
Mjini Magharibi	1519	849 (55.9)	670 (44.1)	
Kaskazini Pemba	546	240 (44.0)	306 (56.0)	
Kaskazini Unguja	438	189 (43.2)	249 (56.8)	
Kusini Pemba	385	154 (40.0)	231 (60.0)	
Kusini Unguja	316	208 (65.8)	108 (34.2)	
Districts				<0.001
Magharibi	977	564 (57.7)	413 (42.3)	
Mjini	542	285 (52.6)	257 (47.4)	
Kaskazini A	328	134 (40.9)	194 (59.1)	
Micheweni	302	118 (39.1)	184 (60.9)	
Wete	244	122 (50.0)	122 (50.0)	
Kati	218	160 (73.4)	58 (26.6)	
Chake Chake	194	74 (38.1)	120 (61.9)	
Mkoani	191	80 (41.9)	111 (58.1)	
Kaskazini B	110	55 (50.0)	55 (50.0)	
Kusini	98	48 (49.0)	50 (50.0)	

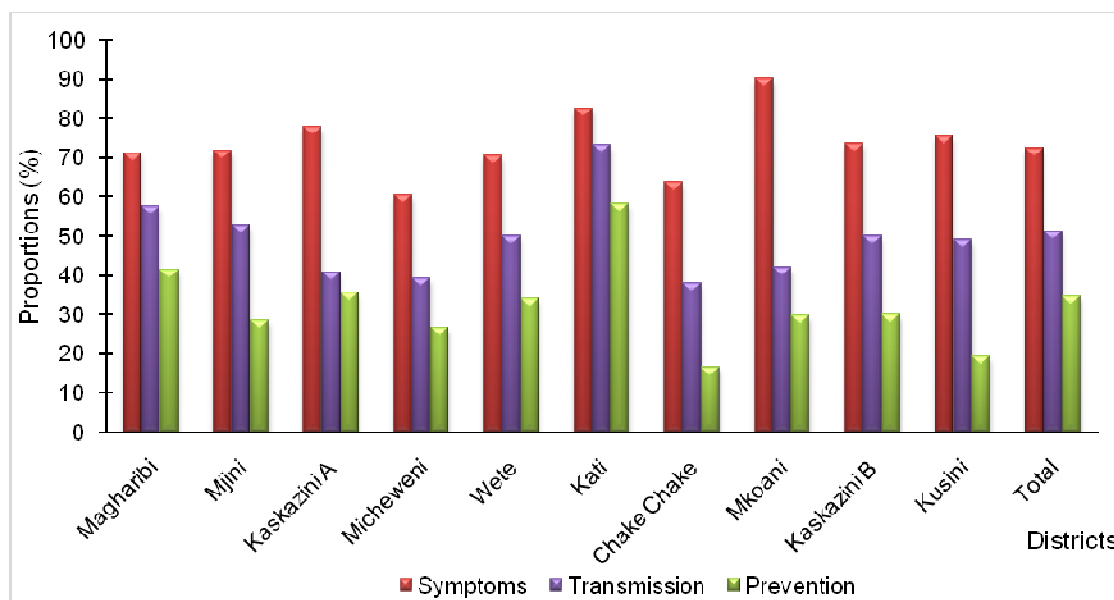
The knowledge of TB prevention is presented in Table 8, and was highest among individuals with advance education level (53.6%), participants from Kati district had highest knowledge in TB prevention (58.3%) followed by participants from Kaskazini A district (35.7%).

Table 8. Knowledge of TB prevention among the study participants, Zanzibar, 2016.

Characteristics	Good knowledge of TB prevention			p-value
	Total No	Yes No (%)	No No (%)	
Age groups (years)				<0.001
15-24	1035	413 (39.9)	622 (60.1)	
25-34	636	225 (35.4)	411 (64.6)	
35-44	457	142 (31.1)	315 (68.9)	
45-54	465	150 (32.3)	315 (67.7)	
55-64	327	100 (30.6)	227 (69.4)	
>=65	284	77 (27.1)	207 (72.9)	
Sex				0.026
Female	2094	695 (33.2)	1399 (66.8)	
Male	1110	412 (37.1)	698 (62.9)	
Education level				<0.001
No formal education	572	88 (15.4)	484 (84.6)	
Primary	786	250 (31.8)	536 (68.2)	
Ordinary level	1667	673 (40.4)	994 (59.6)	
Advanced education level	179	96 (53.6)	83 (46.4)	
Marital status				<0.001
Single	1055	436 (41.3)	619 (58.7)	
Divorced	290	72 (24.8)	218 (75.2)	
Cohabit/married	1859	599 (32.2)	1260 (67.8)	
Income generating activity				0.285
No	1925	651 (33.8)	1274 (66.2)	
Yes	1279	456 (35.7)	823 (64.3)	
Region				<0.001
Mjini Magharibi	1519	559 (36.8)	960 (63.2)	
Kaskazini Pemba	546	163 (29.9)	383 (70.1)	
Kaskazini Unguja	438	150 (34.2)	288 (65.8)	
Kusini Pemba	385	89 (23.1)	296 (76.9)	
Kusini Unguja	316	146 (46.2)	170 (53.8)	
Districts				<0.001
Magharibi	977	405 (41.5)	572 (58.5)	
Mjini	542	154 (28.4)	388 (71.6)	
Kaskazini A	328	117 (35.7)	211 (64.3)	
Micheweni	302	80 (26.5)	222 (73.5)	
Wete	244	83 (34.0)	161 (66.0)	
Kati	218	127 (58.3)	91 (41.7)	
Chake Chake	194	32 (16.5)	162 (83.5)	
Mkoani	191	57 (29.8)	134 (70.2)	
Kaskazini B	110	33 (30.0)	77 (70.0)	
Kusini	98	19 (19.4)	79 (80.6)	

Figure 7 shows district performance for knowledge on TB symptoms, transmission and prevention which varies across the districts. However, Kati district seem to show overall good knowledge in the three categories.

