MEAT SAFETY MANAGEMENT PRACTICES OF MEAT HANDLERS IN ABATTOIRS IN PORT HARCOURT, RIVERS STATE

## Study objectives

## General objective

The aim of the present study is to assess the waste management andmeat safety practices of abattoir workers in abattoirs located in Port Harcourt, Rivers State.

## Specific objectives

1. To assess the knowledge of proper waste management practices among abattoir workers in Port Harcourt, Rivers State.
2. To determine the waste management practices of abattoir workers in Port Harcourt, Rivers State.
3. To identify the meat handling practices of abattoir workers in Port Harcourt, Rivers State.
4. To identify possiblecontributorsassociated with meat handling practices of abattoir workers in Port Harcourt, Rivers State.

## Research questions

1. What is the level of knowledge of proper waste management practices among abattoir workers in Port Harcourt, Rivers State?
2. What are the waste management practices of abattoir workers in Port Harcourt, Rivers State?
3. What meat handling practices are adopted by abattoir workers working in abattoirs in Port Harcourt, Rivers State?
4. What are the determinants associated with meat handling practices of abattoir workers in Port Harcourt, Rivers State?

## Data analysis

The data was entered into a spreadsheet of the Microsoft Excel 2010. The Statistical Package for Social Sciences (IBM, SPSS version 23) was used to perform both descriptive and inferential analyses. A score was obtained for the knowledge of the respondents on proper waste management practices and a cumulative knowledge score of 14 points and above signified good knowledge while a cumulative knowledge score of 13 points and below signified poor knowledge. Also, the meat handling practices among the workers were scored. A practice score of 9 and above was considered as having good practice while Cumulative score of 8 and below as poor practice. The chi-squared test was used to test for any association between the socio-demographic details of the respondents and their waste management and meat handling practices. All analyses were conducted at the 95% confidence level and p-value ≤ 0.05 would be considered as being statistically significant.

# Presentation of results

**Table 1: Sociodemographic characteristics of respondents**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=250)** | **Percentage (%)** |
| **Gender** |  |  |
| Female | 17 | 6.8 |
| Male | 233 | 93.2 |
|  |  |  |
| **Age (years)** |  |  |
| <20 | 7 | 2.8 |
| 20-29 | 65 | 26.0 |
| 30-39 | 92 | 36.8 |
| 40-49 | 57 | 22.8 |
| 50-59 | 25 | 10.0 |
| 60-69 | 4 | 1.6 |
|  |  |  |
| **Marital status** |  |  |
| Married | 137 | 54.8 |
| Single | 94 | 37.6 |
| Widow(er) | 4 | 1.6 |
| Divorced/Separated | 15 | 6.0 |
|  |  |  |
| **Religion** |  |  |
| Christianity | 111 | 44.4 |
| Islam | 139 | 55.6 |
|  |  |  |
| **Educational status** |  |  |
| None | 24 | 9.6 |
| Primary | 57 | 22.8 |
| Secondary | 142 | 56.8 |
| Tertiary | 27 | 10.8 |
|  |  |  |
| **Position** |  |  |
| Veterinarian | 9 | 3.6 |
| Meat inspector | 32 | 12.8 |
| Butcher | 83 | 33.2 |
| Manager | 23 | 9.2 |
| Administrative staff | 32 | 12.8 |
| Abattoir assistants | 51 | 20.4 |
| Cleaners | 20 | 8.0 |

## 1.2 Sociodemographic details of respondents

Among the participants of this study, it was found that most of them 233 (93.2%) were males and the highest proportion of the respondents 92 (36.8%) were aged between 30 and 39 years with a mean age of 36.5±10.3 years. Majority of the respondents 137 (54.8%) were married, were Muslims 139 (55.6%) and had received secondary school education 142 (56.8%). Also, 83 (33.2%) of the respondents were butchers, 32 (12.8%) were meat inspectors, 23 (9.2%) were abattoir managers, 9 (3.6%) were veterinarian doctors among others. The details of their sociodemographic characteristics are shown in Table 4.1.

