International Egyptian Journal of Nursing Sciences and Research (IEJNSR)

Original Article

Occupational Health Hazards Prevalence, Knowledge, Attitude and Practice among Butchers at Assiut District and City

Fayza M. Mohammed[1], Shaimaa M. Goda[2], Shimaa A. Khalaf[1*]

[1]Assistant Professor of Community Health Nursing, Faculty of Nursing, Assiut University

[2]Lecturer of Community Health Nursing, Faculty of Nursing, Assiut University

[*]**Corresponding author:** Shimaa A. Khalaf, dr.shaimaaahmed@aun.edu.eg

ABSTRACT

Background: Workers in slaughterhouses engaging in unhygienic practices create conducive environments for zoonoses and meat contamination. Knowledge of hygiene practices and their determinants provides evidence for the design of targeted interventions. **Aim:** To assess occupational health hazards prevalence, knowledge, attitude and practice among butchers at Assiut District and City. **Subjects and method; Study design:** A community-based descriptive, cross-sectional design was used. **Setting:** Butchers' shops in Assiut District and City. **Sample:** Included 350 people working in butcher profession: **Study tools:** Three tools were included in this study; **Tool (I):** A structured interview sheet consisted of five sections; personal characteristics, work related data, work environment assessment, reported occupational health problems, and butchers' knowledge. **Tool (II):** Butchers' attitude regarding occupational health hazards. **Tool (III):** Butchers' practice observational checklist. **Results:** It was found that 45.1% of butchers aged<40 years, 40.9% had secondary education, 45.7% had fair level of knowledge with significance relation with education, residence, and nature of work. Also, 78.9% of them had a positive attitude with positive links with education, residence and receiving training courses and 70.0% of them had satisfactory practices which correlated with education, residence and work experience. **Conclusion:** Butchers had a fair level of knowledge, positive attitude and satisfactory level of practices regarding occupational hazards. **Recommendations:** Health education program regarding occupational safety and the importance of protective personal equipment should be encouraged.

Keywords: Attitude, Butchers, Knowledge, Occupational Health Hazards, Prevalence.

Introduction:

Occupational hazards are the leading cause of morbidity and mortality among butchers in recent years. Occupational hazards have increased over the past few decades, leading to rising rates of occupational exposure. Physical, chemical, mechanical, electrical, and psychosocial hazards are among the common occupational hazards encountered in abattoirs. These hazards can cause occupational diseases or exacerbate pre-existing illnesses of non-occupational origin **(Tolera & Mengistu, 2021).**

Numerous working conditions have an impact on employees' health, but those that take place in facilities that produce and process food, especially in the meat industry, such as slaughterhouses, expose workers to biological agents due to the likely presence of microorganisms in the animal, its products, and the workplace **(Marzoque et al., 2021)**.

Both industrialized and developing nations may experience new zoonosis outbreaks, which typically affect animal species for which the disease has not yet been described. These outbreaks may be caused by previously known agents or by recently discovered diseases **(Eljamay et al., 2022).** Butchers also frequently face ergonomic risks, musculoskeletal conditions such repetitive strain injuries, and work-related musculoskeletal illnesses. It is impossible to ignore the physical risks associated with meat processing, such as loudness and cold **(Marzoque et al., 2021)**.

Workers in slaughterhouses may be exposed to dangerous substances such hydrogen peroxide, which is occasionally used as a disinfectant, ammonia, which is used in the packing of meat, and chlorine, which is added to water to disinfect meat. Burns from unintentional splashes, respiratory problems, and irritations of the throat, eyes, nose, and skin can result from these exposures **(Johnson & Etokidem, 2019).**

The prevalence of occupational hazards in abattoirs has increased due to several factors, including inadequate food handling procedures, a lack of financial resources to upgrade to safer equipment, a lack of hygiene, and a lack of training for handlers in food establishments like abattoirs **(Matchawe et al., 2019; Bahir et al., 2022)**. Many slaughterhouse workers deal with dangerous and predictable working circumstances daily; these conditions are exacerbated by risk factors that can lead to unfortunate and deadly incidents. Inadequate and frequently non-existent occupational safety and health management programs are the cause of these all-too-common risks and hazards **(Jerie & Matunhira, 2022).**

Occupational health nurses are crucial in monitoring and evaluating workers' health in relation to different jobs and risks including butchers in slaughterhouses. They are also in charge of environmental health, emergency planning, workers' treatment, follow-up and referrals, emergency care for diseases and injuries related to the job, rehabilitation for return-to-work concerns, and risks management using their specific training and experience **(Mousa, Abd ElAal, & Sarhan, 2024)**.

Significance of the study:

The World Health Organization reports that butchers' knowledge of occupational dangers is insufficient; hence, it is recommended that ongoing educational sessions be organized to raise butchers' awareness of these hazards **(Eljamay et al., 2022)**.

Since meat is a highly perishable food stuff and the abattoirs and butcher shops are such labor-intensive working areas, the awareness, and level

of training of the meat handlers regarding good hygienic management and the critical control points of the food chains are of great significance to mitigate the health risk of meat consumers **(Gebeyehu & Tsegaye, 2022).** Zoonotic infections, chemical hazards, inexperienced workers, poor first-aid facilities, psychosocial hazards, and risky behavior are among some serious safety and health concerns also associated with the meat industry **(Jerie & Matunhira, 2022)**.

Butchers' professions are considered one of the neglected areas of study resulting in scarcity of research discussing the occupational health hazard among those populations. In Egypt, very little data is published about health hazards that facing workers operating in the slaughterhouse's environments, as well as their knowledge, attitude, and practice. The objective of this study was to shed light on butchers' knowledge, attitude, practice and prevalence of occupational health hazards to develop further educational programs for raising awareness about occupational hazards in butchers' shops.

Aim of study:

To assess the occupational health hazards prevalence, knowledge, attitude and practice among butchers at Assiut District and City.

Research questions:

1. What is the prevalence of occupational hazards among butchers?
2. What is the level of knowledge regarding occupational health hazards among butchers?
3. What is butchers' attitude toward occupational health hazards preventive measures?
4. What are butchers' levels of preventive practice of occupational health hazards?

