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Perspectives of Poultry Slaughterhouse Workers on Musculoskeletal Health and Wellbeing Program for the Poultry Industry: A Qualitative Study

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ABSTRACT

Introduction: Work-related musculoskeletal pain (WMSP) is a common occupational disorder in the poultry slaughterhouse industry. Poultry slaughterhouse workers (PSW) reported a high prevalence of work-related musculoskeletal problems (WMP) with mild to moderate disability at work. Therefore, a musculoskeletal health and wellbeing intervention program (MIP) is needed for PSW in the workplace. The study aimed to explore PSW's perspectives on musculoskeletal health and well-being intervention programs in the poultry industry workplace.

Methods: Descriptive qualitative research was conducted among 26 PSW (10 men and 16 women). Data were collected with one-to-one interviews conducted in a private room by a qualified therapist. The average interview time was 33 minutes for each participant. The data was verbatim transcribed and analyzed using thematic analysis.

Results: The finding demonstrated four key themes emerging from the perspectives of PSW on the MIP at the workplace. The four key themes are as follows: (i) work condition, with two subthemes: characteristics of work and influencing factors to WMP, (ii) impacts of WMP on moods, (iii) self-management of symptoms and prevention of WMP, and (iv) organizational support and welfare.

Conclusion: The themes were largely interrelated and built a picture of the perspectives of PSW on MIP in the poultry industry workplace. The perfectives of PSW also helped identify content for MIP development. The study also proposed several recommendations for the musculoskeletal health and well-being of the poultry industry workforce.

Keywords: Qualitative research; Work-related musculoskeletal problems; Poultry slaughterhouse workers; Musculoskeletal health and wellbeing intervention program; Prevention

Introduction

The poultry industry is expanding fast, with the United States standing at the top of the list, producing 19.9 million metric tons of chicken meat per year, contributing to 20.1% of the global demand [1]. In Asia, next to China, Thailand stands in the 8th position, producing 3.3 million metric tons of chicken meat, which is 3.3% of the world's output [2]. The poultry industry in Thailand is rapidly expanding, with poultry exporters vigorously stretching their markets to meet the global demand for chicken products [3]. The constant drive for higher profit and production due to the rapid expansion of the poultry industry creates adverse factors such as an increase in working hours or an increase in production line speeds [4]. Such adverse factors (e.g., repetitive movements and decrease in breaking hours) contribute to negative working conditions and affect the health and well-being of PWS, which may lead to work-

related musculoskeletal problems (WMP) at the workplace [5-7]. Recent evidence suggested that Thailand PSW reported a very high prevalence of WMP, with 97% of PSW reporting WMP at least in any one body region at a given time [8]. The PSW had the highest prevalence of WMP at the shoulder region (61.5%), followed by wrists/hands (60.3%), and approximately 83% of PSW reported disability at the shoulder, wrist, and hands [8, 9]. Slaughtering involves placing an unconscious chicken on a moving line and cutting the neck. Evisceration includes the removal of feathers, abdominal slitting, and removal of internal organs. The cut-up task involves special and fine cutting of the chicken into assorted products, such as chicken wings, chicken breasts, and packing [8]. All of these tasks involved repetitive motions and significant force, both of which could contribute to the development of musculoskeletal disorders in various parts of the upper extremities [8, 9]. Needless to say, WMP leads to reduced work capacity, lost productivity, long-term sickness absence, and early retirement in the working population [10].

The workplace and work environment can positively and negatively contribute to people's health and well-being [11]. Despite steps to reduce WMP at the workplace, several control measures, such as occupational safety, engineering controls, and the use of technology and quality equipment at work, have been implemented [5,9]. In WMP management, the workers' needs and expectations are valuable indicators for developing policies and delivering healthcare services [12-14]. Furthermore, involving people in their own care has been suggested to help people manage their own health and well-being on a daily basis [15,16]. Also, an understanding of the users' clinical, practical, and emotional needs and problems is recommended in the context of developing health and care services for the users [17]. In the process of developing MIP for the PSW, there is a need to understand the perspectives of the PSW, such as their opinion, needs, and expectations towards designing a multicomponent intervention program [12-14].

