

## Article

# Assessment of the work conditions of small slaughterhouses in the Thi-Qar governorate in Iraq

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## Abstract

**Background:** Working conditions have a vital role to play in determining health and disability. So, the objective of this study was to assess the work conditions of small slaughterhouses in the Thi-Qar governorate in Iraq.

**Design and methods:** This study is a cross-sectional field survey. A total of twenty-six (26) small slaughterhouses were included as a sample size from the Thi-Qar governorate. The data collection was done by observations of the authors using a questionnaire and specific questions were also directed to the slaughterhouse workers if needed. It was conducted between February and April 2018. The study was planned to demonstrate the current status of small slaughterhouses in terms of water supply facilities, quality of small slaughterhouses building, sanitation practices.

**Results:** All of the small slaughterhouses had a water supply and all they had hot and cold water. Most of the small slaughterhouses had water tanks and put water pipes away from slaughter sites. The proportions ranged from 76.9 to 96.0 for the quality of small slaughterhouses building. With regard to fire safety measures, 96.2% of buildings are supplied with mobile fire extinguishing equipment according to safety and security requirements. Concerning rodent and insects' control, sixteen (61.5%) of small slaughterhouses use insecticides and pesticides and only six (23.1%) of them use traps for rodents. Most of the small slaughterhouses' windows (88.5%) were covered with a thin net to prevent the insects from entering.

**Conclusions:** The finding of this study indicated that work conditions of small slaughterhouses were generally adequate in terms of water supply facilities, sanitation practices, ventilation, fire safety measures, and rodents and insects' control.

## Introduction

Globally, work is a fundamental part of life and working conditions have a vital role to play in determining health and disability,<sup>1</sup> and a substantial factor contributing to the employee performance, morale, and productivity.<sup>2</sup> Nowadays, working conditions are varying from the previous because of the technology in soci-

ety.<sup>3,4</sup> The risk factors influencing working conditions are various interacting such as biological, chemical,<sup>5</sup> physical<sup>4</sup> and ergonomic, as well as the presence of psychosocial risk in the workplace.<sup>6,7</sup> A slaughterhouse is an interesting case, where animals are slaughtered for food consumption.<sup>2</sup> Remarkable, in the most world, the slaughter of animals which is an essential component<sup>8</sup> has been estimated 2.5 million during 2009-2010, and up to 3.5 million during 2011-2012. Due to the meat consumption, in addition a high meat export, it has increased in recent years.<sup>9</sup> As mention early, risk factors above are involved. In the context, the significant role status of hygiene of the butchers and the surrounding play in workers in particular and consumer in general.<sup>10</sup> Inadequate facilities which is another important factor in terms of working conditions that produced meat contamination and have been associated with produced occupational hazards.<sup>11</sup> Thus, the study is intended to highlight to the status of slaughterhouse conditions in terms of water supply facilities, quality of small slaughterhouses building, sanitation practices in a sample representing the slaughterhouse in the Thi-Qar in the province.

## Design and Methods

### Study design

This study which is a cross-sectional field survey was conducted between February 2018 and April 2018, in Thi-Qar governorate which is located in the heart of the southern Iraq to the north of Basrah governorate. It consists of five administrative districts, with a population of 1,883,160 in 2012.<sup>12</sup>

### Study sample

The study was initiated by selecting a sample which would represent the population. In this study, a convenient sample was made up of 26 small slaughterhouses in Thi-Qar governorate by using the simple random sampling technique.

### Definition of small slaughterhouses

Theoretical definition: A place where animals are slaughtered for food consumption.<sup>2</sup>

### Significance for public health

Given the lack of researches that has been conducted in this field in Iraq, it was important to highlight the most significant the work conditions in the small slaughter houses, because unsafe and inadequate working conditions at slaughterhouses can result in contamination of meat, spread of disease, environmental hazards, and occupational hazards to workers so work must be done to provide a safe work environment for workers and raise efficiency of preventive measures and their use to reduce occupational, environmental risks, injuries and diseases resulting from them.

Operational definition: A place where animals are slaughtered and sale of their meat in Thi-Qar governorate.

### Data collection

The study was planned to demonstrate the current status of small slaughterhouses in terms of water supply facilities, quality of small slaughterhouses building, sanitation practices. The study was started in the morning in the hours of work and completed at 1:00 at the latest after lunch. Working conditions were observed and recorded systematically using a previously prepared questionnaire, and specific questions were also directed to the slaughterhouse workers if needed.

The questionnaire included twenty-five close ended questions, including the following parts:

Part I: Years open of small slaughterhouses and number of workers in it.

