HYGIENE PRACTICES AND DISEASE RISK PERCEPTION AMONG ABATTOIR WORKERS IN DAR ES SALAAM

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Master of Public Health Dissertation
Muhimbili University of Health and Allied Sciences
October, 2019

Muhimbili University of Health and Allied Sciences

School of Public Health and Social Sciences

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By

Godwin Andrea Minga

A Dissertation Submitted in (Partial) Fulfillment of the Requirement for the Degree of Master of Public Health of

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CERTIFICATION

The undersigned, I certify that I have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Science a dissertation entitled: **''Hygiene practices and disease risk perception among Abattoir workers in Dar es Salaam'',** in (partial) fulfillment of the requirement for the degree of Master of Public health of Muhimbili University of Health and Allied Sciences

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Dr. Mangi J. Ezekiel (PhD)

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Godwin Andrea Minga,** declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any other university for similar or any other degree award.

Signature …… **Date**..……

ACKNOWLEDGMENT

This work would not be accomplished without the help and blessings from the Almighty God, without him I would not have been able to successfully pass through all these difficult times and finally come out with this manuscript.

My heartfelt gratitude goes to my supervisor Dr Mangi J. Ezekiel for his tireless efforts in giving me valuable and excellent advice from the initial preparation of the research proposal to the completion of this dissertation. I also thank Dr Amon Sabasaba resident advisor for his professional advice from the proposal development, analysis, and final report writing.

I am also deeply grateful to the District Executive Directors (DED) of Kinondoni, Ubungo, Temeke and Ilala Districts in Dar es Salaam, for accepting this work to be done in their provinces as part of the fulfillment of the Master of public health.

My sincere thanks go to all members of the academic staff of the School of Public Health and Social Science at Muhimbili University of Health and Allied Sciences, Dar es Salaam. It was from them that the foundation of this work was conceived and developed.

DEDICATION

To my lovely family, my wife Lucy, my children's Trevis and Uswege for their understanding and patience all the time. Lastly, I would like to dedicate this work to my parents my Father, Andrew Minga and my lovely Mother Ritha Kibona who have always inspired me in education. Thank you all.

ABSTRACT

Background: Globally, a Hygienic practice among abattoir workers is a big problem, only 40% of abattoir workers show good hygiene practices. This causes an increased risk of infectious diseases, food and borne diseases, results to public health threat. Little is known about the factors influencing hygiene practices among abattoir workers in Tanzania. This study aims to assess factors influencing hygiene practices and disease risk perception among abattoir workers in Dares salaam.

Methods: A cross-sectional survey was conducted at four municipality abattoirs in Dar es Salaam region between July and September 2018. A stratified random sampling method was used to obtain participants. Structured questionnaires and checklist were used to collect information on various parameters. Data analysis was done using SPSS ver. 22

Results: Total of 423 participants were enrolled. Slaughters were more dominated and highly exposed to the risk of disease infectious compare to other occupations. Knowledge regarding hygiene practices were low although majority have at least primary level of education, more than half (56.5%) of respondents were un trained regarding hygiene practices, the study observed absent of hygiene facilities like sterilizer, good floor, good fence and the restriction regulation in the abattoir, thus hinder facilitation of hygiene practices and favor bacterial contamination. Study also revealed 53.3% had low disease risk perception on regarding hygiene practices. The study observed more significant association between disease risk perception and hygiene practices, compare to other factors, through Chi-square at $P<0.05$,95%CI and Logistic regressions OR was 22.512.

Conclusion and Recommendation: This study indicated high needs of sensitization on behavior intervention due to low disease risk perception however enforcement of law regards hygiene practices should be needed, knowledge promotion on hygiene practices through routine training are needed conducted.

Keywords: Hygiene practices, Abattoir workers, knowledge, disease risk perception

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ABBREVIATIONS

F A.O:	Food and Agriculture Organization
MAFC:	Ministry of Agriculture, Food Security, and Cooperatives.
MLF:	Ministry of Livestock and Fisheries.
MoHCDEC:	Ministry of Health, Community Development, Gender, Elderly, and Children.
NEMC:	National Environmental Management Council.
PPE:	Personal Protective Equipment.
TFDA:	Tanzania Food and Drug Authority.
TMB:	Tanzania Meat Board
WHO:	World Health Organization
CI:	Confidence Interval
OR:	Odds Ratio

OPERATIONAL DEFINITIONS

Abattoir-is a slaughterhouse, or a place where animals are slaughtered for consumption as food.

Food borne disease- is any illness resulting from the food spoilage of contaminated food, *pathogenic* bacteria, viruses, or parasites that contaminate food, as well as toxins

Hygiene- conditions or practices conducive to maintaining health and preventing disease, especially through cleanliness

Zoonosis-is any infectious disease which can be transmissible from animal to humans

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Abattoir is a facility where animals are killed in a place with hygienic conditions, to ensure its safety and wholesomeness for human consumption as food products (1). Globally poor hygienic practices among abattoir workers risk to infectious diseases, food and borne diseases (2). An infectious disease in humans called zoonosis, which can be transmitted from animals to humans and vice versa (3).

It is being estimated about 60% of all human disease cases are zoonosis (4). Brucellosis, bovine tuberculosis, echinococcosis, and anthrax are among listed cases as endemic zoonosis of concern according to World Health Organization (WHO). Direct contact with infected animals and materials among abattoir workers, can risk them to acquire infection. They are exposed to carcasses and viscera of infected animals and get infected through cuts, wounds, splashing of infected blood and other fluid (5).

Moreover, slaughtering of animals especially cattle challenged by improper hygiene practices such as slaughtering on the ground, skinning and evisceration in the same place without ensuring the cleaning of the environment. Which results in heavy contamination of meat with bacteria.(6). Meat provides an excellent environment for the growth of bacteria, which is considered a threat to food safety and consumer health. That has been implicated in many cases of food borne disease(6). Meat can be contaminated during the slaughtering process through contact with the animal's skin, hair, limbs, blood, stomach, gut contents, bile, excretions, facilities, equipment, clothes and hands of workers(7).

Food and borne diseases often follow the consumption of contaminated foodstuffs, especially from animal products such as, meat from infected animals or carcasses contaminated with pathogenic bacteria. The bacteria that causes meat contamination is derived at the slaughterhouse are as follows:*Salmonellaspp.Staphylococcus aureus, Listeria monocytogenes,*

Campylobacterspp, and Escherichia coli O157: H7. Mostly, contamination occurs because of inadequate hygienic conditionin a slaughterhouses(7)

Studies conducted, in Tanzania at Vingunguti abattoir showed a significant number of meats contamination in the floor by fecal from animals, this was due to poor hygienic practices, lack of adequate knowledge on the existence of entering pathogens and negative perception on sanitary conditions among abattoir workers. Lack of good infrastructures may lead to poor hygiene practices such as absence of potable running water, separated clean and dirty areas, stunning and bleeding facilities, area for inspection of carcasses, properly drainages system, cold room, changing room, Personal protective equipment (PPE)and proper working tools(8,1,9,10,11).

Knowledge of disease infection is very low among abattoir workers (11). Moreover, inappropriate bad slaughtering system which did not comply with the safety and hygiene measures, the failure to use PPE and disinfectants are the factors which may lead to the problem of hygienic practices (9).

