Factors Associated with Primary Healthcare Center Worker's Knowledge About Patient Safety: A Cross-Sectional Study in Buleleng, Bali

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Abstract: Patient safety improvement is primarily discussed around hospital settings. Since primary healthcare center is the gatekeeper to the health system in Indonesia, it has the premise of resolving community health problems. Little research was given attention on patient safety implementation at the primary care level. The study, therefore, aimed to determine factors related to health workers' knowledge about patient safety in primary healthcare centers of Bali province. This current study used a cross-sectional design. It was conducted from April to May 2021. The research population was all health workers who worked in 20 primary health centers of Buleleng regency, Bali. This study selected 699 respondents as samples that participated in the survey. The survey was a self-administered questionnaire consisting of closed questions. Multiple linear regression was then conducted to determine factors associated with health workers' knowledge level regarding patient safety. Based on the multiple linear regression test, education level and exposure to information contribute to understanding patient safety ($p < 0.01$). Primary healthcare workers in Bali have sufficient knowledge regarding patient safety. However, some aspects need improvement. Effective communication and understanding of dangerous medication remain major challenges in patient safety practices. Thus, the Buleleng District Health Office must provide socialization, training, and policy on patient safety standards.

1 INTRODUCTION

Patient safety is crucial for establishing health care quality. Although patient safety incidents are reported low, millions of patients worldwide are likely to suffer disabilities, injuries, or death every year due to unsafe medical care. Most health care takes place at the primary level. It is important for primary healthcare centers to provide the community with safe, sustainable and universally accessible care. Primary healthcare center has been envisioned to be an integral part of the health system and a cornerstone in communities' social and economic growth since the late seventies according to the Alma Ata Declaration (Alameddine et al., 2015). Primary healthcare centers are the first contact that the community can reach out. However, referral to higher health facilities such as hospital makes primary healthcare centers underestimated (Sheik et al., 2013). Some studies have found errors in primary healthcare centers related to their organization, notification of doctors, communication, and staffing (Sheikh, et al., 2013; Marchon & Junior, 2014). These problems can lead to negative consequences in patient services (Marchon & Junior,2014; Makeham et al., 2015; Singh et al., 2017)

Primary healthcare center is widely available in Indonesia. Maintaining patient safety is important

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according to the Regulation of the Indonesian Minister of Health Regulation No. 75 of 2014 concerning Primary Healthcare Center and No. 11 2017 concerning Patient Safety. Regulations about these topics are also addressed in accreditation standards for primary healthcare centers, doctor practice/clinics, and other first level health service facilities (Indonesian Ministry of Health, 2017). Patient safety in primary healthcare centers is not as managed as at hospitals. There were no modules or guidelines available. Comparing the number of health care providers, Indonesia had 2,925 hospitals and 10,205 primary healthcare centers in 2020 (Ministry of Health, 2021). That primary healthcare centers are more spread than hospitals suggests that patient safety must also be prioritized for primary care. Most primary healthcare workers did not understand the concept and definition of patient safety (Satrya, Susilowati, and Sunukanto, 2018). Primary healthcare center is the gateway to the health system; therefore, health workers need to have adequate knowledge about patient safety to minimize the incidence of adverse events. With proper management, primary healthcare centers can help secondary healthcare providers such as hospitals to solve various adverse events. Thus, this study aimed to measure and determine factors related to health workers' knowledge about patient safety.

2 METHODS

2.1 Study Design and Setting

This study used a cross-sectional design to identify factors related to health workers' knowledge about patient safety. This study was conducted from April to May 2021. Data were collected using a self-administered questionnaire consisting of closed questions. The questions had positive and negative statements. This study used a total sampling technique to select 699 samples from 20 primary healthcare centers in Buleleng regency (Department of Health, 2020). The eligibility criteria of the samples were active health workers who were registered in the Buleleng Regency Health Office and willing to participate in this study.

2.2 Study Variables

Twenty questions related to patient safety were listed in the questionnaire. Items on knowledge about patient safety were designed based on the guidelines from the Regulation of the Indonesian Minister of Health No.11 of 2017 (Indonesian Ministry of Health, 2017). The dependent variable of this study was knowledge about patient safety, while the independent variables were socio-demographic characteristics of the staff (age, gender, education level, and length of work), exposure to information about patient safety, participation in patient safety training, and the existence of supporting documents. The supporting documents reviewed were the decree letter of the quality and patient safety team, patient safety incident reporting procedures, incident reports, monitoring, evaluation schedule, and review papers. The primary healthcare centers were considered complete if they had at least 4 (four) records. Gender category was divided into male and female, and education category was grouped into high school, diploma, and bachelor/postgraduate. The last variable was the history of providing information and training that was grouped into ever and never. The questionnaire was confirmed valid and reliable based on the Pearson correlation statistical test (r count > r table or *in-cor* > 0.3) and Cronbach alpha (>0.6). Statement numbers 3, 10, 13, 19, and 20 were negative statements. Answers were scored one if they were correct and 0 if it was wrong. Due to the pandemic COVID 19, data collection was strictly carried out according to health protocols.

