WATER TREATMENT AND SAFE STORAGE PRACTICES AMONG WOMEN IN KIUYU MBUYUNI (MICHEWENI DISTRICT), PEMBA

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Master of Public Health Dissertation
Muhimbili University of Health and Allied Sciences
October, 2016

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By

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A Dissertation Submitted in (Partial) Fulfilment of the Requirements for the Degree of Master of Public Health of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences
October, 2016

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a report titled "**Water treatment and safe storage practices among women in Kiuyu Mbuyuni (Micheweni District), Pemba,** in partial fulfillment of the requirements for the degree of Master of Public Heath of Muhimbili University of Health and Allied Sciences.

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Date

DECLARATION AND COPYRIGHT

I**, Zuwena Hamad Ali,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature…… Date…….

ACKNOWLEDGEMENT

First, I would like to thank Allah who always give me strength to fulfill this task.

My appreciation goes to my supervisor Dr. Larama MB Rongo and Co-supervisor, Hussein Mohamed who guided me throughout this study.

Special heartfelt thanks go to my parents Khadija Massoud and Hamad Ali for their financial and moral support and tolerance especially during hard time.

Lastly, but not the least I would like to thank my class mates for their support and encouragement.

DEDICATION

This dissertation is dedicated to my lovely Mom, for her patience regardless of loneliness faced during the period of my absence while pursuing my studies.

ABSTRACT

Introduction: Globally, it is estimated that 1.7 million people die annually through waterborne diseases caused by poor water quality and lack of basic sanitation and hygiene. The most affected are children under five years, particularly in developing countries, who often succumb to the ravages of diarrhea disease. Household water treatment and safe storage has been shown to be the most effectives means for control or reduce dearrhea disease.

Objective: The aim of this study was to assess practices on treatment of drinking water and safe storage among women in KiuyuMbuyuni.

Methodology: The study was a cross sectional, quantitative study design. The study area was KiuyuMbuyuni, located in Micheweni, North District of Pemba Island. We interviewed 233 women to assess practices on water treatment and safe storage and the response rate was 98.7%.

Results: This study revealed that majority of women (77.8%) had low economic status. Nearly three-quarter of women (74.4%) treated drinking water by boiling and less than half (32%) by filtering. Results showed that 90.9% of women stored drinking water in a special room while only 21% stored water where children cannot reach. Nearly half (49.5%) of the interviewed women cleaned containers for stored drinking water every day and just half (53.5%) of them used cup without handle to take drinking water from the storage container. More than three-quarters (81.7%) of the women at KiuyuMbuyuni used bucket with lid as a method for storing drinking water compared with other methods like bucket without lid, small and jerry can.

Conclusion: Most common used methods for treating drinking water in KiuyuMbuyuni were boiling and filtering water, whereby safe storage of drinking water was kept in a special room. It is recommended that women should store treated water in a container with small mouth like jerry can and bucket with lid.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

HWT	Household Water Treatment
IRB	Institute of Review Body
NBS	National Bureau of Statistics
MPV	Millennium Project Village
MUHAS	Muhimbili University of Health and Allied Sciences
POU	Point of use
POE	Point of entry
SHEHIA	Street government
UNICEF	United Nation Children's Fund
WHO	World Health Organization

OPERATIONAL DEFINITION OF THE KEY TERMS

Practices refer to performing an activity or exercise (a skill) repeatedly in order to acquire improve or maintain proficiency on it. This means to treat and store drinking water repeatedly in the household.

Drinking water treatment means range of methods employed for the purposes of treating water in the home or at point of use in other settings. These are also known as point-of-use (POU) or point-of-entry (POE) water treatment technologies therefore HWT is to treat collected water by remove or inactivate microbial pathogens or to remove chemical and radiological contaminants by boiling, chlorination or exposure to sun light.

Safe drinking water storage means that once the water has been treated and is safe to use, it is stored in a container that protects the water from re-contamination. It is preferable to store treated water in plastic, ceramic, or metal containers with the following characteristics, which serve as physical barriers to recontamination:

- A small opening with a lid or cover that discourages users from placing potentially contaminated items, such as hands, cups, or ladles, into the stored water;
- A spigot or small opening to allow easy and safe access to the water without requiring the insertion of hands or objects into the container; and,
- A size appropriate for the household water treatment method, with permanently attached instructions for using the treatment method and for cleaning the container.

CHAPTER ONE

1.1Background

The World Health Organization (WHO) defines safe drinking water as a water that does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages (WHO, 2011). Clean and safe drinking water is a basic human right. The global problem of access to safe water and sanitation continues to plague the poor countries of the world. According to World Health Organization (WHO) an estimated 2.6 billion people, comprising about 40 per cent of the world's population, live without adequate access to safe water and good sanitation (WHO, 2014). About 2 billion of these populations are found in rural areas of South Asia, Eastern Asia, and sub-Saharan Africa. Majority of the affected population are found in informal settlements, per urban and rural parts of the developing countries where the practice of open defecation, poor sanitation services, and use of unsafe water persists because of knowledge gaps and attitude making people unable to practice basic hygiene(Moe and Rheingan, 2006).