1.2 Problem Statement

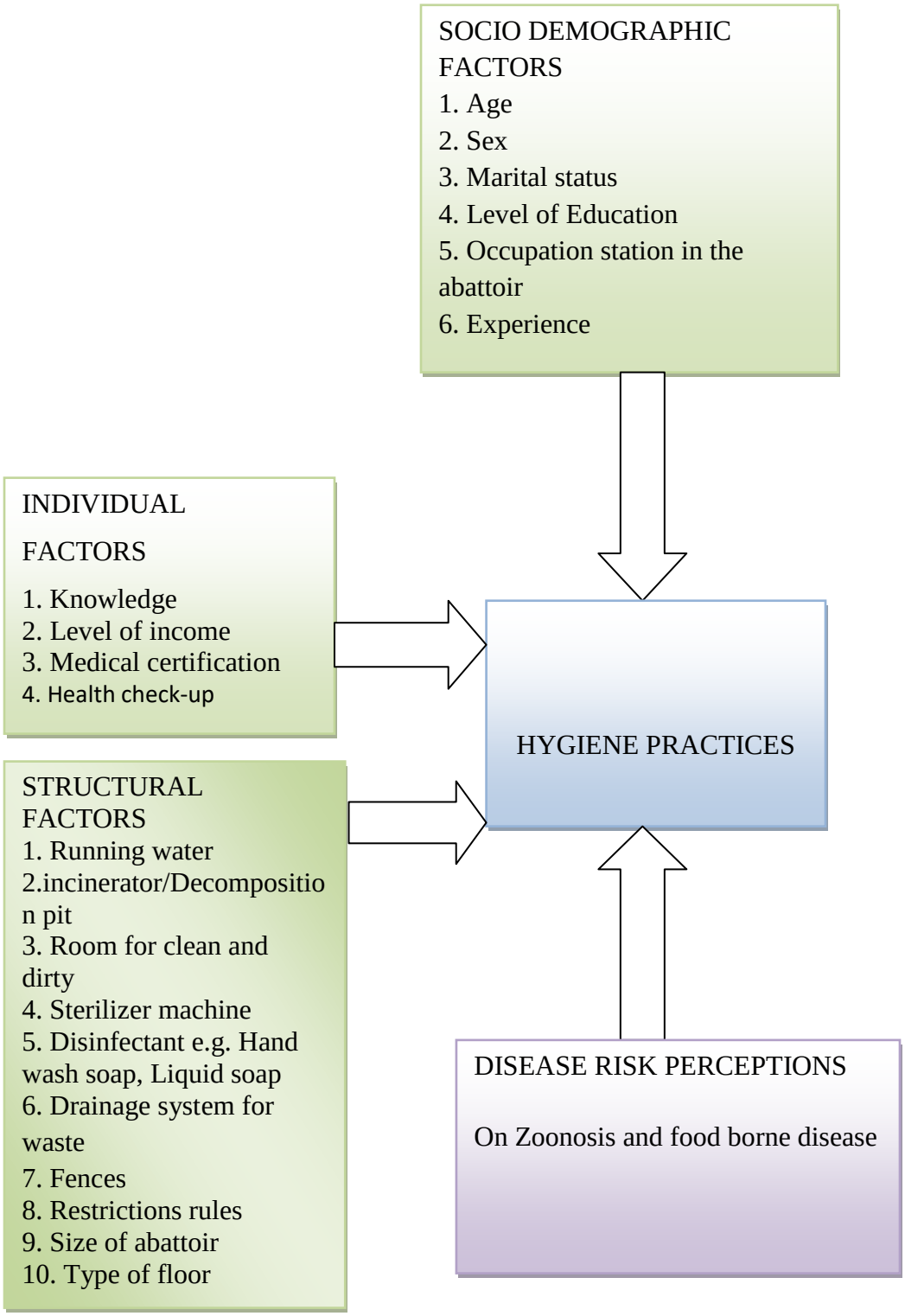
Poor hygiene practices among abattoir workers is a big challenge, Only 40% of abattoir workers shows good hygiene practices(12,13). In developing countries especially Tanzania majority of abattoir workers they don't practice hygiene (14,15,11). Poor hygiene practices can risk to disease infections, food and borne disease, therefore it burdens the public health.

Poor infrastructure like inadequacy space, water supply, drainage system, poor roof, poor floor, hand washing facilities are among the factors which hinder hygiene practices, moreover other individual factors among abattoir workers such as lacking education, wearing Personal protective equipment (PPE), wearing of rings, inadequacy hand washing before and after slaughtering a cattle may lead to the problem(13,12,1,2).

The effort made to improve hygiene practices in the abattoirs. For instance there have been efforts by a number of institutions and agencies such as NEMC, MoHCDGEC, TFDA, TMB, MLF and number of studies reported and recommend on the impact of hygiene practices and prevention of zoonosis and food borne disease in the abattoir (17,18,16,).

Despite all efforts made in Tanzania, the problem of hygiene practices still exists. There is limited evidence about factors influencing, hygiene practices in Tanzania in general and in Dar es salaam region where most of the meat produced in Tanzania is consumed. In addition, there is paucity of information on risk perception for zoonotic diseases among abattoir workers. This study aimed to assess factors influencing hygiene practices and disease risk perception among abattoir workers.

1.3 Conceptual Framework



The above conceptual frameworks: shown how hygiene practices influenced by four factors which are socio-demographic factors, individual factors, structural factors, and disease risk perception.

I. Socio-demographic factors: Age, sex, marital status, occupation, level of education, experience
II. Individual factors among slaughter workers: These factors are knowledge, level of income, Health certificate and frequently health check-up among abattoir workers
III. Structural factors. Running water, incinerator/Decomposition pit, a special room for infected animal/product, cleaning equipment, disinfectant e.g. Hand wash soap, Liquid soap, and Fences, Roof, floor, Restriction rules, size of an abattoir, sterilizer machine, toilet and bathroom influence Hygiene practices among abattoir workers
IV. Disease risk perceptions among abattoir workers for those have a high disease risk perception they perform good hygiene practices and for those of have low disease risk perception, they have poor hygiene practices.

1.4 Rationale of the Study

The need for this study is incredibly significant in creating awareness of the factors influencing hygiene practices and disease risk perceptions among abattoir workers to their occupational place. The baseline information generated will facilitate the development of effective support of behavioral changes on hygiene practices, improving good infrastructure, promotion on knowledge of hygiene practices, developing policies and guidelines for one health application of hygienic practices in the abattoirs.

1.5 Research Questions

1.5.1Main Research Question

What are the factors influencing hygiene practices and disease risk perception among abattoir workers in selected abattoirs in dares salaam?

1.5.2 Specific Research Questions

1. What are the social demographic factors influencing hygiene practices among abattoir workers?
2. What are the individual factors influencing hygiene practices among abattoir workers?
3. What are the structural factors influencing hygiene practices among abattoir workers?
4. What are the disease risk perceptions influencing hygiene practices among abattoir workers?

1.6 Objectives

1.6.1General Objective

To asses factors influencing hygiene practices and disease risk perception among abattoir workers in selected abattoirs in Dar es Salaam.

1.6.2 Specific Objectives

1. To determine social demographic factors influencing hygiene practices among abattoir workers.
2. To determine individual factors influencing hygiene practices among abattoir workers
3. To determine structural factors influencing hygiene practices among abattoir workers
4. To determine disease risk perceptions, influence hygiene among abattoir workers.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Hygiene Practice in the Abattoirs

The literature showed hygiene practices among abattoir workers in India was low, proportional of abattoir workers who covered their head was observed low(12).Uses of detergents was also identified as the part of hygiene practices in the abattoirs ,the study in Ethiopia (28) reported more than half of respondent (66.6%)using disinfectants for cleaning. The study in Kenya (32)observed utensils did not cleaned adequately ,35.9% of operators did not use detergent during cleaning of utensils and surfaces.

In Ghana(21) reported that butchery workers did not cleaning utensils appropriately while 35% of the butchery operators wiped butchery utensils with a piece of cloth. Another literature observed some of workers did not washing their hands with water and soap before and after sale of meat which contribute to contamination of meat.(34) Recommends that hand-washing alone has no effect on *S. aureus* counts on hands. This agrees with (30), reported on unhygienic operation by poor practices of meat processors in an abattoir in western Nigeria.

Other studies reported majority of abattoir workers they don't practices safety and hygiene, during working time in their stations (14,15,11). A study in Nigeria reported below fifty percentage showed good hygiene practices while workers were male and poorly educated (12).

However Hygiene practices within the abattoir were conducted if necessary materials were installed, planned, executed, controlled, cleaning and sanitation program for rooms, machines and equipment are very important to achieve a hygienic standard, (19).

2.2 Abattoirs facilities

The slaughterhouse should have importance facilities, such as enough space is required, purposely for disposing of condemned animals in the decomposition pit, compost stacks, lavatories, disposal of liquid and solid waste. Buildings/facilities should be constructed and made a separate room for clean and unclean processes. The floor must be hard, smooth, impervious and sloping sufficiently towards a drain thus allowing cleaning with water. This is according to W.H.O standards. The dry materials which can be cleaned by water, are recommended, e.g. stone, lava blocks, bricks or concrete. Roofing is recommended to protect and allow the slaughter process to be weather independent, also to provide shade and keep down the internal temperature and to enable the collection of rainwater in water tanks. This is according to F.A.O and W.H.O.

Meat contamination in the abattoirs results from the use of contaminated water, unhygienic practices like poor handling, use of contaminated tables, display of meat intended for sale, the use of contaminated knives and other equipment's in cutting operations. Inadequate slaughtering and disposal facilities, make the abattoir become a source of pollution, attracting domestic and wild carnivores, rodents and flies, which are vectors of diseases. This may raise the public health problem (20,9).

2.3 Individual factors influence Hygiene Practices

The abattoirs /butchery workers did not clean butchery utensils appropriately. (22) reported few abattoir workers that cleaning of utensils and surface was 17.4 %, this is a very low number of proportional to the public health. The level of education and the training status on hygiene practice: 7.7% of them were illiterate. 61.5% of the respondents did not take training regarding meat hygiene. Those who received training were not appreciating the effectiveness of the training which only focused on the management of animal skin in the abattoir (10).

FAO and WHO recommend permanent personnel performing all work in the slaughterhouses and few lessons regarding the process of hygiene, personal hygiene, cleaning and disinfection may be given. Ideally, personnel should be organized in a way that part of the staff is occupied

with cleaning and disinfection. This group of personnel must be educated and trained especially in cleaning and disinfection procedures as well as general hygiene.