2.3 Statistical Analysis

All data were then edited and cleaned for analysis. Descriptive statistics were used to obtain variable distributions (i.e., frequencies, percentages, means, and standard deviations). In addition, bivariate linear regression test was employed to determine associations between independent and dependent variables; candidate variables were nominated with p-values of < 0.25. A multiple linear regression test was performed to determine which independent variables were associated with the dependent variable. Results would be considered significant if p-values were < 0.05. All data analyses were conducted using Stata 14.0.

2.4 Ethical Approval

This study was granted an ethical approval from the Ethics Commission, Faculty of Medicine, Udayana University under the Ethics License Number: 2021.01.1.0381. All respondents' data were anonymous to maintain confidentiality. All respondents gave their consent to participate prior to the survey.

3 RESULTS

Table 1 shows the participants' socio-demographic characteristics. The median age group is almost of 41 years. Most respondents were female (72.8%), had a diploma degree, and had worked for more than 14 years. Nearly all respondents claimed to have received information about patient safety, mostly from the mass media. Most of the respondents (83.3%) never attended training on patient safety, and they (86%) mostly had complete supporting documents at primary healthcare centers.

Table 1: Respondents' socio-demographic characteristics.

Socio-demographic Characteristics	Frequency (N)	Proportion (%)
Age (Median ±IQR)	(41±18)	
Gender		
Male	190	27.2
Female	509	72.8
Latest Education		
≤ High School	87	12.4
Diploma	435	62.2
University	177	25.4
Working Period (Median ±IQR)		
Having heard information about patient safety		
Ever	33	4.7
Never	666	95.3
Patient safety training		
Never	583	83.3
Ever	117	16.7
Availability of supporting documents		
Not complete	98	14
Complete	601	86

The minimal score in level of knowledge about patient safety is 3 (three), and the maximal score is 20. With normally distributed data about knowledge, the median and interquartile range (Median ±IQR) is 17 ±3. Table 2 gives the details of the respondents' answers on patient safety. Many respondents lack knowledge about effective communication and types of dangerous drugs.

Table 2: Statement items regarding patient safety knowledge.

No	Statements	Answer (%)	
		True	False
1	Patient safety is a system that makes patient care safer.	687 (98.3)	12 (1.7)
2	Patient safety is an important thing to do and an obligation to the health service	691 (98.9)	8 (1.1)
3	A patient safety incident is any intentional event and condition that results in or potentially results in a preventable injury to the patient.	438 (62.7)	261 (37.3)
4	An unexpected event is an event that causes injury to the patient due	595 (85.1)	104 (14.9)
5	Patients are identified using at least two identities: the patient's name and date of birth.	542 (77.5)	157 (22.5)
6	Identification of the patient is made before the administration of drugs, blood, or blood products.	603 (86.3)	96 (13.7)
7	In the clinical examination, the patient is identified before treatment and action.	675 (96.6)	24 (3.4)
8	The purpose of patient identification is to prevent errors in drug administration and action.	681 (97.4)	18 (2.6)
9	Effective communication is carried out between health workers.	497 (71.1)	202 (28.9)
10	Effective communication that is timely, accurate, clear, and easily understood by the recipient will add to the action error.	244 (34.9)	455 (65.1)
11	Drugs that include the drug NORUM (the name and similar appearance) should be re-spelled by the officer.	649 (92.8)	50 (7.2)
12	Effective communication can improve patient safety.	677 (96.9)	22 (3.1)
13	Predatory drugs are at low risk of causing unwanted impacts.	252 (36.1)	447 (63.9)
14	Predatory drugs are drugs that look similar or similar to speech.	646 (92.4)	53 (7.6)
15	Electrolyte concentrates are not in the patient's care unit unless clinically needed and taken action.	417 (59.7)	282 (40.3)
16	Electrolyte concentrate stored in the patient's care unit should be clearly labeled and stored in a tightly restricted area.	589 (84.3)	110 (15.7)
17	To reduce the risk of infection, wash your hands for five moments.	628 (89.8)	71 (10.2)
18	Excellent and proper handwashing is done with six steps of handwashing.	669 (95.7)	30 (4.3)
19	The use of gloves leads to the absence of the need to wash hands first.	130 (18.6)	569 (81.4)
20	Hand washing is not one of the measures to reduce the risk of infection.	145 (20.7)	554 (79.3)

Table 3 shows the results from multivariate analysis of the multiple linear regression test; factors associated with the respondents' knowledge about patient safety are gender, education, exposure to information about patient safety, and the availability of supporting documents ($p < 0.05$). Male respondents have better knowledge of patient safety than female respondents (31%). Education level and exposure to information contribute to the understanding of patient safety.

Table 3: Relationship between respondents' demographic characteristics and knowledge level.