Drinking water quality is an issue of concern for human health, but risks arise from infectious agents, toxic chemicals and radiological hazards (Gordon et al, 2008). Globally, an estimated 1.7 million people die annually, largely through waterborne diseases caused by poor water quality and lack of basic sanitation and hygiene (Ashbolt, 2004). Children under five years are the most affected group , particularly those living in developing countries, who often succumb to the ravages of diarrhea diseases (Bhateja, et al, 2014)

In Tanzania mainland about 54 % and 80 % of the population have access to clean water supply in rural and urban areas respectively (World Health Organisation, 2008). However in Zanzibar access to safe water is a major problem especially in the rural areas where piped water and access to safe protected sources has not increased significantly in the last ten years. About 74% of people in Unguja town have direct piped water but this is true for only 1% of the people in the non-coral, rural areas of Pemba. Few people in Unguja town use wells or springs as a source of water (ZPRP, 2002). However, access to safe water alone does not reduce water borne disease significantly.

Evidence show that even if the source of the water is safe, there is always risk of contamination of water during collection, transportation and storage at household level (Gordon et al., 2008). In addition, proper hygienic practices must be emphasized when promoting water and sanitation interventions to decrease morbidity and mortality especially in rural area. Along with increasing access to safe water supply sources, promotion of water management at the point of use to all user groups is important because most of rural areas have low knowledge on treatment of drinking water and practices. Hygiene promoters inform household members especially women about the correct use and storage of water, the need for improved sanitation facilities, personal and environmental hygiene and diarrhea transmission and management, aiming at sustainable behavior change (ZPRP ,2002). Household water treatment and safe storage practices (HWTS) is very important for the communities, as they are significantly effective in improving microbial water quality than other WASH interventions (WHO, 2007). Several water treatment methods used at the household level include boiling, chemical disinfection, solar disinfection and use of filters(English, 2002).Proper household water management practices among women are highly important when dealing with issues concerning waterborne diseases. Women also have a significant role for the children's safety and play a major role in areas where safe water is not available in the house. Women are typically responsible for collecting and storing water, as well as for treating the water at home (Sobsey et al, 2008). Household Water Treatment and Safe Storage is a cheap and effective strategy for water treatment. However, householders must have the motivation to treat their drinking water and technologies and consumables must be affordable and easily available (UNICEF, 2007).

Evidence from the research will guide the government to develop an action plan to improve water treatment and storage at household level and reduce water borne diseases associated with unsafe drinking water.

1.2 Problem statement

Ensuring safe drinking water remains a big challenge in developing countries where waterborne diseases cause havoc in many communities. One among the major challenge is inadequate hygiene practices in ensuring that drinking water is safe at household level.

KiuyuMbuyuni village has experienced frequent episodes of diarrhea diseases, which result in morbidity and mortality especially among children under the age of five years. Evidence shows that many diarrhea cases are associated with consumption of unsafe water at the household level. Management of water quality at home is of paramount importance. In many cases, women are responsible for ensuring the safety of drinking water at home. Nevertheless, no information is available on the practices of women on water treatment and safe storage in KiuyuMbuyuni.

Therefore, the aim of this study was to assess practices on treatment of drinking water and safe storage among women in KiuyuMbuyuni.

1.3 Rationale of the study

The significance of this study is to understand the practices on water treatment and safe storage among women in KiuyuMbuyuni and to generate information about methods used for water treatment and safe storage. Therefore, this information will help community and local government to develop strategy on safe water management, water treatment and safe water storage options, which are cost effective and locally acceptable.

1.4. Research Questions

1) Do women in KiuyuMbuyuni village treat drinking water at the household level?
2) Do women in KiuyuMbuyuni village follow proper storing practices in the management of drinking water at household level?
3) What are methods used for storage drinking water among women in KiuyuMbuyuni?

1.5 Objectives

To assess practices on water treatment and safe storage among women in KiuyuMbuyuni

1.5.1 Specific objectives

1) To determine drinking water treatment practices among women in KiuyuMbuyuni.
2) To determine safe storage drinking water practices among women in KiuyuMbuyuni.
3) To assess methods used for storage drinking water among women in KiuyuMbuyuni.