A lack of knowledge regarding meat contamination is the biggest hindrance to improving hygiene in the meat industry(23). The good conception of hygiene practices has been attributed to those employees with a basic level at least a primary education, while bad practices to those who were illiterate. (24)

2.4 Structural factors influencing Hygiene Practices

The structure factors influence hygiene practices were reported in the different study, a study in western Kenya(11) showed, the most notable findings were, the lack of facilities to ensure adequate meat hygiene. Ideally, the floor of abattoir should be hard concrete and impervious to reduce dirty, allow drainage and easy for cleaning in slaughterhouse according to FAO. The roof is important to protect the carcass from the weather and to reduce the temperature in the slaughterhouse according to WHO. Moreover, another study has shown 10% of slaughterhouses/abattoir did not have a cement floor and over 30% of slaughterhouses did not have a roof and the division in the slaughterhouse between the dirty (killing, bleeding) and clean (eviscerating and splitting) operations to prevent carcass contamination (10). The absence of division can lead to carcass contamination from the skin, the intestines and the ground (25).

International guidelines specify that hot water should be readily accessible for cleaning, equipment and hand washing. Some studies indicated a lack of water and hand washing facilities in a slaughterhouse. Lack of hand washing has public health implications for abattoir workers. Hand washing is predominantly used to protect the meat contamination and the abattoir workers against directly transmitted of bacteria such as *Salmonella spp*(26).

Absence of abattoir toilet, workers admitting to regularly defecating in the open space. This behavior may promote the persistence of infectious diseases(26).. The presence of pests and roaming animals in the slaughterhouse may contribute to disease transmission either through

contamination of meat or eating of meat scraps by dogs or rats which can lead to persistence and spread of diseases such as echinococcosis and leptospirosis (26).

2.5 Disease risk perceptions

An occupational hazard with those at risk either living near animals or handling them in the abattoirs is a big public health problem. In developing, countries showed adverse health implications both for animals and human beings as well as economic implications for individuals and communities(27).Regarding on hygiene practices, the disease risk perception among abattoir were reported, the perception on disease risk indicated less consideration or perceive on the risk of getting the infectious , food and borne disease(16).

Disease risk perception regards hygiene the study observed the uses of PPE can reduce the contamination this was reported by(16) 97% of abattoir workers agree that, the use of protective clothes can reduce the risk of diseases and cross contamination. The perception on protective practices to reduces the risk of cross-contamination, because the meat handlers are probable a source of contamination for microorganisms. This agrees on the report of the World Health Organization of 2004.Another study in Ethiopia showed 36% respondents were perceived agreed on wearing rings. Wearing of jewelry, watches, and other detachable items should be discouraged. dirt and organisms such as *S. aureus* can build up and around such items, and they pose a risk of foreign body contamination if they fall into the meat.(28).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design and duration

This was a cross-sectional study that was conducted between July and September 2018.

3.2 Study area

The study area was conducted in Dar es Salaam, where four municipalities abattoirs used: Ilala (Vingunguti abattoir), Kinondoni (Tegeta abattoir), Temeke (Mbagala abattoir) and Ubungo (Kimara abattoir). They were selected because they supply many cattle meat and have a high number of workers.

3.3 Study population

The study population consisted of all abattoir workers from selected abattoirs. These included Meat inspectors, slaughterers, animal keepers, meat sellers, cleaners, loaders, and administrative officer.

3.4 Sample size calculation

The sample size was computed by using the formula below described by Martin et al., (1987

$$n = \frac{z^2 p\,(100-p)}{\varepsilon^2}$$

z= level of confidence (1.96 for 95% confidence level)

p= expected proportion

ε= margin of error

The degree of precision was set at 5%.

The expected proportion for abattoir workers practice Hygiene in the abattoir assumed to be at 50%.

From the above formula;

$$n = \frac{1.96^2 50\,(100-50)}{5^2}$$

n= 384

Therefore 384 with the 10% non-respondent was Total (N) 423

3.5 Sampling technique

Multi-Stage sampling was conducted. In the first stage, four abattoirs were purposively sampled from four municipalities of Dar es salaam. The selection was based on the size and number of workers in the abattoirs. These were Vingunguti abattoirs (Ilala), Tegeta abattoir (Kinondoni), Mbagala abattoir (Temeke), and Kimara abattoir (Ubungo).

In the second stage, a stratified sampling technique (proportional to size) was used for the selection of study participants from each abattoir. The abattoir workers were divided into seven strata based on their nature of jobs: Meat inspectors, slaughterers, animal keepers, meat sellers, cleaners, loaders, and administrative officers. Sampling frames for different strata were prepared and from each frame, proportionate numbers were selected through the simple random method.

3.5.1 Sample distribution

The Abattoir workers were selected randomly based on their proportion for each stratum to get a total of 106 for each Municipality Abattoir except one had 105. In the end, the total sample was 423 respondents. The sample distribution can be seen in **Table 1 below**.

Table 1: Sample distribution of abattoir worker in each municipality

Municipality	**Abattoir selected**	**Abattoir workers(n)**
Ilala	Vingunguti	106
Kinondoni	Tegeta	106
Ubungo	Kimara	105
Temeke	Mbagala	106
Total	4	423

3.6 Eligibility criteria

3.6.1 Inclusion criteria

All workers involved in abattoir operations were included in the study: kill floor workers/slaughters, Meat inspectors, loaders, meat sellers and administrative workers.

3.6.2 Exclusion criteria

Individuals at the abattoir who were not involved in abattoir activities for example security were excluded in the study.

3.7 Data collection tools

Data collection was started from July 2018 to September 2018. The data of the study were collected using quantitative methods. An interview administered questionnaire (with closed and open-ended questions) was used, the questionnaire was in English and translated into Kiswahili. It was covered with social demographic information, individuals, structure factors related to hygiene practices and disease risk perceptions among abattoir workers. The checklist was used to assess the availability of Hygiene products observed within the abattoir facilities.

The questionnaire used to collect data for objective one (individual factors) and objective two (Structural factors), The questionnaire was adapted for survey hygiene practices in the abattoir from the one used by (22). The tool modified to reflect hygiene practices among abattoir workers in selected abattoirs. Moreover, the dependent variable contained 10 questions modified from(28).

3.8 Study variables

3.8.1Dependent variable

3.8.1.1Measuring of dependent variable (hygiene practices)

Hygiene practices were measured as categorical of poor and good hygiene practices whereby the 10 statements of (1=yes and 0=No) were used. Hygiene practices levels of respondents were presented after the computed percentage of the hygiene practices. The level of hygiene

practices was obtained using the cut off points as follows based on ten statements $10 \times 1 = 10$ as the highest level of good hygiene practices, The average scores below 5 or equal to 5 indicated poor hygiene practices, while above 5 indicated good hygiene practices (22).

3.8.2 Independent variables

3.8.2.1Measuring of independent variables

Socio demographic variables: Age, Marital status, occupation and occupation age were measured as ordinal were by Gender or sex was Nominal.

Structural variables: Running water, Incinerator/Decomposition pit, Special roof for infected material/animal product, Cleaned Equipment's, Disinfectants, Latrine and Bathroom, fences, roof, sterilizer machine, Restriction laws and Penalty, Drainage system, Abattoir size, and Location were measured as Nominal.

Individual factors variables: level of knowledge, health certificates, frequently of health check-up were measured by Nominal while the level of income was measured ordinal.

Disease risk perception: Perceptions of abattoir workers were measured to obtain a score positive perception or Negative perception by Likert scale 4 levels (strongly agree, agree, disagree, strongly disagree) whereby 1, 2 scores were considered positive and 3, 4 scores were negative.

3.8.3 Investigation tools, validity, and reliability

The reliability and internal consistency of the Cronbach's Alpha test were used to check the questionnaire and the results obtained were 0.8 which indicated acceptance and good reliability. The reliability coefficient of more than 0.70 was acceptable in most social science research (Pallant, 2011).

3.8.4 Recruitment and training of research assistants

The study required three Animal health and One Medical professional with experience in research assistants to cover the estimated sample size of respondents. The assistants were trained on the research concept, protocol and interview questionnaire for three days.

3.8.5 Pre-test study

A study pilot was conducted in the Ilala Municipality at Ukonga abattoir. The interview schedule (questionnaires) pretested on a random sample of 20 abattoir workers. This pilot pretest provided a clear indication of the response to interview questions and the average time allocated to interview one respondent.

3.9 Ethical consideration

Ethical approval was obtained from the Research and publication committee of Muhimbili University of Health and Allied Sciences. Permission to conduct the study was obtained from the District Executive Director to the selected districts municipalities in Dar es salaam. Participation in the study was voluntary, and every participant was free to withdraw from the study at his/her will without any penalty. A written or thumb print informed consent was sought from all abattoir workers. Confidentiality was maintained in the study by assuring that all questionnaires collected were kept in bags and no name of the respondents or any other identifying information on the records of the information were kept together.

3.10 Data collection procedure

The interviewers have introduced themselves and provide a consent form to the respondents. The interviewee was informed on the aim of the study and ensured their confidentiality on the information given in the study. Their names and phone numbers were not included in the questionnaire for non-disclosure and confidence. The interview conducted in privacy such as an unoccupied office.

