



Research article

Knowledge, attitudes on falls and awareness of hospitalized patient's fall risk factors among the nurses working in Tertiary Care Hospitals

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Abstract: Background: Fall is the most common patient safety incident in health care organizations. This study was initiated to obtain information regarding knowledge & attitude on falls and awareness of fall risk factors among nurses to devise evidence-based and multidisciplinary educational and training programs to improve patient safety and thereby reduce morbidity and mortality associated with falls. **Methods:** A descriptive cross-sectional survey study was conducted among 339 registered nurses working in Tertiary care hospitals across Chennai, Tamil Nadu, India. A modified version of the previously validated standard questionnaire was administered by the investigators through an online survey method to explore the level of knowledge & attitude on falls and awareness of inpatient fall risk factors among Nurses. **Results:** In this study, 15.6% of participants had adequate knowledge of falls, 57.2% had a favorable attitude towards falls and 38.3% had adequate awareness of fall risk factors. Years of experience in nursing has a statistically significant association with the level of knowledge on fall. The participant's attitude towards falls had a statistically significant relationship with age, education, experience in nursing, and previous patient fall experience. The correlation between fall knowledge, the attitude toward falls, and awareness of fall risk factors were highly significant. The majority of the participants expressed their favorable attitude toward the need for fall preventive education. **Conclusion:** In our study, it is evident that there is a void that has to be filled to improve the knowledge, attitude, and awareness of falls and their risk factors. There is a need for extensive education and holistic, multifactorial, and interdisciplinary training program to be undertaken through various health care organizations.

Keywords: fall; fall risk factors; hospitalized patient; awareness

1. Introduction

A fall is defined as an event that results in a person coming to rest inadvertently on the ground or floor or other lower level [1]. Falls and their consequences are major public health problems, making them the second leading cause of accidental deaths worldwide [2]. Fall is reported as the most frequent patient safety event occurring in hospitals [3]. Falls occur at a rate of 3–5 per 1000 occupied bed days, and the Agency for Healthcare Research and Quality estimates that each year 700000 to 1 million hospitalized patients fall [4]. Nearly one in every three inpatients aged 65 years and older sustains a fall. The traumatic complications of falls include physical injury, functional impairment, increased rate of hospitalization, and delayed recovery as a result people suffer a lot with a huge burden to the family, health sector, and economy of the country [5–7]. A significant proportion of non-traumatic falls, often instill fear of fall- a post-fall syndrome which includes dependency, loss of autonomy, confusion, immobilization, and depression, which will lead to a further restriction in daily activities and thus affects Quality of life [8,9]. Despite the continued efforts to decrease falls in hospital settings, there continues to be an increased incidence of inpatient falls. Nurses are the true backbone of any health facility. They provide constant care to patients and they must be properly trained to identify risk factors and employ strategies to prevent them. Due to demanding work schedules, lack of awareness, and complex patient profiles, there are high chances that preventable aspects of these “geriatric giants” are not well addressed and often overlooked. The disabilities of the older adults in mental, physical, and social domains are sometimes misperceived as an unavoidable concern of older age people, it has to be improved. Conditions such as incontinence, intellectual

impairment, instability, and immobility are common in older adults and have a greater impact on quality of life [10]. The comprehensive geriatric assessment (CGA) process is a multidisciplinary diagnostic and treatment option that recognizes the medical, functional, and psychosocial limitations of frail older adults to create a strategy to increase the health conditions with aging [11]. CGA needs evaluation in physical, affective, social, cognitive, financial, environmental conditions, and spiritual conditions which have aid in older age people health. CGA is completely based on the systematic evaluation by healthcare professionals to find health problems and gain better health outcomes. The assessment team carries out different components of the process, mostly physicians, nurses, physician assistants, and physiotherapists conduct the assessment of older adults. The 24-hour practicing nurses are expected to play a major role in the caring process of older adults as well as in the assessment practice. Prolonged care and assessment of the individuals help the nurses to give complete care. Such things are possible only by the comprehensive assessment process. To ensure the kills of the nurses, a current study was conducted on the knowledge and attitude of nurses attribute to disseminating and establishing a foundation for fall preventive activities in Tertiary care hospitals. Even though falls among hospitalized patient is a well-recognized topic in both nursing and medical literature, in many developing countries it has not been prioritized for research. Hence, the current study had been devised to find out these lacunae and establish the best care for the patients.

