

IMPACT OF AN INTERVENTION PROGRAM ON IMPROVEMENT OF KNOWLEDGE, ATTITUDES, PRACTICES (KAP) ON FOOD AND OCCUPATIONAL HEALTH SAFETY AMONG CATTLE ABATTOIR WORKERS IN MALAYSIA

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ABSTRACT

Objective: Food and occupational safety and proper meat handling are some of the approach used to decrease economic losses due to meat spoilage in food industries. A significant improvement may be achieved in foodborne diseases prevention if Public health guidelines are strictly followed. Crucial line of defense can also be established through food handler education. In this study an intervention program was conducted to improve the Knowledge, Attitude and Practice (KAP) of workers involved in cattle carcass processing on personal hygiene and good practices.

Method: An intervention program was conducted to improve the Knowledge, Attitude and Practice (KAP) of abattoir workers on personal hygiene and good practices. During the intervention, presentations on good hygienic practices and safety were conducted. Data on the KAP scores of the workers were collected in pre-post intervention phases. Comparisons were made on the scores to determine the effectiveness of the intervention.

Results: Thirty-four percent (34%) of the workers that participated in the intervention were within the age of 31-40 while 19% in the range of 51-60 years. The demographic data showed that all of the workers involved in the study were male. Training of workers on meat cutting, meat storage and personal hygiene has improved significantly ($p=0.010$, 0.010 and 0.001) after the intervention. The mean scores for KAP before the intervention were 7.1 ± 1.87 , 4.3 ± 0.73 and 5.5 ± 1.01 respectively. After the intervention, the scores were 9.4 ± 2.15 , 4.7 ± 0.48 and 5.8 ± 0.93 respectively. The total mean KAP before the intervention was 16.9 ± 2.38 compared to 19.9 ± 2.83 . Comparison of KAP score in pre and post-intervention phases indicated a significant difference in knowledge ($p<0.0001$) and attitude (0.025) but no significant difference was observed in practice scores ($p=0.115$) based on the paired t-test analysis. However, the total KAP scores for pre and post-intervention were observed to have a significant difference ($p<0.0001$) which indicated an improvement in the KAP score after the intervention.

Conclusion: The intervention program was found to improve workers performance in terms of occupational and food safety

Keywords: Food safety, occupational safety, industrial hygiene

1. Introduction

Numerous factors have been related to an increase in foodborne infection. Some of the important factors include; international travels, increase in population, changes in food preparation behaviors, increase in fast-food outlets and lack of training for food handlers. (Motarjemi & Käferstein, 1999). One of the major factors implicated in food-borne disease outbreaks have been reported to be mishandling of food by workers (WHO, 2000).

Training on good industrial practices and personal hygiene has proved to be an essential business policy to reduce economic loss as well as managing food safety and occupational risks. In addition, it serves as a means through which food safety can be enhanced, offering a long-term solution for the food industry (Smith, 1999). For instance, the Regulation (EU) No. 852/2004 adopted by the EU parliament in 2004, outlined the requisite for all the institutions involved in food processing to identify the stages of food manufacturing procedures to ensure full adherence to food safety guidelines across EU food businesses effective from 1st January 2006. Risk-based approach to guarantee food safety in Food Safety Management System was the major change in the regulation.

Implementation of the regulation has associated food handlers education with improvement in protection against foodborne infections (Legnani, 2004; Martínez-Tomé et al., 2000; Sun et al., 2005; Worsfold, 2001). Food vendors, restaurants and industries must ensure that all steps of production, processing and supply of food under their supervision complied with the stated guidelines for hygienic practices stated by the laws (EU) No. 852/2004 (Jevšnik et al., 2008). Hazard Analysis and Critical Control Points (HACCP) standards requires the full commitment and compliance by the food business owners for effective implementation of the procedures. Such assurances include participation in training and workshops in areas of food safety, manufacturing controls and personnel hygiene.

Furthermore, it was recommended that employees should manage any critical control points (CCPs) after the establishment of HACCP after receiving relevant trainings. Some countries have underlined the need for the HACCP principles application. In Portugal, the Codex Alimentarius has introduced 30 years ago which have become law in Portugal in 1998 and almost a decade later established the requisites for a "handler card" for meat handlers from 1st August 2008 (Do Sector

Elétrico, 1998 and Da União, 2006). A recent survey conducted in Portugal to evaluate knowledge on good practice, work safety and hygiene of workers in the food processing indicated that professional training in Good Practice in Food Industry (GPFI) and in both areas (BT) have had an impact on the workers scores in Knowledge and Practice questions (Gomes-Neves et al., 2011).