1.6 Problem analysis diagram

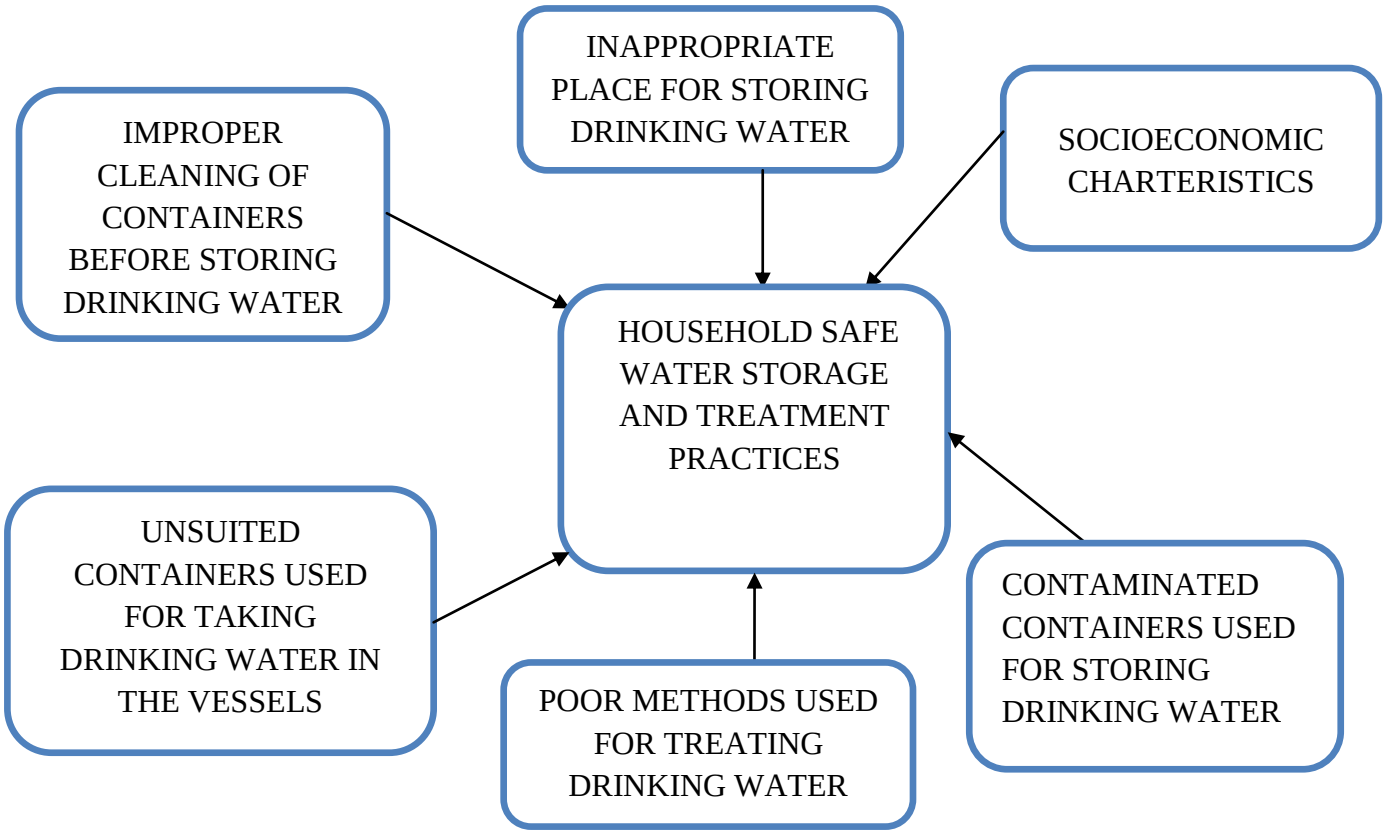

Figure 1: problem analysis diagram

Poor household safe water storage and treatment practices which is highly influenced by contaminated containers used for storing drinking water, applying of poor treatment methods for treating drinking water, unsuitable containers used for taking drinking water in the vessels, improper cleaning of containers before storing drinking water and inappropriate place for storing drinking water, which indeed have negative health consequences.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Water treatment practices

According to (Freeman, et al, 2012) who explained Household water treatment, boiling, chlorination and filtration, has been shown effective in improving drinking water quality and preventing water born disease among vulnerable populations. Water treatment technology has emerged as an approach that empowers people and communities with poor access to safe water to improve water quality by treating in the home. The water treatment and safe storage in the home helps to prevent recontamination during transport from water sources and enable people to take charge of the safety in their water (Lemons, 2014). The study conducted in Mkuranga district show that 48% of the household treated drinking water compares with other methods likes chlorine and filtration (Kakulu, 2012). Other study conducted in Babati Tanzania show that 35 % of the women treated their drinking water, while the remaining 65 % stated that they did not do anything with the water before drinking it (Sobsey et al, 2009).Many observations suggest that treating water in the home can prevent illness. Recent epidemiologic studies have demonstrated that persons whose families boil drinking water at home are at lower risk of water born disease like diarrhea in general (Mintz, et al, 1990).

2.2 Practices on safe storage of drinking water

A study by Roberts et al. 2001 reported that in many parts of the developing world, drinking water is collected from unsafe surface sources outside the home and then held in household storage vessels. Drinking water may be contaminated at the source, transport or during storage. Distributing and using safe storage containers have shown substantial reductions in water born disease. Safe storage means keeping treated water away from sources of contamination and using a clean and covered container. Study conducted in Korongwe town showed that 85% of the household practicing safe storage drinking water (Joshua, 2009). A good safe storage container should also have instructions on how to properly use and maintain it. By separate containers for storing untreated water and treated water, regularly cleaning the

storage container with soap, storing treated water off the ground, storing treated water away from animals, pouring treated water from the container instead of scooping the water out of it. (WHO,2013).

2.3 Methods used for storage of drinking water

There are many designs for water containers around the world. A safe water storage container should have a strong and tightly sealing lid or cover, have a tap or narrow opening at the outlet for access, and have a stable base so it does not tip over, be durable and strong and be easy to clean. According to (Kakulu, 2012) reported that most of residence in KurangaDististrict use bucket with lid for 75% while bucket without lid was 12.3% and 2.3% use jerry cans as method of storage drinking water in the household.

CHAPTER THREE

3.0 METHODOLOGY

3.1Study design

The study was a cross sectional to describe water treatment and safe storage practices among women in KiuyuMbuyuni.

3.2 Study area

The study was conducted in KiuyuMbuyuni, located in north District of Pemba Island. Pemba Island is comprised of two regions, Pemba North and Pemba South. Micheweni District is in Pemba North. In 2007, the population of Micheweni District was projected at 101,928. Within Micheweni District also administratively divided into ten wards. These are:-Kinowe, Msuka, konde, Mgogoni, Tumbe, WingwiMapofu, WingwiNjuguni, ShumbaViamboni and KiuyuMaziwaNg'ombe. Within the wards there are 27 shehias (lowest administrative unit within the government) (Browde Communication, 2009). The main activities were agriculture and fishing. Therefore shehia of MaziwaNg'ombe was selected to conduct study because have higher cases of water born disease. There for this area was selected in order to determine drinking water treatment and safe storage practices among women in the village of KiuyuMbuyuni.