2. Materials and methods

2.1. Study design and participants

This cross-sectional study was conducted in Panimalar Medical College Hospital & Research Institute, Chennai, Tamil Nadu, India. A probability random sampling technique was used for selecting the study participants. The researcher's recruited 339 registered nurses who are working in tertiary care hospitals across Chennai aged over 20 years. This study was conducted between February, 2020 to May, 2020. Registered nurses who can read and write English and those willing to give informed consent were only included in the study. Nursing students, trainees, and who were not available during data collection were excluded from participating in the study. A semi-structured questionnaire was used to gather information from concerned participants at a single point in time. Confidentiality of all participants was maintained by assigning a unique respondent ID to each participant. This study protocol was approved by the Institutional Review Board (IRB) of the Panimalar Medical College Hospital & Research Institute, Chennai (Panimalar Medical College Hospital & Research Institute IRB #1/2020/003) and conformed to the requirements of the Declaration of Helsinki (as revised in Seoul 2008). Informed consent has been obtained from all the participants of the study.

2.2. Measures

A modified version of the previously validated standard questionnaire was administered by the investigators comprised of 52 questions/statements on demographic characteristics and information about the fall and its risk factors [12]. The demographics were followed by 3 sections with a set of questions/statements. Section-1 incorporated 16 simple questions, to assess the knowledge of falls by selecting correct and incorrect options. Section-2 embraced 13 positive and negative statements on 5

points Likert scale, the respondents have to record their responses on the 5 points Likert scale ranging from: Strongly agree (SA), Agree (A), Unsure (U), Disagree (D), Strongly Disagree (SD) for obtaining information on the attitude of fall and section-3 encompassed risk factor category question with the list of 16 risk factors where the respondent has to select related /unrelated option. The reliability of this tool was analyzed using Cronbach's alpha, wherein $\alpha = 0.75$.

2.3. Sample size estimation

The sample size (n) has been arrived at 313, based on the hypothesis testing for single proportion with 2 sided with the population proportion of 0.82, sample proportion of 0.757, power (%) of 80, and alpha error (%) of 5.

2.4. Statistical analysis

Each statement/question was numerically coded to obtain a score for knowledge and attitude of falls and awareness of fall risk factors. All the categorical variables are presented as numbers and percentages. Descriptive analysis was performed using univariate statistics to report the Mean and Standard Deviation (SD) for the continuous variable and frequency distributions for the categorical variables. Correlation, non-parametric tests of Kruskal-Wallis and Mann-Whitney test were performed to compare differences in the variables. All reported statistically significant differences were calculated at the 95% confidence level. Spearman's rho test measured the strength and direction of the relationship between two variables. The Chi-square test was used to assess the association between categorical variables. Statistical significance was set at $P < 0.05$. All statistical analyses were performed using Statistical Package for Social Science (SPSS, version 17) for Microsoft Windows, SPSS Inc. USA.

3. Results

Of the 439 participants who were intended to receive survey questionnaires, 339 participants submitted completed questionnaires: a response rate of 75% leaving 339 valid for analysis. Table 1 depicted the demographic characteristics of the nurses. Out of the participants (n = 339) are Female (84.1%) and Male (15.9%). Most of the nurses participated in the study (36.3%) where their professional experience is less than 6 months. 21% of the respondent have experienced patients' that have sustained falls whereas (56.3%) have not experienced previous patient fall. The majority of the respondent (71.7%) have received fall prevention education. However, only (18.3%) were extremely familiar with fall prevention activities (Table 2).

3.1. Knowledge on fall

Considering the overall level of knowledge of the 339 participants, 26.8% (n = 91) of individuals had inadequate knowledge, 57.5% (n = 193) had moderately adequate knowledge, and 15.6% (n = 53) had adequate knowledge of falls (Figure 1). The average mean knowledge of the study participants was 10.05 ± 2.21 (Table 3). Correlation between level of knowledge and participants' years of experience in nursing alone showed a statistically significant relationship at $P =$

0.01 among all the selected demographic variables. (Table 4) Similarly, only years of experience in nursing have a statistically significant association ($P = 0.01$) with the level of knowledge on falls (Table 5).

The statements concerned with diseases condition and medications related to falls as expressed by the participants represented the lowest of all knowledge scores were: 42% for “Taking medicine for diabetics is not related to falling” and “Intravenous therapy or intravenous access has a risk for fall”. 46% for “Depression is not related to falling and 47.2% for “Taking medicines for blood pressure is not related to falling” (Table 6).

