Patient safety incident reporting behavior and its associated factors among healthcare professionals in Hadiya zone, Ethiopia: A facility based cross-sectional study

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What is already known about the topic
■ There are numerous reasons contributing to underreporting, including inconvenient reporting systems, inconsistent reporting standards, poor safety culture among institutions, fear of punishing actions, and inadequate systematic analysis of reports and feedback
What this paper adds
■ The incident-reporting behavior of healthcare professionals was low in the study area.
■ There is variation in incident reporting behaviour among healthcare professionals.
■ Healthcare professionals' perception of the time that reporting a patient safety incident takes can affect their behavior in incident reporting.

ABSTRACT

Background: Incidents affecting patient safety can cause unnecessary injury to a patient. It is generally accepted that incident reporting can improve patient safety. In Ethiopian public hospitals, especially in the Hadiya zone, patient safety-related incidents are commonly witnessed, but there is no evidence of reporting behavior among healthcare professionals.

Purpose: This study aimed to assess patient safety incident reporting behavior and its associated factors among healthcare professionals working in public hospitals in the Hadiya zone, South Nation's, Nationalities, and Peoples' Region, Ethiopia, in 2021.

Method: A cross-sectional study design was employed, among 345 healthcare professionals working in public hospitals in the Hadiya zone from August 1–30, 2021. A simple random sampling technique was used to select study participants, and a structured self-administered questionnaire which is adapted from a Hospital survey on patient safety survey and literature was used to collect the data. The data were entered into a data attraction template prepared using the Epi data software and then exported to the SPSS version 25 software for analysis. Descriptive analyses were conducted to determine the general characteristics and distributions of the data collected. An inferential statistical analysis was conducted using the logistic regression model to identify associations between outcome and predictor variables. The odds ratio with the 95 % confidence interval was used to test the associations between the outcome variable and predictor variables. Finally, statistical significance was set at p-value < 0.05.

Results: From the total of 354 healthcare professionals expected, 334 participants, which gave a response rate of 94.4 %, had completed and returned the questionnaire. The result shows that overall patient safety incident reporting behavior among healthcare professionals was 28.7 % (95 % Confidence Interval (CI): (24.6, 33.2). Being a nurse professional [Adjusted Odd Ratio (AOR): 5.48, 95 % CI: (1.67, 17.80)], having job training [AOR: 2.87, 95 % CI: (1.46, 6.28)], having a team within the units [AOR=2.79, 95 %CI: (1.23, 6.28)], communication openness [AOR=2.78, 95 %CI: (1.44, 5.37)], and management support [AOR=2.8, 95 %CI; (1.40, 5.60)] were found to factor significantly associated with patient safety incident reporting behaviour.

Conclusion: This study revealed that the incident-reporting behavior among healthcare professionals was low compared to previous studies. Being a nurse professional, having an on-job training, having a team within the unit, communication openness, perception of the time reporting takes, fear of administration sanction and management support were factors associated

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with their patient safety incident reporting behavior. Managers should focus on patient safety incidents, prepare continuous training programs, and provide open communication to improve patient safety incident reporting.

Introduction

A patient safety incident (PSI) is any unplanned event that could have resulted in harm to a patient, including a spectrum of events from near misses to patient safety incidents causing severe harm or death. It is an unintended event or hazardous condition resulting from the process of care rather than due to underlying disease, which leads to unintended health consequences (World Health Organization (WHO), 2014). Patient safety incidents are categorized as harmful, non-harmful, and near-miss incidents. A harmful incident is a patient safety incident that results in harm to a patient, including harm resulting when a patient does not receive his/her planned or expected treatment, whereas a non-harm incident occurs when a patient safety incident occurs but does not harm the patient. A near-miss incident is a patient safety incident that does not cause harm but has the potential to do so (World Health Organization (WHO), 2020). Patient safety-related issues such as medication safety are a major concern in developing countries as well as developed countries; it is associated with treatment outcomes, increased morbidity and mortality, an increase in the cost of illness, an increase in the length of hospital stay, increase the admission to the emergency department as well as visiting the healthcare facilities; decrease the quality of life among patients and public, decrease the satisfaction toward the healthcare services and systems, increase the health expenditure (Al-Worafi, 2023). Globally, the provision of health services is facing an increasing challenge in terms of enhancing and guaranteeing patient safety. Unsafe care results in over 3 million global deaths each year and exerts a similar global health burden to HIV/AIDS or road accidents (Lachman et al., 2022).