Figure 7. A comparison of districts survey on the knowledge of TB related symptoms, TB transmission and TB prevention, Zanzibar, 2016.



We then combined the three TB knowledge sub-categories of symptoms, transmission and prevention and knowing all the three categories as good knowledge. About a third (29.9%) of the study participants had good knowledge TB. The summary baseline characteristics of study participants and good knowledge of TB are summarized in Table 9.

The combined knowledge of symptoms, transmission and prevention among the study participants, showed that more than a half (54.1%) of study participants from Kati district have good combined knowledge of TB, followed by Magharibi district (35.3%) and Kaskazini A (32.9%). It was observed that more than a third (35.0%) of study participants of aged between 15 – 24 years has good combined knowledge of TB. Almost half (48.6) of the study participants with advanced education and a third of (35.9%) single individuals had overall good knowledge of TB.

Table 9. Combined knowledge of symptoms, transmission and prevention among the study participants

Characteristics	Good combined knowledge			p-value
	Total No	Yes No (%)	No No (%)	
Age groups (years)				<0.001
15-24	1035	362 (35.0)	673 (65.0)	
25-34	636	189 (29.7)	447 (70.3)	
35-44	457	118 (25.8)	339 (74.2)	
45-54	465	132 (28.4)	333 (71.6)	
55-64	327	92 (28.1)	235 (71.9)	
>=65	284	65 (22.9)	219 (77.1)	
Sex				0.14
Female	2094	608 (29.0)	1486 (71.0)	
Male	1110	350 (31.5)	760 (68.5)	
Education level				0.001
No formal education	572	65 (11.4)	507 (88.6)	
Primary	786	211 (26.8)	575 (73.2)	
Ordinary level	1667	595 (35.7)	1072 (64.3)	
Advanced education level	179	87 (48.6)	92 (51.4)	
Marital status				<0.001
Single	1055	379 (35.9)	676 (64.1)	
Divorced	290	63 (21.7)	227 (78.3)	
Cohabit/married	1859	516 (27.8)	1343 (72.2)	
Income generating activity				0.41
No	1925	565 (29.4)	1360 (70.6)	
Yes	1279	393 (30.7)	886 (69.3)	
Region				<0.001
Mjini Magharibi	1519	468 (30.8)	1051 (69.2)	
Kaskazini Pemba	546	143 (26.2)	403 (73.8)	
Kaskazini Unguja	438	133 (30.4)	305 (69.6)	
Kusini Pemba	385	79 (20.5)	306 (79.5)	
Kusini Unguja	316	135 (42.7)	181 (57.3)	
Districts				<0.001
Magharibi	977	345 (35.3)	632 (64.7)	
Mjini	542	123 (22.7)	419 (77.3)	
Kaskazini A	328	108 (32.9)	220 (67.1)	
Micheweni	302	67 (22.2)	235 (77.8)	
Wete	244	76 (31.1)	168 (68.9)	
Kati	218	118 (54.1)	100 (45.9)	
Chake Chake	194	26 (13.4)	168 (86.6)	
Mkoani	191	53 (27.7)	138 (72.3)	
Kaskazini B	110	25 (22.7)	85 (77.3)	
Kusini	98	17 (17.3)	81 (82.7)	

From the logistic regression model (Table 10) on the baseline characteristics that may influence good knowledge, we observe the level of education to be the strong predictor of knowledge in our study participants. The higher the level of education the likelihood of having good knowledge on TB symptoms, transmission and prevention.

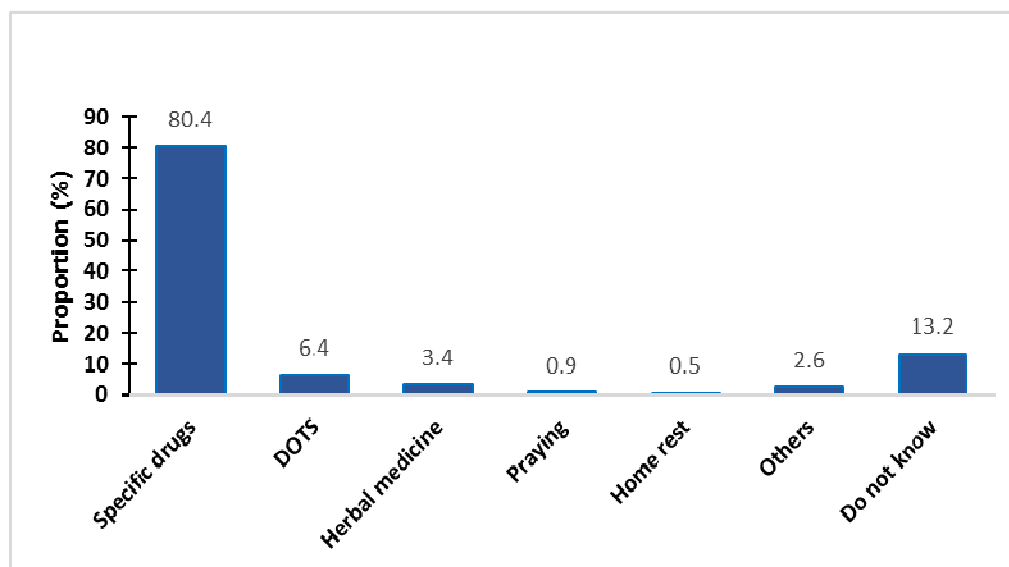
Table 10. Factors associate good knowledge of TB symptoms among the study participants