3.2. Attitude towards fall

In this present study, 2% ($n = 6$) had unfavorable attitude, 42.2% ($n = 143$) had moderately favorable attitude and 57.2% had favorable attitude towards fall (Figure 1). 49.69 ± 5.746 was the average mean attitude of the study participants (Table 5). The participants’ attitudes towards falls had a statistically significant relationship at $P = 0.001$ with age, education, and experience in nursing and previous fall experience at $P = 0.05$ (Table 6). There were statistically significant associations between an attitude toward falls with age (0.05), gender ($P = 0.001$), educational qualification ($P < 0.001$), and experience in nursing ($P = 0.001$) (Table 5).

The lowest mean score for the statements on an attitude of fall was: 2.58 ± 1.24 for the statement “hospital environment is safe for fall”. 2.66 ± 1.26 for “fall is unavoidable”. Majority of the participants expressed their favorable attitude toward the need for fall preventive education (Table 7).

3.3. Awareness of fall risk factors

The participants level of awareness on fall risk factors were 38.3% ($n = 130$) adequate, 52.2% ($n = 177$) moderately adequate and 9.4% ($n = 32$) inadequate (Figure 1). The average mean value was 11.48 ± 2.165 (Table 3). The correlation between fall knowledge, an attitude toward fall, and awareness of fall risk factors were highly significant at $P = 0.0001$ with 95% CI (Table 3).

Table 1. Demographic characteristics of the nurses included in the study ($n = 339$).

Demographics	Frequency	Percentage (%)
Age		
≤20 years	47	13.9
21–25 years	174	51.3
26–30 years	56	16.5
30 years	62	18.3
Gender		
Female	285	84.1
Male	54	15.9

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Demographics	Frequency	Percentage (%)
Educational qualification		
Diploma in nursing & midwifery	87	25.7
Post basic bachelor of science in nursing	3	0.9
Bachelor of science in nursing	205	60.5
Master of science in nursing	44	13.0
Experience in nursing		
Less than 6 months	123	36.3
6 months to 2 years	75	22.1
2–6 years	82	24.2
7–10 years	19	5.6
More than 10 years	40	11.8
Previous patient fall experience		
Yes	148	43.7
No	191	56.3
Received fall prevention education		
Yes	243	71.7
No	96	28.3
Fall prevention activity		
Extremely familiar	62	18.3
Very familiar	103	30.4
Somewhat familiar	126	37.2
Not so familiar	32	9.4
Not at all familiar	16	4.7

Table 2. Frequency and Percentage of level of awareness on fall risk factors among the nurses (n = 339).

Risk factor	Category	n	Percentage (%)
Gender	Related	182	53.7
	Unrelated	157	46.3
Educational level	Related	138	40.7
	Unrelated	201	59.3
Hearing	Related	247	72.9
	Unrelated	92	27.1
Depression	Related	254	74.9
	Unrelated	85	25.1
Taking medicine	Related	290	85.5
	Unrelated	49	14.5
Urinary incontinence	Related	205	60.5
	Unrelated	134	39.5

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Risk factor	Category	n	Percentage (%)
Number of chronic disease	Related	258	76.1
	Unrelated	81	23.9
Cognitive impairment	Related	283	83.5
	Unrelated	56	16.5
Insomnia	Related	294	86.7
	Unrelated	45	13.3
Age	Related	302	89.1
	Unrelated	37	10.9
Use of assistive device	Related	268	79.1
	Unrelated	71	20.9
Anxiety for fall	Related	276	81.4
	Unrelated	63	18.6
Sight	Related	291	85.8
	Unrelated	48	14.2
Walking disorder	Related	313	92.3
	Unrelated	26	7.7
Activities of daily living	Related	262	77.3
	Unrelated	77	22.7
Dizziness	Related	306	90.3
	Unrelated	33	9.7

Table 3. Correlation between knowledge, attitudes toward falls, and awareness of fall risk factors among nurses (n = 339).

Variables	Mean	Standard deviation (SD)	Spearman's rho & P-value, Sig.
Knowledge	10.05	2.22	r = 0.206
Attitude	49.7	5.75	P = 0.001
Knowledge	10.05	2.22	r = 0.252
Awareness on fall risk factors	11.48	2.16	P = 0.001
Attitude	49.7	5.75	r = 0.214
Awareness on fall risk factors	11.48	2.16	P = 0.001

Table 4. Correlation of different characteristic variables with knowledge and attitude of fall.