There is a rising concern that approximately 400,000 patients will suffer from preventable harm that contributes to death each year (James, 2013). Medical errors have been highlighted as major contributing factors to patient safety incidents and patient morbidity and mortality in the United States and the United Kingdom (Sommella et al., 2014). This high magnitude of patient safety incidents has attracted significant attention from the public, medical providers, and healthcare payers (Bauman and Hyzy, 2020; Wassenaar et al., 2014). In the United States of America, data show that 210,000 to 440,000 patients who go to hospitals for healthcare services suffer some type of preventable harm that contributes to their deaths annually. This would cause patient safety to be the third leading cause of death in America, behind heart disease, which is the first, and cancer, which is the second (Makary and Daniel, 2016).

European data from the WHO consistently show that patient safety incidents occur in 8 % to 12 % of hospitalizations. Reducing the rate of adverse events in the European Union alone would lead to the prevention of more than 750,000 harm-inflicting patient incidents per year, leading to over 3.2 million fewer days of hospitalization, 260,000 fewer incidents of permanent disability, and 95,000 fewer deaths per year (Liukka et al., 2020).

Hospitals in low- and middle-income countries account for nearly two-thirds of the global burden of adverse events resulting from unsafe care each year, with 134 million adverse events and 2.6 million deaths (World Health Organization (WHO), 2019). In developing countries, numerous reasons contribute to underreporting, including inconvenient reporting systems, inconsistent reporting standards, poor safety culture among institutions, fear of punishing actions, and inadequate systematic analysis of reports and feedback (World Health Organization (WHO), 2011).

In Ethiopian public hospitals, there is a severe lack of a patient safety culture. Generally, in Ethiopia, the Ministry of Health has intended strategies, procedures, and processes for patient care quality, including an incident-reporting system. According to Ethiopian hospital reform implementation guidelines, an incident manager should be assigned to each hospital to receive and investigate all incident reports. However, healthcare providers' incident reporting behaviour remains low (Hospital and Initiative, 2017).

Incident reporting is widely recognized as a way to improve patient safety. Healthcare facilities have a high risk of morbidity and mortality; thus, it is considered a highly hazardous industry and needs assessment of safety culture (Wami et al., 2016). Patient safety culture is an important aspect of quality healthcare delivery and an issue of global concern (Wright et al., 2016). All reporting and learning systems, whether large- or small-scale, must first create a positive culture in which reports are encouraged and valued and staff are praised for participating. Leadership commitment, policies, and practical steps should be implemented to foster a supportive, positive environment (World Health Organization (WHO), 2021).

Incident reporting systems (IRS) in patient safety are methods of reporting near misses and adverse events to communicate safety-related information and allow clinicians to learn about and from patient safety incidents (Pham et al., 2013). Such systems ensure a response from organizations and healthcare workers accountable for maintaining safety, responding to the public's right to know, and providing incentives to healthcare organizations to implement internal safety systems that reduce the likelihood of such events occurring (Wassenaar et al., 2014).

Incident reporting in healthcare refers to collecting healthcare incident data with the goal of improving patient safety and care quality. Done well, it identifies safety hazards and guides the development of interventions to mitigate risks, thereby reducing harm. As healthcare organizations strive to improve consistently, there is a growing understanding of the need to create a culture of safety, which is an essential element of high-quality healthcare (Mannion and Davies, 2018). The main reason for reporting incidents to improve patient safety is the belief that safety can be improved by learning from incidents and near-misses rather than fantasizing that they have not happened (Tewari and Sinha, 2013). The researchers were able to investigate the differences between actions that resulted in success and those that resulted in failure due to their focus on dangerous incidents and came to some conclusions about how people should be encouraged to act, especially by changing their working environments to produce more suitable results (World

Health Organization (WHO), 2021).

Different factors such as communication openness and management support contribute to the incident reporting behavior of health care professionals. Communication is a key safety and quality issue critical to safe patient care. Open communication is fundamental to encouraging healthcare teams to work together to handle issues. Communication openness is when staff speak up freely if they see something that may affect a patient negatively and feel free to question those with more authority. Studies indicate that communication openness is positively associated with patient safety incident reporting which is in turn positively related to team cohesion (Aldawood et al., 2020; Yu et al., 2022). Effective communication helps remove barriers to reporting near misses and errors and encourages open communication about how to prevent future harm (Fadling, 2017). Specifically, open communication between leadership and staff at the unit level is vital in promoting safe hospital culture (AHRQ, 2018). Hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority. Managers play a crucial role in maintaining compliance with workplace health and safety regulations and standards (Parand et al., 2014). It is the responsibility of management to set the tone for a safety culture and ensure that all employees understand and follow safety protocols. A well-designed incident management system will assist the healthcare professionals to identify, report, manage and learn from incidents (World Health Organization (WHO), 2021).