Therefore, the study's main aim was to explore the perspectives of the PSW about the musculoskeletal health and wellbeing intervention program at the workplace. The information obtained from the study would be helpful to design and develop MIP at the workplace for the PSW to manage WMP.

Methods

Study design and setting

A qualitative descriptive research design was used to explore the PSW's perspectives regarding developing MIP at the poultry slaughterhouse workplace. The study was undertaken among PSWs recruited from one of the three poultry industries in the northern parts of Thailand. A simple random method was used to select one of the three poultry slaughterhouse factories. The study was conducted over a four-month period between August and November 2023. All participants were informed of the details and objectives of the study as well as the workplace manager, supervisors, and occupational safety officer. Participants who were willing to participate in this study signed an informed consent form before entering the study. The study was approved by a university institutional ethics committee, according to the Declaration of Helsinki (Ethical approval number AMSEC-64EX-112).

Participant characteristics

The factory had a total of 120 workers, which included 90 PSW, 24 office staff, and six storage workers. Inclusion criteria for the study were as follows: (i) age between 18-59 years old, (ii) working as PSW at a chicken meat factory for at least 1 year, (iii) working in standard full time for at least 7 hours per working day, and (iv) reported musculoskeletal symptoms in the previous 7 days in at least one body region: a) neck, b) shoulders, c) elbows, d) upper back, e) lower back, f) wrists/hands, g) hips/thighs, h) knees, and i) ankles/feet). Exclusion criteria were a history of any sensory deficits, a history of back surgery, and any recent traumatic injuries to the neck, back, extremities, and pregnancy. The study also excluded any PSW who had sought any medical help and were under any pain medication at the time of the study. Participants were randomly chosen from each task section (i.e., slaughtering, evisceration, and cut-up). This approach ensured a broad range of information across all task sections and minimized bias. In total, 26 PSWs who met the inclusion and exclusion criteria and volunteered to participate in the study were recruited.

Study procedure

The researcher presented the details of the study to the PSW in their organization staff meeting, and the participation information sheet, together with the study consent forms, were left in the room. The researcher then visited the organization's premises to identify a suitable place to conduct the interview. After the meeting and visit, an email was sent to all the PSWs, inviting them to participate in the study. While the PSW were encouraged to participate in the study, it was explained that their participation is totally voluntary. Any participants who expressed interest in participating were asked to read the participant information sheet and advised to return the signed consent form prior to their participation in the study.

Data collection

Data were collected through one-to-one interviews with a qualified physiotherapist who was experienced in conducting qualitative interviews and did not have any role in this study. The interviews were conducted on the poultry slaughterhouse premises

within a month from the time the participants signed the consent form. The interviews were held in a private room, which ensured that all participants felt that they were able to express their points of view freely, and a friendly and collaborative atmosphere was promoted during the interview [18]. A predetermined interview question guide based on existing literature was used to lead the interviews, and prompting was used wherever necessary to focus on the conversation further [19, 20]. The interview questions were tested during the first interview, and there was no change. The average interview time was 33-40 minutes for each participant. Interviews were audio-recorded with participants' permission. Data files were stored in a password-protected computer, managed confidentially, and discarded after analysis [18].

Data analysis

The sample size for the study was based on qualitative research methods [21,22]. Purposive sampling was purposeful to ensure that it reaches potential participants and provides rich data pertinent to the research question [23]. The sample size of this study was 26 PSWs, followed by the sampling strategy of the health sciences samples [23]. The samples were a minimum of 20 and a maximum of 147 [23]. The demographic data (e.g., age, sex, weight, height) were summarized in frequency, mean (M), standard deviation (SD), and percentages. The data was verbatim transcribed by a research assistant who never met the participant before. The data was analyzed using thematic analysis [11,21,22], which was based on the following steps: (i) familiarizing the researcher with the data, (ii) generating initial codes, (iii) searching for themes, (iv) reviewing the themes, (v) naming the themes, and (vi) producing the report [22, 23].