Variables	Knowledge on Fall			Attitude on Fall			
	n	Mean rank	Kruskal-Wallis test	n	Mean rank	Kruskal-Wallis test	
Age	≤20 years	47	155.93	H = 7.010 d.f = 3 P = 0.072 N.S	47	143.17	H = 23.831 d.f = 3 P = 0.00*
	21–25 years	174	161.02		174	157.05	
	26–30 years	56	191.46		56	175.93	
	>30 years	62	186.48		62	221.31	
Gender	Female	285	170.28	Z = 0.124 P = 0.901 N.S	285	174.42	Z = 1.911 P = 0.056 N.S
	Male	54	168.50		54	146.67	
Educational qualification	Diploma in nursing and midwifery	87	169.11	H = 0.052 d.f = 3 P = 0.997 N.S	87	125.41	H = 37.086 d.f = 3 P = 0.001*
	Post basic bachelor of science in nursing	3	159.00		3	174.33	
	Bachelor of science in nursing	205	170.33		205	175.27	
	Master of science in nursing	44	170.95		44	233.32	
Experience in nursing	Less than 6 months	123	165.21	H = 7.113 d.f = 4 P = 0.130 N.S	123	153.56	H = 36.388 d.f = 4 P = 0.001*
	6 months to 2 years	75	153.81		75	163.08	
	2–6 years	82	175.11		82	151.40	
	7–10 years	19	212.21		19	228.61	
	More than 10 years	40	184.56		40	243.83	
Previous fall experience	Yes	148	170.50	Z = 0.083 P = 0.934 N.S	148	152.44	Z = 2.909 P = 0.004*
	No	191	169.62		191	183.61	

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Variables		Knowledge on Fall			Attitude on Fall		
		n	Mean rank	Kruskal-Wallis test	n	Mean rank	Kruskal-Wallis test
Received fall prevention education	Yes	243	176.62	Z = 1.997 P = 0.046*	243	176.14	Z = 1.839 P = 0.066
	No	96	153.26		96	154.45	N.S
Fall prevention activity	Extremely familiar	62	149.93	H = 7.091 d.f = 4 P = 0.131 N.S	62	162.38	H = 6.042 d.f = 4 P = 0.196 N.S
	Very familiar	103	183.88		103	185.34	
	Somewhat familiar	126	175.00		126	170.72	
	Not so familiar	32	145.84		32	145.84	
	Not at all familiar	16	167.38		16	143.44	

Note: H: Kruskal–Wallis test; Z: Mann-Whitney test; $P < 0.05$ is considered as statistically significant; N.S: Not significant; d.f: degrees of freedom; * indicates statistically significant.

Table 5. Association of demographic variables with the level of knowledge and level of attitude among participants enclosed in this study.

Demographics		Level of knowledge on Fall				Level of attitude on Fall			
		Inadequate	Moderately adequate	Adequate	Chi-Square test, <i>P</i> -value & Sig.	Unfavorable	Moderately favorable	Favorable	Chi-Square test, <i>P</i> -value & Sig.
Age	≤20 years	15 (31.9%)	26 (55.3%)	6 (12.8%)	$\chi^2 = 6.695$ d.f = 6 <i>P</i> = 0.350 N.S	0 (0.0%)	25 (53.2%)	22 (46.8%)	$\chi^2 = 14.391$ d.f = 6 <i>P</i> = 0.026*
	21–25 years	50 (28.7%)	103 (59.2%)	21 (12.1%)		2 (1.1%)	81 (46.6%)	91 (52.3%)	
	26–30 years	12 (21.4%)	32 (57.1%)	12 (21.4%)		0 (0.0%)	22 (39.3%)	34 (60.7%)	
	>30 years	14 (22.6%)	34 (54.8%)	14 (22.6%)		0 (0.0%)	15 (24.2%)	47 (75.8%)	
Gender	Female	78 (27.4%)	161 (56.5%)	46 (16.1%)	$\chi^2 = 0.807$ d.f = 2 <i>P</i> = 0.668 N.S	0 (0.0%)	115 (40.4%)	170 (59.6%)	$\chi^2 = 13.813$ d.f = 2 <i>P</i> = 0.001*
	Male	13 (24.1%)	34 (63.0%)	7 (13.0%)		2 (3.7%)	28 (51.9%)	24 (44.4%)	
Educational qualification	Diploma in nursing and midwifery	19 (21.8%)	56 (64.4%)	12 (13.8%)	$\chi^2 = 3.319$ d.f = 6 <i>P</i> = 0.768 N.S	1 (1.1%)	57 (65.5%)	29 (33.3%)	$\chi^2 = 33.282$ d.f = 6 <i>P</i> = 0.001*
	Post basic bachelor of science in nursing	1 (33.3%)	2 (66.7%)	0 (0.0%)		0 (0.0%)	1 (33.3%)	2 (66.7%)	
	Bachelor of science in nursing	60 (29.3%)	111 (54.1%)	34 (16.6%)		1 (0.5%)	77 (37.6%)	127 (62.0%)	
	Master of science in nursing	11 (25.0%)	26 (59.1%)	7 (15.9%)		0 (0.0%)	8 (18.2%)	36 (81.8%)	