3.10.1Data management

The filling of questionnaires during interviews was primarily supervised by the principal investigator. The filled questionnaires were examined daily to check for the quality of interviews conducted on that day to trackback missed responses from the interviewees. The data were verified for completeness of filling. The data was coded and entered in statistical package software SPSS version 22 to run frequencies of the data. Data cleaning was done to ensure no information missing.

3.10.3 Data analysis plan

Data were analyzed using Statistical Package for Social Sciences version 22 (SPSS) where relationships between variables were explored. Both descriptive and inferential statistical analyses were used in this study.

Objective 1. To determine social demographic factors influencing hygiene practices among abattoir workers. The frequency and percentage of variables were measured to obtain social demographics factors influence hygiene practices among abattoir workers in a selected abattoir. Results were presented in a table. The Chi-square test was used to compare two or more proportions to determine associations and statistical differences with 95% confidence intervals (95% CI) values and the Significance level was $\alpha = 5\%$.

Objective 2. To determine individual factors influencing hygiene practices among abattoir workers. The frequency and percentage of variables were measured to obtain individual factors influence hygiene practices among abattoir workers in a selected abattoir. Results were presented in a table. The Chi-square test was used to compare two or more proportions to determine associations and statistical differences with 95% confidence intervals (95% CI) values and the Significance level was $\alpha = 5\%$.

Objective 3. To determine structural factors influencing hygiene practices among abattoir workers.

The frequency and percentage of variables were measured to obtain the structural factors influence hygiene practices among abattoir workers. Results were presented in a table.

Objective 4. To determine disease risk perceptions among abattoir workers. The scores were analyzed by using descriptive analysis through SPSS, to report the response on disease risk perception positive or Negative through frequency and percentage. Data ware presented in tables. The Chi-square test was used to compare two or more proportions to determine associations and statistical differences with 95% confidence intervals (95% CI) values and the Significance level was $\alpha = 5\%$.

Ultimately General: logistic regression analysis was performed to test the strength of association between the dependent variable (Hygiene practices) and a group of independent variables. (Age, Marital status, education, gender, individual, and structural factors) to show the strength of association.

3.10.4 limitations of the study

1. Information bias and social desirability bias: The data used for this study relied on self-report of study participants. There is a possibility of some reporting what they are supposed to do instead of what they practice at the abattoir. This limitation was minimized through the probing of interviewees and triangulation of data collection methods.
2. Time of interviewing respondents of the study: Because the study was focused on the urban working population, it was difficult to interview them during working hours or when pre-occupied with work issues. This limitation was overcome by involving the administrative officers who assisted with allocating appropriate time to conduct the interviews particularly in the evenings before slaughter time.

CHAPTER FOUR

4.0 RESULTS

4.1 Social demographics characteristics of abattoir workers

A total of 423 abattoir workers were interviewed, majority of respondents 415 (98.1%) were males and 8(1.9%) were female. The study reported the following occupations among abattoir workers: 22 individuals were meat inspectors, 282 were slaughterers,24 animal keepers,15 meat sellers,16 cleaners,51 loaders and 13 an administrator. 43% of respondents were ranging between 21-30 years of Age. The study reported 242(57.2%) of respondents had a primary school education, 113 (26.7%) had a secondary school education,37(8.7%) had college/university education and 31 (7.3%) none of the respondents had attended a school. In addition, 36.6% of abattoir workers had work experience less than four years, 30.3% had experience of 4-7 years and 33.1% had 8 years and above, **shown in Table 2.**

Table 2: Social characteristics of abattoir workers

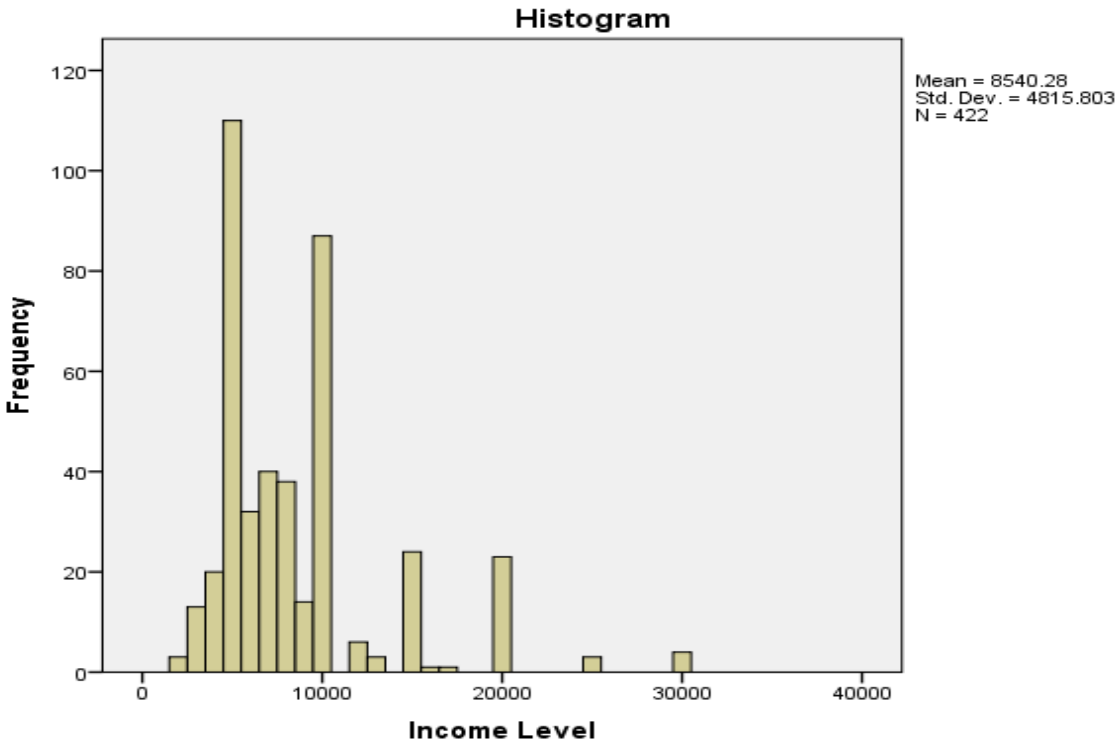
Variables	Category	Frequency(n)	Percentage (%)
Age	15-20	58	13.7
	21-30	184	43.5
	31-40	94	22.2
	41-50	55	13.0
	Above 50	32	7.6
Sex	Male	415	98.1
	Female	8	1.9
Marital status	Unmarried	116	27.4
	Married	299	70.7
	Divorced	6	1.4
	Widowed	2	0.5
Education Level	Primary school	242	57.2
	Secondary school	113	26.7
	University education	37	8.7
	Non-education	31	7.3
Occupation age(yr.)	1-3	115	36.6
	4-7	128	30.3
	≥ 8	140	33.1
Occupation	Meat inspectors	22	5.2
	Slaughters	282	66.7
	Administrator	13	3.1
	loaders	51	12.1
	Cleaners	16	3.8
	Meat sellers	15	3.5
	Animal keepers	24	5.7

4.2 Individual factors influencing hygiene practices

4.2.1 Income level of abattoir workers

The mean income of 422 respondents was 8540.28 Tshs per day. The minimum income amount was 2000 and maximum income was 30000 Tshs. However, 1 respondent rejected to respond, and was considered as missed value. The graph shows majority of 110 abattoir workers income was 5000 Tsh and the lowest income was 2000Tsh whereby the highest income was 30000Tsh. Shown **in Figure 1**

Figure 1: The Income information per day among Abattoir workers



4.2.2 Information on health check-up and health certificate among abattoir workers

The number of abattoir workers going for health checkup frequently was exceptionally low.293 (69.3%) of respondents had not done health checkup after every 3-6 months. Only 30.7% had routine checkup. The health conditions were checked after every 3-6 months. The study reported 130 (30.7%) of abattoir workers had the health certificate, the certificate was

obtained after medical check-up while 293 (69.3%) of the remaining respondents did not have the health certificate.

4.2.3 Knowledge level on hygiene practices in the abattoir

The knowledge level of respondents was measured using 10 questions related to hygiene practices which were grouped into five categories. The study reported, 49.9% understood the importance of the hygiene practices while 50.1% of respondents did not understand good hygiene practices and failed to mention the importance of hygiene. The knowledge regarding disease transmission caused by unhygienic practices, results showed 45.2% of abattoir workers understood and mentioned one example of disease such as brucellosis or salmonellosis. 54.8%of abattoir workers did not understand the disease transmission caused by unhygienic practices and failed to mention example of disease.

The study also reported54.6% of abattoir workers heard about hygiene practices through seminar training, Television, Radio and Newspaper while54.4% had not heard about hygiene practices anywhere. The study reported 30.7%of respondents said they conducted hygienic practices daily while 69.3% of respondents said they conducted the hygiene practices weekly in the abattoir. The study reported56.5% of respondents had not attended the training on hygiene practices while 43.5%had attended the training on hygiene practices. Shown in Table 3.