Characteristics	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age groups (years)		<0.001		0.30
15-24	1.00		1.00	
25-34	0.79 (0.64-0.97)		0.88 (0.69-1.13)	
35-44	0.65 (0.51-0.83)		0.94 (0.69-1.28)	
45-54	0.74 (0.58-0.94)		1.13 (0.83-1.55)	
55-64	0.73 (0.55-0.96)		1.15 (0.81-1.63)	
>=65	0.55 (0.41-0.75)		1.26 (0.85-1.88)	
Sex		0.14		0.91
Female	1.00		1.00	
Male	1.13 (0.96-1.32)		1.01 (0.85-1.2)	
Education level		<0.001		<0.001
No formal education	1.00		1.00	
Primary	2.86 (2.11-3.87)		2.78 (2.03-3.82)	
Ordinary	4.33 (3.28-5.71)		4.23 (3.11-5.74)	
Advanced	7.38 (4.99-10.9)		7.38 (4.86-11.2)	
Marital status		<0.001		0.24
Single	1.00		1.00	
Divorced	0.5 (0.36-0.67)		0.72 (0.5-1.05)	
Cohabit/married	0.69 (0.58-0.81)		0.89 (0.7-1.12)	
Income generating activity		0.41		0.64
No	1.00		1.00	
Yes	1.07 (0.92-1.25)		0.96 (0.8-1.15)	
Region		<0.001		0.060
Mjini Magharibi	1.00		1.00	
Kaskazini Pemba	0.8 (0.64-0.99)		0.91 (0.72-1.14)	
Kaskazini Unguja	0.58 (0.44-0.76)		1.11 (0.88-1.41)	
Kusini Pemba	0.98 (0.78-1.23)		0.72 (0.55-0.96)	
Kusini Unguja	1.67 (1.31-2.15)		1.8 (1.39-2.34)	

7.3.2 Knowledge of TB treatment

The majority (90%) of the study participants know that TB is curable. Almost 80.4% of study participants know that TB is treated by specific drugs though 0.9% of study participants believe that TB can be cured by praying (see Figure 8).

Figure 8. The proportion of participants with knowledge that TB is curable and on treatment of TB, Zanzibar, 2016.



7.3.3 Knowledge of TB risk groups

We also observed that more than two thirds (73.1%) of study participants know that anybody can get TB while 20% of the study participants know that other individuals/groups can get TB (Table 11).

Table 11. Knowledge on who can get TB, Zanzibar, 2016.

Individuals/groups	No (%)
Anybody	2342 (73.1)
Alcoholics	118 (3.7)
Drug users	99 (3.1)
PLHWA	80 (2.5)
Homeless people	55 (1.7)
Poor	44 (1.4)
Prisoners	11 (0.3)
others	650 (20.3)

7.4 TB attitudes and stigma

The self-assessment risk of TB is high at 81.9% of study participants responded that they are at risk of getting TB. If they were found to have TB, 41.1% of study participants would react by being sorrowful and would tell their parents (44.9%) as shown in Table 12.

Table 12. Self-assessment risk of getting TB, reaction and who to talk to.

Risk/reaction (n=3204)	No (%)
Self-assessment risk of getting TB	
Yes	2625 (81.9)
No	579 (18.1)
Reaction if you were found out that you have TB	
Sorrow	1318 (41.1)
Accept	877 (27.4)
Fear	574 (17.9)
Surprise	307 (9.6)
Shame	229 (7.1)
Feel shy	130 (4.1)
Other	211 (6.6)
Do not know	90 (2.8)
Talk to about your illness if you had TB	
Parent	1440 (44.9)
Spouse	1403 (43.8)
Doctor	856 (26.7)
Children	510 (15.9)
Other family member	415 (13)
Close friend	116 (3.6)
Other	72 (2.2)
No one	26 (0.8)

7.5 Practice towards TB symptoms

When a person has TB symptoms, 97.2% of study participants responded that they would go to the health facility, 2.5% would go to the pharmacy and 0.3% would either undergo self-treatment or would go to the tradition healer. Majority would only go if they are sure of the TB symptoms (67.6%) and only 31 won't go even if they have symptoms. Of the 31 who could not go to the health facility, 12 would not go because they are not sure where to go (Table 13).

Table 13. Proportion of participant’s decision, timing and reasons for TB care seeking, Zanzibar, 2016.

Responses	No (%)
Decision with what to do when a person has TB symptoms	
Health facility	3115 (97.2)
Pharmacy	79 (2.5)
Self-treatment with herbs	11 (0.3)
Traditional healer	9 (0.3)
Other	13 (0.4)
Which point would you go to the health facility?	
If I am sure of TB symptoms	2166 (67.6)
No relief self-medication	585 (18.3)
Symptoms lasting for 3 weeks	422 (13.2)
Won’t go	31 (1)
Reasons of not going to health facility (n=31)	
Not sure where to go	12 (38.7)
Cost	11 (35.5)
Fear for the disease	3 (9.7)
Do not trust the health care workers	1 (3.2)
Other	4 (12.9)

The study participants had indicated that majority (67.1%) of them would feel the desire to help a TB patients. Fewer had reported they would stay away (12.7), or fear of getting infected and even saying it is their problem (2.3) as shown in Table 14.