Subjects and Method:

- Research design:

A community-based descriptive, cross-sectional study conducted among butchers in Assiut District and City.

Setting:

The current study carried out at Assiut District and City: **Assiut District**: Due to the limited number of butcher's shops and to represent the rural localities in the current study; total coverage for all the butchers' shops which located in seven rural local units, and it is affiliated 25 villages were used. **Assiut City**: To represent the urban localities in the current study, data was gathered based on the city's administrative classification (East and West). To represent the various situations, butcher shops were chosen using a simple random sampling technique.

Sample descriptions:

All butchers in Assiut District and City who had been in the meat industry for at least six months, were older than eighteen, and operated daily rotating shops were the target sample. Butchers who weren't in the shop when the data was being collected weren't included.

Sample selection technique:

Sample size calculated by using EPI/Info 2000, version (3.3), with power 80% and CI 95%;

on the knowledge prevalence (10%). The sample size was estimated to be 280 people. To avoid drop out and refusal; sample size was increased to be 350 butchers.

Tools of the study:

Three proper tools were included in this research after reviewing the relevant literature to elicit necessary information.

Tool (I): A structured interviewing sheet used, which adapted from previous studies **(Matchawe, Ndip, Zuliani, 2019; Gajida et al., 2019; Tolera & Mengistu, 2021)**; consisted of five (5) sections:

Section one: Personal characteristics of butchers, it included six (6) questions such as: Age, levels of education, marital status, residence, years of experience and Body Mass Index (BMI) which calculated after measuring weight and height, then divided weight in kg by square height in meters (kg/m2) which classified as following:

- Underweight - BMI under 18.5 kg/m^2
- Normal weight - BMI greater than or equal to 18.5 to 24.9 kg/m^2
- Overweight – BMI greater than or equal to 25 to 29.9 kg/m^2
- Obesity – BMI greater than or equal to 30 kg/m^2 **(Hales et al., 2018; Khalaf, Abd elshafy & Aly, 2023)**.

Section two: Work related data in this part nine (9) questions were asked for the butchers to assess their working data such as: Nature of work, working hours per day, working postures…. etc.

Section three: Work environment assessment, in this section the conditions of the butchers' shops was assessed by the researcher during other researcher interviewing with the butchers, it involved ten (10) areas of assessment such as: presence of slab, knives, floor with adequate slope, adequate ventilation, insect, drinking water…etc.

Section four: Reported occupational health problems among butchers. Questions regarding reported occupational health problems were asked such as physical and psychological problems (cuts, skin problems, stress, fatigue), chemical hazards (detergents and chlorine splashes) and biological hazards (fungal, bacterial, protozoal infections).

Section five: Butchers' knowledge regarding occupational hazards included (19) questions mainly assessed their knowledge on the diseases transmitted through meat and factors affecting the safety of meat. Total score of knowledge were (31) grade, using score system for knowledge, a correct response was scored (1) grade and zero for the incorrect **(Matchawe, Ndip & Zuliani, 2019; Gajida et al., 2019)**, scoring as following:

- Poor= score <50%.
- Faire= score 50-70%.
- Good= score > 70%.

Tool (II): Information addressing butchers' attitude of occupational health hazards was obtained. There were thirteen questions in this portion, and butchers could respond on three different points. Likert scale (agree, disagree, or uncertain) for items like choosing healthy animals is crucial for producing healthy meat; hand

washing with a disinfectant after using the restroom is required; cleaning the abattoir's facilities is a means of preventing contamination, etc. These had corresponding scores of 2, 1, and 0. After adding them up, the final score was transformed into a percentage. If the score was greater than 70%, the attitude was deemed positive; if the score was less than 70%, it was deemed negative **(Matchawe, Ndip & Zuliani, 2019)**.

Tool (III): This section contained the practice observational checklist. It was a nonparticipant observation in which the researcher watched passively rather than participating in the group's activities. To determine the level of compliance, the checklist included standard operating procedures for all meat processing and waste disposal operations. The procedures portion included twenty-two questions about practice like cleaning slaughter equipment, using gloves during slaughter, and wiping hands with the same cloth in between tasks. Don or not don ratings were assigned to the observations. The marks were converted to unsatisfactory (below 50%) and satisfactory (50% and above) practice **(Matchawe, Ndip & Zuliani, 2019; Gajida et al. , 2019)**.

- Validity:

The converted Arabic tools were verified and appraised by three Community Health Nursing professors, Faculty of Nursing, Assiut University who look over for implication, completeness and applicability. Developments of the questionnaire were completed according to the modifications required.

-Reliability:

The value of Cronbach's alpha reliability test for knowledge was 0.89 and for attitude was 0.720 and Practice 0.784.

-Procedure: The current research proceeded according to the following:

1- Ethical considerations:

The Assiut University Faculty of Nursing's Ethical Committee approved the research proposal (No.1120240759.). The studied butchers faced no danger when the research was being used. Common ethical guidelines for research were followed. After explaining the nature and goal of the study to the butchers who were enthusiastic about participating, the agreement was obtained from them. Anonymity and confidentiality were guaranteed. Study participants were given the option to decline participation or leave the study at any time without explanation, and privacy concerns were considered when gathering data.

2. Administrative phase:

The Directorate of Health in Assiut City received an official letter from the Dean of the Faculty of Nursing at Assiut University; it included permission to conduct the study and described its purpose and nature.

3-Pilot study:

To test the clarity and comprehensibility of the data collection tools, a pilot study was conducted with 10% (35) butchers. The outcomes of the pilot study demonstrated that no changes were required. Consequently, these 35 butchers were included in the study sample.

-Field work: Data gathered between March and August 2024. The researchers introduced themselves to the participants and gave a brief explanation of the study's objectives. The data were collected for around six months. The average length of each interview was (30-40) minutes. Every day about (5-8) sheets were finished. Data were collected (two days/ week).