Ethical approval

The study was ethically approved by a university institutional ethics committee (Ethical approval number: AMSEC-64EX-112 as per the Helsinki declarations).

Results

A total of 26 participants (10 men (38.4%) and 16 women (61.6%)) aged between 25-50 years participated in the study. The participants reported WMP in various body regions, such as the shoulders, neck, arms, back, and legs. Eight of the participants (30.8%) worked in the slaughtering sessions, nine workers (34.6%) performed evisceration tasks, and nine workers (34.6%) performed work tasks in the cut-up sessions.

Table 1 Demographic characteristics of poultry slaughterhouse workers

Characteristics (n=26)	**Mean ± SD**
Gender	
Males - n (%)	10 (38.4%)
Females - n (%)	16 (61.6%)
Age (years)	34.76 ± 6.55
Weight (kg)	59.34 ± 11.57
Height (cm)	161.76 ± 10.83
Body mass index (kg/m^2)	22.69 ± 3.89
Underweight (< 18.5) - n (%)	2 (7.6%)
Normal (18.5 – 22.9) - n (%)	11 (42.3%)
Overweight (23 – 24.9) - n (%)	7 (26.9%)
Obese (≥ 25.0) - n (%)	6 (23.2%)
Previous injury at upper limbs	
No - n (%)	19 (73.1%)
Yes - n (%)	7 (26.9%)
Smoking	
No - n (%)	15 (57.6%)
Yes - n (%)	11 (42.4%)
Alcohol consumption	
No - n (%)	9 (34.6%)
Yes - n (%)	17 (65.4%)
Task section	
Slaughtering - n (%)	8 (30.8%)
Evisceration - n (%)	9 (34.6%)
Cut-up - n (%)	9 (34.6%)

Characteristics (n=26)	**Mean ± SD**
Work experience (years)	6.03 ± 3.40
1-5 - n (%)	13 (50.0%)
5.1-10 -n(%)	8 (30.76%)
> 10-n (%)	5 (19.2%)
Work hours (hours)	10.88 ± 1.47
Tool use (i.e., knives and scissors)	
No - n (%)	13 (50.0%)
Yes - n (%)	13 (50.0%)

Table 2 Development of themes, subthemes, and categories through coding in the thematic analysis of poultry slaughterhouse workers (PSW)

Themes	Subthemes	Category	Coding
Work condition	Characteristics of work	Occupational factors	Highly repetitive motions Excessive use of force Sustain posture for long Insufficient recovery time
	Influencing factors	Physical factors	The conveyor belt: height of conveyor belt Chicken: a lot of chicken
		Environment factor	Exposure to cold temperatures
		Equipment factor	Holding a knife
		Personal factors	Careless Lack of awareness Personal causation
Impacts of WMP on moods	Mood	Psychosocial Factors	Moody, disturbed, frustrated unhappy and stress
Self-management for prevention and relief symptoms	Prevention		Knowledge of symptoms Knowledge of risk factors Exercise / stretching Leisure / break
	Relief symptoms		Rest Sleep Massage Medication
Support	Organization		Welfare

The average age of the PSW was 34.76±6.55 years. The average weight and height were 59.34±11.57 kg and 161.76±10.83 cm, respectively. The mean work experience was 6.03±3.40 years, and the mean working hours per day was 10.88±1.47 hours. About 42.4% (n=11) were smokers, and 26.9% (n=7) had previous injuries to the upper limbs. Half (n=13) of participants used knives as a tool to perform their job tasks at the workplace (Table 1). There are four themes extracted: work conditions, including the characteristics of work and influencing factors leading to WMP; impacts of WMP on moods; and self-management for prevention and relief of symptoms; and 4) support, which refers to the organization system at the workplace (Table 2).