Overall the attitude of community is support (50.7) if there is a TB patient in the community. Meanwhile 17.4% of study participants reported that TB patients will be rejected by the community. TB patients would also be involved in community activities, but few of the respondents admitted that TB patients can be stigmatized.

Table 14. Community regards and general feeling on TB patients, Zanzibar, 2016.

Item	No (%)
Feelings about people with TB disease	
Desire to help	2149 (67.1)
Stay away	406 (12.7)
Fear of infection	244 (7.6)
No feeling	216 (6.7)
It is their problem	75 (2.3)
Other	114 (3.6)
How is a person who has TB usually regarded/treated?	
Supports	1626 (50.7)
Friendly	875 (27.3)
Reject	557 (17.4)
Other	146 (4.6)

7.5.1 TB and HIV relationship

More than two thirds (86.6%) of study participants reported that yes HIV positive patients should be concerned about TB. More than half (51.2%) of study participants reported that HIV positive patients should be concerned about TB because they are likely to develop it. Nevertheless, 66.3% of study participants responded that HIV positive patients should not be concerned about TB but do not know the reason.

As regards to HIV testing for TB patients, majority (85.8%) of study participants responded that TB patients should be tested for HIV. Almost a half (46.5%) of study participants reported that it is important for TB patients to test for HIV because TB patients are more likely to have HIV. Almost two thirds (66.2%) who reported that it is not necessary for TB patient to test for HIV do not know the reason though 17.7% reported that TB has no relationship with HIV (see Table 15).

Table 15. Community practices toward TB and HIV, Zanzibar, 2016.

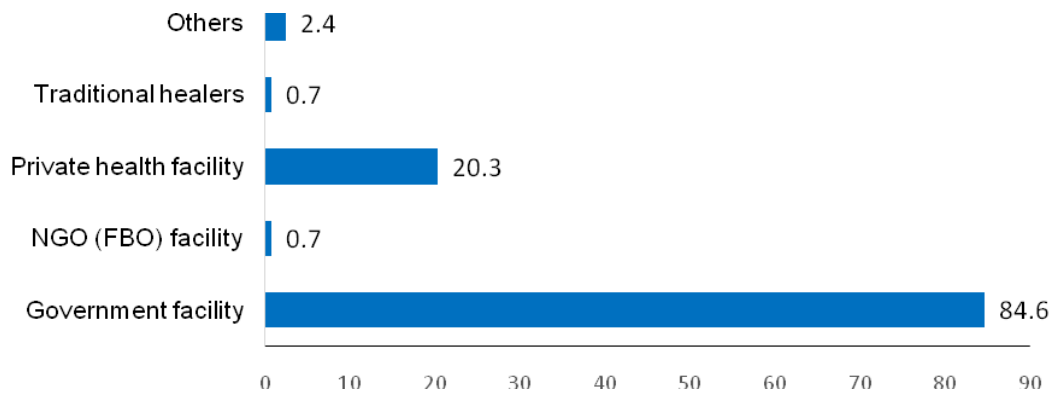
TB disease in HIV-positive patients	No (%)
Should HIV-positive patients be concerned about TB (n=3204)	
Yes	2,774 (86.6)
No	430 (13.4)
Yes, why HIV positive concerned about TB (n=2774)	
More likely to develop TB	1419 (51.2)
Same virus	154 (5.6)
Do not know	337 (12.1)
Other	864 (31.1)
No, HIV positive should not be concerned about TB (n=430)	
No relationship	54 (12.6)
Less likely to develop TB	8 (1.9)
Do not know	285 (66.3)
Other	83 (19.3)
HIV Testing in TB patients	
Test for HIV (n=3204)	
Yes	2749 (85.8)
No	455 (14.2)
Reasons, testing HIV among TB patients (n=2749)	
More likely to have HIV	1277 (46.5)
Same bacteria	180 (6.5)
Do not know	399 (14.5)
Other	893 (32.5)
Reasons for not testing HIV for TB patients (n=455)	
No relationship	78 (17.1)
Less likely to have HIV	8 (1.8)
Do not know	301 (66.2)
Other	68 (14.9)

7.6 Health seeking behavior of study participants

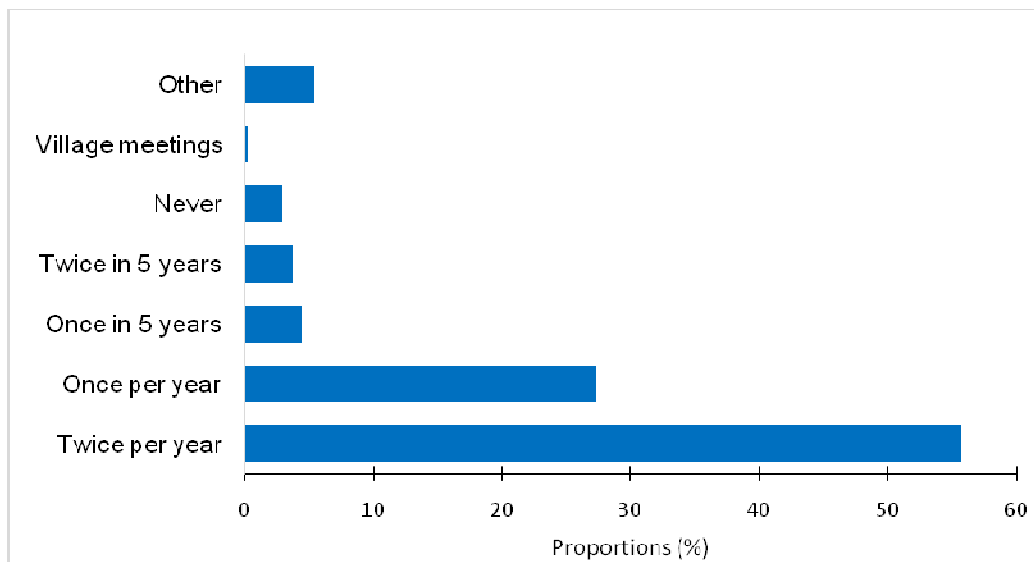
Most study participants reported that they would seek health care services from the government health facilities at (84.6%) followed by private health facility at (20.3%). Traditional healers are only consulted by 0.7% of the study population as shown in Figure 9.