Statistical analysis:

Data entry and analysis were done using SPSS version 22 (Statistical Package for Social Science). Data were presented as number, percentage, mean, standard deviation. The Chi-square test and Pearson correlation were used to compare between qualitative variables. P-value considered statistically significant when $P< 0.05$.

Results:

Table (1): Presents that 45.1% of butchers aged <40 years, 40.9% of them had secondary education, 65.7% reside in urban setting, 46.0% of them were overweight and 40.6% of them worked in butcher profession for 10-15 years.

Table (2): Reveals that 49.4% of butchers handling heavy loads, 51.7% worked from 8-12 hours, 57.7% worked for 3 days per week, 69.7% wore personal protective equipment during work, 77.4% stored meat in the freezer and 67.4% served meat in nylon bags.

Table (3): Describes the butchers' stations' environmental conditions as 84.0% had slab in the working place, 88.6% had adequate ventilation, 72.0% had floor with proper drainage facilities and 49.7% of the station had stray animals.

Table (4): Indicated the occupational health problems as reported by the butchers; 62.6% had upper limbs, neck and back problems, 67.7% had injury, 69.1% stampede/animal kick, 22.3% had frequent headache, 18.9% had fatigue. Chemical health hazards as 66.9% exposed to hypochlorous acid splashes. Biological health hazards as 16.6 had fungal infection like ringworm.

Figure (1): Shows that 45.7%, 38.6% and 15.7% of butchers had fair, poor and good level of knowledge regarding occupational health hazards respectively.

Figure (2): Demonstrates that 78.9% of butchers had a positive attitude toward occupational health hazards

Figure (3): Declares that 70.0% of butchers had satisfactory practice level.

Table (5): Discovers that there is a statistically significant positive and very strong correlation between knowledge and attitude, knowledge and practice; attitude and practice

Table (6): Illustrates that there were statistical significance differences between level of knowledge and butchers' levels of education, residence, nature of work, working hours/day, working day/week and receiving training courses about occupational hazards p-values= 0.000, 0.000, 0.001, 0.001, 0.000 and 0.000 respectively.

Table (7): Donates that there are statistical significance differences between butchers' level of attitudes and their levels of education, residence, nature of work, working hours/ day, working days/week and receiving training courses about

occupational hazards p-values= 0.000, 0.000, 0.000, 0.001, 0.000 and 0.006 respectively.

Table (8): Proves that statistical significance differences present between butchers' level of practices and their levels of education, residence, experience as butchers, working hours/ day, working day/week and receiving training courses about occupational hazards p- values= 0.000, 0.000, 0.008, 0.001, 0.000 and 0.000 respectively.

Table (1): Personal data of butchers at Assiut District and City

Personal data	No. (350)	%
Age (years):		
< 40	158	45.1
40 -< 50	120	34.3
≥ 50	72	20.6
Levels of education:		
Basic education or less	84	24.0
Secondary	143	40.9
University	123	35.1
Marital status:		
Single	45	12.9
Married	287	82.0
Divorced	12	3.4
Widow	6	1.7
Residence:		
Urban	230	65.7
Rural	120	34.3
BMI:		
Normal	104	29.7
Overweight	161	46.0
Obese	85	24.3
Experience as a butcher (years):		
< 10	101	28.9
10 – 15	142	40.6
> 15	107	30.6

Table (2): Work related data among butchers at Assiut District and City

Work related data	No. (350)	%
Nature of work:		
Repetitive & forceful	112	32.0
Vibratory	65	18.6
Handling heavy loads	173	49.4
Working hours per day:		
< 8	169	48.3
8 – 12	181	51.7
Working days per week:		
2 days	110	31.4
3 days	202	57.7
4 - 7 days	38	10.9
Working posture:		
Bending/ awkward	62	17.7
Static work/ frequent standing	141	40.3
Alternative postures	147	42.0
Taking of rest break:		
Yes	306	87.4
Using Personal Protective Equipment (apron...etc.)		
Yes	244	69.7
Methods of known abattoir waste disposal:		
Open dumping	209	59.7
Burning	22	6.3
Land filling	24	6.9
Do not know	95	27.1
Meat storage methods:		
Cold room	29	8.3
Freezer	271	77.4
Refrigerator	46	13.1
Room temperature	4	1.1
#Meat serving methods:		
Nylon bag	236	67.4
Sheet of papers	85	24.3
Plates/ dishes	140	40.0

More than one answer was selected

Table (3): Assessment of butchers' stations environmental conditions at Assiut District and City

#Assessment of environmental condition	No. (350)	%
Have slab in the working place	294	84.0
Have knives	338	96.6
Have floor with adequate slope for ease wash and drainage	268	76.6
Have adequate ventilation	310	88.6
Presence of detergent	244	69.7
Presence of disinfectant	238	68.0
Potable drinking water	332	94.9
Floor with proper drainage facilities	252	72.0
Presence of insect	196	56.0
Presence of stray animals	174	49.7

More than one answer was selected

Table (4): Reported occupational health problems among butchers at Assiut District and City

Health problems	No. (350)	%
# Physical and psychological hazards:		
Cuts and bruises	134	38.3
Upper limbs, neck and back problems	219	62.6
Noise induced hearing loss	38	10.9
Skin problems	32	9.1
Injury	237	67.7
Bose, chest and lung problems	112	32.0
Stress	205	58.6
Infectious diseases	70	20.0
Stampede/ animal kick	242	69.1
Bone Piercing	185	52.9
Vibration	168	48.0
Frequent headaches	78	22.3
Eye irritation	55	15.7
Fatigue	66	18.9
Loss of concentration	52	14.9
#Chemical health hazards:		
Hypochlorous acid splashes	234	66.9
Detergents splashes	212	60.6
Chlorine splashes	36	10.3
#Biological health hazards:		
Fungal Infections Like Ringworm (Algae infected environment)	58	16.6
Protozoan Infections like Malaria (Insect bites)	42	12.0
Bacterial Infections like Tuberculosis (Infected animals, dirty water	38	10.9

