ORIGINAL RESEARCH ARTICLE

Association of personal factors with increased risks of accidents in the workplace among health workers in nine Puskesmas in Kediri City, Indonesia

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Abstract

Public Health Center hereinafter referred to as the Puskesmas is a health service facility that organizes public health efforts and first-level individual health efforts by prioritizing promotive and preventive efforts in their work areas. If the results of the examination cannot be handled promotively and preventively, they will be referred to more complete health facilities such as hospitals. Standard action in Puskesmas is still high and often ignored, this is very dangerous if left unchecked it will have an impact on the safety and health of health workers, patients, and patients' families. The objective of this study is to analyze the correlation of personal factors with the unsafe actions of health workers in nine Puskesmas in Kediri City, Indonesia. The population for this study was health workers including nurses, midwives, laboratories, and cleaners, totaling 410. This study is analytical with a cross-sectional design, While statistical analysis consists of univariate, bivariate, and logistic regression. The results show a correlation between fatigue and unsafe actions of health workers Ignoring safety procedures, the knowledge of health workers, and unsafe actions of health workers Ignoring safety procedures, and not using personal protective equipment. There is a correlation between personal factors (knowledge, fatigue) and unsafe actions and strong correlation. The results of the analysis using logistic regression produced a significance value of 0.000, which means that there is an influence of the knowledge and fatigue variables on unsafe acts. It is recommended that a safety talk in the mornings on a regular basis would increase health vigilance at work. *(Afr J Reprod Health 2024; 28 [10s]: 184-190).*

Keywords: Unsafe action; health worker; Puskesmas

Résumé

Le Centre de santé publique, ci-après dénommé Puskesmas, est un établissement de services de santé qui organise des efforts de santé publique et des efforts de santé individuelle de premier niveau en donnant la priorité aux efforts de promotion et de prévention dans leurs zones de travail. Si les résultats de l'examen ne peuvent pas être traités de manière promotionnelle et préventive, ils seront orientés vers des établissements de santé plus complets tels que des hôpitaux. L'action standard à Puskesmas est encore importante et souvent ignorée. Cette situation est très dangereuse si rien n'est fait et aura un impact sur la sécurité et la santé des agents de santé, des patients et de leurs familles. L'objectif de cette étude est d'analyser la corrélation entre les facteurs personnels et les actions dangereuses des agents de santé dans neuf Puskesmas de la ville de Kediri, en Indonésie. La population de cette étude était composée d'agents de santé comprenant des infirmières, des sages-femmes, des laboratoires et des agents de nettoyage, totalisant 410 personnes. Cette étude est analytique avec une conception transversale, tandis que l'analyse statistique consiste en une régression univariée, bivariée et logistique. Les résultats montrent une corrélation entre la fatigue et les actions dangereuses des agents de santé ignorant les procédures de sécurité, les connaissances des agents de santé et les actions dangereuses des agents de santé ignorant les procédures de sécurité et ne utilisant pas d'équipement de protection individuelle. Il existe une corrélation entre les facteurs personnels (connaissances, fatigue) et les actions dangereuses, et une forte corrélation. Les résultats de l'analyse par régression logistique ont produit une valeur significative de 0,000, ce qui signifie qu'il existe une influence des variables de connaissance et de fatigue sur les actes dangereux. Il est recommandé qu'un entretien régulier sur la sécurité le matin accroisse la vigilance en matière de santé au travail. *(Afr J Reprod Health 2024; 28 [10s]: 184-190).*

Mots-clés: Action dangereuse ; agent de santé; Puskesmas

Introduction

Humans always face all sorts of risks that can occur in the workplace. Interactions with the working environment, tools, and other employees raise the risk of work accidents and illnesses. The results of the Occupational Injury and Disease Survey (2018) show that 95% of cases of accidents are due to work.

According to the International Labour Organization (ILO), more than 380,000 (13.7%) of the 2.78 million health workers die each year[1].