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Demographics		Level of knowledge on Fall				Level of attitude on Fall			
		Inadequate	Moderately adequate	Adequate	Chi-Square test, <i>P</i> -value & Sig.	Unfavorable	Moderately favorable	Favorable	Chi-Square test, <i>P</i> -value & Sig.
Experience in nursing	Less than 6 months	31 (25.0%)	78 (63.4%)	14 (11.4%)	$\chi^2 = 20.814$ d.f = 8 <i>P</i> = 0.008*	0 (0.0%)	61 (49.6%)	62 (50.4%)	$\chi^2 = 31.448$ d.f = 8 <i>P</i> = 0.001*
	6 months to 2 years	21 (28.0%)	47 (62.7%)	7 (9.3%)		2 (2.7%)	30 (40.0%)	43 (57.3%)	
	2–6 years	28 (34.1%)	35 (42.7%)	19 (23.2%)		0 (0.0%)	43 (52.4%)	39 (47.6%)	
	7–10 years	4 (21.1%)	8 (42.1%)	7 (36.8%)		0 (0.0%)	4 (21.1%)	15 (78.9%)	
	More than 10 years	7 (17.5%)	27 (67.5%)	6 (15.0%)		0 (0.0%)	5 (12.5%)	35 (87.5%)	
Previous patient fall experience	Yes	38 (25.7%)	88 (59.5%)	22 (14.9%)	$\chi^2 = 0.404$ d.f = 2 <i>P</i> = 0.817 N.S	1 (0.7%)	73 (49.3%)	74 (50.0%)	$\chi^2 = 5.606$ d.f = 2 <i>P</i> = 0.061 N.S
	No	53 (27.7%)	107 (56.0%)	31 (16.2%)		1 (0.5%)	70 (36.6%)	120 (62.8%)	
Received fall prevention education	Yes	63 (25.9%)	136 (56.0%)	44 (18.1%)	$\chi^2 = 3.986$ d.f = 2 <i>P</i> = 0.136 N.S	1 (0.4%)	97 (39.9%)	145 (59.7%)	$\chi^2 = 2.402$ d.f = 2 <i>P</i> = 0.301 N.S
	No	28 (29.2%)	59 (61.5%)	9 (9.4%)		1 (1.0%)	46 (47.9%)	49 (51.0%)	

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Demographics		Level of knowledge on Fall				Level of attitude on Fall			
		Inadequate	Moderately adequate	Adequate	Chi-Square test, <i>P</i> -value & Sig.	Unfavorable	Moderately favorable	Favorable	Chi-Square test, <i>P</i> -value & Sig.
Fall prevention activity	Extremely familiar	18 (29.0%)	38 (61.3%)	6 (9.7%)	$\chi^2 = 15.086$ d.f = 8 <i>P</i> = 0.057 N.S	0 (0.0%)	31 (50.0%)	31 (50.0%)	$\chi^2 = 11.478$ d.f = 8 <i>P</i> = 0.176 N.S
	Very familiar	27 (26.2%)	55 (53.4%)	21 (20.4%)		0 (0.0%)	35 (34.0%)	68 (66.0%)	
	Somewhat familiar	31 (24.6%)	71 (56.3%)	24 (19.0%)		1 (0.8%)	52 (41.3%)	73 (57.9%)	
	Not so familiar	13 (40.6%)	17 (53.1%)	2 (6.3%)		1 (3.1%)	17 (53.1%)	14 (43.8%)	
	Not at all familiar	2 (12.5%)	14 (87.5%)	0 (0.0%)		0 (0.0%)	8 (50.0%)	8 (50.0%)	

Note: $P < 0.05$ is considered statistically significant; NS: Not significant; d.f: degrees of freedom; * indicates statistically significant.

Table 6. Statements that evaluate participant's knowledge of falls in this study (n = 339).

Items	Mean	Standard deviation
The recurrence rate is high among anyone who has already experienced a fall.	0.67	0.472
Falls occur most frequently in safety incidents in hospitals.	0.58	0.495
Falls increase an elderly persons' death rate.	0.77	0.420
Elderly hip fractures occur from falls.	0.89	0.312
Sliding is not falling.	0.55	0.499
The more medicine you take, the higher your fall risk.	0.58	0.494
The more diseases you have, the higher your fall risk.	0.66	0.473
Depression is not related to falls.	0.46	0.499
Someone who has a visual impairment has a higher risk for falls.	0.91	0.280
Being numb in the limbs is not related to falls.	0.57	0.496
Dysuria is a risk factor for falls.	0.70	0.458
Taking medicine for diabetes is not related to falls.	0.42	0.495
Taking medicine for blood pressure is not related to falls.	0.47	0.500
Hearing-impaired is not related to falls.	0.53	0.500
Falls occur more when getting up from and down on beds in hospitals.	0.86	0.343
IV therapy or IV access has a risk for fall.	0.42	0.495

Table 7. Statements that evaluate the attitude of falls among nurses enclosed in the study (n = 339).