More than one answer was selected

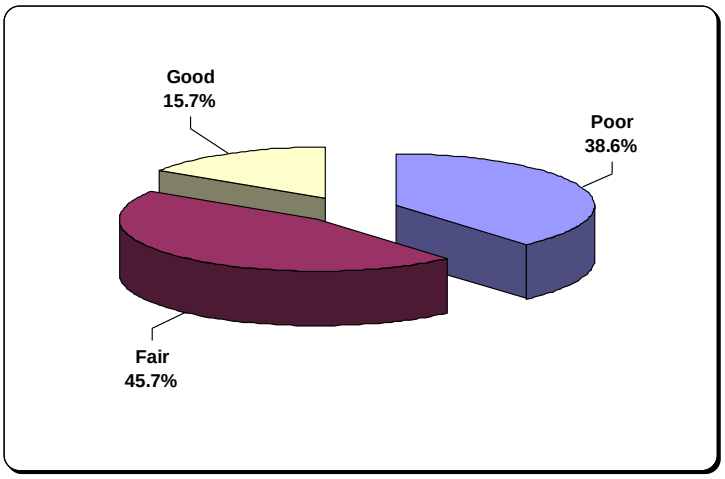

Figure (1): level of knowledge related to occupational health hazards among butchers at Assiut District and City

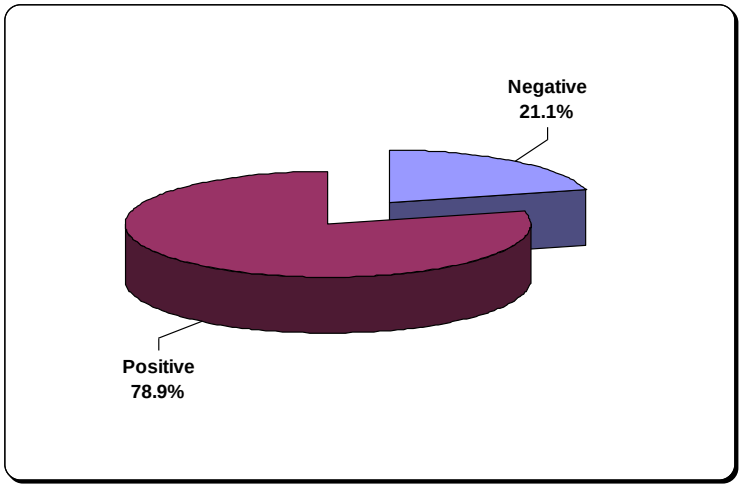

Figure (2): level of attitude regarding occupational health hazards among butchers at Assiut District and City

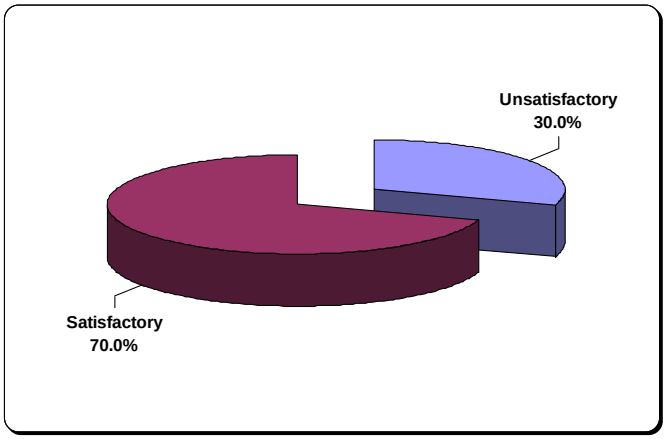

Figure (3): Level of practice related to occupational health hazards among butchers at Assiut District and City

Table (5): Correlation between level of knowledge, practice and attitude among butchers at Assiut District and City

KPA variables	r-value	P-value
Knowledge – Attitude	0.429	0.000*
Knowledge – Practice	0.379	0.000*
Attitude – Practice	0.649	0.000*

Pearson correlation

Table (6): Relation between butchers' personal data and their level of knowledge at Assiut District and City

Personal data	Level of knowledge						P-value
	Poor		Fair		Good		
	No.	%	No.	%	No.	%	
Age (years):							
< 40	59	37.3	70	44.3	29	18.4	
40 - < 50	48	40.0	61	50.8	11	9.2	0.163
≥ 50	28	38.9	29	40.3	15	20.8	
Levels of education:							
Basic education or less	58	69.0	16	19.0	10	11.9	
Secondary	50	35.0	65	45.5	28	19.6	0.000*
University	27	22.0	79	64.2	17	13.8	
Marital status:							
Married	98	34.1	148	51.6	41	14.3	0.000*
Single	37	58.7	12	19.0	14	22.2	
Residence:							
Urban	47	20.4	142	61.7	41	17.8	0.000*
Rural	88	73.3	18	15.0	14	11.7	
Experience as a butcher (years):							
< 10	41	40.6	42	41.6	18	17.8	
10 – 15	47	33.1	71	50.0	24	16.9	0.366
> 15	47	43.9	47	43.9	13	12.1	
Nature of work:							
Repetitive & forceful	50	44.6	53	47.3	9	8.0	
Vibratory	34	52.3	23	35.4	8	12.3	0.001*
Handling heavy loads	51	29.5	84	48.6	38	22.0	
Working hours per day							
< 8	81	47.9	61	36.1	27	16.0	0.001*
8 – 12	54	29.8	99	54.7	28	15.5	
Working days per week							
2 days	76	69.1	18	16.4	16	14.5	
3 days	35	17.3	132	65.3	35	17.3	0.000*
4 - 7 days	24	63.2	10	26.3	4	10.5	
Receiving training courses about occupational hazards							
Yes	59	22.6	155	59.4	47	18.0	0.000*
No	76	85.4	5	5.6	8	9.0	

Chi-square test

Table (7): Relation between butchers' personal data and their level of attitudes regarding occupational hazards at Assiut District and City