Part II: Water supply facilities (4 question). It was required to respond with yes or no.

Part III: Quality of slaughterhouses, in term of houses building, ventilation, fire safety measures and rodent and insects' control (14 question). It was required to respond with yes or no.

Part VI: Sanitation practices (7 question). It was required to respond with yes or no.

### Statistical analysis

The statistical program SPSS (version 24) was used to analyze the data. Frequency distributions were evaluated as numbers and percentages.

## Results

In all, there were 26 small slaughterhouses in the study area. As shown in below figure, 92% of small slaughterhouses since opened equal or less than 10 years (Figure 1). Majority of the small slaughterhouses 16 (61.5) had four workers. Five (19.2%) and four (15.4%) of it had 3 and 5 workers respectively. Only one the small slaughterhouse (3.8%) had six workers (Figure 2). All of small slaughterhouses had water supply and all it had hot and cold water. Twenty-five (96.2%) of small slaughterhouses had water tanks. In regard to location of water pipe, twenty-two (84.6%) of it put water pipes away from slaughter sites in order to not be easily extracted by animals during slaughter (Table 1).

The observation that, small slaughterhouses owners performed better with respect to quality of building. Most small slaughterhouses had standard floor, separate inspection rooms, power supply put away from slaughter sites, doors open out and are fitted with self-locking bolts, the workers' restrooms and toilets are completely isolated from meat trading areas and do not open directly to them and separate the work areas from the areas allocated to the shop visitors.

As shown in Table 2, most small slaughterhouses' windows were located high and full width of the four walls and it made from suitable material and small slaughterhouses had enough air pullers. With regard to fire safety measures, 96.2% of buildings is supplied with mobile fire extinguishing equipment according to safety and security requirements. Concerning rodent and insects' control, the result was as follow, seventeen (65.38%) of butchers take pest control. About 62% of them use insecticides and pesticides and only six (23.1%) of them use traps for rodents.

Most of small slaughterhouses' windows (88.5%) were covered with a thin netting to prevent the insects from entering.

Information on sanitation practices is presented in Table 3. Findings revealed that 92.3% of small slaughterhouses' drainage networks are not maintained. The most common solid waste disposal methods used by butchers is burying which represent in 88.5% From the investigation, the proportion of butchers who dispose of waste on a daily was 73.1%. Fourteen out 26 (53%) of small slaughterhouses' butchers dispose of liquid waste in a sewerage networks in the shop. As regards findings on cleaning the drainage channel, it revealed that 42.3% of butchers cleaning the channel every 3 month. All of butchers collected the remains of carcasses that are unfit for human consumption and residues in the respective containers and then discarded.

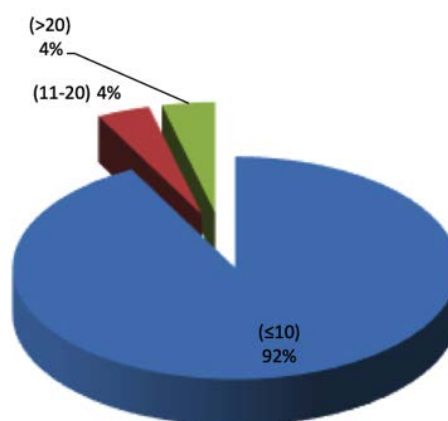


Figure 1. Years of opening of small slaughterhouses.



Figure 2. Number of workers in small slaughterhouses.

Table 1. Water supply facilities in small slaughterhouses.

	Yes	%	No	%
Water supply	26	100	0	0
Provide hot and cold water	26	100	0	0
Provide water tanks	25	96.2	1	3.8
Put water pipes away from slaughter sites	22	84.6	4	15.4

## Discussion

Slaughterhouses are activities that pose a unique challenge of environmental safety.<sup>13</sup> In this study, majority slaughterhouses were established equal or less than 10 years representing 92% from the total number of 26 slaughterhouses. These finding not coincide with the finding of Olowoporoku in Nigeria, who indicated that more than half of slaughterhouses were established above 20 years.<sup>8</sup>

Water suitable for human consumption is plays critical role in facilitate various slaughterhouse activities, whether in its hot or cold state.<sup>14</sup> At present in Iraq, the researchers have not found available national figures on the state of facilities of water supply in the slaughterhouses. As this study is one of the few studies in this field which indicated that all of small slaughterhouses had a adequacies facilities of water supply. The above observation dis-

agrees with the results of Cook *et al.*, who stated that there was a general lack of adequacies supply of water facilities.<sup>11</sup> Building ventilation of slaughterhouses was considered as an important determinant of indoor air's quality. In this study, a good level of the ventilation rate was observed in all slaughterhouses. Study shows good level of rodent and insects control in all slaughter houses, only use traps for rodents of them being rather poor which is supported by other study done by Junaidu Yakubu *et al.*, showing all of the respondents except 3 take pest control.<sup>15</sup> This study is focused on the observation of the significance of quality of slaughterhouses. Collectively, observation of this study indicated that there is an adequacy of quality in all slaughterhouses.