Table 3: Knowledge on hygiene practices among abattoir workers

Variables	Category	Frequency(n)	Percentage (%)
Knows good hygiene practices and mentioned the correct importance of hygiene practices in the abattoir	Yes	211	49.9
	No	212	50.1
Knows disease transmission by unhygienic practices and one disease example	Yes	191	45.2
	No	232	54.8
Heard of hygiene practices and were you heard	Yes	231	54.6
	No	192	45.4
Daily frequently doing hygiene practices	Yes	130	30.7
	No	293	69.3
Attended training of hygiene practices and mentioned when.	Yes	184	43.5
	No	239	56.5

4.2.3.1 Sum score of knowledge level among abattoir workers

The Overall score was computed to obtainthe sum of knowledge level. The respondents who scored above five, out of ten questions by saying yes were regarded to have high knowledge of hygiene practices, in contrast to respondents scoring 5 and below regarded to have low knowledge of hygiene practices in the abattoirs. Therefore, the total score obtained was converted into percentage, the study showed (267)63.1% of respondents had low knowledge regarding hygiene practices, they scored below 0.5%. The study also showed (156)36.9% of respondents scored above 0.5% had high knowledge on hygiene practices.

4.3 Disease risk perceptions

Disease risk perceptions among abattoir workers regarding hygiene practices were obtained through 7 Questions. The responses indicated how abattoir workers perceived the disease risk regarding hygiene practices in the abattoirs. Likert's scale with 4 levels was used for each response; the respondents who said they agree or strongly agree with the statements were considered low disease risk perception while the respondents who said they disagree or strongly disagree in the response were considered high disease risk perception. The study reported total of 237 (56%) respondents said to agree and strongly agree that food borne disease is transmitted by unhygienic practices. Regarding zoonosis transmitted from infected animal or its products 51.3% of respondents mentioned to Disagree and strongly disagree while 48.6% of respondents mentioned to agree and strongly agree. Regarding the statement 'Rings in the finger cause food contamination', 229 (54.1%) of abattoir workers Disagreed and strongly disagreed to the statement. 227 (53.7%) of abattoir workers Disagreed and strongly disagreed to the statement 'Handling of an infected animal without gloves can risk zoonosis'. 244 (57.7%) were said to Disagree and strongly disagree to the statement 'Faeces of animals during slaughtering can be a source of meat contamination' while 179(42.3%) were said to agree and strongly agree. Regarding the statement 'Dirt clothes and floor can be a source of contamination to the meat', 236 (55.8%) of respondents happened to Disagree and strongly disagree. Concerning 'Hygiene practices daily prevent risk of food borne disease and

zoonotic disease', 244 (57.6%) of respondents decided to Disagree and strongly disagree. Shown in Table 4

Table 4: Disease risk perceptions among abattoir workers

Variables	Category	Frequency(n)	Percentage (%)
Food borne disease transmitted caused by unhygienic practices	Strong disagree	165	39.0
	Disagree	72	17.0
	Agree	115	36.6
	Strong agree	31	7.3
Disease risk perceptions regard zoonosis transmitted from an infected animal	Strong disagree	143	33.8
	Disagree	74	17.5
	Agree	163	38.5
	Strong agree	43	10.2
Rings in the finger cause food contamination	Strong disagree	148	35.0
	Disagree	81	19.1
	Agree	168	39.7
	Strong agree	26	6.1
Handling of an infected animal without gloves can risk to zoonosis	Strong disagree	10	2.4
	Disagree	217	51.3
	Agree	165	39.0
	Strong agree	31	7.3
Faecal of animals during slaughtering can be a source of meat contamination	Strong disagree	10	2.4
	Disagree	234	55.3
	Agree	155	36.6
	Strong agree	24	6.7
Dirt clothes and floor can be a source of contamination to the meat	Strong disagree	12	2.8
	Disagree	224	53.0
	Agree	156	36.9
	Strong agree	31	7.3
Hygiene practices daily prevent risk of foodborne disease and zoonotic disease.	Strong disagree	15	3.5
	Disagree	229	54.1
	Agree	148	35.0
	Strong agree	31	7.3

4.3.1 Sum score of disease risk perceptions

The score was calculated in four level of Likert scale, the respondents who said they agree and strongly agree were given score of 3 and 4 respectively. For the respondents who said Strongly disagree and disagree were given scored of 1 and 2 respectively. Therefore, the respondents scoring 7 to 14 were regarded to have low disease risk perception while respondents who scored 15 to 28 were regarded to have high disease risk perception. The disease risk perception showed 238 (56.3%) of respondents had low perception while 185 (43.7%) of respondents had high perception.

4.4 Hygiene practices among abattoir workers

The hygiene practices of respondents determined by 10 Questions, each question had scored 1 for those who said Yes and 0 for those who said no. The study observed hygiene practices **shown in Table 5**

Table 5: Hygiene practices among abattoir workers

Variables	Category	Frequency(n)	Percentage (%)
Wearing white coat and gumboot	Yes	338	79.9
	No	85	20.1
Covering of head	Yes	185	43.7
	No	238	56.3
Cleaning premises with disinfectant	Yes	248	58.6
	No	175	41.4
Not wearing of ring ornaments	Yes	140	33.1
	No	283	66.9
Discard infected material/waste	Yes	186	44.0
in decomposition pit or incinerator	No	232	56.0
Washing knives with soap	Yes	175	41.4
clean water and sterilizer	No	248	58.6
Cleaning toilet daily with	Yes	177	41.8
disinfectant	No	246	58.2
Hands washed before slaughter	Yes	323	76.4
and after slaughter	No	100	23.6
Slaughter an animal in the bench and	Yes	148	35.0
not at the floor	No	275	65.0
Pest control practices	Yes	207	48.9
	No	216	51.1

4.4.1 Sum of hygiene practices

The Overall score were computed to obtain total score for hygiene practices. The respondents who responded to more than five, out of ten statements by saying yes were regarded to have good hygiene practices, in contrast, respondents who scored 5 and below were regarded to have poor hygiene practices in the abattoirs. Therefore, the total score obtained was converted into percentage, the study showed 216 (51.1%) of respondents had poor hygiene practices, they scored below 0.5%. The study also showed 207(48.9%) of respondents, scored above 0.5% had good hygiene practices.

4.5 Structural factors

The structure factors were observed through checklist form. The hygiene facilities recommended in the abattoirs were identified. The observation showed the presence or absence of the hygiene facilities in each selected abattoir named Vingunguti, kimara, Tegeta, and Mbagala abattoir. The study indicated presence of recommended important material which helps to support hygiene practices. The absence of recommended material may hinder the facilitation of hygiene practices. The indicator showed the availability and unavailability of the hygiene facilities **Shown in Table 6**

Table 6: Hygiene product availability in the abattoir facilities

Variables	Indicator	Vingunguti(n)	Kimara(n)	Tegeta(n)	Mbagala(n)	Total (%)
Running water	Available	1	1	1	1	4(100)
	Unavailable	0	0	0	0	0 (0)
Decomposition	Available	1	1	1	1	4(100)
pit/incinerator	Unavailable	0	0	0	0	0(0)
Room for clean and	Available	1	0	0	0	1(25)
dirty	Unavailable	0	1	1	1	3(75)
Disinfectant	Available	1	1	1	1	4(100)
	Unavailable	0	0	0	0	0(0)
Fence for rodent &	Available	0	1	0	0	1 (25)
dogs' control	Unavailable	1	0	1	1	3 (75)
Sterilizer/Autoclave	Available	0	0	0	0	0(0)
equipment	Unavailable	1	1	1	1	4(100)
Toilet and bathroom	Available	1	1	1	1	4(100)
	Unavailable	0	0	0	0	0(0)
Good Floor for cleaning	Available	1	1	1	0	3 (75)
	Unavailable	0	0	0	1	1 (25)
Good roof for	Available	1	1	0	1	3 (75)
ventilation	Unavailable	0	0	1	0	1 (25)
space size	Available	1	0	0	0	1 (25)
for waste control	Unavailable	0	1	1	1	3 (75)
Drainage system of	Available	1	1	1	1	4(100)
waste material	Unavailable	0	0	0	0	0(0)
Hygiene rule and	Available	0	1	0	0	1 (25)
penalty	Unavailable	1	0	1	1	3 (75)

4.6 Association of social demographics and hygiene practices

The relationship and associations of all social demographic information of respondents through chi-square was observed when P was < 0.05. The social demographics variable: Age, sex, marital status, level of education, occupations and age of experience, the study reported no significant association with hygiene practices at CI 95%. **Shown in Table 7**

Table 7: Association between social demographics and hygiene practices among abattoir workers

Demographic Variables	Category	hygiene practices		Chi-Square P-Value
		Poor	Good	
Age	15-20	31	27	
	21-30	98	86	
	31-40	45	49	
	41-50	27	28	0.881
	Above 50	15	17	
Sex	Male	211	204	
	Female	5	3	0.514
Marital status	Unmarried	67	49	
	Married	145	154	
	Divorced	4	2	0.136
	Widowed	0	2	
Education level	Primary school	126	116	
	Secondary school	58	55	
	University education	17	20	0.902
	Non-education	15	16	
Occupation	Meat inspectors	11	11	
	Slaughters	145	137	
	Administrator	14	10	
	loaders	22	29	0.682
	Cleaners	10	6	
	Meat sellers	9	6	
	Animal keepers	13	31	
Occupation age(yr.)	1-3	83	72	
	4-7	64	64	**0.734**
	≥ 8	69	71	