## 1.3 Knowledge of proper waste management practices of the abattoir workers

**Table 4.2: Knowledge of proper waste management practices of the abattoir workers**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=250)** | **Percentage (%)** |
| **Liquid waste generated here can be disposed in the river** |  |  |
| Strongly agree | 171 | 68.4 |
| Agree | 59 | 23.6 |
| Undecided | 6 | 2.4 |
| Disagree | 7 | 2.8 |
| Strongly disagree | 7 | 2.8 |
|  |  |  |
| **There is no need for treatment of the waste before disposal** |  |  |
| Strongly agree | 23 | 9.2 |
| Agree | 41 | 16.4 |
| Undecided | 19 | 7.6 |
| Disagree | 103 | 41.2 |
| Strongly disagree | 64 | 25.6 |
|  |  |  |
| **Waste produced can be disposed into shallow holes outside the abattoir** |  |  |
| Strongly agree | 105 | 42.0 |
| Agree | 66 | 26.4 |
| Undecided | 15 | 6.0 |
| Disagree | 48 | 19.2 |
| Strongly disagree | 16 | 6.4 |
|  |  |  |
| **Stomach contents from the animals can be disposed in holes that meet up with specific required standards** |  |  |
| Strongly agree | 126 | 50.4 |
| Agree | 105 | 42.0 |
| Undecided | 7 | 2.8 |
| Disagree | 7 | 2.8 |
| Strongly disagree | 5 | 2.0 |
|  |  |  |
| **Solid waste generated in the abattoir can be recycled for other uses** |  |  |
| Strongly agree | 148 | 59.2 |
| Agree | 92 | 36.8 |
| Undecided | 4 | 1.6 |
| Disagree | 5 | 2.0 |
| Strongly disagree | 1 | 0.4 |

The knowledge of the study respondents on proper waste management practices was assessed. This assessment showed that as much as 230 (94.0%) of them either agreed or strongly agreed that liquid waste generated in the abattoir could be disposed in the river. Also, majority of the respondents 167 (66.8%) either disagreed or strongly disagreed that since the waste was coming from animals, there was no need for treating the waste before disposal. 171 (68.4%) of them either agreed or strongly agreed that the waste produced in the abattoir could be disposed into shallow holes outside the abattoir, also 231 (92.4%) of them either agreed or strongly agreed that stomach contents from the animals could be disposed in holes that met with specific required standards for such disposal. In order to reduce waste output, 240 (96.0%) of the respondents agreed or strongly agreed that solid waste produced in the abattoir may be repurposed for other uses. Table 4.2 displays the responses' specifics.

**Table 3: Overall knowledge of proper waste management practices among the workers**

|  |  |  |
| --- | --- | --- |
| **Knowledge** | **Frequency (n=250)** | **Percentage (%)** |
| Good knowledge | 216 | 86.4 |
|  |  |  |
| Poor knowledge | 34 | 13.6 |

Assessing these responses for knowledge of proper waste management practices among the abattoir workers showed that majority of the workers had good knowledge of these proper waste management practices. The details of the responses are shown in Table 4.3.

## 1.4 Waste management practices of the abattoir workers

**Table 4.4: Waste management practices in the abattoir**

|  |  |  |
| --- | --- | --- |
| **Waste management practices** | **Frequency (n=250)** | **Percentage (%)** |
| Where abattoir wastes are gathered before disposal |  |  |
| Dung pit | 225 | 90.0 |
| Waste bin | 25 | 10.0 |
|  |  |  |
| How solid waste produced in this abattoir is disposed |  |  |
| Burning | 184 | 73.6 |
| Dumping into the river | 29 | 11.6 |
| Dumping into drainages | 18 | 7.2 |
| Dumping on vacant land or bush | 19 | 7.6 |
|  |  |  |
| How liquid waste produced in the abattoir is disposed |  |  |
| Into the nearby bush | 27 | 10.8 |
| Into the nearby river | 135 | 54.0 |
| Into the nearby drainage | 85 | 34.0 |
| I don’t know | 3 | 1.2 |
|  |  |  |
| Treatment of waste products from this abattoir is done before disposal |  |  |
| Yes | 192 | 76.8 |
| No | 58 | 23.2 |
|  |  |  |
| Sale of the abattoir waste products to persons or organizations |  |  |
| Yes | 245 | 98.0 |
| No | 5 | 2.0 |
|  |  |  |
| Persons to whom the waste products are sold to |  |  |
| Farmers | 126 | 50.4 |
| Feed producers | 94 | 37.6 |
| Industries | 29 | 11.6 |
| Others | 1 | 0.4 |