Figure 9. The health-seeking behaviour of the study participants. A). The proportion of where study participants go if they are sick, or to treat a general health problem. B). The proportion of the number of times they visit the health facility, Zanzibar, 2016.

A



B



8 RESULTS – HEALTH CARE WORKERS

8.1 Description of the health care workers

A total of 228 health care workers were interviewed. Of whom, the majority were in the age-group of 25-34 years. There were more women (64.5%) health workers than men (35.5%). More than a third (35.5%) of health care workers interviewed are working in Magharibi district while and Kaskazini B had fewer number of health care workers i.e. 2 (0.9%).

More than half of health care workers interviewed (75%) hold a diploma level of education (see Figure 10) and 79.8% of health care workers interviewed are married couples. Regarding duration of work, 50.9% of health care workers have stayed at their working station for more than 3 years. Table 16 summarized the baseline characteristics of the health care workers who were interviewed in the KAP study.

Figure 10. The frequency distribution of education levels among HCW interviewed, Zanzibar, 2016.

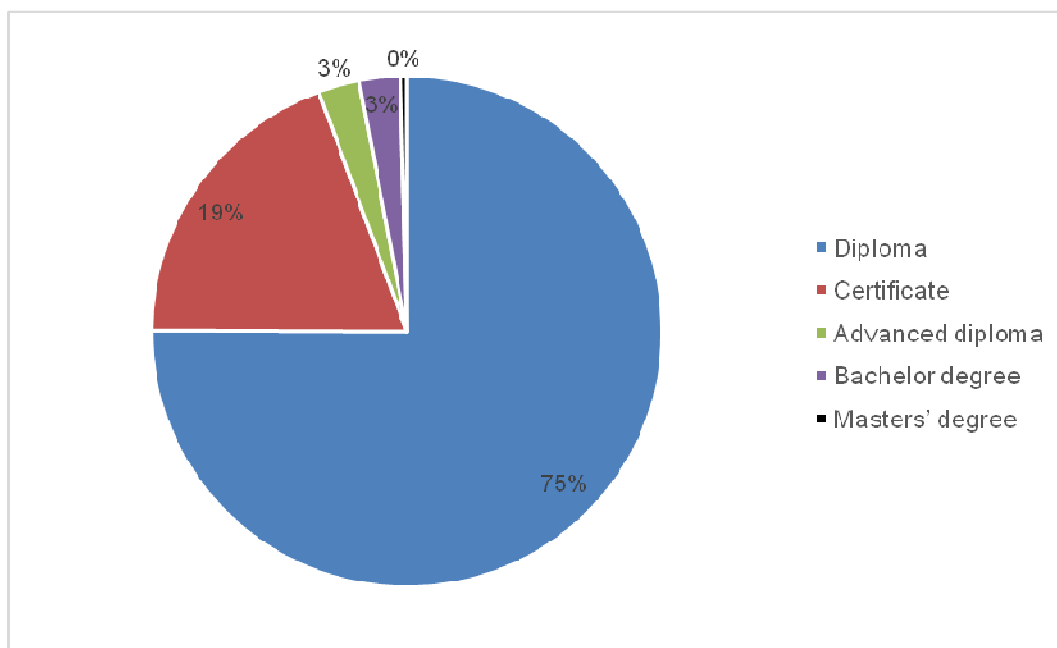


Table 16. Baseline Characteristics of health care workers interviewed, Zanzibar, 2016.

Characteristics	No. (%)
Age groups (years)	
15-24	14 (6.1)
25-34	103 (45.2)
35-44	38 (16.7)
45-54	44 (19.3)
55-64	27 (11.8)
>=65	2 (0.9)
Sex	
Female	147 (64.5)
Male	81 (35.5)
Marital status	
Married	182 (79.8)
Single	35 (15.4)
Divorced	8 (3.5)
Widow	3 (1.3)
Education level	
Diploma	171 (75)
Certificate	44 (19.3)
Advanced diploma	6 (2.6)
Bachelor degree	6 (2.6)
Masters' degree	1 (0.4)
Designation	No (%)
Nurse	132 (57.9)
Clinician	39 (17.1)
Lab Technician	23 (10.1)
Health Officer	16 (7)
Pharmacy	15 (6.6)
Radiographer	3 (1.3)
Duration at work	
More than three years	116 (50.9)
Less than one year	62 (27.2)
Two-three years	50 (21.9)
Region	
Mjini Magharibi	81 (35.5)
Pemba Kaskazini	66 (28.9)
Unguja Kaskazini	38 (16.7)
Unguja Kusini	25 (11)
Pemba Kusini	18 (7.9)
District	
Magharibi	49 (21.5)
Wete	44 (19.3)
Kaskazini A	36 (15.8)
Mjini	32 (14)
Micheweni	22 (9.6)
Kusini	15 (6.6)
Chake Chake	11 (4.8)
Kati	10 (4.4)
Mkoani	7 (3.1)
Kaskazini B	2 (0.9)

Regarding training on TB, 54.8 % of health workers have not received any training on TB though 74.1% of health workers provide health education as part of their duty at the health facility. For those health workers who provide health education at their units, 44.7% provide it on monthly basis where as 25.5% provide it on weekly basis (Table 17).