A workplace accident, as described by Frank Bird in Ramli[2], is an unwanted event that affects people or material damage caused by contact with a source of kinetic energy, electricity, chemistry, or heat, among others. During the accident process, the four components of production, namely people, equipment, materials, and the environment, interact with each other and produce a product or service. According to data collected by the International Labour Organization in 2018, the number of work accidents causing deaths in developing countries is four times higher than in industrialized countries[3]. The number of occupational accidents in Indonesia was 114,000 in 2019 and would reach 177,000 in 2020[4] There are many theories about work accidents, especially about what causes them. In 1931, Heinrich put forward the theory that every workplace accident is caused by five consecutive factors called "dominos". This theory known as the "domino theory" explains that habits are wrong[5]. Bird and Germain later developed the theory. According to Frank E. Bird in Suardi[6], unsafe actions and unsafe conditions are the leading causes of work accidents. Based on the above data, it is known that unsafe actions are the cause of 85% of accidents at work[7]. DuPont research found that 76% of work accidents are caused by unsafe acts, 22% are due to unsafe actions and unsafe conditions, and 4% are caught by unsafe conditions[8]. Research found worker health must be more protected to improve safety action. Unsafe action is an action taken by a worker that can increase the risk of an accident, an action that is not in accordance with the safety standards that have been determined in the workplace so that it can cause an accident. Health Workers ignore safety procedures such as not using personal protective equipment gloves[9].

Personal factors studied are related to the level of knowledge and exhaustion of health energy. Knowledge is the result of knowing and occurs after a person makes a sensation of a particular object. Sensing occurs through the human senses, the senses of vision, hearing, smell, taste, and flavor. Most of human knowledge is acquired through the eyes and ears[1011]. The researched knowledge relates to information known to the health worker regarding occupational safety and health, occupational accidents, hazards that may arise from work, the use of protection personal equipment, and operational standards of procedures or work instructions applied in the workplace.

Personal and work factors are the main causes of unsafe actions and unsafe conditions, according to Frank E. Bird's theory[12]. Research found that most employees perform unsafe actions with a percentage of 88.9%, and there is a correlation between personal factors and unsafe acts. Individual factors, also known as individual factors, are factors that originate from humans. Individuals have less knowledge, fewer skills, less motivation, and physical and mental problems[13].

Based on theory and some research, it is known that unsafe actions lead to many work accidents. Therefore, research is needed on the causes of unsafe actions, which are reviewed by individual factors, such as the level of knowledge and exhaustion of employees. In the process of implementing (Standard Operating Procedure Occupational Safety and Health) (SOP K3) in the scope of the public health center (Puskesmas) in the city itself, there is a threat to lower the action of the six steps of washing hands. Implementation of the threat of six steps of inappropriate hand washing can lead to accidents as well as work-related diseases. Officers can be infected either by patients, sesame worker health, or the contamination of non-sterile devices. Puskesmas or Community Health Center is a health service facility that organizes public health efforts and first-level individual health efforts, by prioritizing promotive and preventive efforts in its working area. If the results of the examination cannot be handled promotive and preventive, it will be referred to a more complete health facility such as a hospital[14].

As a healthcare institution, the public health center (Puskesmas) faces occupational safety and health risks for the workforce, patients, and their families, including physical, ergonomic, chemical, biological, psychosocial, and occupational accidents[1516]. The biological risk of disease transmission is the most dangerous to occupational health. Furthermore, the use of a variety of medical devices and conditions of equipment that do not meet safety standards increases the risk of accidents at work, from mild to fatal[12]. However, the use of safety-based behavior or security-based conduct can reduce such risks[18]. In Kediri, the highest incidence of Healthcare-Associated Infections (HAI) is

phlebitis, which reached 1.2 percent in 2021 and 1.6 percent in 2022. The purpose of this study is to analyze the substandard occupational safety of the medical staff (410 staff). Data from nine Puskesmas in Kediri City supports the PPI, which indicates that average safe-based behavior is still below the access threshold, which is 0.4% of Puskesmas ones. Based on the Loss Causation Model theory and some research results, it is known that work accidents are mostly caused by unsafe actions and therefore need to be investigated about the causes of unsafe acts, reviewed from personal factors that include the level of knowledge and work fatigue. The objective of this study was to determine the appropriate preventive measures to minimize unsafe actions and accidents at work among Puskemas in Indonesia.

Methods

The study was conducted with analytical research methods because it analyses the correlation between dependent and independent variables. This study was observational and formative because the collection of research data was carried out without giving treatment to the subjects being studied. Based on this, the study included cross-sectional research because it was done at a specific period of time.