Healthcare professionals are expected to grow in their incident-reporting practices, to learn from past errors and to enhance patient safety and healthcare quality. Although there are some studies addressing incident reporting behaviors of healthcare providers in Ethiopia, the information is very scarce in Southern Nations, Nationalities and Peoples' Region of Ethiopia, particularly in public hospitals in the Hadiya zone, Ethiopia. Therefore, this study aimed to assess patient safety incident reporting behavior and its associated factors among healthcare professionals working in public hospitals in the Hadiya zone, Ethiopia.

Methods

Participants and the settings

This study was conducted on healthcare professionals working at four public hospitals in the Hadiya zone. Hadiya zone is located in the Southern Nations, Nationalities, and Peoples' Region, Ethiopia; which is 233 km from Addis Ababa, the capital city of Ethiopia. Currently, there are four public hospitals in the Hadiya zone: Nigst Eleni Muhammed Referral Hospital, Shone Primary Hospital, Homoch Primary Hospital, and Gimbichu Primary Hospital. Totally 808 healthcare professionals are working at these public hospitals during the study period. The study was conducted from August 01 to 30, 2021, and an institution-based cross-sectional study design was employed.

The healthcare professionals working in the public hospitals in the Hadiya zone were the source population, and the study population were randomly selected from these healthcare professionals. The study population was the healthcare professionals including nurses, midwives, and physicians who had direct involvement in patient care at those public hospitals in the Hadiya zone during the data collection period. Furthermore, healthcare professionals with less than 6 months of work experience were excluded from the study.

Sample size and sampling techniques

The sample size for this study was determined by the double population proportion formula. It was calculated using EpiInfo 7.0 StatCalc program by taking assumptions of 95 % confidence interval, 80 % power, 5 % margin of error, and a ratio of exposed to unexposed 1:1 from previous research conducted (Table 1).

According to the result in the table above, using the factor on-job training yields higher than the others. Therefore, 534 participants were included in the initial sample size. As the total number of healthcare professionals working in Hadiya zone public hospitals is less than 10,000, the correction formula was used as follows: $nf = n/(1 + n/N)$. Where nf is the final sample size, n is the initial sample size, which is 534, and N is the total number of HCP working at a public hospital in the Hadiya zone. nf = 534/ (1 + 534/808) = 322. Furthermore, a 10 % non-response rate was added and a final sample size, of 354 healthcare professionals was considered for the study.

Final sample size was proportionally distributed to each hospital based on the total number of healthcare professionals at each of the identified hospitals in the Hadiya zone. A simple random sampling technique, which is a computer-generated random number, was used to select 354 healthcare professionals in each hospital. A list of healthcare professionals obtained from each hospital's human resources was used inserted into a computer using the Excel worksheet and the computer-generated sample selection.

Variables of the study: Patient safety incident reporting behavior was the outcome variable while the independent factors include Socio-demographic factors, patient safety culture dimensions, and organization-related factors.

Table 1
Sample size determination for associated factors of the study among healthcare professionals in Hadiya Zone, Ethiopia.

Associated factor	%Exposed with outcome	%unexposed with the outcome	Odd ratio	Sample size	Reference
Training	35	23.6	1.75	534	(Y Eshete et al., 2021)
Fear of administrative sanction	9.9	30.3	0.25	138	(Y Eshete et al., 2021)
Fear of legal penalties	7.3	30.4	0.18	106	(Y Eshete et al., 2021)
Feed back	17.4	34.9	0.39	218	(Eshetu hailesslasie, 2017)