Table 17. Health education issues with the health care workers

Item	No. (%)
Ever received training on TB	
No	125 (54.8)
Yes	103 (45.2)
Providing health education part of your duty at the unit	
Yes	169 (74.1)
No	59 (25.9)
Currently provide education on TB	
No	134 (58.8)
Yes	94 (41.2)
Frequency of providing TB health education (n=94)	
Monthly	42 (44.7)
Weekly	24 (25.5)
Daily	13 (13.8)
Other	15 (16)

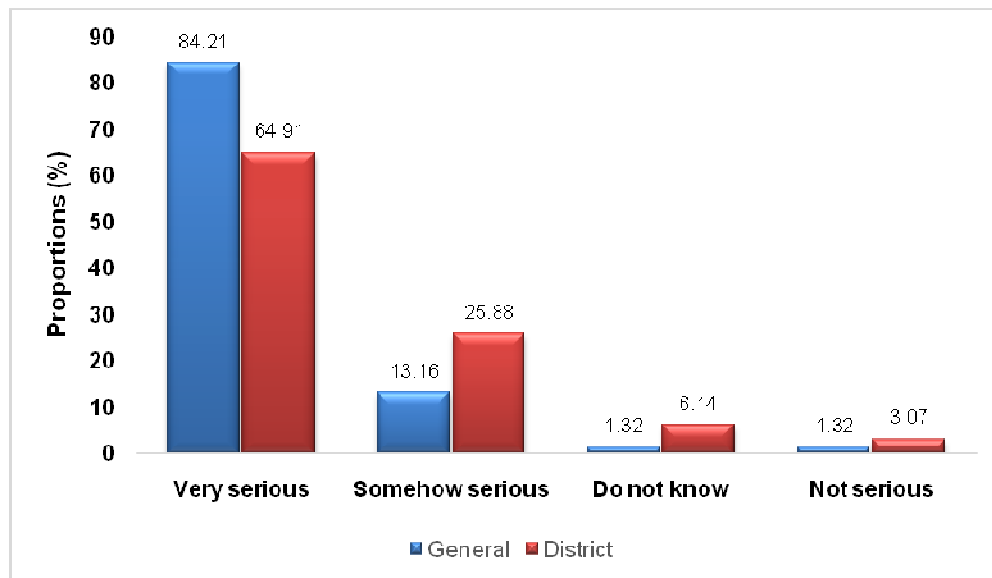
There is a considerable exchange of TB information among health care workers, as 46.5% have had TB information from a fellow health care workers. Noteworthy, is the radio and television are mentioned as a good source of information among health care workers who were interviewed (Table 18).

Table 18. Source of TB information for health care workers, Zanzibar, 2016.

HCW source of TB information (n=228)	No (%)
Health care workers	106 (46.5)
Radio	93 (40.8)
Teachers	76 (33.3)
Television	74 (32.5)
Leaflets	61 (26.8)
Newspaper magazine	38 (16.7)
Advertisements	21 (9.2)
Family member	18 (7.9)
Religious leaders	3 (1.3)
Other	40 (17.5)

HCW view TB as a very serious disease both in general as well as at their area. Very few of the HCW said TB is not a serious disease as shown in Figure 11.

Figure 11. HCW perception of seriousness of TB in general in the country and at the district, Zanzibar, 2016.



8.2 Knowledge of TB symptoms, modes of TB transmission and prevention

The commonest symptom reported was cough by 96.1% of the HCW and only one of the HCW could not mention any TB related symptom. Fifteen (5.5%) of the HCW had mentioned all the five classical TB symptoms listed by the WHO. These 15 HCW were also graded to have high knowledge of TB as they could report more than 3 TB related symptoms. Overall the knowledge of TB related symptoms is high over 70% (Table 19).

Table 19. Table of reported symptoms, number of classical symptoms and levels of symptoms knowledge as reported by HCW, Zanzibar, 2016.

Reported symptoms	NO (%)
Symptoms	
Cough	219 (96.1)
Fever	171 (75)
Cough for 3weeks	161 (70.6)
Weight loss	145 (63.6)
Hemoptysis	136 (59.6)
Fever for 7 days	62 (27.2)
Chest pain	37 (16.2)
Fatigue	37 (16.2)
Shortness of breath	35 (15.4)
Excessive night sweats	31 (13.6)
Headache	8 (3.5)
Rash	5 (2.2)
TB symptoms knowledge grading	
None	1 (0.4)
One	8 (3.5)
Two	56 (24.6)
Three	85 (37.3)
Four	63 (27.6)
Five	15 (6.6)
TB knowledge categories	
No knowledge	1 (0.4)
Low knowledge	64 (28.1)
Moderate knowledge	148 (64.9)
High knowledge	15 (6.6)

Definition of TB knowledge (based on TB related symptoms by WHO)

No knowledge – no any symptoms mentioned

Low knowledge – one to two symptoms mentioned

Moderate knowledge – three to four symptoms mentioned

High knowledge – all the five symptoms mentioned

On analyzing the modes of transmission, 98.7% could correctly identify that TB is transmitted through air. It is worth noting that, inappropriate modes of TB transmission were mentioned i.e. handshakes or sharing utensils. Further on, covering mouth while coughing (82.5%) was the most found methods of TB prevention mentioned by HCW. Other inappropriate modes of TB transmission such as closing windows at home were mentioned by the HCW as shown in Table 20.