4.7 Association of individual factors and Disease risk perception of abattoir workers with hygiene practices

This factor shows potential to influence hygiene practices and its association determined by Chi-square where P<0.05 indicated an association. However, the study observed no significant association between individual factors and hygiene practices. But for disease risk perception the study showed a significant association with hygiene practices **Shown in Table 8 and Table 9**

Table 8: Association between individual factors and hygiene practices among abattoir workers

Individual Factors Variables	Category	Hygiene Practices Poor (%)	Good (%)	Chi-Square P-Value
Income level	Low income	20(60.6%)	13(39.4%)	
	Moderate income	166(50.0%)	166(50.0%)	
	High Income	30(52.6%)	27(47.4%)	**0.495**
Frequently	Yes	61(46.9%)	69(53.1%)	
health checking	No	155(52.9%)	138(47.1%	**0.256**
Health	Yes	61(46.9%)	69(53.1%)	**0.256**
certificate	No	155(52.9%)	138(47.1%)	
Knowledge	Poor knowledge	137(51.3%)	130(48.7%)	
level	Good knowledge	79(50.6%)	77(49.4%)	**0.894**

Table 9: Association between disease risk perceptions and hygiene practices among abattoir workers

Disease-risk perceptions	Hygiene Practices		Chi-Square
	Poor (%)	Good (%)	P-Value
High disease risk Perceptions	28(15.1%)	157(84.9%)	
low disease risk Perceptions	188(79.0%)	50(21/0%)	0.000

Logistic regression: The strength of the association of hygiene practices were determined by logistic regressions. The study observed disease risk perception factor had strong association with hygiene practices. The abattoir workers with low disease risk perceptions were more likely [OR 22.512 of 13.275 to 38.176 at 95% C.I] to have poor hygiene practices than those with high perceptions. **Shown in Table 10**

Table 10: Logistic regression of individual factors and Disease risk perception of abattoir workers with hygiene practices.

VARIABLES	Adjusted OR (EXP(B))	95%CONFIDENCE¯INTERVAL LOWER	UPPER	P¯VALUE
Disease risk perceptions	22.512	13.275	38.176	0.000
Individual factors				
1.Knowledge level	1.255	0.699	2.255	0.894
2.Income level	1.298	0.755	1.310	0.495
3.Frequently of Health checking	0.698	0.372	1.310	0.256
3.Health certificates	0.698	0.372	1.310	0.256

CHAPTER FIVE

5.0 DISCUSSION

This study aimed to assess factors influencing hygiene practices and disease risk perception among abattoir workers. Social demographic factors, individual factors, structural factors and disease risk perception influencing hygiene practices were determined.

The finding from this study reported the majority of respondents,98.1% were male, this is similar to the study of (21), reported the abattoir activity is more dominated by men. 43.5% of abattoir workers had age of 21-30, followed by 22.2% had age of 31-40, this indicates the nature of the works requires physical strength. This study agrees with the study done by (15), which indicated abattoir workers were ranging between 18-40 years of age which falls within an active age group. Another similar study done by (21), reported the activities of abattoir are dominated by the youth and middle-aged who are more energetic.

Most of abattoir workers had at least primary level of education. These shows high numbers of abattoir workers were educated however the hygiene practices were not inadequate. This results is consistent with study done in Nigeria reported (22), majority of abattoir worker were educated. It was noted that Slaughterers were more dominant in the abattoirs. This may indicate that slaughterers are the more occupation a trisk in abattoirs because of being exposed to infectious material(5).

The findings from this study suggest that a high number of respondents had low overall knowledge regarding hygiene practices. These results confirm findings in the study conducted in western Kenya(11).However the present study reported more than half of the workers, 56.6% heard about hygiene practices on TV, Broadcast and workshop. This study reported that 56.5% had not attended the training with regards to hygiene practices, this may contribute to less awareness and lack of caution towards risk of bacterial contamination, this proportionally agrees with the study reported by(31).Another similar study reported that abattoir workers in most cases in developing countries were untrained and thus, they pay no attention to the hygienic standards, and as a result contribute immensely to bacterial

contamination. The findings point to the existence of inadequate knowledge and this may create low adherence to hygiene practices(22).The study also indicated more than half of workers ,69.3% had no health certificate and routine checkup after 3 to 6 months, this is similar to the study in Kenya(32) showed 94%and 88% of the SME butchery operators in Isiolo and Nairobi Counties, respectively did not possess medical health certificates. This is in contrast to the study in Ethiopia(10) showed less than half 15.4% of the abattoir workers had no health certificate. This observation was may be due to less effectiveness in enforcement of rules and regulations in abattoirs regarding TFDA ACT 2003.

The mean income level of respondent was 8540.24 Tsh which is the lowest according to Tanzania Trading Economy 2017. This agreed with F.A.O report in 2015, which stated that an employee in the abattoirs especially in sub-Saharan countries received low income. This may be a challenge for them to afford the cost of PPE and routine health checkup.

Being a key element in the production and distribution chain for meat it is essential that a slaughterhouse be as hygienic as possible to prevent the spread of both human and animal diseases as well as to reduce economic losses due to premature spoilage of meat caused by contamination (31).The present study witnessed abattoir rooms were not separated into clean and dirty room, this could increase number of bacterial contaminations during slaughter activities. Another similar study has shown slaughterhouse divided into the dirty (killing, bleeding) and clean (eviscerating and splitting) operations to prevent carcass contamination (10). The findings show one abattoir had cracked floor and not well cemented, similar to the study done by (10). This suggests high possibilities of insufficient cleaning in the abattoir which may favor bacterial growth. The nature of floor can even be the source of contamination (15). The study also finds all abattoirs had toilets and were cleaned however proportional number of toilets needed to be investigated further ,this is similar to the study in Morogoro by (15)reported, two abattoir toilets were thorough cleaned weekly. Presence of enforcement on restrictions rule and penalty in the abattoir regarding hygiene practices were not observed in the three abattoirs, the study shows only one abattoir adhere on the enforcement of regulation and rules regarding hygiene practices. This was done by administrators and meat inspectors.

Three abattoirs were not well fenced hence make them easily exposed to vermin and unauthorized people, this is similar to the study reported from Morogoro(15), showed abattoir was located within the area which is close to the town, heavy traffic and surrounded by residential houses and were not fenced .

This study found statistical significance between disease risk perception and hygiene practices in the abattoir. The study shows 79 % of individuals had association to poor hygiene practices.

The proportional of above half (56.3%) of abattoir workers seems to perceive low on disease risk in the abattoir. This indicates lack of consideration and caution to the risk of getting the infectious and food borne disease. In contrast, another study suggested (16), 97% agree to use of protective clothes can reduce the risk of diseases and cross contamination. Ideally perception on use of protective practices aimed to reduce the risk of cross-contamination. The meat handlers are probably a source of contamination for microorganisms. This agrees with the report of the WHO 2004.

The presents study reported 54.6% respondents indicated low perception on ring wearing on the fingers may cause food contamination. The wearing of jewelry, watches, and other detachable items should be discouraged (28) to avoid organisms such as *S. aureus* which can build up and around such items, and they pose a risk of foreign body contamination if they fall into the meat (28).

The findings of this study show hygiene practices among abattoir workers. The coverage of head in the abattoir ideal aimed to reduce the risk of contamination on the meat products. The proportion of respondents who covered their head was low 43.7%, similar to the study in India done by (12)were 43.3% covered their head. The findings of the study also showed 79.9% respondents wearing white coat and gumboot similar to findings of the study in Nigeria(13) showed 79% of the workers are using overalls, 87% are using boots .The study found 58.6% using detergents and soap as disinfectants, it indicated presence of hygiene facilities to maintain sanitary conditions in the abattoir .This study agrees with what was reported by (28)in Ethiopia, with more than half of respondents 66.6% using disinfectants for cleaning.

This Study showed 56% of respondents were not discarding infected material in the incinerator or decomposition pit only 44% did it, the reasons behind were not known, it is thought may be the meat value proportional to the cost, so farmers were not allowed to trim or discard their carcass. This is similar to the study(20) showed dumping of infected material in the marshy area daily. The study also shows 58.6% respondents were not cleaning knives with clean water and sterilizer , This work agrees with the study in Kenya (32)that utensils were not cleaned adequately as 35.9% of operators did not use detergent during cleaning of utensils and surfaces. The results of this study agrees with the work reported by(21) in Bawku Municipality, Ghana. He reported that butchery workers did not clean butchery utensils appropriately and that 35% of the butchery operators wiped butchery utensils with a piece of cloth.