Data collection tool and ethical consideration

The Agency for Healthcare Research and Quality's (AHRQ) Hospital Survey on Patient Safety Culture (HSOPSC) standard questionnaire was adapted and used for this study (AHRQ, 2018). These patient safety culture standard questions contain a total of 42 questions which are composed of 18 items related to work area/unit, 4 items related to supervisors, 6 items related to communication, 3 items related to reporting of patient safety events and 11 items related to the hospital were used. These items contain a five-point Likert scale which was coded as (James, 2013) strongly agree/always, (Lachman et al., 2022) agree/most of the time, (Al-Worafi, 2023) neither agree/nor disagree/sometimes, (World Health Organization (WHO), 2020) disagree/rarely, and (World Health Organization (WHO), 2014) strongly disagree/never. In addition, 8 questions related to the socio-demographic variables, addressed the gender, age, educational status, and experiences in the current hospital, current work unit, current specialty and the primary work area of the respondents. Furthermore, 13 questions (4 questions related to the organization (hospitals), 9 questions related to the individual healthcare professionals) and one question related to training and updating of the respondents were developed by reviewing literatures and used in this study. The 4 questions related to the organization addressed the presence of clear definition of the incidence reporting, awareness of the responsible body for incidence reporting, presence of hospital system enforcing to report incidents and presence of incident reporting system in the hospitals. The 9 questions related to individual healthcare professionals addressed respondent's fear of administration sanction, malpractice litigation, own competence, media, revenge from patients or their families, loss of colleague's respect, and awareness of where to get incident reporting format and what to do with the completed incident reporting form. The questionnaire was prepared in English and data was collected using a self-administered method and controlled by a data collection facilitator during data collection.

The following measures were taken to ensure data quality. Before its application, the questionnaire was pretested on 5 % of the sample size ($n = 17$) in Worabe Comprehensive Specialized Hospital to assess its clarity, sequence, consistency, understandability and for total time it takes before the actual data collection. The result of reliability tests showed that Cronbach''s alpha for was 0.88 on pretest. The facilitators and researchers distributed a paper-based questionnaire to healthcare professionals at each hospital. Respondents were kindly informed to complete at their convenience and place and return the questionnaires to the person who handed them.

Regarding the ethical consideration, the Institutional Review Committee (IRC) of the Ambo University College of Medicine and Health Sciences offered ethical clearance and support letters under the reference number PGC/07/2021. An official letter was

Table 2
Socio-demographic characteristics of healthcare professionals in Hadiya Zone, Ethiopia ($n = 334$).

Variables	Category	Frequency (n)	Percentage (%)
Sex of study participants	Male	154	46.1
	Female	180	53.9
Age of study participants in years	20–24	24	7.2
	25–29	156	46.7
	30–34	98	29.3
	35–39	40	12
	>40	16	4.8
Educational status	Diploma	54	16.2
	BSc degree	208	62.3
	Master	20	6
	Doctor	52	15.6
Profession	Nurse	205	61.4
	Midwife	70	21
	Doctor and specialist	59	17.7
Experience in current Hospital in years	<1	59	17.7
	1–5	173	51.5
	6–10	78	23.4
	>10	24	7.2
Experience in current unit/ward in year	<1	145	43.4
	1–5	154	46.1
	>6	35	10.5
Experience in current specialty in years	<1	55	16.5
	1–5	183	54.8
	6–10	76	22.8
	>10	20	6
Primary work area	Medical	50	15
	Surgical	43	12.9
	Pediatrics	47	14.1
	GYNE/OBS	38	11.4
	OR	24	7.2
	ICU	20	6
	Emergency	44	13.2
	OPD	49	14.7
	MCH	19	5.7

Notes: BSc: Bachelor of Science; GYNE/OBS: Gynaecology and Obstetrics; OR: Operation Room ICU: Intensive Care Unit; OPD: Outpatient Department; MCH: Maternal and Child Health.

submitted to the Hadiya zone public hospitals. Furthermore, permission was obtained from all the respondents.

Statistical analysis

The collected data were checked for completeness, coded, cleaned, explored and entered into Epi Info version 7 and exported to SPSS Version 25 for analysis. Descriptive analysis was conducted to describe participants' socio-demographic, profession, staff position and background information characteristics. The data related to the Patient Safety Culture (work unit, supervisor, communication, reporting of patient safety and hospital) were analysed by calculating the positive responses related to each item. With this, the average of the positive response to each composite variable was determined. Responses of agree/strongly agree and always/ most of the time to the positively worded items and strongly disagree/disagree and never/rarely to the negatively worded items were considered positive responses. The patient safety culture composites were determined by the average of the positive responses of the respondents to the items attributed to the composites. Average and above score positive responses are labelled 'yes' while less than average scores were considered as 'no'.

The statistical association between the patient safety incident reporting behavior and the independent factors were determined by the multiple logistic regression models. Bivariate analysis was conducted to identify the candidate variables for the multiple logistic regression models. The variables with p-values less than 0.25 in the bivariate analysis were included in the multiple logistic regression analysis. No multicollinearity of the independent variables was detected, with a standard error of <1. Model fitness was checked by calculating Hosmer-Lemeshow which was 0.42 (insignificant) and omnibus which was zero (0.00 significant). Crude Odds Ratio (COR) and Adjusted Odds Ratio (AOR), along with a 95 % confidence interval (CI), at a p-value less than 0.05, in the multiple logistic regressions, were considered statistically significant.