Personal data	Level of attitude				P-value
	Negative		Positive		
	No.	%	No.	%	
Age (years):					
< 40	32	20.3	126	79.7	0.930
40 - < 50	26	21.7	94	78.3	
≥ 50	16	22.2	56	77.8	
Levels of education:					
Basic education or less	38	45.2	46	54.8	0.000*
Secondary	30	21.0	113	79.0	
University	6	4.9	117	95.1	
Marital status:					
Married	42	14.6	245	85.4	0.000*
Single	32	50.8	31	49.2	
Residence:					
Urban	34	14.8	196	85.2	0.000*
Rural	40	33.3	80	66.7	
Experience as a butcher (years):					
< 10	26	25.7	75	74.3	0.098
10 – 15	22	15.5	120	84.5	
> 15	26	24.3	81	75.7	
Nature of work:					
Repetitive & forceful	6	5.4	106	94.6	0.000*
Vibratory	20	30.8	45	69.2	
Handling heavy loads	48	27.7	125	72.3	
Working hours per day:					
< 8	50	29.6	119	70.4	0.000*
8 – 12	24	13.3	157	86.7	
Working days per week:					
2 days	34	30.9	76	69.1	0.000*
3 days	12	5.9	190	94.1	
4 - 7 days	28	73.7	10	26.3	
Receiving training courses about occupational hazards:					
Yes	46	17.6	215	82.4	0.006*
No	28	31.5	61	68.5	

Chi-square test

Table (8): Relation between butchers' personal data and their level of practice at Assiut District and city

Personal data	Level of practice				P-value
	Unsatisfactory		Satisfactory		
	No.	%	No.	%	
Age (years):					
< 40	49	31.0	109	69.0	0.579
40 - < 50	38	31.7	82	68.3	
≥ 50	18	25.0	54	75.0	
Levels of education:					
Basic education or less	54	64.3	30	35.7	0.000*
Secondary	40	28.0	103	72.0	
University	11	8.9	112	91.1	
Marital status:					
Married	69	24.0	218	76.0	0.000*
Single	36	57.1	27	42.9	
Residence:					
Urban	36	15.7	194	84.3	0.000*
Rural	69	57.5	51	42.5	
Experience as a butcher (years):					
< 10	42	41.6	59	58.4	0.008*
10 – 15	33	23.2	109	76.8	
> 15	30	28.0	77	72.0	
Nature of work:					
Repetitive & forceful	27	24.1	85	75.9	0.235
Vibratory	20	30.8	45	69.2	
Handling heavy loads	58	33.5	115	66.5	
Working hours per day:					
< 8	67	39.6	102	60.4	0.000*
8 – 12	38	21.0	143	79.0	
Working days per week:					
2 days	71	64.5	39	35.5	0.000*
3 days	16	7.9	186	92.1	
4 - 7 days	18	47.4	20	52.6	
Receiving training about occupational hazards:					
Yes	46	17.6	215	82.4	0.000*
No	59	66.3	30	33.7	

Chi-square test

Discussion:

Numerous occupations, including butchers, veterinarians, hospital staff, and laboratory workers, have seen a high frequency of reports of zoonotic disease. It has been shown that high-risk behaviours associated with one's work can raise one's risk of infection more than one's own performance and knowledge. Workers in slaughterhouses are typically at risk for knife wounds and bloodletting, which increases the

possibility that they could share knives and other sharp objects with their coworkers and spread blood-borne illnesses **(Alkassabany, Farghaly & El-Ghitany, 2018).**

The current study aimed to assess the occupational health hazards prevalence, knowledge, attitude and practice among butchers at Assiut District and City.

In accordance with the personal data more than two fifths of butchers in the current study aged <40 years. This is since people at this age have more obligations and requirements regarding their families, which prompts them to seek to improve their income in one way or another to meet the requirements of life. The current finding was slightly like a study conducted by **Abduelrahmana et al. (2024)** who reported that more than two-fifths of butchers were aged above 46 years old. This was in contrast with **Johnson and Etokidem, (2019)** who reported that the age of butchers was 20-29 years among less than one fifth of respondents. Also, **Matchawe, Ndip and Zuliani, (2019)** reported that more than half of butchers were of young age. As well as **Gajida et al, (2019) and Siluma, et al., (2023)** reported that less than one-quarter and only 10% were aged 40-49 years.

The study showed that all butchers in this study were male this was consistent with **Abduelrahmana et al. (2024)** who found that all butchers were male. This finding can be explained by that due to Egyptian culture in general and the local norms in Assiut community as portion of upper-Egypt denounces female work in this profession.

In the same line the current study reported that less than half of butchers had secondary education, this agreed with **Johnson & Etokidem, (2019)** who concluded that the studied group had completed secondary education. This was in contrast with **Matchawe, Ndip, Zuliani, (2019)** who recorded that more than three-quarters of butchers had lower educational level and **Gajida et al, (2019)** who reported that less than one-fifth had secondary education.

The current study revealed that less than two-thirds of butchers reside in urban settings; this is due to the reluctance of many rural people to work in the city due to its capabilities and facilities, as well as the difference in the economic situation in the urban area from the countryside, not only the economic situation but also the food culture. This observation disagreed with **Adham et al, (2021)** who reported that more than half of butchers reside in urban areas.

The present findings revealed that less than half of butchers were overweight. This may be due to their long-term work, which prompts them to eat fast food. It may also be due to their eating the fat of slaughtered animals during working hours. This was not in the same direction as **Okonkwo et al. (2018)** who reported that butchers in their study weighed less and had significantly lower mean BMI values.

Regarding years of working experience, more than one-third of butchers worked in abattoir profession for

10-15 years. This wasn't aligned with **Gajida et al. (2019)** who recorded that majority had experience > 10 years. While **Johnson & Etokidem, (2019) and Devaru, Raju, Puttaswamy, (2017)** recorded that more than one-third and less than two-thirds had 1-5 and more than 5 years of experience respectively. This was disagreed with **Matchawe, Ndip, Zuliani, (2019)** who reported that the vast majority of butcher had (> 1year) of experience.