Table 20. Knowledge on TB transmission and prevention, Zanzibar, 2016.

Methods	No (%)
Transmission	
Airborne	225 (98.7)
Handshakes	5 (2.2)
Touch public items	3 (1.3)
Sharing utensils	2 (0.9)
Eating the same plate	1 (0.4)
Do not know	2 (0.9)
Others	11 (4.8)
Prevention	
Covering mouth	188 (82.5)
Avoid sharing utensils	8 (3.5)
Hand washing	7 (3.1)
Avoid hand shake	3 (1.3)
Closing windows at home	2 (0.9)
Do not know	7 (3.1)
Others	46 (20.2)

8.3 Attitude towards TB

Overall, the HCW feels ready and has the desire to help (92.1%) TB patients. However, only few would fear or stay away from the TB patient. Over 50% of the HCW feel that the TB patients are supported in the community (see Table 21).

Table 21. The HCW feeling and regard towards TB patients, Zanzibar, 2016.

Attitude towards TB patient	No (%)
Feelings about people with TB disease	
Desire to help	210 (92.1)
Fear of getting infection	9 (3.9)
I will stay away	1 (0.4)
It is their problem	2 (0.9)
Other	6 (2.6)
How is a person who has TB usually regarded/treated?	
Support	116 (50.9)
Rejected	60 (26.3)
Friendly	45 (19.7)
Other	7 (3.1)

The reaction of having TB is sorrow (47.8%) and followed by accepting the disease (41.2%). There are a few of the HCW who would feel shy and shame (5.5% each) if they found

themselves having TB. But fear and surprise are also notable reactions on finding out about TB (Table 22).

For the HCW, a spouse (59.2%) is the likely person they would like to confide their TB disease status. Also, parents and doctors would also be the likely choice of a person to talk to in 38.2% and 36% respectively.

Table 22. HCW Reaction of knowing to have TB and who to talk to, Zanzibar, 2016.

Responses	No (%)
Reaction after knowing to have TB	
Sorrow	109 (47.8)
Accept	94 (41.2)
Fear	53 (23.2)
Surprise	29 (12.7)
Feeling shy	13 (5.7)
Shame	13 (5.7)
Other	10 (4.4)
Who to talk to	
Spouse	135 (59.2)
Parent	87 (38.2)
Doctor	82 (36.0)
Other family member	54 (23.7)
Children	33 (14.5)
Close friend	18 (7.9)
Other	10 (4.4)
No one	1 (0.4)

8.4 Practice on TB

The first response to getting a TB symptom is vital in the TB diagnosis cascade. Over half of the HCW (56.1%) chose to only go to the health facility once he/she is sure of the TB symptoms. The practice of self-medication is common and 18.4 would only seek medical care at the health facility, if only they get no relief of the TB symptoms (Table 23).

Table 23. The HCW practice if they get TB symptoms, Zanzibar, 2016.

Action	No (%)
If I am sure of TB symptoms	128 (56.1)
If symptoms last for 3 weeks	58 (25.4)
No relief after self-medication	42 (18.4)

8.4.1 TB and HIV relationship

We observed 98.2% of the HCW interviewed, agreed that HIV-positive patients should test for TB. Of the 224 HCW, 98.2% agreed that PLHWA are likely to develop TB. Only 4 of the HCW did indicate that HIV-positive patients should not test for TB (Table 24).

Table 24. HCWs Attitude toward HIV testing among TB patients, Zanzibar, 2016.

Responses	No. (%)
Agree to testing for HIV	
Yes	224 (98.2)
No	4 (1.8)
Why should HIV patients test for TB (n=224)	
More likely dev TB	198 (88.4)
Other	26 (11.6)
Why should HIV patients test for not TB	
They are less likely to develop TB	2 (50)
Other	2 (50)

SECTION FOUR

9 DISCUSSION

The KAP study provides valuable information that will guide the ZIHTLP in formulation of the ACSM strategy that is evidence based. The study was conducted in both islands of Unguja and Pemba from selected 30 Shehias of the five regions and 10 districts. The study assessed the levels of knowledge, attitude and practice on TB from the community members and HCW. We therefore discuss in detail the main findings of the KAP study and how they compare with other findings of KAP studies from similar or different settings.

9.1 Community respondents

Knowledge of TB in the community is vital for an individual increase suspicion index and self-screen resulting to a presumptive TB patients seeking TB diagnosis at the nearby health facility. We did observe in our study that there is general low knowledge on TB among the community members and HCW. The combined knowledge of TB symptoms, transmission and prevention was only in a third of the community respondents. Such a low knowledge was also found in the pastoral communities Maasai communities in Tanzania (10). A rather high knowledge of TB among community members was slightly over 50% in Bangladesh (18). The good knowledge among the community respondent is driven by education, as advanced education level was associated with good TB knowledge as also found in other studies in Philippines(19).The knowledge on TB is driven by education. In other words, the higher the education level, the more likely the person would know a combination of knowledge on TB symptoms, transmission and prevention (14).

Many of the respondents correctly identified modes of TB transmission and prevention. This was also observed in other study where transmission through air was mentioned (11), as found in studies done in high TB burden settings like Bangladesh (18,20). Though the airborne and covering mouth were the commonest mode of TB transmission and prevention respectively, they were still less than 60%. The good knowledge on transmission may be key to reducing TB transmission in the community.