3.3 Study population

The study population was women at KiuyuMbuyuni, aged from 18 and above because they were responsible for drinking water treatment and safe storage practice in the house and are the one who takes care the family to compare with man in that area due to their traditional belief.

3.4 Inclusion criteria

- Women aged between 18-55 years
- Those who were consent to participate because these age groups were concerned with water treatment and safe storage practices in the household.

3.5 Sampling Procedure

Multistage cluster sampling method was deployed to identify the required number of women from the visited community to participate in this study in order to get the right information on water treatment and safe storage practices among them. So the procedure of selecting was purposive sampling by selecting the District of Micheweni then selecting ward of KiuyuMaziwang'ombe , and the last step was selecting village KiuyuMbuyuni. In the village, five streets were selected randomly (lottery).

3.6 Sample size estimation

Sample size N arrived using the following statistical formula

$n = z^2 p (100-p) / \mathcal{E}^2 x\ g$

Z= Standard normal deviate set at a 1.96 for 95% confidence level

P= proportion of women concern on water treatment and safe storage practices were 35 (Joshua, 2009)

g=design effect (1.5)

n= sample size

$\mathcal{E}^2$=Sampling error

$$n = \frac{1.96^2 \times 0.35 \times 0.65 \times 1.5}{0.075 \times 0.075}$$

n = 233

3.7 Data collection Instrument/tool

Data was collected using closed ended questionnaire, written in English and then was translated into Kiswahili for easy understanding by all respondents. Questions were asked through face to face interview so as to get clear information concerning drinking water treatment and safe storage practices among women in KiuyuMbuyuni (Micheweni Pemba).

3.8 Validity

In order for the study to increase its reliability of the findings and validity, four experienced research assistants (data collectors) from the same community were engaged. Data collecting tools were jointly (with research assistants) translated into local Swahili language. The research assistants were trained for two days and then were assessed to produce stable and consistent understanding from the data-collecting tool. The tool was pre-tested and piloted prior to the commencement of the actual study at Wesha, Chake-Chake district Pemba, the area with the characteristics more similar to KiuyuMbuyuni. All errors and other ambiguities noted during the pre-test exercise were corrected accordingly, and adjusted to avoid misunderstanding and uncertainty.

Meetings were held at the end of every data collection day to discuss issues pertaining to the work specific. All filled questionnaires were checked for completeness at the end of each data collection day within the field so that to identify any missing data before leaving the field. At the end of each data collection day all field questionnaires were handled to the principal supervisor for safe storage.

3.9 Training and recruitment of research assistant

Four research assistants were trained by the researcher; this included the use of survey instruments, interview techniques, and research ethics and procedures for data collection.

3.10 Data management and analysis

Data was sorted, summarized and analyzed by computer using SPSS version 15. The completed interview schedules were checked for correct entries, errors and missing data. Also they were numbered and coded before entering them into the computer software SPSS.

Frequencies was calculated to obtain the proportions, data was presented using tables. The level of household income was measure by using 8 questions concern on socio economic status and given scores of 1, 2 and 3. The income for each study participant was obtained by adding the each individual's scores; the scores were arranged in ascending order. This was then categorized into three parts and was given scores of <30 Low, 30-60 moderate, and >60 was high level of income.

3.11 Dependent and independent variable

The dependent variable for this study was water treatment and safe storage practices, where as independent variables were place for storing drinking water, methods used for treating drinking water, containers used for storing drinking water, containers used for taking drinking water in the vessels and clean containers before for storage drinking water and socio economic status.

3.12 Ethical Consideration

Ethical clearance was sought from Muhimbili Research Ethical Committee of Muhimbili University of Health and Allied Sciences (MUHAS); the study was only conducted after Institute of Review Body approval from MUHAS. Study participants were received oral and written information on the goal and objectives of the study. The study participants were also informed on the potential benefits for them to participate in the study. The study participants were informed that participation in the study is voluntarily and they are free to stop at any point during the study without any problem. A consent form was prepared for study participant signature explaining that they have understood all about the study and agree to participate.The information about the study was provided in Swahili and approved by appropriate institutional ethics committees of MUHAS. Written consent to participate in the study was obtained from participants after the study information was provided and confidentiality was assured in relation to information disclosed.

CHAPTER FOUR

4.0 RESULTS

4.1 Characteristics of the study population

The sample size taken for the whole study was 233 respondents but three respondents did not participate. Therefore 230 (98.7%) women participated in this study. The mean age of respondents was 35.2 (± 8.64 standard deviation). Most of the participants 163 (70.9%) were married and about 111 participants (48%) did not attend formal school. Regarding employment, only 5.2% (n=12) were formally employed while 47% (n=108) were subsistence farmers. Out of 230 households visited 136 (59.1%) had occupants ranging between 5 to10 people with 50 (21.7%) households accommodating more than 10 people. Also the study has revealed that majority of women 179 (77.8%) had low economic status (Table 1).