The ever-increasing human population have significant impact on demand for proteins through meat consumption. As a result, human contact with animals brought about an unprecedented risk of zoonotic diseases transmission particularly from highly endemic regions. Transportation of animals among countries will be another factor that accelerates the public health dilemma. (Bala and Yaza, 2011). In recent times, zoonotic infections was found to be responsible for approximately 70% of emerging infectious diseases (Cutler, et al, 2010). Over three hundred zoonotic diseases of diverse etiologies that caused high mortality and morbidity have been reported (Pal, 2007). It affects both human gender, different age categories, urban and rural areas and diverse climatic regions. (Acha and Szyfres, 2003).

Various routes of transmission of zoonotic diseases have been established. (Hugh-Jones et al., 2008). However, most common means of transmission of the disease among workers in slaughter houses is through direct contact (Gracey, 1999). Workers in the slaughter houses are at risk of contracting zoonotic infections because of the close contact they usually have animal organs during cattle slaughter or carcass handling (Haagsma et al., 2012).

Numerous zoonotic infections from different origins find a way into the slaughter houses as a result different species of animals been processed for human consumption at the same time. Due to close proximity of the workers with different animals from diverse locations, abattoir workers constitute a major group at risk of occupational zoonosis, (Pal and Dave, 2013). An intervention program is required to improve existing workers' knowledge on occupational hazards and environmental safety so that potential risks of exposure to harmful biological agents can be reduced to the barest minimum. This intervention aimed to improve the KAP of Abattoir Workers on food and Occupational health safety in Malaysia.

2. Materials and Method

A cross-sectional study design was adopted for assessment of current scores of the workers on

Knowledge, Attitude and Practice followed by an intervention program. A total of Thirty-two (32) abattoir workers consented to take part in the study A. Pre-post-test was chosen to evaluate the effectiveness of the program. Six states from the Malaysian Peninsular were selected randomly for the purpose of the intervention; Selangor, Terengganu, Pahang, Negeri Sembilan, Perak and Melaka. Locations were selected based on the data obtained from the Division of Veterinary Services (DVS), Ministry of Agric and Agro-Allied Industries Aras 1, Lot 4G1, Blok Podium, Wisma Tani, No.28 Persiaran Perdana, Presint 4, Pusat Pentadbiran Kerajaan Persekutuan, 62624 Putrajaya Malaysia.

2.2 Sampling Method

Butchers from government Halal cattle abattoir. All butchers working in government cattle abattoir.

Exclusion; Those that do not participate in meat processing or not consented participate in the intervention program.

Inclusion; Workers involved in meat handling and consented to partake in the intervention program.

Approval; Approval for the intervention program was obtained from the Faculty of Medicine Ethics committee and the Division for Veterinary Services of the Ministry of Agriculture, Malaysia. After the approval, the consent form was distributed to the abattoir workers for their willingness to participate in the intervention program. All the government Halal abattoir workers agreed to participate.

2.3 Study Instrument

Self administered questionnaire was developed adopted based on previous concepts by Nel et al. 2004 and Soares et al., 2012. The concepts were reviewed and modified following an advice from experts. Validity and reliability test for the questionnaire was done accordingly. Some respondents outside the study frame were engaged for the test. The score by each respondent for a particular question was recorded and analyzed by using SPSS v.21 and the alpha value was recorded. The alpha value of 0.77 was obtained after the data analysis.

Self-administered questionnaires were distributed to the workers to respond to some questions concerning Knowledge, Attitude and Practice (KAP). Scores were recorded for both the control and the intervention group. It also includes questions on the provision of safety materials and training.



Figure 1: Respondents answering the questionnaire in Senawang Abattoir

2.3.1 Intervention Development

An education program aimed at improving the Knowledge, Attitude and Practice was developed through consultation with a group of experts that specializes in Epidemiology, Medical Statistics and Public Health from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. Preliminaries for the intervention were then conducted afterward (Figure 2).



Figure 2: Preliminaries in Shah Alam and Teluk Intan Abattoirs

The intervention was conducted in terms of poster presentation separated into three modules; Personal hygiene, Sanitation and Practices to avoid carcass contamination. Explanations were made in detail to the abattoir workers about the posters such as hand washing procedures. The posters were initially translated into Bahasa Melayu for better understanding. Group discussion was adopted for better participation and enough time given to the workers to ask questions. Pre-intervention data was earlier taken to determine the areas that require much attention about the worker's KAP. The intervention was conducted after six months.

2.3.2 Poster presentation

Posters indicating good practices in the abattoir environment were displayed at the presentation venue as well as several locations within the working places. This may serve as a reminder for the workers on what they are expected to do before, during and after work. Three strategic locations were chosen for the purpose; Entrance, Inside and the Exit. All information on safety such as Hand washing nail cutting, removal of jewelry and protective clothes wearing were shown at the entrance. Workers were allowed to ask questions regarding the posters for more clarification.