From the present results it was found that most butchers performed medical examinations, from researchers' point of view the results of the present study are likely due to increased awareness of participants about the importance of periodic follow-up in maintaining health status, which is necessary for them to continue working. This was similar with **Gajida et al, (2019)** who observed that the majority performed examination when they are ill only.

Regarding working hours, more than half of the studied butcher worked from 8-12 hours, this reading was consistent with **Gajida et al, (2019)** who observed that more than half of butchers worked for 7-12 hrs/day.

In referral to the use of the PPE (Personal Protective Equipment) from the current study, it was observed that more than two-thirds of respondents wear PPE during work, this is due to their understanding and awareness of the importance of wearing these clothes in preventing diseases, as well as preserving their health. Also, their needs to work without interruption or absence, which makes them more keen on doing so. This observation agreed with **Johnson & Etokidem, (2019)** who reported that more than half of respondents wear aprons.

Regarding the meat storage methods, more than three-quarters stored meat in the freezer. Proliferation of pathogenic bacteria is conductive with environment in which meat stored at the room temperature for a long period. This is likely due to the strict action followed by the General Authority for Veterinary Services to ensure the safety and health of the accessible meat, as well as ensuring the condition and its quality. Implementing restrictive fines, including closing and waxing slaughterhouses, butcher shops, punishments, and others fines that cause the store to lose customers related to bad reputation which bring to the place after that.

This was incongruent with **Matchawe, Ndip, Zuliani, (2019)** who reported that in their studied shops meat exposed at room temperature for about 7 hours before delivery. From the current results more than two thirds of butchers served meat in nylon bags. This was the same reported by **Gajida et al, (2019)**.

The current study described the butcher shops' environmental conditions as the majority had slabs in the working place, had adequate ventilation, less than three quarters had floor with proper drainage facilities, and more than two-fifths of the shops had stray animals. Also, **Reddy, Sujitha, Reddy and Vani, (2019)** presented the studied shops' environmental conditions as the following: sewage facilities less than three-quarters and lairage, floor and its slope for proper drainage more than two-

thirds, ventilation less than one-third were inadequate and more than half stray animals.

For answering the research questions about prevalence of reported occupational health problem; the proposed results revealed that less than two-thirds of the butcher had upper limbs, neck and back problems this was not in the same regard with **Johnson &Etokidem, (2019)** who reported that back pains were present in more than one-third of the sample. It was also reported that more than two-thirds of butchers had injuries, also; this was on the opposite line with **Abdullahi et al, (2016)** who reported that one-fifth of workers had been injured by sharp equipment such as a knife. **Johnson &Etokidem, (2019)** reported in their study that most of the perceived hazards were knife. As for the health problems related to butchery, which include problems in the upper skeletal system (neck and back), this is due to the repeated use of the muscle in the cutting process, as well as repeated bending and straightening at the same time, which undoubtedly affects the muscle and joints and leads to their fatigue.

In referral to the answer to the research questions regarding level of butchers' knowledge about occupational health hazards; the current results revealed that butchers' level of knowledge were more than two-fifths, more than one-third and less than one-fifth for fair, poor and good level of knowledge respectively. Having better knowledge of about the health hazard of their occupation will promote butchers' safety practice which thereby protecting them, their family and the community at large from the negative consequences associated with noncompliance. In the same regard, **Kumar, Verma, Neetika, (2016)** observed that the knowledge about occupational hazards scores was higher for physical hazards**.** Moreover, **Gajida et al, (2019)** recorded that more than three-quarters of the respondents had good knowledge. On the other hand, **Matchawe, Ndip, Zuliani, (2019)** observed that the respondents had generally low level of knowledge.

The finding of the present study reversed with **Abduelrahmana et al., (2024)** who found that more than half of respondents have proper knowledge of potential contamination sources, this finding also; disagreed with the study showed that less than one-third of the respondents knew the sources of meat contamination **(Kehinde et al., 2020)**. This disagreement may be due to different sources of information also different cultures of society.

Regarding answering the question about butchers' attitude toward occupational hazards prevention measures; the presented results revealed that more than three-quarters of butchers had a positive attitude toward occupational health hazards. From the researchers' point of view, despite the gap that exists between the desired awareness of occupational health and safety and avoiding occupational hazards and the tangible reality on the ground, the level of awareness among the participants, even if it is not satisfactory enough, has an essential role in their positive attitude towards the sound practices that must be followed to prevent risks.

This observation was aligned by **Kumar, Verma, Neetika, (2016)** who recorded that the mean scores about attitude towards the occupational hazards were better observed among the respondents. In the same line **Matchawe, Ndip, Zuliani, (2019)** reported that the studied sample had acceptable level of attitude.

Finally, this section answered the research questions of butchers' level of practice. The current findings declared that less than three-quarters of butchers had satisfactory practice. This observation was congruent with **Kumar, Verma, Neetika, (2016)** who recorded those butchers had good scores for practice about occupational hazards. However, **Matchawe, Ndip, Zuliani, (2019)** reported that the respondents had poor hygiene practices towards meat safety and sanitation. Also, inconsistent with **Tolera& Mengistu, (2021)** mentioned that overall, more than forty-five percent of abattoir workers had fair practice.

In general, as regards butchers' knowledge attitude and practice the findings of the present study cleared that only 15.5% had a good level of knowledge; less than three-quarters had satisfactory level of practice and more than three quarters had positive attitude; this disagreed with **Hasan et al., (2024)** found that less than three-quarters of participants demonstrated good knowledge. Also, inconsistent with them in area of practice whereas was observed that (49.8%) of participants had poor practice and more than half (53.0%) had positive attitude.

Regarding the correlation between knowledge, attitude and practice of the butchers, the present study found that there was a statistically significant positive relationship between knowledge and attitude; knowledge and practice; and attitude and practice. That meant that attitude and practice of butchers were the determinant factor for their knowledge, while attitude and knowledge were also a determinant factor for practice. This finding was consistent with **Tolera & Mengistu, (2021)** who observed the presence of strong positive correlation between knowledge and attitude ($r = 0.96$, $p < 0.01$), knowledge, and practice ($r = 0.95$, $p<0. 01$), attitude and practice ($r = 0.93$, $p<0.01$).