Assessment of the waste management practices of the abattoir workers revealed that majority of them 225 (90.0%) gathered or stored the waste produced in the abattoir in dung pits before disposal. 184 (73.6%) also disposed the solid waste produced in this abattoir by burning, 135 (54.0%) disposed the liquid waste produced in this abattoir into the river while majority of them 192 (76.8%) were of the opinion that the waste products produced from the abattoir were treated before disposal. As much as 245 (98.0%) of the respondents opined that the abattoir waste products sold were being sold to other persons or organizations with the majority 126 (50.4%) being of the view that the waste products were sold to farmers. The details of these practices of waste management are outlined in Table 4.4.

## 1.5 Meat handling practices of the abattoir workers

**Table 4.5a: Meat handling practices of the abattoir workers**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=250)** | **Percentage (%)** |
| **Wearing protective clothes (e.g. aprons) when handling meat** |  |  |
| Yes | 242 | 96.8 |
| No | 8 | 3.2 |
|  |  |  |
| **Use potable water for washing the abattoir/facilities before and after slaughtering** |  |  |
| Yes | 244 | 97.6 |
| No | 6 | 2.4 |
|  |  |  |
| **Washing hands after using the toilet before handling meat** |  |  |
| Yes | 242 | 96.8 |
| No | 8 | 3.2 |
|  |  |  |
| **Wash aprons or protective clothing after each day’s work** |  |  |
| Yes | 240 | 96.0 |
| No | 10 | 4.0 |
|  |  |  |
| **Properly cleaning meat storage area before storing new meat products** |  |  |
| Yes | 240 | 96.0 |
| No | 10 | 4.0 |
|  |  |  |
| **Wash service utensils (knives, hooks, and cutting boards) before resuming work** |  |  |
| Yes | 228 | 91.2 |
| No | 22 | 8.8 |
|  |  |  |
| **Replace knives or sterilize them after each meat processing** |  |  |
| Yes | 201 | 80.4 |
| No | 49 | 19.6 |

Assessment of the meat hygiene practices of the abattoir workers revealed that good practices among the workers included that majority 242 (96.8%) of the workers wore protective clothes (e.g. aprons) when handling meat, 244 (97.6%) used potable water for washing the abattoir/facilities before and after slaughtering operations and 242 (96.8%) washed their hands after using the toilet just before handling meat. Most of the workers 240 (96.0%) washed their aprons or protective clothing after each day’s work as well as properly cleaned meat storage areas before storing new meat products. 228 (91.2%) of the workers also reported washing service utensils (knives, hooks, and cutting boards) before resuming work, while 201 (80.4%) of them replaced knives or sterilized them after each meat processing activity. The details of the responses are shown in Table 4.5a.

**Table 1.5b: Meat hygiene practices of the abattoir workers**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency (n=250)** | **Percentage (%)** |
| **Remove personal items such as rings, necklaces, watch, etc. while processing meat** |  |  |
| Yes | 139 | 55.6 |
| No | 111 | 44.4 |
|  |  |  |
| **Handle/process meat when hands have cuts, wounds, bruises, or injuries** |  |  |
| Yes | 72 | 28.8 |
| No | 178 | 71.2 |
|  |  |  |
| **Mixing-up the meat carcass with the intestinal viscera during processing** |  |  |
| Yes | 64 | 25.6 |
| No | 186 | 74.4 |
|  |  |  |
| **Walking over the meat on the ground** |  |  |
| Yes | 53 | 21.2 |
| No | 197 | 78.8 |
|  |  |  |
| **Separating edible offal’s pluck (heart, lungs, trachea and esophagus) during butchering** |  |  |
| Yes | 224 | 89.6 |
| No | 26 | 10.4 |
|  |  |  |
| **Handling money when processing meat** |  |  |
| Yes | 164 | 65.6 |
| No | 86 | 34.4 |
|  |  |  |
| **Wearing hand gloves when handling meat even in the absence of skin wounds** |  |  |
| Yes | 72 | 28.8 |
| No | 178 | 71.2 |
|  |  |  |
| **Wear hairnet or cap while working** |  |  |
| Yes | 94 | 37.6 |
| No | 156 | 62.4 |