(i)Work condition

This theme comprised two subthemes: characteristics of work and influencing factors. The findings explained the perspectives of the participants in terms of how the nature of the work and job tasks could be the causes of their WMP. Participants also identified and described various factors at their workplace related to their occupation, such as highly repetitive motions, excessive use of force, sustained posture for long, and insufficient recovery time as causes of concern to their health and well-being.

"My job is to chop the chicken wings. I have to keep repeatedly moving my arms. I have to raise both of my arms all the time. Sometimes, the chickens are huge; it is difficult to cut and require a lot more force to chop them. Also, I have to chop the chickens 1-2 times

before it breaks into pieces. Some days, there were a lot of chicken, and they were big sizes; I felt like I worked a lot more than usual. When I went back home, my arms were in pain and very sore." [P#14]

The results explained several influencing factors in the work environment that could influence the health and well-being of the PSW. Physical factors such as an extremely cold working environment with cold temperature, ergonomic factors such as the height of the conveyor belt, physical factors such as the height of the person, and equipment factors were discussed.

"I think the conveyor belt for hanging the chicken is quite high. And I'm quite a short guy. When the chickens are on the conveyor belt, all of them will hang upside down. I have to reach up to cut the chicken feet. Although I am standing on a small chair to make me taller, I still have to reach." [P#5]

In terms of the physical working environment, the PSW was exposed to cold temperatures between 8 °C and 12 °C, approximately 8-12 hrs. per day. Workers reported feeling cold at their hands. In terms of equipment,

"*The chicken parts that I have to dissect are the chicken wings that come out of the chiller. It's a bit cold, and I have to hold on to the chicken wing and then cut it. At the first 500-600 chickens, my hand can move normally. My hands are not that cold. But after a while, my hands start to get very cold and very numb. At the end of the day, sometimes, I can't even move my hands. It's numb in both hands and fingers." [P#12]*

About 4 out of the 6 participants reported using a small knife as part of their occupational task and discussed equipment mismatch; for example, PSW discussed difficulty holding small knives with gloved hands. All the PSW recalled handling a huge number of chickens per day/shift, approximately 15,000-16,000 per day. Lack of awareness of the WMP and personal causation were also discussed as concerns by the PSW in terms of their health and well-being.

"The knife that I hold while working is a knife for cutting things such as cutting chicken wings, slitting, and cutting chicken skins. We have to wear gloves when working. Sometimes, I have to grab a knife very hard because the gloves are quite slippery. Especially when I have cut the chicken skin, I have to put more effort into grasping the knife. Sometimes, my fingers are locked, and they're cold." [P#3]

(ii) Impacts of WMP on moods

This theme captured and demonstrated that WMP affected their emotional well-being. The PSW discussed how WMP affected their emotions, causing them to be unhappy, moody, disturbed, and distressed. PSW reported stress due to WMP and vice versa as a result of their job that affected their health and well-being at both the workplace and at home.

"I have shoulder pain and back pain. It hurts almost every day. Some nights, the pain is so painful that I can't sleep. When I woke up, I didn't feel well. I feel irritable and stressed, think about all kinds of things, and am very unhappy. Sometimes, I feel irritable and stressed all day. Then I go for a smoke, and stress or frustration is better. But, when I think back about work. The fact that I have to feel the pain again. Then I'm stressed again." [P#10]

(iii) Self-management for prevention and relief of symptoms

Two different themes emerged from the findings: prevention strategies and relief of symptoms. The PSW was keen to know the prevention strategies for avoiding WMP in terms of managing their health and well-being. The PSW wanted to know more about the knowledge of symptoms, knowledge of risk factors, knowledge of exercise or stretching, and any leisure activities or breaks that might help. When prompted about how they find helpful in managing WMP, the PSW discussed having rest, sleep, massage, and medication as their strategies for symptom relief.