The proposed findings confirmed that there were statistical significance differences between level of knowledge and butchers' levels of education, (p-value= 0.000). This may be explained by possibility of learning in school and reading on diseases associated with their occupation and this can reveal that an increase in education level led to increase in knowledge level. This was the same observation which reported by **Matchawe, Ndip, Zuliani, (2019) and Gajida et al, (2019)** with p-values= 0.019 and 0.003 respectively. In addition, **Ekanem, et al, (2020) and Prabhakar, Lokesh, Saidaiah, and Sai, (2017)** reported the same results.

On the opposite side, **Okpala, Nwobi, and Korzeniowska, (2021), Gorouhi, Ismaeil, Afshar, and Gohari, (2020), Asadpour, Darehkordi, Abdollahi, and Salim, (2020) and Ribah, et al, (2021)**

reported that there wasn't relation between education and knowledge level.

The current study found that there wasn't relation with working years of experience as butcher and knowledge level (p-value=0.366). On the other hand, this disagreed with **Gajida et al, (2019)** who reported the presence of relation with p-value= 0.048.

From the current results it was found that there was statistical significance difference between butchers' level of attitudes and their levels of education, this was not the same results of **Matchawe, Ndip, Zuliani, (2019)** who reported the absence of relation between attitude and butchers' education.

According to the relation between butchers' practice and personal data, there was statistical significance difference between butchers' practice and their education (p-value= 0.000), this was in the same line with **Tolera & Mengistu (2021).** But it wasn't agreed with **Matchawe, Ndip, Zuliani, (2019) and Gajida et al, (2019)**, p-value= 0.743 and 0.1 respectively.

Also, the current findings reported that there was a positive relation between working hours/day and butchers' practice (p-value=0.008). This was similar with **Gajida et al, (2019)** with p-value= 0.045. In addition, there was a relation with working years of experience as butcher and practice (p-value= 0.045). These results were the same reported by **Adesokan & Raji, (2014)** who mentioned that variables like education, and working experience had significant association with level of practice; while this results versus **Gajida et al, (2019)** with (p-value=0.8).

The proposed findings revealed that there was statistically significant difference between practice and marital status, the same reported by **Tolera& Mengistu, (2021)** who observed that marital status, education, work experience had a statistically significant association with meat handling practice.

In referral to the relation between variables like age, level of education, residence with level of knowledge and practice; the current study proved that there was statistically significant difference between level of knowledge and butchers' level of education, residence and training courses. This was congruent with the results of **Hasan et al., (2024)** who observed the significant associations between knowledge and location ($p < 0.001$) and borderline significance in training ($p = 0.051$).

Maintaining butchers' safety from workplace risks while they carry out their job responsibilities is aided by adherence to occupational safety regulations. To make recommendations for improving the health of those worker populations, the current study was carried out to evaluate the prevalence of occupational health hazards as well as butchers' knowledge, practice, and attitude.

Conclusion:

The current study answered the research questions, there were prevalence of upper limbs and back problems, stampede/ animal kick and injury, the participated butchers had fair level of knowledge, positive attitude and satisfactory level

of practices regarding occupational hazards. Also; discovered that there is a statistically significant positive and very strong correlation between knowledge and attitude, knowledge and practice; attitude and practice of participated butchers.

Recommendations:

1- The abattoir management should entail the use of safer equipment that are easy to clean and decontaminate, as well as routine cleaning of all working equipment and surfaces.

2- It is also recommended that routine medical surveillance and diagnostic investigations on possible risk exposure to occupational health hazards be conducted as they are important disease control measures among the abattoir workers.

3- Health education program regarding occupational safety and the importance of PPE should be encouraged.

4- Training program regarding first aids for butchers is recommended.

5- Further research with larger sample size for generalization of results is recommended.

Conflict of interest:

The authors declared that there was no conflict of interest concerning the publication.

Funding: None

Acknowledgments:

Sincere gratitude to all the butchers who shared this work, without whom the valuable information elicited in this study would not be available.

References:

Abduelrahmana M., Adama S., Ahmed A. and Eltahir H. (2024): Knowledge, attitude, and practice of meat hygiene among butchers in abattoirs and meat markets in Wadi Salih Garsila, Central Darfur – Sudan. *American Journal of Zoology*, 7(4): 54-64. https://doi.org/10.11648/j.ajz.20240704.11.

Abdullahi A., Hassan A., Kadarman N., Junaidu Y., Adeyemo O. and Lua P., (2016): Occupational hazards among the abattoir workers associated with noncompliance to the meat processing and waste disposal laws in Malaysia, *Risk Management and Healthcare Policy*, P.p. 9 157–163.

Adesokan H. and Raji A., (2014): Safe meat-handling knowledge, attitudes and practices of private and government meat processing plants' workers: implications for future policy. *J Prev Med Hyg.*; 55 (1):10–16.

Adham D., Abazari M., Moradi-Asl E. and Abbasi-Ghahramanloo A., (2021): Pattern of Crimean-Congo hemorrhagic fever related high risk behaviors among Iranian butchers and its relation to perceived self-efficacy, *BMC Public Health*, 21:255.

Alkassabany Y., Farghaly A. and El-Ghitany E., (2018): Occupational risk of HCV infection among slaughterhouse workers, *International Journal of Advanced Community Medicine*; 1(3): 23-28.

Asadpour, M., Darehkordi, M., Abdollahi, S. and Salim Y., (2020): Knowledge, attitude and practice of butchers about Crimean-Congo hemorrhagic fever (CCHF) in Rafsanjan City in 2019. *Journal of Jiroft University of Medical Sciences*, *7*(3): 440–449.

Bahir M., Errachidi I., Hemlali M., Sarhane B., Tantane A., Mohammed A., Belkadi B., and Filali-Maltouf A., (2022): Knowledge, attitude, and practices (KAP) regarding meat safety and sanitation among carcass handlers operating and assessment of bacteriological quality of meat contact surfaces at the

Marrakech Slaughterhouse, Morocco, *International Journal of Food Science* Vol. 2022, Article ID 4881494, P.p.1-8.

