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ORIGINAL ARTICLE

Implementation of Occupational Safety and Health Management System in the Education Sector

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ABSTRACT

Introduction: The frequency of work accidents, occupational illness, and natural disasters that influence schools and universities requires the implementation of occupational safety and health not only in the industrial sector, but also in the education sector. This study aimed to implement the Occupational Safety and Health Management System (hereinafter OSHMS) at the Public Health Faculty University of Muhammadiyah Jakarta as part of an effort to protect all academic community, contractors, guests, and visitors from work accidents and occupational diseases. **Method:** This study was operational research that employs an implementation framework, which involves the entire population in the faculty as the research sample. Data was analyzed descriptively both qualitative and quantitative. **Result:** OSHMS is successfully implemented with the stipulation of several policies at the Public Health Faculty University of Muhammadiyah Jakarta through the Dean's Decree Number 05 of 2022 concerning Determination of Occupational Safety and Health Policies, the formation of an occupational safety and health committee through the Dean's Decree Number 04 of 2022, implementation of OSHMS socialization, and installation of signs related to safety and health in the workplace. **Conclusion:** The implementation strategy carried out through the stages of exploration, installation, initial implementation, and sustainability was successfully used as a guide in realizing the implementation of OSHMS at the Public Health Faculty University of Muhammadiyah Jakarta.

Keywords: education sector, implementation strategy, occupational safety and health management system

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INTRODUCTION

Occupational safety and health have a wide scope both in science and in its application. The occurrence of work accidents, occupational diseases, and even deaths has made occupational safety and health a global issue that demands attention from various parties, such as government, occupational safety and health practitioners, and employers (Friend and Kohn, 2018).

According to the data from the International Labor Organization, there are 2.78 million workers who die due to work accidents and occupational diseases every year (International Labour Organization, 2019). In Indonesia, the number of workplace accidents increased by 55.2% in 2019, from 114,000 to 177,000 occurrences in 2020 (Muhammad and Susilowati, 2021). These incidents encourage organizational experts to investigate safety culture (Bisbey *et al*., 2021), which is an integral part of organizational culture that is represented by the values, attitudes, beliefs, and behavior of the majority of people within the organization and affects the safety level in the workplace (Jasiulewicz-Kaczmarek *et al*., 2022). Safety and health culture in the workplace becomes a part of the root cause originating from the organization's management and gradually spreads and influences its employees to reduce unsafe behavior, thus achieving the goal of accident prevention (Fu *et al*., 2020).

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The right of workers to obtain safety and health guarantees in the workplace has been echoed since the Industrial Revolution. Since then, regulations governing occupational safety and health have begun to develop and mostly focused on general industries such as manufacturing, construction, and public organizations. Although incidents that occur in academic institutions can have a serious impact on students and academic staff when compared to other fields, implementation of safety and health management systems in the educational sector is still lacking and requires a lot of attention from various parties (Nurhazirah, Harun and Harun, 2021).

According to data from the Labor Force Survey, the UK education sector in 2020 had 140,000 cases of occupational illness, with 55% being stress, depression, or anxiety, 24% being musculoskeletal disorders, and 21% being related to other diseases. Some of the cited risk factors are physical, such as ergonomics, chemical or biological factors, and psychosocial factors (Health and Safety Executive, 2020). Slips, stumbles, and falls are common types of accidents in universities. In addition, the occurrence of fires, burns, or explosions caused by chemicals, injuries caused by laboratory equipment, traffic accidents, stress, depression or anxiety, sexual harassment, riots, disorderly behavior, musculoskeletal disorders, and so on. The incidents of these accidents in most universities have been reported and analyzed in order to take preventive measures to ensure that they do not occur again (Hayashi *et al*., 2021).

Other work accidents that have occurred in universities have been reported in various news, both domestically and abroad, such as falling from the top floor of the building, electrocution, fire, blasting, food poisoning, and slipping or falling. Furthermore, several universities were impacted by natural disasters such as earthquakes that caused infrastructure damage and even fatalities, notably the deaths of students and instructors. All of these unwelcome events can occur at any moment and in any location. As a result, identifying, assessing, and controlling possible dangers is critical in order to prevent unwanted events.