We did observe that individuals would stigmatize TB patients, and these are more likely due to fear of the TB patients. Such a finding has been noted in other communities where fear of TB drive stigma, attitude and actions towards TB (6,7,9). Stigma is demonstrated by feeling sorry and ashamed as a reaction to have TB is mostly attributed to fear of TB (9), as also seen in our study with community respondents feeling sorry and shy away. For instance, feeling humiliated when any family member became infected with TB and community members not to disclose if any family member had TB, could potentially be drivers of stigma as reported in a study in Bangladesh (18). In a rather extreme situation, TB patients could be chased away from the communities (11).

Though traditional healers are less sought for care in our study, other studies on the contrary have shown that traditional healers are sought for care (10,11). The use of traditional healers is driven by culture and customs in respective community. The use of traditional healers may delay TB diagnosis and risk TB transmission (21, 22).

There is a general good knowledge on the relationship between TB and HIV as exemplified in our study. Especially in the community survey, there were high levels of knowledge on testing for HIV in TB patients and vice versa. We think such a knowledge, would have been due to knowledge gained from difference sources. These findings have been reported for instance in focused group discussion in Ghana (9).

9.2 Health care workers

The health care workers are the key component to diagnosing TB among presumptive TB patients upon arrival at the health facility and linking these patients to care. Therefore, HCW are expected to have high knowledge of TB, good attitude and practice. A combination of these would result to high TB suspicion index necessary to reduce diagnosis and treatment delay.

In our study, we have found moderate level 82.0% of knowledge of TB symptoms, transmission and prevention. Though, a study done among HCW in Peru had shown a lower knowledge level of around 67% (14) compared to our study. Such a difference, could be due to the differences in measurement of good knowledge from our study and a study in Peru (14), which used a numerical score while we have used a combination of knowing either TB

symptom, transmission and prevention. Similarly, a study from Mozambique reported that HCW scored just over 50% of the required knowledge score (23). The diversity of findings from different settings, warrants a sustained effort to increase awareness of TB.

Health care workers reported good knowledge of symptoms, mode of transmission and prevention. Specifically, HCW could mentioned the classical TB symptoms as also reported in studies done among HCW in South Africa (24). Cough hygiene as a modes of preventing transmission was commonest form of prevention as similarly reported in other studies in South Africa (24) and Philippines (14).

9.3 Recommendation

There are several recommendations that need to be considered in the development of the ACSM strategy as the result of this study

1. Knowledge package: there is a need to provide information on TB symptoms, transmission and prevention as a package. The knowledge on symptoms are key to increase TB diagnosis. Whereas knowledge on prevention and transmission reduce the transmission of TB in the community.
2. Good knowledge of TB is associated with level of education. It is therefore to use other sources of information that will target those with lower levels of education, so that we can impart more knowledge. This is important, as there are only few individuals in our study population who might have higher education levels.
3. Early access to care need to emphasized, as we did observe that most of the respondents would go to the health facility, if they proved the symptoms are sure of TB and if they are sick for at least 3 weeks. The delay is likely to perpetuate the transmission of TB in the community.

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11 APPENDICES LIST

Appendix 1. Sampled Shehia under each district using probability proportional to size (PPS). The sampling interval= 43,452.

Region	District	Shehia	Population	Cluster		
Kaskazini Unguja	Kaskazini A	Matemwe	5,014	1		
		Kidombo	3,147	2		
		Pale	1,216	3		
Kusini Unguja	Kaskazini B	Fujoni	3,147	4		
		Kati	4,185	5		
	Kusini	Dunga Kiembeni	1,938	6		
Mjini Magharibi	Magharibi	Kijini	2,634	7		
		Pangawe	26,275	8		
		Mwanakwerekwe	20,215	9		
		Mtoni Kidatu	16,612	10		
		Bububu	15,666	11		
		Mombasa	14,492	12		
		Kiembesamaki	11,760	13		
		Kisauni	9331	14		
		Chuini	6,158	15		
		Bumbwisudi	2,269	16		
		Mjini	Mwembemakumbi	8,354	17	
			Nyerere	9,657	18	
			Miembeni	6,095	19	
			Jang'ombe	6,122	20	
		Kaskazini Pemba	Wete	Migombani	7,164	21
				Bopwe	5,212	22
Micheweni	Kiungoni		3,112	23		
	Kiuyu Mbuyuni		6,416	24		
	Kinowe		4,380	25		
Kusini Pemba	Chake Chake	Majenzi	2,370	26		
		Ziwani	4,023	27		
	Mkoani	Kibokoni	2,584	28		
		Chokocho	4,539	29		
		Chumbageni	2,579	30		

Appendix 2. The list of selected Shehia with a composition of the study participants

Region	District	Shehia	Number of study participants	
Unguja North	North A	Matemwe	107	
		Kidombo	126	
		Pale	95	
Unguja South	North B	Fujoni	110	
	Central	Kidimni	118	
		Dunga Kiembeni	100	
Urban West	South	Kijini	98	
	West	Pangawe	97	
		Mwanakwerekwe	109	
		Mtoni Kidatu	102	
		Bububu	116	
		Mombasa	95	
		Kiembesamaki	117	
		Kisauni	108	
		Chuini	104	
		Bumbwisudi	129	
		Urban	Mwembemakumbi	130
			Nyerere	99
			Miembeni	99
			Jang'ombe	107
			Migombani	107
North Pemba	Wete	Bopwe	116	
	Micheweni	Kiungoni	128	
		Kiuyu Mbuyuni	104	
South Pemba	Chake Chake	Kinowe	99	
		Majenzi	99	
		Ziwani	94	
	Mkoani	Kibokoni	100	
		Chokocho	97	
		Chumbageni	94	