Items	Mean	Standard deviation
I am concerned about patient falls.	4.39	0.726
I think falls among patients are unavoidable.	2.66	1.268
I think nurses are responsible for patients' falls.	3.75	1.235
Fall prevention is a higher priority for intervention.	4.35	0.794
I have a concern about nursing interventions for fall prevention.	4.29	0.872
Fall prevention interventions should be conducted actively.	4.37	0.725
A patients' fall risk level should be inspected when hospitalized.	4.32	0.900
Falls preventive education is necessary.	4.56	0.741
Falls occur because of patients.	2.59	1.082
I will help immediately if someone asks for help when they move.	4.53	0.750
Physical injury is not severe even if a fall happens.	3.07	1.218
The hospital environment is safe for falls.	2.58	1.241
I feel guilty if my patient falls.	4.21	0.908

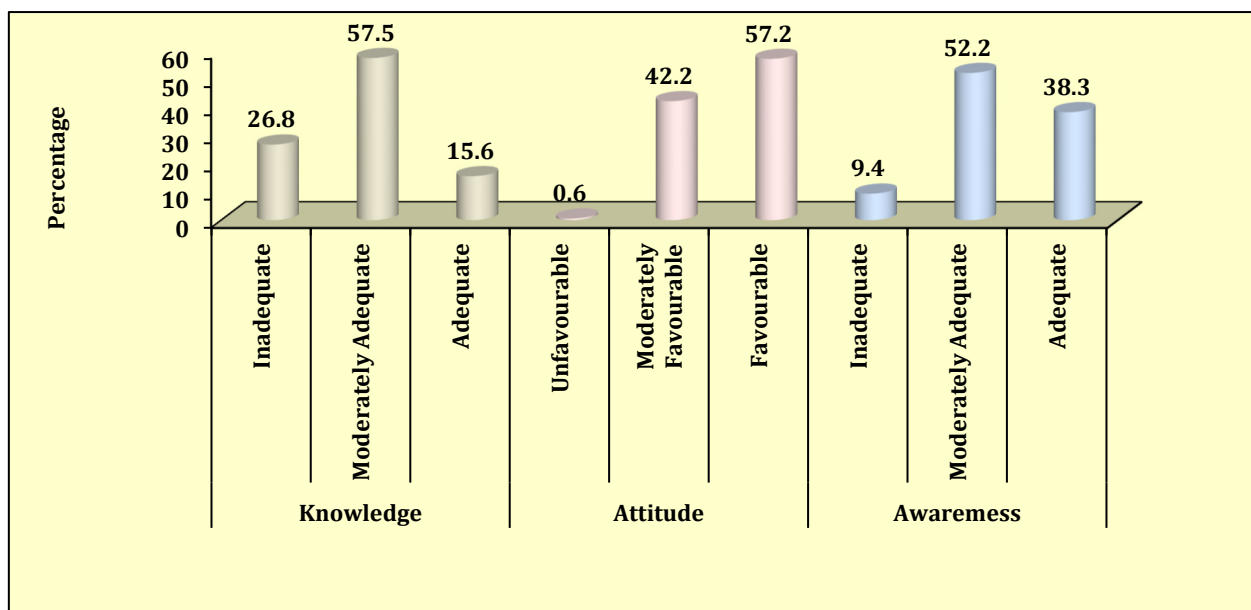


Figure 1. Overall percentage distribution of level of knowledge & attitude on fall and awareness of fall risk factors.

4. Discussion

Fall in hospitalized patients is almost always preventable [13,14]. Nurses with adequate knowledge and awareness of falls and their risk factors are anticipated to bring about a significant reduction in the prevalence of fall occurrence and a positive influence on falls among hospitalized patients [15]. In our present study, 43.7% of nurses had previous patient fall experience which is similar to that reported by various studies [16,17]. This is much higher than that reported by Kim et al. [18]. These differences may be due to the nature of hospital infrastructure, years of nursing training programs, and differences in patient profiles.