The Occupational Safety and Health Law Number 1 Year 1970 has established requirements and guarantees for safety and health in all workplaces (Presiden RI, 1970). Maintenance, safety, and security facilities are one of the areas of national education standards in Indonesia that must be met by every university as part of safety initiatives (Indonesian Ministry of Education and Culture, 2020). Safety precautions are taken to safeguard students, educators, and education employees from disaster risk (Indonesian Ministry of Education and Culture, 2019). In addition, the Indonesian government controlled the implementation of safety and health management systems in the workplace as in Government Regulation of Indonesia Number 50 of 2012 so that it can be applied in all aspects of the community (President of the Republic of Indonesia, 2012). Furthermore, the Indonesian Ministry of Health promotes occupational safety and health efforts to be implemented in every office building through regulation Number 48 of 2016 regarding Occupational Health and Safety Standards in Office (Indonesian Ministry of Health, 2016).

Public Health Faculty University of Muhammadiyah Jakarta was established in 1996 through the Central Leadership Decision Letter of Muhammadiyah Number 96/SK-PP/III-B/1.b/1996. Currently, the Public Health Faculty University of Muhammadiyah Jakarta occupies a four-story building as a venue for academic activities which was inaugurated on May 18, 2020, and is equipped with various facilities including an auditorium, theater lecture hall, tutorial discussion room, library, laboratory, student room, parking lot, and sports facilities. Until now, the Public Health Faculty University of Muhammadiyah Jakarta has a total of 59 lecturers and education staff and 795 students from the undergraduate and postgraduate programs. As a faculty that is now independent and supported by new building facilities, there is a very big opportunity for faculty to build a culture of safety and health in the workplace by developing a management system. More than simply following regulations, safety and health culture in the workplace must be implemented by considering ethical, moral, and practical values as a responsibility to maintain safety and health, as well as to instill safety awareness, which in turn influences the positive image of the university.

Referring to several previously mentioned aspects, namely the high number and the incidents of accidents and illness, and the potential impact of disasters in the education sector, particularly in universities, as a fulfillment of regulations and moral responsibility to protect the entire academic community, contractors, and visitors; the potential risk causes should be positively understood and effectively managed. The goal of this research is to apply a management system of safety and health

referring to the policy of the Minister of Health of the Republic of Indonesia Number 48 Year 2016 regarding Occupational Health and Safety Standards in Office, which includes establishing policy and the implementation that carried out using the implementation strategy stages, and also describe knowledge level and the application of safety and health culture at the Public Health Faculty University of Muhammadiyah Jakarta.

METHODS

This study was an operational research to implement a management system of safety and health at the workplace using an implementation strategy according to the Fixen Theory which includes the stages of exploration, installation, initial implementation, and sustainability (Fixsen *et al*., 2021). Referring to the policy of the Minister of Health of the Republic of Indonesia Number 48 Year 2016, the implementation of the management system in this study is focused on establishing and developing the management system of safety and health in the workplace by establishing policies and the work planning which includes safety, health, and environmental health. This research was conducted at the Public Health Faculty University of Muhammadiyah Jakarta from April 2022 to July 2022. The sample used in this study was the entire population of the Public Health Faculty University of Muhammadiyah Jakarta, consisting of lecturers, educational staff, security guards, and cleaning services. Data collection was conducted through interviews, questionnaires, and field observations. Occupational safety and health knowledge variable covering aspects of formation, development, and standards. Meanwhile, the application of occupational safety and health culture variables covering psychological, behavioral and situational aspects were analyzed quantitatively. At the same time, data related to the implementation of occupational safety and health collected at the beginning of the study through interviews and field observations were analyzed qualitatively. This research has obtained the approval of the Ethics Review from the Health Research Ethics Commission of the Public Health Faculty University of Muhammadiyah Jakarta Number 10.459.B/KEPK-FKMUMJ/IV/2022.

In this study, a modified implementation framework from Purnamawati's 2020 research was adapted to assist implementation in the field (Purnamawati *et al*., 2020). The framework can be seen in Figure 1.