Results

Socio-Demographic characteristics of participants

In this study, with a response rate of 94.4 %, more than half of the respondents, 180 (53.9 %) were female healthcare professionals. The ages of the respondents ranged from 21 to 46 years, with a median of 29 years (interquartile range =6). Most of the respondents, 208 (62.3 %) had BSc degrees. Subsequently, of the respondents, 205 (61.4 %) were nurses (Table 2).

Patient safety culture dimensions

The results related to the Hospital Survey on Patient Safety Culture were grouped according to the safety culture composites they are intended to measure and presented. Among all patient safety culture dimensions, the highest positive response rate was observed with supervisor support patient safety 240 (71.9 %), a team within units 231 (69.2 %), and a team across units 220 (65.5 %), whereas the lowest positive response rate was observed with hospital management support 162 (48.5 %) and feedback to error 147 (44 %) (Table 3).

Table 3
Patient safety culture dimensions among healthcare professionals in Hadiya Zone, Ethiopia ($n = 334$).

S.no	Patient safety dimensions		Frequency (n)	Percentage (%)
1	The team across the units	Yes	220	65.5
		No	114	34.1
2	The team within the unit	Yes	231	69.2
		No	103	30.8
3	Hospital management support	Yes	162	48.5
		No	172	52.5
4	Staffing	Yes	193	57.8
		No	141	42.2
5	Supervisor expectation	Yes	240	71.9
		No	94	28.1
6	Organization learning	Yes	173	51.8
		No	161	48.2
7	Hand-off transition	Yes	210	62.9
		No	124	37.1
8	Communication openness	Yes	165	49.4
		No	169	50.6
9	Non-punitive response to errors	Yes	191	57.2
		No	143	42.8
10	Feedback to errors	Yes	147	44
		No	187	56
11	Overall perception of incident reporting	Yes	116	47.9
		Yes	174	52.1

Organization and individual-related factors among healthcare professionals

Out of all respondents, 214 (64.1 %) responded that there was an incident reporting system in their hospitals. The majority of respondents, 216(64.7 %) are unsure of their responsibility for incident reporting. More than one-third of the respondents, 145(43.4 %) do not know where to get, how to access an incident form, or what to do with it once completed. Nearly half of the respondents 157 (47 %) had a fear of administration sanctions, and almost one-third of the respondents, 177 (33.5 %) had a fear of malpractice litigation to report patient safety incidents (Table 4).

Incident reporting behavior

The overall patient safety incident reporting behavior among healthcare providers was 28.7 % (95 % CI: 24.6, 33.2) (Fig. 1).

Factors associated with incident reporting behavior

All variables with p-values less than 0.25 in bivariable analysis, were transferred to multinomial logistic regression analysis. Each dimension was tested for its association with incident reporting behavior. From this dimension, team within the units, communication openness, hospital management support, and feedback to error were significantly associated with incident reporting behavior in the healthcare profession. Nurses were 5.48 times more likely to report than medical doctors and specialists (AOR=5.46, 95 % CI, 1.67–17.8). Those respondents who received training were 2.87 times more likely to report incidents than those who did not receive the training (AOR=2.8795 % CI: 1.46–6.28). Those respondents who said there is a team within the units were 2.79 times more likely to report incidents than their counterpart (AOR =2.79, 95 %CI, 1.23–6.28). Those respondents who agreed to the presence of communication openness were 2.78 times more likely to report incidents than those who did not have communication openness (AOR=2.78, 95 % CI, 1.44–5.37). Respondents who said there was feedback on errors were 2 times more likely to report incidents than their counterparts (AOR=2, 95 % CI,1.05–4.01) and respondents who said there was management support were 2.8 times more likely to report incidents than those who said no (AOR=2.8,95 % CI,1.4–5.6) (Table 5).

Discussion

In this study, the overall prevalence of incident reporting behavior was 28.7 % (CI: 24.60, 33.20). This finding was congruent with those previous studies in Addis Ababa public hospital which revealed an incidence reporting behaviour of 30.4 %, Amhara region referral hospitals, 31.9 %, and Gondar Comprehensive Specialized Hospital 25.4 % (Y Eshete et al., 2021; Eshetu hailesslasie, 2017; Agegnehu et al., 2019). This similarity may indicate the general characteristics of patient safety report behaviors in the country and may be attributed to the fact that similar guidelines are utilized. However, the result was higher than the result of a study conducted in