Table 1: Socio demographics characteristics of the study population (N=230)

Characteristics	Frequency	Percentage
Respondent status		
Mother	150	65.2
Sister	53	23
Aunt	12	5.2
Step-mother	8	3.5
Mother in law	7	3
Total	**230**	**100**
Age group		
18-28	82	35.7
28-38	79	34.3
>38	69	30
Mean age(years)	35.26(8.64)	
Total	**230**	**100**
Marital status		
Single	48	20.9
Married	163	70.9
Divorced	15	6.5
Widow	4	1.7
Total	**230**	**100**
Level of education		
Not gone to school	111	48.3
Primary	35	15.2
Secondary	79	34.3
College/University	5	2.2
Total	**230**	**100**
Occupational status		

Characteristics	Frequency	Percentage
Employed	12	5.2
Unemployed	28	12.2
Self employed	67	29.1
Peasant	108	47
business woman	7	3
Housewife	8	3.5
Total	**230**	**100**
Number of people in household		
1-4 persons	44	19.1
5-10persons	136	59.1
>10people	50	21.7
Socio economic status among women		
Low	179	77.8
Moderate	49	21.3
High	2	0.9
Total	**230**	**100**

4.2 Water treatment practices among women

Regarding water treatment practices, results revealed that most women in KiuyuMbuyuni (74.4%, n=67) practice drinking water treatment by boiling (74.4%, n=67) followed by filtration (32%, n=29) as a second method for treating drinking water at the household level.

Table 2 Drinking water treatment practices among women in KiuyuMbuyuni.

Treatment methods	Frequency	Percent
Boiling	67	74.4
Storage for 48hours	12	13.3
Exposure to sunlight	17	18.9
Filtration	29	32.2
Chlorine treatment	20	22.2

4.3 Safe storage drinking water practices among women.

Results showed that 211 (90.9%) of women stored drinking water in a special room while 19(9.1%) stored water where children cannot reach. About 114 (49.5%) of women used clean containers for storing drinking water every day and 123 (53.5%) of women used cup without long handle for taking drinking water from the storage container.

Table 3: Safe storage drinking water practices among women in KiuyuMbuyuni

Storage practices	Frequencies	Percentage
Stored a special room	211	90.9
Stored in place where children is very difficult to get	19	9.1
Total	230	100
Clean drinking water		
Every day	114	49.5
After two days	76	33.0
After three days	40	17.5
Total	230	100
Containers used for taking drinking water		
Cup	123	53.5
Cup with long handle	107	46.5
Total	230	100

4.4 Methods for storage of drinking water

More than three-quarters of the women in KiuyuMbuyuni 81.7% (n=188) used bucket with lid as a method for storing drinking water to compare with other methods like bucket without lid, while the second method was small pans was 35.2% (n=81) and jerry can was 19.1% (n=44)

Table 4: Methods for storage of drinking water (n=230)

Storage methods	Frequencies	Percentage
Bucket with lid	188	81.7
Bucket without lid	30	13.0
Jerry cans	44	19.1
Small pans	81	35.2

CHAPTER FIVE

5.0 DISCUSSION

5.1 Drinking water treatment practices

The findings of the current study showed that most of the women in KiuyuMbuyuni practiced drinking water treatment by using boiling 74.4%, followed by filtration 32%; however, fewer reported to use water guards, storing water for 48hours, and exposure to sunlight. This resultsshow that most of women in KiuyuMbuyuni have more awareness on treating drinking water by using boiling methods as an effective means of killing pathogens. This result was related with the study conducted in Cambodia showed that most of the household use boiling 66% as a methods for treating drinking water (Brown & Sobsey, 2012).For those who did not treat water pointed-out reasons, which included belief and misconception that water was safer from its source and was believed that there was no incidence of any harmful event while drinking water without any treatment**.** Also the study conducted in rural Tanzania show that most of the household use boiling for 99.3% as an effective means of killing pathogens on drinking water(Mohamed et al., 2016). The proportional of water treatment by boiling was prevalent in this study than the study conducted in Mkuranga District of Tanzania 2012, where only 43.6% treated drinking water by boiling followed storage for 48 hours 40.3%(Kakulu, 2012). Similarly, the study conducted in Korogwe town 2009 showed that 35.7% of the households treated drinking water by boiling followed by storing for a while, which was 48.2%(Joshua, 2009). Findings of this study are comparable to results conducted in Babati in 2008 which showed that 75% of the household used boiling followed chlorination as the main method of household water treatment (Maria 2009).

5.2 Safe storage of drinking water practices

During this study, results showed that 91.7% of women stored drinking water in a special room by separate drinking water with other domestic water so the women in KiuyuMbuyuni have more care to make sure drinking water are safe but other respondents who were not storing drinking water argued that water sources were safe. This finding was related with the

study conducted in Ethiopia, which reported that household stored drinking water in a special room was 70.3% (Dawa & Council 2013). Proportion of women who were cleaning containers every day for stored drinking water was 49.6%, this means women in KiuyuMbuyuni make sure after treating drinking water container are clean for storing drinking water however, the study conducted in Ethiopia showed 31.2% of them cleaned containers every day before storing, where by women who were using cups without long handle for taking drinking water in the vessels was 53.5%, it concurred with the study conducted in Ethiopia, which showed the use of cup without long handle in the household was 54.6% (Dawa & Council 2013). Also, it was noted that, in other study conducted in Mkuranga District of Tanzania 2012 showed that 93% used cup for taking drinking in the vessels so this study was not related (Kakulu, 2012).

More than half of the women (81.7%) in KiuyuMbuyuni used bucket with lid as a method for storing drinking water to compare with other methods like bucket without lid, small pans and jerry, this result show that most of women in KiuyuMbuyuni had more care to make sure water are not re contaminated to avoid water born disease, this study was related with the study conducted in Cambodia most of the household boiled drinking water use covered container for 51% like bucket with lid as a methods for storing drinking in the household level, (Brown & Sobsey, 2012)**.** although the study conducted in pre urban community in Western Kenya showed 68% used bucket with lid as a method of safe storage drinking water (Wasonga et al., 2014). Furthermore, the study conducted in Mkuranga district 2009 showed 24.1% of the respondents used bucket with lid as a methods for storing drinking water, this finding was not related with the finding in this study (Kakulu, 2012).