These findings showed cleaning of toilet daily was not conducted for 58.6% of respondents, this agreed with the study in Morogoro city conducted by(33), which showed that although the two abattoir toilets were thoroughly cleaned weekly, they were always in unhygienic condition which further compromised good hygienic practices of a food industry. The present study showed76.4% washed their hands before and after slaughter ideally to reduce the risk of bacterial contamination this agreed with the study by(15),70% of the respondents reported that water sinks used for washing their hands in the abattoir were in good hygienic condition. Unwashed hands could be reliable sources of contamination. In the present study some of the workers had no habit of washing their hands with water and soap before and after sale of meat which contribute to contamination of meat.(34) Recommends that hand-washing alone has no effect on S. aureus counts on hands..

This study found a substantial proportion of respondents had unwanted material like ornament rings, 33.0% of them periodically use to put on rings, while they were working in the abattoir without considering any risk of disease. The study also showed that very few abattoir workers had the tendency of discarding infected carcass in the incinerator or decomposition pit only 44.0% did. Generally, it was observed that operational procedures by the workers could predispose them to their poor hygiene. This agrees with the observations of(30), on the

environmental implications of unhygienic operation by poor practices of meat processors in an abattoir in western Nigeria.

The study also has shown Abattoir workers wearing dirty clothes might be sources of contamination of beef with microorganisms. Thus it is important that all possible measures be taken to reduce or eliminate such contamination(33).Finally Hygiene practices within the abattoir were conducted if necessary materials were installed, planned, executed, controlled, cleaning and sanitation program for rooms, machines and equipment are very important to achieve a hygienic standard (19).This study indicates some limitations on the abattoirs selected in Dar es Salaam where only those used for cattle were selected while other livestock abattoirs like pig, and poultry abattoir were missed in this study this could not give the whole picture of hygiene practices in the abattoir in the Dar es salaam

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Basically, the study has shed some light on the factors influencing hygiene practices among abattoir workers. This study definitively answers the questions regarding factors influencing hygiene practices in the abattoir. The study showed that there are a number of factors influencing hygiene practices among abattoir workers. Slaughterhouse workers have low knowledge about hygiene in the abattoir. Although the study shows more abattoir workers have at least primary education, the majority had no health certificate, and had low income. At the structural level the study observed the abattoir was not good in terms of floor not well cemented, some abattoirs were not well fenced to ensure control for entrance of dogs and other. The abattoirs had no sterilizer or autoclave purposely for sterilization of utensils like knives. The room for dirt and cleaning was missing which creates the possibilities of bacterial contamination in food, although disinfectants and water was available. The study also concludes to observe low disease risk perception among abattoir workers, this shows significant association with poor hygiene practices

6.2 Recommendations

Based on these findings, there are challenges of hygienic practices in abattoirs, which could affect the production of meat and disease spreading to abattoir workers, hence putting the public at risk. The following recommendations are put forward to alleviate the observed prevailing situation

i) The routine training will be needed to promote knowledge of hygiene practices in the abattoir. Provision of that training programs should be to all abattoir workers.
ii) Policies, regulations and guidelines regarding WASH at all levels along the production chain in the abattoir should be adhered to and enforced to reduce risk of Food borne disease and zoonosis. Health Officers and Veterinary Officer should work together (one health approach) and enforce the law as per TFDA ACT of 2003.

iii) To safeguard the health of the public, the structure of abattoirs should be relocated to a new site far from people residence and traffic, ensure it is well fenced, allocate a separate room for cleaning and dirt.

iv) Disease risk perception should be addressed by behavior intervention E.g. Health belief model

v) Good hygienic practices should be encouraged at all levels in the abattoir operation.

6.3 Dissemination plan

This study will be published at the end of 2019 to give scholars a room of knowing what was unknown before. A dissertation will be produced for submission. Thereafter, the Dar es salaam region and its municipalities where the study was conducted will be given a copy of the report.

6.4 Future perspective

The study was focused on assessing the factors influencing hygienic practices among abattoir workers in Dar es salaam, there are a lot more that must be studied which were not captured due to financial constraint and time. Therefore, a study on the assessment of Latrine ratio per abattoir workers, behavior and awareness among abattoir workers in the abattoir needs to be done.

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APPENDICES

Appendix 1: Consent To Participate In Research – English Version

Muhimbili University of Health and Allied Sciences

School of Public Health Social Sciences

Research on Hygiene practices among abattoir workers in selected abattoirs in Dar es Salaam city

Dear Sir/Madam

You are hereby invited to participate in a study conducted by **Godwin A. Minga** for a master's Dissertation at Muhimbili University of Health and Allied Sciences.

Your participation in this study is entirely voluntary. You should read the information below before deciding whether to participate in the study. Your participation in the study will involve participation in identify factors influence hygiene practices in the abattoirs.

Purpose of the study: The purpose of this study is to identify factors influence hygiene practices among abattoir workers in the Dar es salaam abattoirs.

Voluntary participation: Participation in this study is voluntary and you have a right to refuse to consent. If you consent to participate, you have the right to withdraw from the study at any time if you wish to do so.

Benefits: There are no direct benefits for participating in the study. However, this study will provide information on factors influencing hygiene practices among abattoir workers. This information will be useful to government and non-government actors to improve interventions.

Risks and discomfort: There are no risks or discomforts involved in this study.

Compensation for time: You will not receive any payment or other compensation for participation in this study. There is also no cost to you to participate in the study except your time.

Confidentiality: Your participation in this study will remain confidential and your identity will be disclosed. There will be no link between your identity and response.

Review and approval: The review and approval of the study have been done by the Ethical Committee of Muhimbili University of Health and Allied Sciences (MUHAS).

Results: The results of the study will be made available to you through a planned means of research dissemination and will be compiled in a research paper for publication as part of partial fulfillment of a master's degree.

Consent form: I confirm that I have read carefully, understood the information provided and consent to participate in the study.

Contact: If you ever have questions about this study, you should contact the Principal Investigator Godwin A. Minga from Muhimbili University of Health and Allied Sciences, P.O. Box 65001, Dar-es-Salaam.

I, …… have read the contents of this consent form and my questions have been adequately answered. I, therefore, agree to participate in this study.

Signature of the participant ……. Date …….2018

Signature of the interviewer ……..... Date …….2018

Appendix 2: Ridhaa Ya Kushiriki Kwenye Utafiti - Kiswahili Version

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI.

SHULE YA AFYA NA SAYANSI YA JAMII

Utafiti kuhusu sababu zinazopelekea kuzingatia usafi wa wafanyakazi wa machinjio za Dar es salaam.

Nakuaribisha kushiriki katika utafiti unaofanywa na Bw Godwin Andrea Minga, mwanafunzi wa shahada ya pili kutoka chuo kikuu cha afya na sayansi shirikishi Muhimbili.Kushiriki kwako katika utafiti huu ni kwa hiari, unatakiwa kusoma taarifa zote katika fomu hii na kuamua kushiriki au kutoshiriki katika utafiti huu.

Madhumuni ya utafiti: Dhumuni la utafiti huu ni kutathimini sababu za wafanyakazi wa machinjioni kuwa wasafi wakati wakiwa machinjioni.

Ushiriki: Ushiriki katika utafiti huu ni wa hiari una haki ya kukataa kushiriki, kama umekubali kushiriki katika utafiti unatakiwa kuweka sahihi yako katika fomu hii na kujibu maswali utakayo kuwa utayokuwa umeulizwa.

Faida: Hamna faida ya moja kwa moja kwa wewe kushiriki katika utafiti huu.Ila matokeo ya utafiti huu yatasaidia kutadhimini sababu zinazopelekea wafanyakazi wa machinjio ni kuwa wasafi.Taarifa hizi zitasaidia serikali na wadau wengine kuboresha shughuli za kuimalisha wafanyakazi wa machinjioni kuwa wasafi.

Hasara: Hakuna hasara za moja kwa moja zitakazotokana na utafiti huu.

Fidia: Hakutakuwa na malipo yoyote kutokana na ushiriki wa utafiti hu una pia mshiriki hutakuwa na gharama zozote za wewe kushiriki katika utafiti huu isipokuwa muda wako tu.

Usiri: Ushiriki wako katika utafiti utabaki kuwa siri na taarifa zote zitakazokusanywa zitashughulikiwa kwa usiri wa hali ya juu. Jina lako halitatumika katika taarifa zozote.

Kuidhinisha utafiti: Mapitio na udhinishaji wa utafiti huu umefanywa na kamati ya maadili ya utafiti kutoka chou kikuu cha afya na sayansi shirikishi Muhimbili.

Matokeo: Matokeo ya utafiti huu yatapatikana kupitia uwasilishwaji katika chou kikuu cha afya na sayansi shirikishi Muhimbili na wadau pia ripoti ya utafiti yatawekwa kwa umma ili iweze kusaidia shughuli za utafiti mwingine.

Fomu ya utafiti: Nakiri kwamba nimesoma maelezo yote kwa umakini na nimeelewa kila kilichoandikwa katika fomu hii. Ninaelewa kwamba ninaweza kujitoa muda wowote nitakaotaka kujitoa katika utafiti huu.

Mawasiliano kuhusiana na utafiti huu: Kama una maswali kuhusiana na utafiti huu unaweza kuwasiliana na mtafiti mkuu Ndugu Godwin Andrea Minga kutoka chou kikuu cha afya na sayansi shirikishi Muhimbili, S.L.P 65001, Dar es salaam.