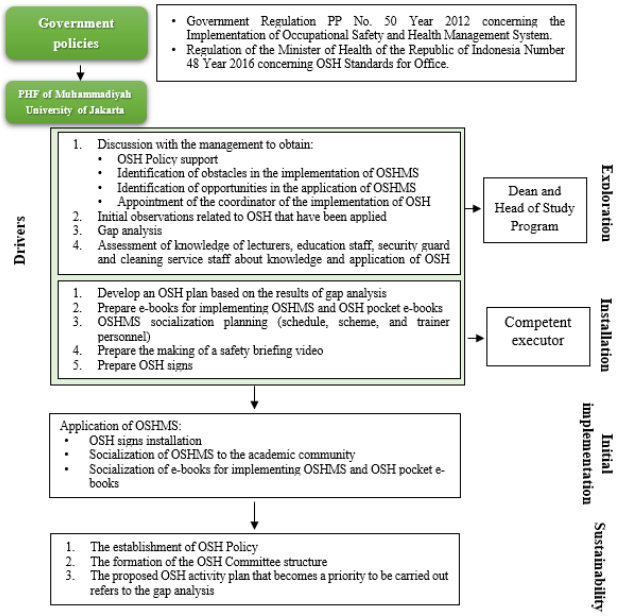

Figure 1. Occupational Safety and Health Management System Implementation Framework

RESULT

Respondents Characteristics

Public Health Faculty University of Muhammadiyah Jakarta has a total human resources of 59 people consisting of 26 lecturers, 18 educational staff, 6 security guards, and 9 cleaning service personnel. The average age of the lecturer group was 43.5 years, with the youngest being 28 years and the oldest being 73 years. Table 1 shows the complete age characteristics.

Table 1. Age Characteristics

N	L	ES	S	CS
Valid	26	18	6	9
Missing	0	0	0	0
Mean	43.5	32.4	36.3	28.7
Median	42	28.5	36.5	24
Std. Deviation	11.3	9.04	4	9.2
Minimum	28	23	31	21
Maximum	73	51	43	44

Note:
L :Lecturer S :Security guards
ES:Educational Staff CS:Cleaning Service

The majority of lecturers were female, with 61.5% and 38.5% male. The female gender accounts for 55.6% of educational staff, while the male gender accounts for 44.4%. On the other hand, in cleaning service, males dominate with 66.7%, while females with 33.3%. All security guards were male. Table 2 shows the complete features of education level and work period.

Overview of Occupational Safety and Health Knowledge and Culture Application Assessment

The assessment of the knowledge and cultural application of occupational safety and health was carried out through a questionnaire that referred to the Minister of Health of the Republic of Indonesia Number 48 of 2016 concerning Occupational Safety and Health Standards for Office. Questionnaires were distributed both online and offline. Of the 59 targets that were expected, only 38 people (64.4%) were willing to answer the questionnaire.

Assessment Result of Occupational Safety and Health Knowledge Level

In this assessment, there were 20 questions related to the regulation and application of safety and health in the workplace, safety at work, health at work, environmental work health, and ergonomics aspects.

Based on the results of the knowledge level assessment, 66% of respondents had a good level of knowledge, 26% had a sufficient level of knowledge, and 8% had a poor level of knowledge. More details for each level of knowledge aspect are described in Table 3.

Implementation safety and health in the workplace aspect has the highest value at 84.2% among the other aspects, followed by the other five aspects in order, namely the occupational safety and health policy aspect at 68.4%, the ergonomic aspect at 60.5%, the health aspect of the work environment at 52.6%, the occupational health aspect at 28.9%, and the occupational safety aspect at 18.4%. The occupational health knowledge aspect has the lowest degree of knowledge when compared to the other five elements, with 31.6%, followed by the health aspect of the work environment with 15.8%, the occupational safety and health policy aspect with 13.2%, and the occupational safety and ergonomics aspects with 10.5% each.

Assessment Results of Occupational Safety and Health Culture Application Level

The application of safety and health culture level was assessed through psychological, behavioral, and situational aspects, which consisted of 14 questions. Based on the result from this assessment, 55% of respondents were at a good level, 34% at a fairly good level, 11% at a fairly low level, and there were no respondents who had at low level.