Even though the majority of the participants (71.7%) reported “received fall prevention education”, only 15.6% had an adequate level of knowledge which was lower when compared with the study reported by Kim et al. [18], where 85.7% of nurses had a high level of knowledge. Similar to our study, Laing et al. [19] reported a lower level of knowledge among health workers about falls. In our study majority of the nurses had working experience of fewer than 2 years hence low level of knowledge regarding a complex multifactorial event like a fall can be attributed.

In the assessment of knowledge session of the questionnaire statements about diseases condition, treatment-related, and medications related to falls as expressed by the participants represented the lowest of all scores similar to previous studies [18,19]. This could be attributed to not incorporating multidisciplinary evidenced-based training on falls with a new perspective. In India, it is a harsh reality that many hospitals neither have standard policies and procedures nor training programs on falls and their prevention. Laing et al. [19] revealed that the knowledge and skills of nurses related to falls and their prevention were improved after the training confirming the need for evidence-based training. Hence, the introduction of a care bundle approach frequent in-services and focus groups may enhance nurses learning and improve clinical outcomes.

This study revealed majority 57.2% had a favorable attitude towards falls which supports the study by Kim CG et al. [17] where the attitude level of nurses was 77.2% positive toward falls. This may be due to the social and cultural empathy incorporated in training. Contradictory results have been shown in various other studies [16,17,20]. This may be due to the difference in nature of study participants (students, workers). However, the potential gaps in awareness of fall risk factors may be addressed by developing nurse-sensitive, context-specific fall-prevention clinical guidelines for practice in India.

In our study, 52.2% had moderately adequate awareness of fall risk factors. In contrast, 60% of health care professionals including nurses had little or some awareness of fall risk factors in a study [21,22]. Therefore, an onsite training program on awareness of fall risk factors designed for nurses is crucial and need of the hour to help them identify the most important risk factors for falls and translate the knowledge into practice. The majority of the participants (66.1%) expressed a need for fall preventive education in this study this was achieved through developing a multifactorial, multidisciplinary fall preventive educational program and introducing a bundle approach to falls.

The years of experience in nursing showed both a strong association and a positive relationship with the level of knowledge. This implies that the knowledge improves as they gain more working experience because they obtain more information and hands-on experience. The attitude of nurses towards falls had strong associations with age, gender, educational qualification, and experience in nursing. This implies that as their experience in nursing care increases with education and patient care the more positive attitude they develop toward falls and their preventive measure.

Interestingly, our study also showed a strong correlation between knowledge, attitude, and awareness of fall preventive measures with each other. This is supported by several studies as well [17–19,23]. This shows that continued medical education and training of nurses are required to bring about an overall change in fall incidents in hospitalized patients.

5. Limitations

This study was conducted with certain limitations. The study participants were selected based on the probability random sampling technique. Registered nurses who are able to read and write English and those willing to give informed consent were only included in the study.

6. Conclusions

In our study, it is evident that there is a void that has to be filled to improve the knowledge, attitude, and awareness of falls and their risk factors. There is a need for extensive education and holistic, multi factorial, and interdisciplinary training program to be undertaken through various health care organizations including governmental and non-governmental organizations regarding falls and risk factors of falls to reduce fall occurrence thereby ensuring patient safety.

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Availability of data and material

The data used to support the findings of this study are available from the corresponding author upon request.

Authors' contributions

Conceptualisation: SKM; Methodology: Investigation: KMJ and SKM; KMJ, DR, SM, PS, YS, VPV: contributed to data curation, validation, visualization; PC, RGJM, SRTK, VPV: contributed to formal analysis, validation, visualization; KMJ and SKM: contributed to writing the Original Draft of the Manuscript; MK and SKM: Contributed to Writing–Review and Editing of the Manuscript; SKM: Supervision and Project Administration; KMJ, DR, SM, PS, PC, RGJM, YS, SRTK, VPV, MK & SKM: All authors reviewed the manuscript and approved the submitted manuscript.

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Conflicts of interests

All the authors declare no conflict of interest.