"I know that my arms and hands pain are from my work. I understand that if I stop working, I will not get hurt. Sometimes, I tried to stretch my arms and back to release my pain. Also, I tried taking a break, like going to the restroom or smoking for approximately 5-6 minutes. It's better than doing nothing. And on Sunday, I will sleep all day and do absolutely nothing. Then, I will feel less pain because I don't have to lift my arms or use my arms and hands." [P#21]

(iv) Organizational Support and Welfare

The PSW discussed the organizational support and welfare policies, which would be helpful for their health and well-being.

"I would like them to increase welfare, such as increasing the day of sick leave. Fifteen days a year is not enough. This year, I already took 14 days of sick leave days because of COVID-19. After that, I have to take private leave instead. I would like them not to deduct the money from the private leave. Sometimes, people have errands to manage, which must go on a normal day. I want the company to pay normally, even on private leave. For me, I think I would like to receive welfare like this, which will make me feel good and supported." [P#25]

Discussion

The study investigated the perspectives of the PSW with WMP about the musculoskeletal health and wellbeing intervention program. The study was a part of the Sustainable Measures for Assessment and Rehabilitation Drive (SMART Drive) project, which involves a network of international researchers with expertise in occupational and musculoskeletal health working together to develop MIP at the workplace [8, 13, 24, 25]. The current study was a continuation of the

first part of the project, which investigated the WMP and reported a high prevalence of WMP among PSW [8]. Engaging with the patients to understand their values and beliefs in terms of establishing their needs and their use of services is strongly recommended prior to the development of health care services [26]. The current study findings explained the impact of WMP on the work of PSW and vice versa. Healthcare professionals need to recognize the patient's views and preferences and hold discussions with the individuals to encourage them to express their personal needs and preferences for care, treatment, and self-management [27]. Thus, prior to the development of the musculoskeletal health and wellbeing intervention program, the PSWs were approached, and their perspectives were collected.

Workplace intervention programs facilitate implementing health promotion and prevention of occupational disease in the workplace [28]. However, any strategies to develop a workplace intervention program need to be tailored and naturally appropriate to the target participants promoting health competencies [28]. Therefore, the current study was a sincere effort to engage with the PSW to explore how a workplace intervention program could be tailored and made appropriate to the poultry industry. The study findings identified four key themes from the PSW and their perspectives on the musculoskeletal health and wellbeing intervention program. The PSW felt that the scope of contents of the musculoskeletal health and wellbeing program should incorporate the four key themes, which include working conditions, the impact of WMP on moods, self-management strategies covering knowledge on prevention and symptoms management, and organizational support. Evidence recommends that the contents of the program should encourage capacity, support healthy behavior, and increase the knowledge and skills of the workers [29]. Therefore, the themes identified from the current study from the perspective of the PSW are in line with recommended evidence for an intervention program at the workplace. For example, the PSW highlighted the need to be supported in their capacity to practice healthy working conditions at the workplace together with organizational support and improve their knowledge of self-management related to physical and mental well-being. Evidence from past studies also emphasizes the importance of PSW in understanding symptoms and risk factors of WMP at the workplace and self-management of WMP through prevention strategies and pain education [30,31].

The various key themes that emerged from the perspectives of the PSW are helpful for the authors as they prompt the scope for further scientific evidence on the study themes for developing the contents for MIP at the workplace. For instance, the findings of the study instigate authors to develop a new project scoping and synthesizing evidence related to how the working conditions could be adjusted to promote musculoskeletal health and wellbeing at the workplace. In the organizational setting, the design of a work-break schedule has a positive influence on work conditions, mood, productivity, and social aspects [32]. Work breaks are considered to positively affect employees' physical and cognitive performance, well-being, and health [33]. A systematic review found that taking a 10-minute short break can help alleviate leg muscle fatigue [32]. PSW performs tasks (e.g., slaughtering, evisceration, and cut-up) on the production line for 8 to 12 hours, with only a single 60-minute break at noon. The work-break schedule is designed to reduce prolonged static postures, interrupt monotonous tasks, minimize repetitive movements, and prevent excessive force use while also providing more recovery time [32-34]. With reference to some of the evidence mentioned above, a comprehensive scoping review would be needed on positive working conditions at the workplace, which then would forward to developing musculoskeletal health and well-being interventions among the PSW.