From this assessment, the dimensions of belief and facilities showed the best value among other dimensions and had a value of 71.1%, followed by the other three dimensions sequentially, namely the behavioral dimension with 52.6%, the policy dimension with 31.6%, and the perception

Table 2. Characteristics of Gender, Education, and Work Period

	L (%)	ES (%)	S (%)	CS (%)
Gender				
Male	38.5	44.4	100	66.7
Female	61.5	55.6	0	33.3
Education				
Doctoral	34.6	0	0	0
Master	65.4	0	0	0
Bachelor	0	66.7	0	0
Senior High School/ Equivalent	0	22.2	100	89
Yunior High School/ Equivalent	0	11.1	0	11
Work Period				
<6 year	46.2	66.7	100	100
6-10 year	26.9	16.7	0	0
>10 year	26.9	16.7	0	0

Note:
L :Lecturer S :Security guards
ES:Educational Staff CS:Cleaning Service

Table 3. Value of the OSH Knowledge

Level (%)	Deficient	Fair	Good
OSH Policy	13.2	18.4	68.4
OSH Implementation	7.9	7.9	84.2
Occupational Safety	10.5	71.1	18.4
Occupational Health	31.6	39.5	28.9
Environmental Work Health	15.8	31.6	52.6
Ergonomics	10.5	28.9	60.5

Note:
OSH : Occupational Safety and Health

dimension with 7.9%. The lowest scores among the other components were for the dimensions of perception and policy/ training, with 36.8% and 23.7%, respectively. The value of other occupational safety and health culture application dimensions can be seen in Table 4.

Overview of the Implementation Strategy

Exploration Stage

This stage started with a preliminary survey conducted through interviews with the Head of General Affairs, followed by interviews with the dean and the head of the laboratory of the Public Health Faculty University of Muhammadiyah Jakarta. Field observations were conducted to supplement the interview data and as material for gap analysis. Questionnaires that have been tested for validity and reliability were used to assess the level of knowledge and application of occupational safety and health culture among lecturers, educational staff, security guards, and cleaning services. As a result of this inquiry phase, the dean agreed to conduct the research; support for policies with the stipulation of the Dean Decree Number 05 of 2022 concerning Determination of Occupational Safety and Health Policy of the Public Health Faculty University of Muhammadiyah Jakarta; support for the formation of the committee structure with the stipulation of the Decree of the Dean Number 04 of 2022 concerning The Establishment of the Organizational Structure of Occupational Safety and Health Committee of the Public Health Faculty University of Muhammadiyah Jakarta; find out the knowledge and application culture level of safety and health among lecturers, educational staff, security guards, and cleaning services through the questionnaire distribution; and the preparation of a gap analysis in which there were regulatory references and recommendations related to the implementation of occupational safety and health referring to the regulation from the Health Ministry of Republik of Indonesia Number 48 Year 2016 and supported by other relevant regulations.

Table 4. Value of the Application of OSH Culture

Level (%)	Low	Fairly low	Fairly good	Good
Faith	2.6	7.9	18.4	71.1
Perception	36.8	28.9	26.3	7.9
Behavior	0	10.5	36.8	52.6
Policy/ Training	23.7	15.8	28.9	31.6
Facility	2.6	7.9	18.4	71.1

Note:
OSH : Occupational Safety and Health

Installation Stage

At the installation stage, the necessary facilities and infrastructure were prepared, referring to the results carried out at the exploration stage and adjusted to the implementation in this research. The result of this installation stage was the selection of several occupational safety and health signs to be installed at several points in the faculty, including signs for going up and down stairs, signs of caution when climbing or descending stairs, installation of anti-slip on stairs on evacuation routes; signs for descending stairs on the evacuation route; fire extinguisher triangle signs and instruction to use; electrical hazard warning signs for server rooms and electrical panel boxes; urine indicators in every male's and female's toilets; assembly point signs; as well as installation of first aid kits and the contents of first aid kits according to the regulatory standards. Another outcome of this stage is that the plan and schedule related to socialization have been established with speakers who have expertise in industrial hygiene and occupational safety and health field; a guidebook for the implementation of occupational safety and health management system, and an occupational safety and health pocketbook have been prepared in the form of e-book; as well as making safety briefing video.