Table 4
Healthcare professionals' perception and awareness of organizational and individual factors related to patient safety incident reporting at Hadiya Zone, Ethiopia ($n = 334$).

| Items	Category	Frequency	Percent (%)
Lack of clear definition of incident reporting	yes	80	24
	no	254	76
Am not sure whose responsibility is incident reporting	Yes	118	35.3
	No	216	64.7
Takes time to complete the form	Yes	74	22.8
	No	260	77.2
The hospital system does not enforce report	Yes	54	16.2
	No	280	83.8
Fear of administrative sanction	Yes	157	47
	No	177	53
Fear of malpractice litigation	Yes	112	33.5
	No	222	66.5
Fear of own competence	Yes	113	33.8
	No	221	66.2
Fear of media	Yes	134	40.1
	No	200	59.9
Fear of revenge of patient or their family	Yes	100	29.9
	No	234	70.1
Fear of loss of colleagues respect	Yes	28	8.4
	No	306	91.6
Presence of incident reporting system in your hospital	Yes	214	64.1
	No	120	35.9
Do you know where or how to get the incident reporting form	Yes	189	56.6
	No	145	43.4
Do you know what to do with the complete incident report form	Yes	194	58.1
	No	140	41.9
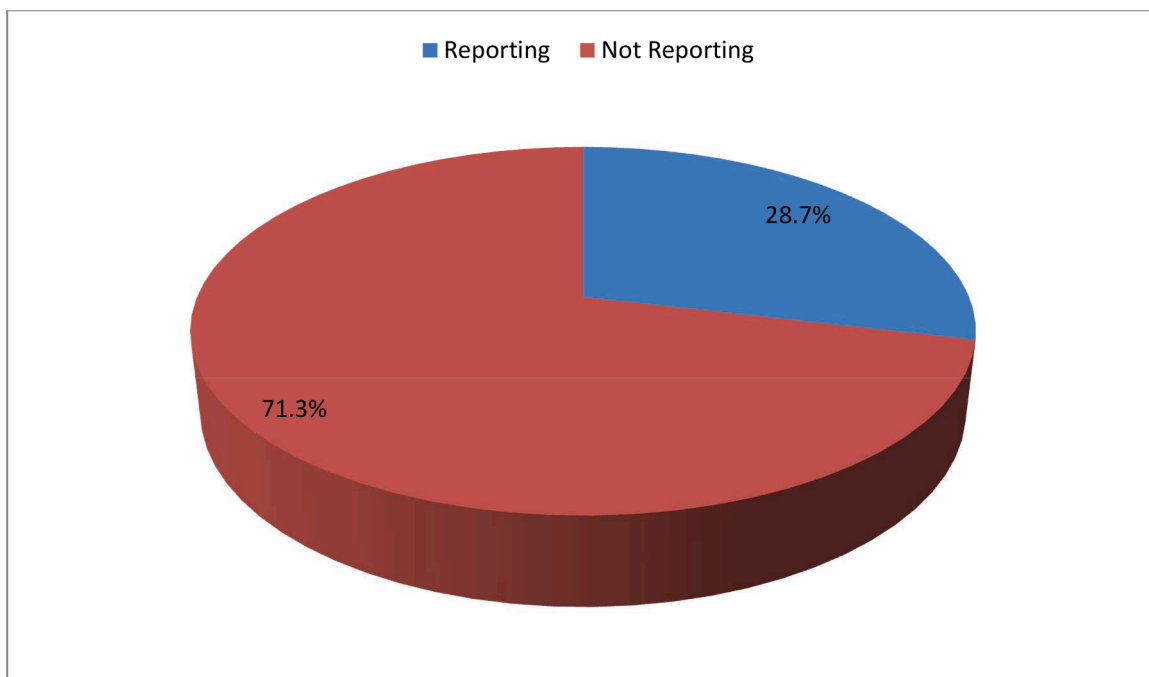
Fig. 1. Incident reporting behaviour among healthcare professionals in Hadiya Zone, Ethiopia (*n* = 334).

Table 5
Bivariable and Multivariable analysis on incident reporting behaviour and associated factors among healthcare professionals working in Hadiya Zone, Ethiopia.