2.3.3 Presentation

A two-hour presentation was performed in the presence of the participants. During the presentation, the participants were educated on the nature and transmission of pathogens, Health safety, good practices to avoid exposure and contamination of meat and the importance of their jobs as butchers. The modules were subjected to reviews by a group of experts before the intervention.



Figure 3. Presentations

2.3.3 Outcome measures

A score of 0 and 1 was used for incorrect and correct answers respectively during the Assessment of Knowledge, Attitude and Practice. A total of 37 questions out of which 12 questions were on provisions of protective equipments and trainings on occupational safety while 25 questions were on KAP. The score was rated as Good if the participant scored marks $\geq 70\%$ and insufficient if $< 70\%$ (Soares et al. 2012).

3. Results

3.1 Respondents socio-demographic background

Thirty-two abattoir workers had participated in the intervention programme. The demography of the participants showed that all were of male gender and aged between 21-60 years as shown Table 1.

Table 1. Demographic of the respondents

Characteristic	n = 32	%
Sex		
Male	32	100%
Age		
21-30	7	22%
31-40	11	34%
41-50	8	25%
51-60	6	19%
Education		
Primary	2	6.3%
Secondary	22	68.8%
Tertiary / Degree	8	25%
Marital status		
Married	27	84.4%
Not married	5	15.6%

Note: Mean $\pm$ SD age: 35 $\pm$ 11

3.2 Comparison of KAP Scores

The total KAP score for the workers had increased from 16.9 to 19.9 after the intervention as shown in Table 2.

3.2 Comparison of paired KAP Scores before and after intervention

The results for paired KAP scores for pre and post-intervention are presented in Table 3. A significant difference was recorded for the KAP in the post and pre-intervention phases.

Table 2: Comparison of knowledge, attitude and practice scores for abattoir workers

	Mean	N	SD	SEM
Pre intervention knowledge score	7.1	32	1.87	.33
Post intervention knowledge score	9.4	32	2.15	.38
Pre intervention attitude score	4.3	32	.737	.13
Post intervention attitude score	4.7	32	.482	.09
Pre intervention practice score	5.5	32	1.01	.18
Post intervention practice score	5.8	32	.93	.16
Pre intervention KAP score	16.9	32	2.38	.42
Post intervention KAP score	19.9	32	2.83	.49

Table 3: Paired KAP Scores before and after intervention

	Mean	SD	Sig. (2-tailed)
Pre-post intervention knowledge score	2.281	2.372	< .0001**
Pre-post intervention attitude score	.343	.827	.025*
Pre-post intervention practice score	.312	1.090	.115
Pre-post intervention KAP score	2.937	2.793	< .0001**

4. Discussion

Demographic data obtained by this study showed that the abattoirs had no female worker participating in carcass processing and the mean age of the workers was found to be 35±11 years. Only 25% of the abattoir workers had a tertiary level of education (Table 1).

The mean scores for knowledge, Attitude and Practice before the intervention were 7.1±1.87, 4.3±0.73 and 5.5±1.01 respectively. After the intervention, the

scores were 9.4±2.15, 4.7±0.48 and 5.8±0.93 respectively. The total mean KAP before the intervention was 16.9±2.38 compared to 19.9±2.83 (Table 2).

Comparison of KAP score in pre and post-intervention phases indicated a significant difference in knowledge ($p<0.0001$) and attitude (0.025) but no significant difference was observed in practice scores ($p=0.115$) based on the paired t-test analysis.

However, the total KAP scores for pre and post-intervention were observed to have a significant difference ($p<0.0001$) which indicated an improvement in the KAP score after the intervention as shown in Table 3. Improved KAP has been associated with a decrease in the prevalence of food pathogens by various researchers (Nel et al., 2004, Bas et al., 2004 and Coleman, 2005).

The improvement was correlated with a decrease in the dissemination of pathogens as well as personal hygiene. Though other researchers reported different results indicating non-significant differences (Askarian et al., 2004 and Angelilo et al., 2001).

This study adopted a cross sectional study design which limits its ability to be used for generalized conclusion. Another limitation may be related to the number of samples as well as drawing causal conclusions. The is urgent need to provide more trainings especially in hygienic practices and other good manufacturing practices related in the slaughter houses. Public health intervention its evaluation may be crucial effort towards food protection and occupational safety..

5. Conclusion

This study records an improvement in the Knowledge, Attitude and Practice (KAP) of abattoir workers significantly. The improvement may help in reducing the Occupational and public health burden associated with the abattoir industry.

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Conflicts of Interest

The author declares no conflict of interest.

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