Initial Implementation Stage

Beginning in June 2022, the first stage of implementation was carried out through several activities, including the placement of signs to increase awareness of safety in specific locations such as in the main stairs area, along the evacuation routes, in the assembly points, and in the server room as well as electrical panel box to secure electrical installations. Besides that, urine indicators have been installed in every toilet on every floor to raise awareness of occupational health issues. To support the implementation stage, the socialization event for this program was attended by lecturers, educational staff, security guards, and cleaning services, as well as undergraduate and graduate students. Material related to safety and health in the workplace, including industrial hygiene, was provided by speakers who were experts in their fields, as well as socialization of a pocket e-book

conducted by researchers and the premiere of a safety briefing video. Some results from this stage can be seen in the below documentation:

Sustainability Stage

At the sustainability stage in this research, the policies that have been established have become a commitment that the occupational safety and health management system must be implemented. In addition, the committee structure that has been formed is expected to provide significant support for future program implementation in the faculty.

To support the sustainability stage of this research, a priority plan recommendation was made referring to the gap analysis, including ratification of the safety and health committee by the local labor department, conducting meetings to discuss plans for the next development and implementation program, and providing training mainly to the occupational safety and health committee.

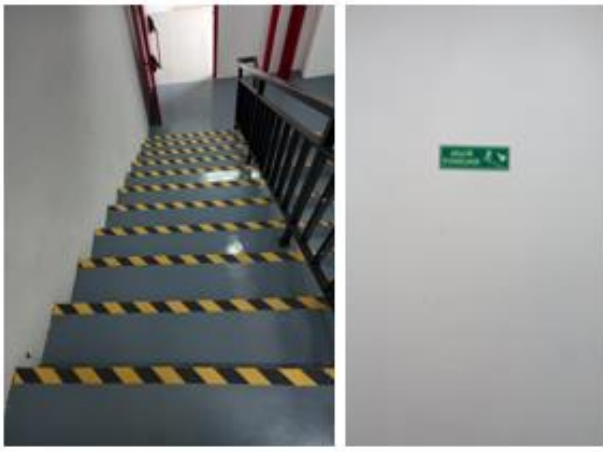

Figure 3. Safety Sign for Evacuation Route

Figure 4. Safety Sign in Main Area

Figure 5. Occupational Safety and Health Signs

DISCUSSION

Occupational Safety and Health Knowledge and Culture Application

According to the results of the knowledge level assessment, there were 8% of respondents with a poor level of knowledge. Meanwhile on the application of occupational safety and health culture assessment, even though there were no respondents who were at a low level, this assessment found 11% of respondents at a fairly low level. Several studies have found that good knowledge in this field has a favorable impact on occupational safety and health culture application. It is in line with research conducted on employees of manufacturing companies in the Cibitung Industrial area of Bekasi (Endriastuty and Adawia, 2018). Knowledge related to safety and health in the workplace becomes a very important part of realizing safety and health for Electronic Engineering Students in Electronic Engineering, Education Study Program, Yogyakarta State University (Munir, Dewanto and Wulandari, 2018). Good knowledge also influences the awareness of occupational safety and health behavior among students in the laboratory of the Faculty of Medicine, Sriwijaya University (Yana, 2019). Research on students at the University of Aydin Istanbul also shows that knowledge of safety and health can change correct behavior and awareness so that it can prevent workplace accidents and illness (Olcay, Temur and Sakalli, 2021).

According to the findings of this research which was conducted at the Public Health Faculty University of Muhammadiyah Jakarta, 66% of respondents had good knowledge and culture application of occupational safety and health, with results revealing that 55% of respondents were at a good level. Most of the respondents have an education and training background, which supports their level of knowledge and the good application

culture of occupational safety and health. Although knowledge and application of the culture level related to safety and health in the workplace were mostly good, 8% of respondents have a low level in terms of knowledge, meanwhile, 11% of respondents have a fairly low level in terms of culture application. Therefore, improvements are needed, such as providing training, particularly to the committee, and periodic socialization to the academic community. A positive safety culture can improve health and safety in the workplace, which in turn affects organizational performance.