The study was conducted among nine Public Health Centers (Puskesmas) in the same city. The study period covered May to July 2023. The study population consisted of 410 health workers in nine Puskesmas in the same city. In this study, samples were taken from the total health worker population of 410 in the nine Puskesmas in the same city The sample in this study was 410 health workers nurses, midwives, laboratories, registration, and cleaning services at the health center. The puskesmas has a large working area covering one sub-district and has an auxiliary puskesmas for wider reach. The variables in this study consisted of dependent and independent variables. The dependent variables were unsafe actions an action taken by a worker that can increase the risk of an accident, an action that is not in accordance with the safety standards that have been determined in the workplace, so that it can cause an accident. Health Workers ignore safety procedures such as not using personal protective equipment gloves. The independent variable in this research was personal factors that included the levels of knowledge and exhaustion of work. Primary data collection is obtained from observations and questionnaires. Observations were carried out directly related to unsafe actions, while a questionnaire was administered to respondents to obtain information related to the study. The questionnaire was administered to public health center (puskesmas) workers. Before filling out the questionnaire, puskesmas workers were gathered to be given an explanation of the questionnaire so that they understood. The determination of knowledge assessment is said to be good knowledge if the total score is 34-50, middle total score is 23-33, low total score is 10-22.

The data obtained were analyzed using univariate and bivariate analysis. Univariate analysis was used to present the data obtained in the form of a table to see the association using the logistic regression test

Ethical considerations

This research followed the ethical guidelines established by the Committee on Publication Ethics and was approved by the review board of the Ethics Committee of the Faculty of Health Technology and Management, Institut Ilmu Kesehatan Bhakti Wiyata Kediri (reference no. 17/FTMK/EP/V/2023). The participation of respondents was based on willingness to participate in this study and informed consent was obtained from all the participants.

Results

Based on Table 1 shows health worker majority had good knowledge of safe actions 214 (52,2%), middle 118 (44.9%), and low knowledge 12 (2.9%). The next personal factor was fatigue. The results indicate different conditions for each individual, but it all comes down to a loss of efficiency and a decrease in working capacity and endurance[1920]. The fatigue studied is the rate of fatigue. Health worker is associated with feelings and complaints of fatigue.

The results in Table 2 indicate that 54 (13.1%) health workers were less fatigued, while 44.9%, were fatigued, and the highest proportion (42.0%) were very fatigued. Based on the level of fatigue perceived by health workers, the majority were very fatigued.

Table 1: Distribution of knowledge-level health workers in nine Puskesmas

Knowledge level	Number (%)
Good	214 (52,2)
Middle	184 (44.9)
low	12 (2,9)

Table 2: Distribution of fatigue level health workers in nine Puskesmas

	Number (%)
Less fatigue	54 (13,1)
Fatigue	184 (44.9)
Very fatigue	172 (42,0)

Table 3: Distribution of unsafe action health workers in nine Puskesmas

Unsafe action	Number (%)
Safe action	141 (34.4)
Unsafe action	269 (65.6)

Table 3 shows the distribution of health workers by safe action, and shows that the majority of health workers (65.6%) practiced unsafe actions.
Table 4 provides information about the results of the logistic regression analysis of knowledge variables, level of fatigue, and unsafe acts. Based on the table, it can be seen that the knowledge and fatigue variables have a significance value of 0.00. This value is smaller than 0.05, so the conclusion obtained is that there is a significant influence of the knowledge and fatigue variables on unsafe acts.
The logistic regression model that can be formed based on Table 5 is

$$y = \frac{1}{1 + \exp^{-(1.048 - 1{,}317\ knowledge + 2.094\ fatigue)}}$$

In the logistic regression model for the knowledge variable, a coefficient of -1.317 was obtained. The negative value of this coefficient means that the higher the respondent's level of knowledge, the more likely the respondent will not commit unsafe acts. In the fatigue level variable, the coefficient is 2.904. Referring to this value, if the respondent experiences fatigue, they will have a greater chance of committing unsafe acts.

As an illustration of the implementation of the logistic regression model above, if there are respondents who have a low level of knowledge and experience a level of fatigue, then the probability of the respondent committing an unsafe act is 0.98 with the following calculation.

$$y = \frac{1}{1+\exp^{-(1.048 - 1{,}317\ (1) + 2.094\ (2))}} = 0.98.$$

Table 4: Logistic Regression between knowledge, fatigue to unsafe act

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	knowledge	-1.317	.230	32.766	1	.000	.268
	fatique	2.904	.359	65.606	1	.000	18.251
	Constant	-1.048	.517	4.107	1	.043	.351

Discussion

The statistics can be seen that the knowledge and fatigue variables have a significance value of 0.00. This value is smaller than 0.05, there is a significant influence of the knowledge and fatigue variables on unsafe acts.