Variables		Incident reporting behaviour		COR CI (95 %)	AOR CI (95 %)	P value
		Yes	No			
Professional status	Nurse	76	129	8.1(2.82–23.2)	5.48(1.67–17.8)	0.05
	Midwives	16	54	4.07(1.27–12.9)	2.46(0.64–9.48)	0.19
	Physicians	4	55	1	1	
Team with in-unit	Yes	81	148	3.88(2.05–7.36)	2.79(1.23–6.28)	0.01
	No	13	90	1	1	
Team across the unit	Yes	76	144	2.48(1.42–4.3)	1.03(0.49–2.15)	0.92
	No	20	94	1	1	
Overall perception of PS	Yes	58	102	2.03(1.25–3.29)	1.44(0.75–2.75)	0.26
	No	38	136	1	1	
Communication openness	Yes	69	96	3.78(2.25–6.3)	2.78(1.44–5.37)	0.002
	No	27	142	1	1	
Hand off transition	Yes	68	142	1.67(0.98–2.73)	1.4(0.7–2.65)	0.31
	No	28	96	1		
Feedback to error	Yes	68	79	4.88(2.9–8.1)	2(1.05–4.01)	0.03
	No	28	159	1	1	
Hospital management support	Yes	70	92	4.27(2.53–7.1)	2.8(1.4–5.6)	0.003
	No	26	146	1	1	
Supervisor expectation	Yes	79	161	2.22(1.23–4)	1.51(0.74–3.51)	0.22
	No	17	77			
Staffing	Yes	66	127	1.92(1.16–3.17)	1.48(0.76–2.88)	0.24
	No	30	111			
Organizational learning	Yes	62	111	2.08(1.27–3.42)	1.79(0.92–3.49)	0.08
	No	34	127			
On job training related with PSIR	Yes	35	33	3.56(2.04–6.08)	2.87(1.46–6.28)	0.005
	No	61	205	1	1	
Fear of administration sanction	Yes	23	137	0.22(0.13–0.39)	0.49(0.25–0.97)	0.04
	No	73	101	1	1	
Fear of malpractice litigation	Yes	17	95	0.32(0.18–0.58)	0.76(0.36–1.64)	0.49
	No	79	143	1	1	
Fear to loss colleague respect	Yes	14	14	2.73(1.24–5.97)	1.67(0.55–5.03)	0.36
	No	82	224	1	1	
Reporting takes longer time	Yes	13	61	0.45(0.23–0.87)	0.37(0.16–0.87)	0.02
	No	83	177	1	1	

Ghana which was 16.1 % and in Bale zone which was 12.6 %, but, it is lower than study conducted in Israel 44.1 % and Uganda Health center, 72.6 % (Safety et al., 2020; Rashed and Hamdan, 2015; Poku et al., 2023; Mauti and Githae, 2019). This discrepancy may be due to differences in the study settings, socio-demographics, and study period duration. The current study did not consider the frequency of patient safety incidents reported which could be important variable for determining the effect/impact of the incidents that happened.

Being a nurse professional was more likely to report patient safety incidents than other healthcare professionals. This result is in support with the results of the studies conducted in Korea, South Africa, and other public hospitals in Ethiopia (Kim and Lee, 2023; Gqaleni and Bhengu, 2020; Mekonnen et al., 2017) which revealed high incident reporting of nursing care providers. This might be because assuring patient safety and quality are a part of nursing education while reporting and recording are considered a habit or duty of the nurses in response to their role in advocating and maintaining quality patient care. However, there is a homogeneity difference in the study population as the previous studies included mainly nurses.

Those who had training had approximately three times higher odds of reporting patient safety incidents than those who had no training. This result is in line with the result of a study conducted at Gonder Comprehensive Specialized Hospital (Eshetu hailesslasie, 2017). This similarity might be because the trained healthcare professionals will become open-minded, consider the benefit of error reporting, continue self-training, engage in the training of others, and accept incident reporting as a norm. A positive reporting environment will be nurtured if education and training have equipped staff with an understanding of how systems fail, how harm occurs in health care, and how the impact of both can be reduced (World Health Organization (WHO), 2020). There is a need to explore the effect of on-the-job training on the quality and sustainability of incident prevention and reporting practices.

Respondents who feared administrative sanctions were less likely to report than those who did not. This finding was similar to a study in Canada, Korea, Iran-Jahrom, Pakistan, Uganda, the Amhara Region, and Gonder (Y Eshete et al., 2021; Kim and Lee, 2023; Skutezky et al., 2022; Naome et al., 2020; Badiyepeymaie Jahromi et al., 2014; Jafree et al., 2015). This may necessitate a common understanding of the purpose and goal of incident reporting among the general healthcare community, including hospital administrative bodies.