Implementation Strategy

The exploration phase was conducted to assess the feasibility and readiness of the organization to implement the program. Researchers used various approaches to obtain data, raise support and commitment from management to provide policy, and formation of committee structure. The implementation strategy used in this study has shown that organizational commitment has a very important role in increasing the involvement of its members in implementing the new program or innovation (Nahak and Ellitan, 2022). Interviews and field observations were used to conduct a gaps analysis, and a questionnaire was used to assess human resources in implementing the planned program. Competence people with adequate numbers, resources of funds and time, organizational structure, systems, and culture are some of the factors that support strategy implementation as planned or intended (Rani, 2019).

In the installation stage, an activity plan has been determined, which is the result of identification in the previous stage. At this stage, the involvement of various parties, such as the dean, laboratory head, general department, IT team, security guards, cleaning services, and other related personnel, is needed (Fixsen *et al*., 2021). The success of this stage is demonstrated by the readiness in the implementation plan for the program socialization such as schemes, schedules, and keynote speaker; preparation of a pocket e-book and a guidance e-book; selection of safety and health signs; and the making of a safety briefing video with the selection of materials and methods tailored to the needs of the research location. Previous research (Purnamawati *et al*., 2020) has shown that success in this stage can be seen through the availability of appropriate guides as training tools such as modules, booklets, and flipcharts, tailored to the needs and capabilities of the place where the intervention is to be carried out.

Initial implementation is the stage in which innovations or new programs that were proposed in the previous stage are implemented. One of the activities carried out at this stage is training to improve staff competency in supporting the new program that will be implemented. The training carried out in the initial implementation stage was conducted in previous research to improve the delivery of Comprehensive Medication Management (CMM) in primary care (Blanchard *et al*., 2017). Training is also performed in an effort to strengthen the capacity midwives' competency in the Prevention Mother To Child Transmission (PMTCT) (Purnamawati *et al*., 2020).

The efforts undertaken at this stage aimed to promote and raise awareness among the academic community about the importance of implementing occupational safety and health in the workplace. Periodic adaptation and training are needed so that the academic community can adapt to changes that will eventually shape the occupational safety and health culture to a better level. Occupational safety and health training has a significant relationship to the actions related to the prevention of Coronavirus disease (Covid-19) in a hospital in North Sulawesi Province (Waleleng, Doda and Manampiring, 2020). The installation of signs, as well as the safety and health socialization, have increased the awareness of students to implement safety and health in the Mechanical Engineering Education Study Program at Universitas Sebelas Maret Surakarta (Arief, Estriyanto and Saputro, 2020). Occupational safety and health signs also have a positive correlation to the occurrence of work accidents in construction projects in Jakarta and Makassar (Wirawan and Waty, 2020), while safety induction can increase the level of safety and health knowledge in the intervention group in a research conducted on meeting building users at a State University and a Private University in Semarang (Fath, 2020).

Several studies have shown that the safety and health policies have effectiveness in increasing employee performance, such as research on workers and staff of construction service companies at PT. Nur Aini Rahma Mandiri, Tuban Regency, which shows a correlation rate of 47% (Sugiyanto and Sulfiani, 2020). Application of the management system of safety and health in the workplace also showed a positive significant relationship between employee commitment and performance in IMANA

Steel Rwanda Ltd and SteelRwa Industries Ltd, with a significance value of 0.00, which is less than 0.05 (Umugwaneza, Nkechi and Mugabe, 2019).

Monitoring the sustainability process in this research could not be carried out because the implementation phase would take at least 2 to 4 years from the exploration stage (Blanchard *et al*., 2017). Various factors, both internal and external, related to safety and health in the workplace, such as stringent legal regulations, inadequate policies within the organization, lack of awareness, lack of management skills and knowledge, as well as lack of employee involvement and time constraints; are considered as barriers that can interfere the successful implementation of the program (Blanchard *et al*., 2017).

CONCLUSION

This study shows that the stages of the implementation strategy can assist the implementation of the occupational safety and health management system at the Public Health Faculty University of Muhammadiyah Jakarta, with the active involvement of various related parties. Safety and health training needs to be given regularly, especially to the committee and the entire academic community for the sustainability of the implementation of the program. This research is expected to be a consideration for policymakers to develop guidelines related to safety and health in the workplace that are specifically intended for the education or academic sector so that they are easily adopted and applied at all education levels.

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