5.3 Limitation of the study

The study design used in this study (i.e. cross sectional) cannot establish cause-and-effect due to lack of temporality. Information on treating drinking water and exposure were collected simultaneously, therefore difficulty to establishing that exposure antedated outcome.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study found that most of women in KiuyuMbuyuni practiced water treatment by using boiling. The storing practices revealed from most of women was storing drinking water in a special room, and cleaning containers every day and the use of cup without handle for taking drinking water in the vessels; whereby the use of bucket with lid as a method for storing drinking water.

1. Majority use boiling for treating drinking water.
2. Majority use special room to store drinking water.
3. Over 82% clean the container at least every other day
4. Bucket with lid is the most common storage utensil for drinking water.

6.2 Recommendation

1. Women in the household should store drinking water in a special room and clean containers every day. Also water stored in containers with wide mouth should be fetched using cup with a long handle to avoid contamination.

2. Women should use appropriate containers for storing drinking water to void recontamination of treated water.

3. We could use that opportunity to promote water treatment and storage practices, which are effective in order to avoid contamination or recontamination of drinking water in the household

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APPENDICES

Appendix I: (Consent Form in English)

ID NO._____

Consent to participate in this study

Greetings

My name is …….I am working on this research project. The objective is to assess knowledge and practices on water treatment and safe storage among women in KiuyuMbuyuni Pemba

Purpose of the study

The purpose of this study is to collect information on knowledge on water treatment and safe storage among women in Micheweni and to understand the prevalence of diarrhea for under five children, this information will enable to help instituting public health control measures in the work place if needed. You are requested to participate in this study in because your participation is highly important in this study.

What participation involved

If you agree to participate in this study, you will be required to answer series of questions that have been prepared for the study through interviewing.

Confidentiality

I will ensure you that all the information collected from you will be kept confidential. Only people working in this research will have access to this information and your name will not be put in the information records.

Risk

You will be asked question concerned on knowledge on water treatment and safe storage among women. If some questions make you uncomfortable you are free to refuse to answer

any particular question and stop the interview at any time. We do not expect any harm to happen to you because of participating in this study.

Write to withdraw and alternatives

Taking part in this study completely is your choice. If you choose to participate in this study or if you stop to participate in this study you will not get any harm. You can stop to participate in this study any time even if you have already give the consent, refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits

The information you will provide will help to understanding level of knowledge on water treatment and safe storage among women. The report of this study will be share with respective authority for improvement and control measures.

Do you agree?

I …… have read the content in this form, my questions have been answered, I voluntarily agree to participate in this study.

Signature of the participant……

Signature of the research assistant…….

Date of signed consent

Appendix II: (Consent Form In Swahili)

FOMU YA RIDHAA

ID, NO.

Ridhaa ya kushiriki

Asalam Alaykum. Naitwa ……. Nafanya kazi ya kutafiti juu ya uwelewa katika njia zinazotumika katika kuyafanya maji ya kunywa kuwa salama , kuangalia jinsi munavyohifadhi maji ya kunywa .

Madhumuni ya utafiti

Madhumuni ya utafiti huu nikukusanya taarifa juu ya uelewa njia zinazotumika katika kuyafanya maji ya kunywa kuwa salama, kuangalia jinsi munavyoya hifadhi maji ya kunywa.

Nini kinahitajika ili kushiriki

Ili kushiriki katika utafiti huu inabidi kukubali na kujiunga kwa kujibu masuala kutoka kwenye dodoso kwa ajili ya kupata taarifa zilizokusudiwa.

Usiri

Nina kuhakikishia kuwa taarifa hizo zitakusanywa kutoka kwa kozi takuwa siri na hakuna mtu yoyote ambae hafanyi kazi kwenye utafiti huu atakayeambiwa alichosema. Itaandaliwa taarifa ya utafiti huu ambayo haitamtaja mshiriki yoyote.Jina lako na wala utambulisho mwengine wowote hautawekwa kwenye taarifa unazo zitoa.

Habari

Katitka utafiti huu utaulizwa maswali inawezekana yakakufanya usijiskie vizuri. Una hiari ya kujibu au kutojibu maswali hayo.Hakuna hatari yoyote itayotokea kwako kutokana na ushiriki wako kwenye utafiti huu.

Haki ya kujitoa au venginevyo

Ushiriki katika utafiti huu ni hiari, aidha unaweza kuamua kushiriki wakati utafiti unaendelea. Kutoshiriki au kujitoa kwenye utafiti huu hakutokuwa na adhabu yoyote na hutopoteza stahili zako endapo utaona ni vyema kufanya hivyo.

Faida

Kama utakubali katika utafiti huu itakuwa ni faraja kwa vile utafiti huu una lengo la kutambua na kuweka mikakati ya kukubaliana na hali ya tatizo hili. Matokeo ya utafiti huu yatasaidia katika Wizara ya Afya kuweka mikakati madhubuti juu ya tatizo hili.

Je, unakubali?

Mshirikianakubali…….

Mshiriki nakataa…….

Mimi…….Nimesoma maelezo ya fomu hii, maswali yangu yamejibiwa na nimeridhika. Na kakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki…….

Sahihi ya mtafiti msaidizi…….

Tarehe ya kutia sahihi ya kushiriki……..