Adequate sanitation practices are consider essential for sustaining all process of meat production, and for prevention of infectious diseases. Nevertheless, in the developing countries, most of slaughterhouses are still lacking proper working conditions such as

**Table 2. Quality of small slaughterhouses.**

Quality of small slaughterhouses' building	Yes	%	No	%
Slaughterhouse floor in non-slip material with appropriate orientation towards the sewerage	22	84.6	4	15.4
Provide inspection rooms to separate the fat and residues of hair, skin, meat and bones	23	88.5	3	11.5
Put power supply away from slaughter sites	22	84.6	4	15.4
The doors open out and are fitted with self-locking bolts	20	76.9	6	23.1
Separate the work areas from the areas allocated to the shop visitors in a manner that allows them to see the work areas without causing them to enter them	25	96.2	1	3.8
The workers' restrooms and toilets are completely isolated from meat trading areas and do not open directly to them	25	96.2	1	3.8
<b>Ventilation</b>				
The windows of the slaughterhouse are high and full width of the four walls	17	65.4	9	34.6
The windows are made out of suitable material	23	88.5	3	11.5
There are enough air pullers	24	92.3	2	7.7
<b>Fire safety measures</b>				
The building is supplied with mobile fire extinguishing equipment according to safety and security requirements	25	96.2	1	3.8
<b>Rodent and insects' control</b>				
Pest control carried out	17	65.38	9	34.62
Use insecticides and pesticides	16	61.5	10	38.5
Use traps for rodents	6	23.1	20	76.9
Windows are covered with a thin net to prevent the insects from entering	23	88.5	3	11.5

**Table 3. Sanitation practices small slaughterhouses.**

		n	%
The drainage networks are maintained properly	Regular	1	3.8
	Non regular	1	3.8
	Not maintained	24	92.3
Solid waste disposal methods	Burying waste	23	88.5
	Burning	0	0
	Dumping in vacant lands	2	7.7
	Dumping along drainage	1	3.8
Solid waste disposal frequency	Daily	19	73.1
	Twice in week	7	26.9
Liquid waste disposal methods	Sewerage networks in the shop	14	53.8
	Public sewerage networks	12	46.2
Drainage channel cleaning frequency	Daily	8	30.8
	Weekly	2	7.7
	Monthly	5	19.2
	Every 3 month	11	42.3
The remains of carcasses that are unfit for human consumption and residues are collected in the respective containers and then discarded	Yes	26	100
	No	0	0
Use of covered containers	Yes	19	73.08
	No	7	26.92

good construction, adequate facilities for meat inspection and appropriate sanitation and hygienic practices.<sup>16</sup> From this study can then be inferred that practices of sanitation in slaughterhouses were rather satisfactory. These results are in conflict with the study done by Olowoporoku in Nigeria, which stated that practices of sanitation in slaughterhouses were very poor.<sup>8</sup> The major disposal methods of solid waste was burying waste which was reported by 88.5%, this does not go with study done by Golbaz *et al.*, who found the most methods uses is discharge in city landfill followed by burring.<sup>17</sup>

## Conclusions

It is important to note that the finding of this study indicated that quality of small slaughterhouses was generally adequate, an indication that water supply facilities is good. As observed from the study, there is also good sanitation practices among small slaughterhouses. Small slaughterhouses' butchers performed better with respect to ventilation, fire safety measures and rodent and insects' control. Hence, periodic workshops/seminars should be organized by the concerned authorities to educate workers at slaughterhouses about benefits as a crucial economic resource, general rules and regulation concerning Iraqi standards of slaughterhouses environmental. As well as important keep slaughterhouses environmentally safe by aware of serious problems with working conditions in the slaughterhouses. There is a great need for further research on impact of slaughterhouses on outdoor environmental in term of soil, water, and land pollution. Also, on risk assessment of occupational hazards among butchers at slaughterhouses.

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**Conflict of interest:** The authors declare that they have no competing interests, and all authors confirm accuracy.

**Availability of data and materials:** All data generated or analyzed during this study are included in this published article.

**Ethics approval and consent to participate:** Verbal permission was sought from the owners of small slaughterhouses in the Thi-Qar governorate to do this study.

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