References

1. Lamb SE, Jørstad-Stein EC, Hauer K, et al. (2005) Development of a common outcome data set for fall injury prevention trials: the Prevention of Falls Network Europe consensus. *J Am Geriatr Soc* 53: 1618–1622. <https://doi.org/10.1111/j.1532-5415.2005.53455.x>
2. World Health Organization (2008) The global burden of disease: 2004 update. Available from: <https://apps.who.int/iris/handle/10665/43942>
3. Healey F, Darowski A (2012) Older patients and falls in hospital. *Clin Risk* 18: 170–176. <https://doi.org/10.1258/cr.2012.012020>
4. Healey FM (2011) The prevention of patient falls in healthcare settings, with particular emphasis on the effect of bedrail use on falls and injury as part of multi-faceted interventions. Doctoral dissertation, Newcastle University.
5. Kumar A, Srivastava DK, Verma A, et al. (2013) The problems of fall, risk factors and their management among geriatric population in India. *Indian J Community Health* 25: 89–94.
6. Dsouza SA, Rajashekar B, Dsouza HS, et al. (2014) Falls in Indian older adults: a barrier to active ageing. *Asian J Gerontol Geriatr* 9: 33–40.
7. Williams JS, Kowal P, Hestekin H, et al. (2015) Prevalence, risk factors and disability associated with fall-related injury in older adults in low- and middle-income countries: results from the WHO Study on global AGEing and adult health (SAGE). *BMC Med* 13: 147. <https://doi.org/10.1186/s12916-015-0390-8>

8. World Health Organization (2008) Ageing, Life Course Unit. WHO global report on falls prevention in older age. Available from: <https://www.who.int/publications/i/item/9789241563536>
9. Mitchell-Fearon K, James K, Waldron N, et al. (2014) Falls among community-dwelling older adults in Jamaica. *SAGE Open* 4: 2158244014564351. <https://doi.org/10.1177/2158244014564351>
10. Inouye SK, Studenski S, Tinetti ME, et al. (2007) Geriatric syndromes: clinical, research and policy implications of a core geriatric concept. *J Am Geriatr Soc* 55: 780–791. <https://doi.org/10.1111/j.1532-5415.2007.01156.x>
11. Smith G, Kydd A (2016) Editorial: getting care of older people right. The need for appropriate frailty assessment. *J Clin Nurs* 26: 5–6. <https://doi.org/10.1111/jocn.13618>
12. Tzeng HM, Yin CY (2013) Frequently observed risk factors for fall-related injuries and effective preventive interventions: a multihospital survey of nurses' perceptions. *J Nurs Care Qual* 28: 130–138. <https://doi.org/10.1097/NCQ.0b013e3182780037>
13. Campbell B (2016) Patient falls: preventable, not inevitable. *Nurs Made Incred Easy* 14: 14–18. <https://doi.org/10.1097/01.NME.0000475168.08103.37>
14. Shojanian KG, Marang-van de Mheen PJ (2015) Temporal trends in patient safety in the Netherlands: reductions in preventable adverse events or the end of adverse events as a useful metric? *BMJ Qual Saf* 24: 541–544. <https://doi.org/10.1136/bmjqs-2015-004461>
15. Cangany M, Back D, Hamilton-Kelly T, et al. (2015) Bedside nurses leading the way for falls prevention: an evidence-based approach. *Crit Care Nurse* 35: 82–84. <https://doi.org/10.4037/ccn2015414>
16. Seo OI (2008) Influence of knowledge and attitude on behaviors of falls prevention activities in patient among university hospital nurse. Unpublished master's thesis, The Catholic University of Korea, Seoul.
17. Kim CG (2011) Nurses' knowledge and attitude toward fall in hospitalized patients. *J Ind Sci Res* 28: 275–281.
18. Kim MH, Jeon HW, Chon MY (2015) Study on the knowledge and attitudes of falls and awareness of fall risk factors among nursing students. *Indian J Sci Technol* 8: 74. <https://doi.org/10.17485/ijst/2015/v8iS1/57593>
19. Laing SS, Silver IF, York S, et al. (2011) Fall prevention knowledge, attitude, and practices of community stakeholders and older adults. *J Aging Res* 2011. <https://doi.org/10.4061/2011/395357>
20. Choi BH (2011) The nursing student's attitude and preventive activities on inpatients falls. Unpublished master's thesis, Keimyung University.
21. Asiri F, ALMohiza MA, Faia Aseeri M, et al. (2018) Fall prevention knowledge and practice patterns among home healthcare professionals in southern Saudi Arabia: an observational study. *J Int Med Res* 46: 5062–5073. <https://doi.org/10.1177/0300060518789816>
22. Gutta S, Joseph A, Chakraborty A, et al. (2013) Study on the knowledge, attitudes and practices regarding prevention of recurrent falls in the elderly. *IOSR J Dent Med Sci* 9: 32–38. <https://doi.org/10.9790/0853-0933238>

23. Kalu ME, Vlachantoni A, Norman KE (2019) Knowledge about risk factors for falls and practice about fall prevention in older adults among physiotherapists in Nigeria. *Physiother Res Int* 24: e1742. <https://doi.org/10.1002/pri.1742>



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