Working conditions influence the workers' physical and mental well-being [35]. In the current study, PSW reported that WMP impacted their moods, causing them to be disturbed, frustrated, unhappy, and stressed at the workplace. Mental issues can impact worker well-being in several ways, including reduced job satisfaction, limited job control, increased job strain, and psychological distress [35]. Workplace factors often act as psychosocial stressors, leading to psychological distress. Short-term physiological effects of these stressors commonly include increased muscle tension, reduced blood flow to the extremities, increased catabolic activity, and inhibited anabolic activity, which impairs muscle tissue repair [35]. Over time, work-related stress can raise the risk of WMP by intensifying physical strain and occupational stress factors [35,36]. Therefore, strategies to improve the mental health and job satisfaction of PSWs are necessary, and they need to be factored into the musculoskeletal health and well-being intervention programs for the poultry industry. The PSW also suggested the need to develop knowledge of self-management strategies to manage the symptoms and risk factors of WMP. Evidence from recent systematic reviews highlights that self-management strategies have a valuable role in the management of WMP [37, 38]. Hence, it should be considered for the MIP for PSW. Similarly, the PSW discussed the importance of organizational policies and welfare support for health and well-being at the workplace. The support from the organization includes a health promotion approach and empowering knowledge on WMP at the workplace [30,31]. From an organizational perspective, the MIP should engage stakeholders, supervisors, managers, safety officers, and PSW, which may enable the organization to have a greater understanding of WMP management options, allowing them to take sustainable and effective action in the management of WMP at the workplace [14].

The study findings were useful in understanding what the PSW wanted as part of MIP in the poultry industry workplace. From understanding the perspectives of the PSW, the authors have started looking into the evidence base with a specific focus across the various study themes to inform an intervention program at the workplace. Listening to the PSW, the authors like to suggest some recommendations to the poultry industry to improve the musculoskeletal health and well-being of the PSW. As part of the worker's welfare and training at the workplace, the industry should develop programs to increase the knowledge of the PSW on symptoms and risk factors of WMP, pain education, and self-management strategies of WMP. Any such training programs should consider involving managers, supervisors, safety officers, other stakeholders, and PSW. Training contents may also include biomechanics of poultry processing tasks, work posture, exercises to prevent WMP, and pain management. Information booklets, posters, educational videos, and health talks on WMP prevention and health promotion need to be organized for workers at regular intervals. Stress-relieving procedures such as breathing exercises, relaxation techniques, and stretching exercises need to be taught to the PSW. Proper personal protective equipment needs to be provided and replaced regularly to withstand sustained cold conditions at the workplace inside the poultry industry. High-quality protective gloves and boots need to be provided to the PSW as they are shown to reduce health losses by up to 60%-90% [39]. Also, organizational policies should provide and encourage PSWs to take regular breaks to warm areas every 1-2 hours [40]. Organizational policies should promote infrastructure and support to promote physical and mental well-being activities. The organizational policy should build healthy environments as well as a healthy community to address the health and wellness of staff in the poultry industry. Last, there are good opportunities here for further innovations to develop new designs of poultry processing knives, saws, and scissors, which should give a biomechanical advantage to the upper extremities and reduce the strain on the musculoskeletal structures.

Conclusion

The current study presents evidence of the perspectives of PSW on MIP in the poultry industry workplace. An understanding of the perspectives of PSW helped to scope evidence and build content for the development of MIP for the poultry industry. The study recommends several practices and industry implications for the musculoskeletal health and well-being of the poultry industry workforce.

Conflict of interest

No conflict of interest to declare.

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Author contributions

All authors contributed to the study concept. BH, PK, and UP performed literature research. LJ developed methods. BH and LJ accomplished data collection and analysis. All authors had access to the data, interpreted the study results, and commented on the overall manuscript.

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