Mimi……. Nimesoma maelezo yote katika fomu hii na maswali yangu yameweza kujibiwa Nakubali kushiriki katika utafiti huu.

Sahihi ya Mshiriki..... Tarehe ……2018

Sahihi ya Msahili ……..... Tarehe ……2018

Appendix 3: Questionnaires English Version

Muhimbili University of Health and Allied Sciences

School of Public Health and Social Sciences

Questionnaire for assessment of factors influencing hygiene practices and disease risk Perception among abattoir workers in Dar Es Salaam.

Id No-----Date of Interview--------Ward----------District----------

Name of Interviewer----------

PLEASE GIVE THE CORRECT ANSWER FROM THIS QUESTIONS

SOCIO DEMOGRAPHIC FACTORS

Please give the correct answer to the following questions

1. Age
    1. 15-20
    2. 21-30
    3. 31-40
    4. 41-50
    5. Above 50 [ ]

2. Sex: Male/Female……
3. Marital Status
    1. Unmarried
    2. Married
    3. Divorced [ ]
    4. Widowed
4. What is the highest level of education that you attained?
    1. Did not go to school
    2. Primary education [ ]

3. Secondary education
4. University education

5. Your Occupation age(experience) in years

1 .1-3 years [ ]

2. 4-7 years

3. Above or 8 years

6. Occupation in the abattoir

1. Meat inspectors [ ]
2. Administrator
3. Meat seller
4. Loaders
5. Cleaners
6. Animal keepers
7. Slaughters

INDIVIDUAL FACTORS INFLUENCE HYGIENE PRACTICES

A). LEVEL OF INCOME

1. On average how much do you earn per day (TZS) ……

B). KNOWLEDGE TO WARD HYGIENE PRACTICES

1. Do you know the meaning of hygiene practices, if yes go to question 2? A). Yes B). No ( )

2. Mention one importance of hygiene practices……

3. Unhygienic practices in the abattoir can cause the transmitting of foodborne disease and zoonosis? A). Yes B). No ( )

4. Explain by mention one disease caused by unhygienic practices? A). Yes B). No ( )

5. Do you hear about the Hygiene practices in the abattoir? A). Yes B). No ( )

6. Mention where you heard about the Hygiene practices in the abattoir?.....

7. Do you practices hygiene in the abattoir frequently? A). Yes B). No ( )

8. At what frequently do you practice hygiene? 1.weekly 2. Daily

9. Did you attend any training on the hygiene practices for the abattoir worker? A). Yes B). No ( )

10. At what time the training conducted1.Before starting a job 2.After starting a job

C) MEDICAL CERTIFICATION AMONG ABATTOIR WORKER

1. Did you check your health routine?1)Yes 2)No [ ]

2. Do you have medical certification for working in the abattoir?1)Yes 2) No [ ]

D) DISEASE RISK PERCEPTIONS

Number	Questions	Strong agree	Agree	Disagree	Strong disagree
1	Is foodborne disease can be transmitted through poor hygiene practices in the abattoir?				
2	Zoonosis can be transported from an infected animal to the abattoir worker?				
3	Ring in the finger can be a source of food meat contamination during slaughtering?				
4	Faecal contamination to the meat can be a source of contamination?				
5	Handling of an infected animal without gloves will risk to zoonosis				
6	Dirty clothes and the unclean floor will be a source of contamination during slaughtering?				
7	Hygiene practices daily will prevent food borne disease and zoonosis?				

E) HYGIENE PRACTICES IN THE ABATTOIR; where A=1 and B=2

1) Wearing of clean white coat and gumboot. A). Yes B). No ( )
2) Wash hand with soap before and after slaughtering a cattle A). Yes B). No ( )
3) Cleaning the premises with disinfectant A). Yes B). No ( )
4) Discard the infected material in the incinerator or decomposition pit A).Yes B).No( )
5) Wearing of ring ornaments, A). Yes B). No ( )
6) Knives for slaughtering are washed by clean water and sterilized A). Yes B). No ( )
7) Cleaning of the toilet with disinfectant daily A). Yes B). No ( )
8) Slaughtering animal in the bench and not in the floor A). Yes B). No ( )
9) Covering the head, A). Yes B). No ( )
10) Pest control program has done routine A). Yes B). No ( )

Appendix 4: Questionnaires Kiswahili Version

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

Maswali ya utafiti wa sababu zinazopelekea usafi wa shughuli za machinjio na taadhali ya mitazamo ya magonjwa kwa wafanyakazi wa machinjio.

Namba ya Utabulisho ----- tarehe ya kuhojiwa--------kata---------wilaya-------

Jina la muulizaji----------Machinjio ya ……

TAFADHALI TOA JIBU SAHIHI KWA MASWALI

TAARIZA ZA KIJAMII ZA MFANYAKAZI WA

1.Umri wako ni kati ya miaka

a) 15-20
b) 21-30 [ ]
c) 31-40
d) 41-50
e) Above 50

2. Jinsia yako Mme au Mke……

3. Halii ya ndoa

a) Huna ndoa
b) Una ndoa
c) umeachika [ ]
d) mjane

4. Kiwango cha elimu yako?

a) Hukwendashulekabisa
b) Elimu ya msingi
c) Elimu ya sekondali [ ]
d) Elimu ya chuo kikuu

5. Kazi yako katika machinjio

a) Mkaguziwanyama [ ]
b) Mchinjaji
c) Mbeba mizigo
d) Mtunza mifugo

e) Utawala
f) Muuzanyama
g) Mfagizi

6. Una muda ganikazini

a) Miaka 1-3
b) Miaka 4-7 [ ]
c) Miaka 8 nakuendelea

SABABU BINAFSI ZINAZOPELEKEA USAFI WA MACHINJIO

A). KIWANGO CHA KIPATO

1. Kiwango cha pesa za kitanzania unazoingiza kwa siku……

B). UWELEWA WA KUFANYA USAFI

1. Unajuamaana ya Usafi wa machinjio? a)Ndiyo b)Hapana [ ]

2. Kama ndiyo andiika faida inayotokana na usafi wa machinjio……..

3. Maambukizi kwabinadamukwamagonjwayamifugoyanatokananakutokuwawasafiwamachinjio?

a) Ndiyo b) Hapana [ ]

4. Taja Ugonnjwa mmoja unaoweza kupatikana kwa kutokuwa msafi machinjioni……

5. Umeshawai kufundishwa juu ya usafi wa machinjioni? a) Ndiyo b)Hapana[ ]

6. Eleza mahali ulipo waikusikia……

7. Je wewe mwenyewe unatekeleza usafi wa machinjio maranyingi? a)Ndiyo b)Hapana[ ]

8. Ni mala ngapi huwaunatekeleza usafi huoa)kilawiki b)kilasiku [ ]

9. Umewai kufanya mafunzo yoyote juu ya usafiwa machinjio? a) Ndiyo b)Hapana [ ]

10. Mafunzo hayounayapata wakati gani.a)Baada ya kuanzakazi b)Kabla ya kuanzakazi[ ]

C) CHETI CHA AFYA KWA WAFANYA KAZI WA MACHINJIO

1. Huwa unacheki afya mara kwamara? a)Ndiyo b)Hapana [ ]

2. Una cheti cha afya kwa ajili ya kufanyakazi machinjioni? a) Ndiyo b) Hapana [ ]

D) HISIA ZA KUPATA UGONJWA

Na	Swali	Naku bali sana	naku bali	sikub ali	Siku bali Sana
1	Ugonjwawachakulayanasababishwanaunasambaakwakutofanyausafikwenye machinjio.				
2	Ugonjwa unaosambaa kutoka kwa ngombe kwenda kwa mchinjaji kwa kupitia mnyama aliyeasirika au sehemu zilizoasirika?				
3	Pete kidoleni inaweza kuwa chanzo cha kuchafua chakula na kusababisha magojwa				
4	Uchafu wa kinyesi cha ngombe kinaweza kuwa chanzo cha kuharibu nyama?				
5	Kushika myama aliye athirika kinaweza kuwa chanzo cha ugonjwa kwa binadamu.				
6	Nguo chafu na sakafu chafu kinaweza kuwachazo cha uchafu kwenye machinjio?				
7	Usafi unasaidia kuzuia magonjwa ya chakula na magojwa ya maabu kizikati ya ngombe na binadamu?				

Appendix 5: Checklist Form

STRUCTURAL FACTORS: HYGIENE PRODUCT AVAILABILITY IN THE ABATTOIR FACILITIES

	AVAILABILITY	YES (1)	NO (0)
1	Running water		
2	Incinerator or Decomposition pit		
3	Special room for infected animal/product		
4	Presence of disinfectant		
5	Good fence for rodent and dogs' control		
6	Sterilizer machine for equipment		
7	Toilet and bathroom		
8	Good Floor for cleaning		
9	Good roof for ventilation and temp		
10	Large size abattoir		
11	Good drainage system for waste material.		
12	Restriction laws and punishments penalties for those who break the abattoir laws		