Still on the assessment of their meat handling practices, 139 (55.6%) removed their personal items such as rings, necklaces, watch, etc; during the processing of meat. It was also identified that 178 (71.2%) of the workers did not handle or process meat if their hands had cuts, wounds, bruises, or injuries and that as much as 186 (74.4%) and 197 (78.8%) of them did not mix-up the meat carcass with the intestinal viscera during processing nor walked over the meat on the ground respectively. Most of them 224 (89.6%) were also of the opinion that separated edible offal’s pluck (heart, lungs, trachea and esophagus) during butchering. These notwithstanding, poor meat handling practices among the workers included that as much as 164 (65.6%) of them handled money when processing meat, only 72 (28.8%) wore hand gloves when handling meat even in the absence of skin wounds and as few as 94 (37.6%) wore hairnets or caps while working. The details are shown in Table 4.5b.

## 1.6 Grading of meat handling practices

**Table 4.6: Meat handling practices categorization among the workers**

|  |  |  |
| --- | --- | --- |
| **Handling practice** | **Frequency (n=250)** | **Percentage (%)** |
| Good practice | 230 | 92.0 |
|  |  |  |
| Poor practice | 20 | 8.0 |

When the meat handling practices listed above were summed up, it was identified that 230 (92.0%) presented with more of good level of meat handling practices while 20 (8.0%) were found to manifest more of poor meat handling practices. This is shown in Table 4.6.

**1.7 Socio-demographic factors associated with meat handling practices of** the **abattoir workers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Factors | **Meat handling practice** | |  | | **ꭓ2** | **OR** |
|  | **Good** | **Poor** | | **Total** | **(p-value)** | **(95% C.I.)** |
|  | **f (%)** | **f (%)** | | **f (%)** |  |  |
| Age (years) |  |  | |  |  |  |
| < 36 | 107 (91.5) | 10 (8.5) | | 117 (100.0) | 0.089 | 0.870 |
| > 36 | 123 (92.5) | 10 (7.5) | | 133 (100.0) | (0.765) | (0.35-2.17) |
|  |  |  | |  |  |  |
| Sex |  |  | |  |  |  |
| Male | 213 (91.4) | 20 (8.6) | | 233 (100.0) | 1.586 | 0.914 |
| Female | 17 (100.0) | 0 (0.0) | | 17 (100.0) | (0.208) | (0.88-0.95) |
|  |  |  | |  |  |  |
| Marital status |  |  | |  |  |  |
| Single | 101 (89.4) | 12 (10.6) | | 113 (100.0) | 1.922 | 0.522 |
| Married | 129 (94.2) | 8 (5.8) | | 137 (100.0) | (0.166) | (0.21-1.33) |
|  |  |  | |  |  |  |
| Religion |  |  | |  |  |  |
| Christianity | 104 (93.7) | 7 (6.3) | | 111 (100.0) | 0.778 | 1.533 |
| Islam | 126 (90.6) | 13 (9.4) | | 139 (100.0) | (0.378) | (0.59-3.98) |
|  |  |  | |  |  |  |
| Education |  |  | |  |  |  |
| Not educated | 21 (87.5) | 3 (12.5) | | 24 (100.0) | 0.730 | 0.569 |
| Educated | 209 (92.5) | 17 (7.5) | | 226 (100.0) | (0.393) | (0.15-2.10) |
|  |  |  | |  |  |  |
| Position |  |  | |  |  |  |
| Non-butcher | 157 (94.0) | 10 (6.0) | | 167 (100.0) | 2.767 | 2.151 |
| Butcher | 73 (88.0) | 10 (12.0) | | 83 (100.0) | (0.096) | (0.86-5.39) |
|  |  |  | |  |  |  |
| Knowledge waste management |  |  | |  |  |  |
| Poor | 31 (91.2) | 3 (8.8) | | 34 (100.0) | 0.036 | 0.883 |
| Good | 199 (92.1) | 17 (7.9) | | 216 (100.0) | (0.849) | (0.24-3.19) |
| **Total** | **230 (92.0)** | **20 (8.0)** | | **250 (100.0)** |  |  |

**Table 4.7: Socio-demographic factors associated with anxiety among the respondents**

**OR: Odds Ratio C.I.: Confidence Interval**