Appendix III: (Questionnaire in English)

Questionnaire

Questionnaire: Knowledge on water treatment and safe storage among women in Kiuyu, Pemba

Identification

Questionnaire number……..

District Ward……..

Shehia…….

Village……

Streets…….

Demographic characteristics

Respondent status Appendix 4 (Questionnaire in Swahili form)

S/NO	SOCIO-DEMOGRAPHIC CHARACTERISTICS		RESPONSE
1	Respondent status	1. Mother	
		2. Sister	
		3. Grandmother	
		4. Aunt	
		5. Mother	
		Other (specify): ……	
2	2.Sex	1. Female	
3	.Age of the respondent	……..	
4	What is your marital status?	1. Single	
		2. Married	
		3. Divorced	
		4. Widower	
		5. Cohabiting	
5	Occupation	1. Employed	
		2. Non employed	
		3. Self employed	
		4. Farmer	
		5. Business	
		6. House wife	
		7. Other (specify): ……..	

6	What is your level of education?	1. Primary	
		2. Secondary	
		3. Advanced level	
		4. University	
		5. Other specify……	
7	How many people live in your house?	…….	
8	Do you afford the cost of water treatment ?	1.Yes	
		2. No	
		3.I don't know	
9	Do you afford the cost of containers used for storing drinking water?	1.Yes	
		2.No	
		3.I don't know	
10	Does the household have	1. Electricity	
		2. Radio	
		3. Television	
		4. Mobile phone	
		5. Refrigerator	
		6. Other (specify): ……	
11	What type of fuel does household normally use?	1. Fire wood	
		2. Electricity	
		3. Gas	
		4. Charcoal	
		5. Paraffin	
		6. Other (specify): ……	

12	House unit (floor) record (observation)	1. Earth, sand, dug	
		2. Cement	
		3. Carpet	
		4. Cement tiles, terrazzo	
		5. Wood, planks, bamboo, palm	
		6. Parquet or polished wood	
		7. Others (specify): ……	
13	Wall materials record (observation).	1. Grass	
		2. Pole and mud	
		3. Sun dried bricks	
		4. Baked bricks	
		5. Cement	
		6. Stone	
		7. Other(specify)……	
14	Roofing materials (observation).	1. Grass/thatch/mud	
		2. Iron sheets	
		3. Tiles	
		4. Concrete	
		5. Asbestos	
		6. Other (specify): ……	
15	Do you have a bank account/ any parent(mother or father)	1. Yes	
		2. No	
		3. I don't know	
16	Do you know how to treat drinking water?	1. Yes	
		2. No	
		3. I don't know	

17	In your house is there anyone who treats drinking water?	1. Yes	
		2. No	
		3. I don't know	
18	If yes, which methods used for treating water?	1. Boiling storage water for 48 hours	
		2. Exposure to sunlight	
		3. Water guard or chlorine	
		4. Domestic filter	
		5. Slow sand filtration	
		6. Others (specify): ……	
19	If not. Why you are not treat drinking water?	1. Have no time?	
		2. You will waste your time?	
		3. You have no money?	
		4. To have no skill on treating drinking water?	
		5. You don't like the test?	
		6. Other (specify): ……	
20	Do you think there is a need to treat drinking water?	1. Yes	
		2. No	
		3. I don't know	
21	Do you think is there any risk if not treat drinking water?	1. Yes	
		2. No	
		3. I don't know	
22	If yes. What kind of disease can get?	1. Diarrhea	
		2. Typhoid	
		3. Cholera	
		4. Other (specify)……	

23	If not why?	1. Because God protect you and water	
		2.You drink every day without get any harm	
		3. Other specify……	
24	Do you know how to store drinking water in the house?	1. Yes	
		2. No	
		3. I don't know	
25	If not why?	1. Is safe from water sources	
		2. Is to waste time	
		3. Other specify……..	
26	If yes, who store drinking water?	1. Mother	
		2. Anti	
		3. Sister	
		4. Mother in law	
		5. Other specify…….	
27	Do you store drinking water separately from other water for other domestic purpose?	1. Always	
		2. Some times	
		3. Never	
28	Which containers used for storing drinking water?	1. Bucket with lid	
		2. Bucket without lid	
		3. Jerry cans	
		4. Small pans	
		5. Other (specify)……	
29	Where does your family store water?	1. In a special room	
		2. The place that children is very difficult to get	
		3. Other (specify)……	

30	How often clean drinking water container?	1. Every day	
		2. After two days	
		3. Three days	
		4. Other (specify): ……	
31	Which containers used for taking drinking water?	1. Cup	
		2. Others (specify):……	
32	Is there any contribution get from the government concern on water treatment and safe storage?	1. Yes	
		2. No	
		3. I don't know	
33	If yes what kind of contribution you get	1. Get education on how to treat drinking water	
		2. Give material for treating drinking water	
		3. Containers for storage drinking water	
		4. Other specify……	

Appendix IV: Questionnaire in Kiswahili

NO	TAARIFA BINAFSI ZA MHOJIWA		**MAJIBU**
1	Mhojiwa	1. Mama	
		2. Dada	
		3. Mama wakambo	
		4. Madogo	
		5. Shangazi	
		6.Nyenginezo ……	
2	Jinsia	1. Mwanamke	
3	UmriwaMhojiwa		
		1. …….	
4	Haliyandoa?	1. Sijaolewa	
		2. Nimeolewa	
		3. Nimeachika	
		4. Mjane	
		5. Kimada	
5	Kazi	1. Nimeajiriwa	
		2. Sijaajiriwa	
		3. Nimejiajiri mwenyewe	
		4. Mkulima	
		5. Mfanyabiashara	
		6. Mama waNyumbani	
		7. Nyenginezo (……)	
6	Kiwango cha Elimu?	1. Sijasoma	
		2. Msingi	
		3. Secondary	
		4. Advanced level	
		5. Elimuyajuu	