Devaru J., Raju A. and Puttaswamy M., (2017): A cross-sectional study on the awareness and hygienic practices among the poultry butchers in urban Bengaluru, *International Journal of Medical Science and Public Health*, 6(6): 1028-1031.

Ekanem, A., Ijezie, A., Udo, I., Ekrikpo, U., and Idung, A., (2020): Meat singeing practices and knowledge of its effects on health and environment among butchers in Uyo, Nigeria. *Journal of Advances in Medical and Pharmaceutical Sciences*, 23–33.

Eljamay S., Younis F., Alashger E., and Eltuomi R., (2022): Assessment of Knowledge, attitudes, and perceptions of safety and prevention procedures among butchers in Derna and neighboring areas/ Libya, *East Asian Journal of Multidisciplinary Research (EAJMR)*, 1(7): 1317-1332.

Gajida A., Ibrahim U., Iliyasu Z., Jalo R., Chiroma A. and Saidu F., (2019): Knowledge of occupational hazards, and safety practices among butchers in Kano metropolis, Kano State, Nigeria, *Pyramid Journal of Medicine*; Vol. 2:41, 43-48.

Gebeyehu D. and Tsegaye, (2022): Food safety knowledge and practice of abattoir and butcher shop workers: a health risk management perspective, One Health Outlook, (28): 4:14

Gorouhi, M., Ismaeil, A., Afshar, A., and Gohari, M. (2020): Knowledge, attitude and practice towards crimean congo hemorrhagic fever (cchf): A survey among butchers community in Kerman city. *Journal of Entomological Research*, 44(3): 495–500.

Hales C., Fryar C., Carroll M., Freedman D., and Ogden C., (2018): Trends in Obesity and Severe Obesity Prevalence in US Youth and Adults by Sex and Age, 2007-2008 to 2015-2016. *JAMA*, 319(16):1723-1725.

Hasan A., Uddin B., and Ahmed S., (2024): Knowledge, attitudes and practices of meat hygiene among slaughterhouse workers and retail meat sellers in Bangladesh. *Heliyon* 10(2024) e40066.

Jerie S., and Matunhira K., (2022): Occupational safety and health hazards associated with the slaughtering and meat processing industry in urban areas of Zimbabwe: A case study of the Gweru city Municipal Abattoir, *Ghana Journal of Geography*, 14(1): 22-40.

Johnson O., and Etokidem A. (2019): Occupational hazards and health problems among butchers in Uyo, Nigeria. *Niger Med J*.; 60:106-12.

Kehinde, G., Adejimi A. and Abiola A., (2020): Assessment of knowledge, attitude, and practice of meat hygiene among meat handlers in Lagos State, Nigeria. The Nigerian Journal of General Practice, 18: p. 27.

Khalaf S., Mohamed Abd elshafy and Aly S. (2023): Knowledge and Associated Risk Factors of Knee Osteoarthritis among School Teachers at Assiut City, Tanta Scientific Nursing Journal, 28(1): 247-268.

Kumar R., Verma K., and Neetika, M., (2016): An assessment of the knowledge, attitudes and practices about the prevention of occupational hazards and utilization of safety measures among meat workers in a city of Haryana state of India, *Indian Journal of Applied Research*, 6(3): 164-166.

Marzoque H., da Cunha R., Lima C., Nogueira R., Machado V., and Nääs I., (2021): Work Safety in slaughterhouses: general aspects, Research, *Society and Development*, 10 (1): e55310111980.

Matchawe C., Ndip L. and Zuliani A., (2019): Knowledge, attitude and practices (KAP) regarding meat safety and sanitation among carcass handlers operating at the Yaoundé slaughterhouse, *Cameroon*, 3(9): 1-6.

Mousa M., Abd ElAal E., and Sarhan A., (2024): Occupational Health Hazards and Protective Measures among Workers in Pesticide Factory, *Journal of Nursing Science - Benha University*, 5(1): 542:553.

Okonkwo F., Njan A., Ejike C., Nwodo U., and Onwurah I., (2018): Health Implications of

Occupational Exposure of Butchers to Emissions from Burning Tyres, Annals of Global Health; 84(3): 387–396. DOI: https://doi.org/10.29024/aogh.2321.

Okpala, C., Nwobi, O., and Korzeniowska, M. (2021): Towards delineating butchers' knowledge base, challenges encountered, and enhancement prospects of meat inspection processes: A cattle slaughterhouse case analysis. *Scientific Journal" Meat Technology"*, 62(1): 41–56.

Prabhakar, Z., Lokesh, M., Saidaiah, M., and Sai, E., (2017): Awareness regarding zoonotic diseases among the butchers of Proddatur, Kadapa Dist., AP, India. *Iranian Journal of Health, Safety and Environment*, 4(2): 729–737.

Reddy V., Sujitha B., Reddy M. and Vani S., (2019): Awareness and practices followed by the butchers in hygienic meat production chain in YSR Kadapa district of Andhra Pradesh, *The Pharma Innovation Journal*; 8(10): 140-145.

Ribah, M., Manga, S., Muftau, M., Bello, S., and Anlade, Y., (2021): Assessment of knowledge attitude and practice of raw meat hygiene among value chain personnel from major slaughter slabs in Kebbi State, Nigeria. *Int. J. Food Nutr. Saf*, 12(1): 28–40.

Siluma, B., Ephraim, T., Nethathe B., and Ramashia S., (2023): Evaluation of Meat Safety Practices and Hygiene among Different Butcheries and Supermarkets in Vhembe District, Limpopo Province, South Africa. *Int J Environ Res Public Health*, 20(3).

Tolera S. and Mengistu D., (2021): Occupational hazards exposure and knowledge, attitude and practice towards meat safety amongst abattoir workers, Hawassa City Southern Ethiopia, *International Journal of Occupational Safety and Health*,11(2): 2091-0878.