Variable	Bivariate Analysis				Multivariate Analysis			
	95% CI			P - values	95% CI			P -values
	B	Lower	Upper		B	Lower	Upper	
Age	-0.01	-0.03	0.01	0.125	0.01	-0.04	0.05	0.822
Gender								
Male	Reff	.	.	.	.	.	.	.
Female	0.69	0.28	1.10	0.001*	0.24	-0.19	0.68	0.279
Latest Education								
≤High School	Reff							
Diploma	1.73	1.18	2.29	0.000*	1.23	0.65	1.83	0.000*
University	1.97	1.34	2.59	0.000*	1.49	0.87	2.11	0.000*
Working Period	-0.01	-0.03	0.01	0.162	-0.01	-0.05	0.04	0.733
Having heard information about patient safety								
Never	Reff	.		.	.	.	.	.
Ever	2.84	2.00	3.69	0.000*	2.13	1.27	2.98	0.000*
Training history								
Ever	0.06	-0.44	0.55	0.815				
Never	Reff	.	.	.				
Availability of supporting documents								
Complete	1.22	0.69	1.74	0.000*	0.99	0.48	1.50	0.000*
Not Complete	Reff	.	.	.				

4 DISCUSSION

Patient safety remains a challenge in primary healthcare centers in many developing countries. Patient safety is a program that aims to improve the service process to avoid unwanted events through a comprehensive service plan (Ministry of Health, 2017). Therefore, healthcare workers in primary healthcare centers must have background knowledge about patient safety. Since primary healthcare centers are considered the front line of public health, having sufficient knowledge may help health workers prevent adverse events that may disadvantage patients (Gobashi et.al 2014).

This study found that most participants had good knowledge about patient safety. However, some aspects need improvement to minimize preventable errors in health services. Effective communication among healthcare workers remains an issue. Factors that contributed most to adverse events were failures in communication and management either in professionals or between professionals and patients (Marchon & Junior, 2014). Effective communication between health workers needs to improve because communication errors may lead to poor patient safety. This finding aligns with a study by Daker-White et al., suggesting that significant safety concerns are failures to communicate or transfer medical information between health workers. Communication is fundamental to safety (Daker-White et. al,2015).

Communication errors may act as a contributing factor to incidents. This is in line with the Joint Commission International argument that communication between staff could improve the quality of services and the incidence of unexpected events by informing important information related to patients' condition to the right person on time (Joint Commission International, 2014). Effective, timely, accurate, clear, and easy-to-understand communication will reduce errors in action. Generally, openness to communication is a struggle in most developing countries, leading to a punitive and blaming culture in cases of error or near-miss reporting. As a result, communication sometimes becomes a significant obstacle to improving the quality and safety of care at primary healthcare centers (Marchon & Junior, 2014; Lawalati et al., 2014). This study also found that health workers' knowledge about high-risk drugs remained low. Meanwhile, the most common errors in primary care involved medication errors and diagnostic errors (Makeham et .al,2015). Sufficient knowledge about high-risk drugs is essential for community health workers to minimize the unwanted effects of medications. High-risk drugs must be analyzed carefully to avoid mistakes. According to Aprilia (2011), the administration of drugs to patients requires good knowledge and responsibility to ensure appropriate prescription. Medication errors can result in severe patient injuries or deaths, yet preventable. Prescription errors that occur in primary healthcare centers is one form of medication errors. Prescriptions errors may include wrong medication, drug-drug interactions, and inaccurate written prescription orders (Smith et al., 2017). Errors in medication management in primary healthcare centers are significant threats to patient safety.

Based on multivariate analysis, this study found that education level and exposure to information contribute to understanding patient safety. According to Pratiwi (2019), education level proportionally aligns with knowledge or ability to absorb information. Education level, therefore, can be a criterion for future health workers to serve patients better (Pratiwi,2019). Previous study also explained that good knowledge could lead to skill development, especially competencies in patient safety. Receiving information increases knowledge (Rahmaningrum, 2017), which is not merely obtained from formal education but also non-formal education such as seminars or training and mass media such as the internet and books (Arini et al., 2014). Goslin (2013) argues that one can seek knowledge, skills, values, and norms to implement at their workplace. Therefore, it is necessary to increase staff's knowledge related to information and policy support on patient safety. Similar arguments explained by Al-Khaldi (2013) explain that health workers who did not participate in any training on patient safety had less knowledge about "medical errors" and its causes. Continuous professional development programs are required to provide health workers with information about common medical errors and patient safety (Al-Khadi, 2013).

4.1 Limitations

This current study posed some limitations. First, the use of a cross-sectional design may lead to differences between factors that influence patient safety in other countries. Also, questions to a binary right-wrong create a potential response bias from the participants. Nevertheless, research findings may inform and assist primary healthcare centers and health stakeholders to formulate interventions on improving patient safety. Continuous education for

the health workers in Puskesmas on patient safety is required.

5 CONCLUSION

Generally, primary healthcare centers in Buleleng, Bali have health workers who had sufficient knowledge regarding patient safety. The level of education is predominantly associated with their knowledge about patient safety. However, effective communication and understanding of dangerous medication are two aspects that warrant analysis to find a better intervention. Providing information and sustainable training to all staff, not just medical staff, will increase staff knowledge about patient safety.

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