7	Idadi unaoishi katika kaya yako ?		
		……	
8	Je unakidhi gharama za kutibu maji ya kunywa?	Ndio	
		Hapana	
		Sijui	
9	Je unakidhi gharama za vyombo vya kuhifadhia maji?	Ndio	
		Hapana	
		Sijui	
10	Je katika kaya yakokuna	1. Umeme	
		2. Radio	
		3. Television	
		4. Simu	
		5. Friji	
		6. nyenginezo……	
11	Je munatumia nishati ya namna gani ya kupikia?	1. Kuni	
		2. Umeme	
		3. Gas	
		4. Makaa	
		5. Mafutayataa	
		6. Nyenginezo……	
12	Hali ya nyumba	1. Udongo	
		2. Saruji	
		3. Carpet	
		4. Vigae	
		5. Mbao zisizo na dawa	
		6. Mbao zilizotiwa dawa	
		7. Nyenginezo……	

13	Ukuta	1. Vioo	
		2. Udongo	
		3. Matofali mabichi	
		4. Matofali yaliyochomwa	
		5. Saruji	
		6. Mawe	
		7. Nyenginezo……	
14	Paa	1. Nyasi au makuti	
		2. Mabati	
		3. Vigae	
		4. Zege	
		5. Asbestos	
		6. Nyenginezo……	
15	je unatumia account bank	1. Ndio	
		2. Hapana	
		3. Sijui	
16	Je unajua jinsi ya kutibu maji?	1. Ndio	
		2. Hapana	
		3. Sijui	
17	Katika nyumba yenu kuna yoyote anetibu maji kunywa?	1. Ndio	
		2. Hapana	
		3. Sijui	
18	Ikiwa ndio, njia gani zinazotutumika kutibu maji ya kunywa?	1. Kuchemsha	
		2. Kuyahifadhi kwa masaa 48	
		3. Kuyaweka katika jua	
		4. Kuingiza water guard	
		5. Kuyachuja	
		6. Nyenginezo……	
19	Ikiwa hapana, kwanini hutibu maji ya kunywa?	1. Hunamuda?	
		2. Unapoteza muda?	
		3. Huna pesa?	
		4. Huna ujuzi wa kutibu maji?	
		5. Hupendi ladha na harufu ya maji baada ya kuya tibu?	
		6. Nyenginezo……	

20	Je, unahisi kuna umuhimu wa kutibu maji?	1. Ndio	
		2. Hapana	
		3. Sijui	
21	Je, unahisi kuna hatari yoyote inayoweza kutokea iwapo hutotibu maji ya kunywa?	1. Ndio	
		2. Hapana	
		3.Sijui	
22	Ikiwa ndio unahisi anaweza akapata maradhi gani??	1.Tumbo la kuharisha	
		2.Typhoid	
		3. Kipindupindu	
		4.Nyenginezo……	
23	Ikiwahapana	1. Kila kitaka chotokea Mola keshapanga	
		2. Muda wote unakunywa bila ya kupata matatizo yoyote	
		3. Ni kupotezamudatu	
		4. Nyenginezo……	
24	Je unajua jinsi ya kunahifadhi maji nyumbani kwako?	1. Ndio	
		2. Hapana	
		3. Sijui	
25	Ikiwa ndio na nianaehifadhi maji ndani ya kaya yenu?	1. Mama	
		2. Mamdogo	
		3. Dada	
		4. Mama wa Kambo	
		5. Nyenginezo…….	
26	Ikiwahapana	1. Ni kupoteza muda	
		2.Chanzo cha maji kiko safi	
		3.Nyenginezo……..	
27	Maji ya kunywa munahifadhi sehemu tofauti na maji mengine?	1. Mara nyingi/kawaida	
		2. Baadhi ya muda	
		3. Hapana	
28	Jeeunahisinivyombovyaainaganivinavyowezakutumikakwaajiliyakuhifadhiamajiyakunywa?	1. Bucket with lid	
		2. Bucket without lid	
		3. Jerry cans	
		4. Small pans	
		5. Nyenginezo …….	

29	Sehemu gani munayohifadhia maji?	1. Katika chumba maalum	
		2. Sehemu ambayo watoto sio rahisi kuyapata	
		3. Nyenginezo……	
30	Kila baaada ya muda gani unasafisha chombo chako cha kuhifadhia maji?	1. Kila siku	
		2. Kila baada ya siku mbili	
		3. Kila baada ya siku tatu	
		4.Nyenginezo……	
31	Munatumia chombo gani cha kuchotea maji?	1. Kikombe	
		2. Kata	
32	Je emunapata mashirikiano kutoka kwa serikali juu ya utibuji wa maji ya kunywa pamoja na kuhifadhi?	1. Ndio	
		2. Hapana	
		3. Sijui	
33	Ikiwa ndio, munapata ushirikiano wa aina gani?	1. Munapewa elimu jinsi ya kutibibu maji ya kunywa?	
		2.Munapewa dawa za kutibu maji ya kunywa?	
		3.Munapewa vyombo vya kuhifadhi maji ya kunywa?	
		4. Nyenginezo……	