Feedback on errors was also a significant predictor of incident reporting. Respondents who said there was feedback on errors were more likely to report incidents than their counterparts were. This finding was supported by previous studies in South Australia, South Africa, Addis Ababa and the Amhara Region (Agegnehu et al., 2019; Naome et al., 2020; Yeshiambew Eshete et al., 2021). This may be because reactions to errors contribute to the improvement of safe patient care practices. The current study did not include the administrative bodies and clerks who receive and analyze the incident reports, despite the HSOPSC user guide suggesting it.

Communication openness is also a significant predictor of incident reporting. Respondents who agreed to the presence of communication openness were more likely to report incidents. This result is supported by a previous study in Addis Ababa (Agegnehu et al., 2019). This might be because the discussion about errors makes the healthcare profession feel free and report incidents. The work-unit team was found to be significantly associated with incident reporting. Respondents who said that there was a team in the units were more likely to report incidents than their counterparts, which was supported by a previous study in Pakistan and the southern nations, nationalities and people of Ethiopia (Jafree et al., 2015; Arega, 2017). In these regards, the results suggest that there is a need of identifying the opinions of the different unit leaders in the hierarchy of the hospitals administrations draw the real image of the communication openness and presence of the team work.

Hospital management support is significantly associated with incident reporting. Respondents who perceived the presence of management support were more likely to report incidents than their counterparts were. This result is congruent with a previous study in the Iran-Jahrom, Pakistan, Addis Ababa and Amhara Regions, Ethiopia (Y Eshete et al., 2021; Agegnehu et al., 2019; Badiyepeymaie Jahromi et al., 2014; Jafree et al., 2015). This might be because nearby follow-ups of managers reduce negligence of staff on their work, which reduces mistakes and motivates staff to report any type of incident occurring in their work area. However, the result might have been affected by the distribution of the respondents. Other hospital staff who may not have direct contact or interaction with patients but whose work directly affects patient care and hospital supervisors, managers, and administrators were not included in this study.

Conclusion

This study revealed that the incident-reporting behavior of healthcare professionals was lower than that reported in previous studies. The factors identified to be associated with the incident reporting behavior were professional status, on-job training, the long time needed for reporting, fear of administration sanction, presence of feedback to errors, presence of hospital management support, teamwork within the unit, and communication openness.

Recommendation

Hospital administrations and other responsible bodies should work to improve the incident reporting of healthcare providers, intending to improve patient safety practices. An on-job training related to patient safety incidents should be arranged and provided to health care providers promptly. Teamwork within the work unit and across hospitals should be encouraged to enhance workers' patient safety incident-reporting behaviours. A well-established incident reporting system for patient safety should be installed in public hospitals in Hadiya, Ethiopia. There should be an open discussion on the purpose and goals of patient safety incident reporting among hospital management and healthcare providers. Since nurses have a unique role in the patient safety practice they need to extend their professional commitments by sharing their experiences and knowledge to other healthcare professionals and maintaining

quality patient care. Next researchers should focus on the feasibility and appropriateness of the patient safety incidence reporting systems of hospitals to help the staff use the most favourable and effective reporting system.

Limitation

The current study did not consider the frequency of patient safety incidents reported which could be an important variable for determining the effect/impact of the incidents that happened. The current study did not include the administrative bodies and clerks who receive and analyze the incident reports, despite the HSOPSC user guide suggesting it. Hospital staff who may not have direct contact or interaction with patients but whose work directly affects patient care and hospital supervisors, managers, and administrators were not included in this study. In these regards, there is a need to identify the opinions of the different unit leaders in the hierarchy of the hospitals' administrations to draw the real image of communication openness and presence of the teamwork.

Acronyms

AE, adverse event; AHRQ, Agency of Health Care Research and Quality; BSc, Bachelor Science; FMOH, Federal Minster of Health; IR, Incident Reporting; HCP, Health Care Provider; HSOPSC, Hospital Survey on Patient Safety Culture; ME, Medical Error; MSc, Master's Science; OR, Odds Ratio; PI, Principal Investigator; PS, Patient Safety; PSC, Patient Safety Culture; PSCD, Patient Safety Culture Dimension; PSI, Patient Safety Incident; SNNPR, South Nation's Nationalities and Peoples Region; SPSS, Statistical Package for Social Science; WHO, World Health Organization

CRediT authorship contribution statement

Amina Shemsu: Writing – original draft, Visualization, Validation, Project administration, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Abebe Dechasa:** Writing – review & editing, Writing – original draft, Software, Methodology, Funding acquisition, Data curation, Conceptualization. **Mulatu Ayana:** Writing – original draft, Validation, Supervision, Software, Investigation, Formal analysis, Data curation. **Meseret Robi Tura:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Conceptualization.

Declaration of competing interest

None.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

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