Based on the results of the research, it is known that health workers with poor levels of knowledge of safe actions perform unsafe actions. The results of the study are in line with the theory that unsafe acts are attributable to the lack of knowledge by health workers about the dangers, rules, or safe working methods[21].

The results of this study indicate that 4.5% of health workers with good levels of knowledge also perform unsafe actions. This also supports the theory put forward by Ramli (2020)[21] that one of the causes of unsafe actions is the limited adherence of health workers to established procedures and protocols[21]. These factors relate to the behavior and concerns of the health workers for occupational safety and health[22].

Knowledge is covered in six levels of the cognitive domain: knowing, understanding, application, analysis, synthesis, and evaluation[23]. The results of this study, indicate that health workers have knowledge about safety and health at work, but they do not fully understand the benefits of the application of health and safety procedures at work. Therefore, to reduce unsafe actions on health workers, it is not enough for health workers to know the dangers associated with their work and the procedures to be carried out, they also need to understand the importance of the implementation of occupational health and security measures[23,24].

The efforts of the nine Puskesmas in the city itself to improve the knowledge of health workers are carried out through training and certification in health safety. Although health workers in nine Puskesmas have K3 certification, there is also a need for an improved understanding of occupational safety and health that informs the identification of health worker hazards. In particular, in K3, the impact of unsafe action, the benefits of using self-protection equipment, and the benefits of working safely should be emphasized. This can be done by doing a safety talk before starting work. Through safety talks, it is expected that health personnel can be more alert to the health and safety of the health workers and can minimize the existence of unsafe actions.

Correlation between fatigue and unsafe action

The results of this study indicate that health workers with moderate or less fatigue tend to perform unsafe actions with an average percentage of 27.3%. By contrast, health workers who feel more fatigued perform unsafe actions in the average category with a percentage of 36.4%.

The statistical test results showed a significant correlation between fatigue and unsafe actions with a significant correlation value (p) of 0.000, <0.05, which indicates that there is a correlation between fatigue and unsafe action. The results suggest that the more fatigued the body is, the higher the level of unsafe actions. It is in line with the theory of Suma 'Mur[25] which suggests a high feeling of fatigue can cause a person to be unable to work so that he stops working, just as physiological fatigue causes the worker to stop his activity. Fatigue is easily prevented or eliminated by stopping work or resting. If the workforce starts to feel tired and still has to work, then the exhaustion will increase, interfere with the smooth work, and will have negative consequences for the health personnel concerned[25].

The results of the study showed that the more tired health workers are more likely to undertake unsafe actions. This is in line with the Loss Causation Model theory[26], which states that unsafe action is caused by physical or physiological stress that includes pain, fatigue due to excessive workload or length, exhaustion due to lack of rest, and so on.

Fatigue is also affected by the conditions of the welding work environment, such as the hot work environment, noise, temperature, and so on. The fatigue that the health worker experiences is not just when doing the job, it occurs even before the health power does the job. Long-term fatigue can be one of the factors leading to unsafe action.

The results of the study are also in line with Cameron's theory[19] that work exhaustion is an individual response to psycho-social stress experienced by healthy energy over a certain period of time. Work fatigue decreases performance as well as motivation and is associated with a decrease in physical performance and work productivity. Fatigue can be reduced by managing working conditions and the work environment at the workplace. Working hours can be adjusted to minimize the occurrence of fatigue. In addition, it can also use rest time for physical exercise or stretching so that it can reduce fatigue[27-29].

Conclusion

Personal factors of the health worker that were studied included knowledge and fatigue. The majority of health worker users have good knowledge and feel less tired. Unsafe actions carried out by the health workers, among others, include not using self-protection equipment, in accordance with safety standards. There was a strong correlation between personal factors (knowledge, fatigue) and unsafe actions. It is recommended to have safety talks during the morning hours on a regular basis to increase health vigilance at work. Setting working hours to allow for rest times will reduce and prevent fatigue experienced by health workers

Contribution of authors

Ningsih Dewi Sumaningrum: conceptualizing and designing the research; writing the manuscript
Y. Denny Ardiyanto W: reviewed empirical studies and edited the manuscript
Ririh Yudhastuti: providing suggestions for improvement from the results of the review by the journal reviewer team

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