Medication Errors and Moral Distress in Senior Nursing Students: A Cross-Sectional Descriptive Correlation Study

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Abstract

Medication errors are recognized as a significant threat to patient safety and cause Moral Distress in nursing students. The aim of this study was to investigate the relationship between Medication Errors and Moral Distress in senior nursing students at Kerman University of medical sciences in 2017. This research was across-sectional descriptive correlation study conducted on 120 senior nursing students at Kerman University of medical sciences. The census method was used in this study. Data collection tools included background information, Corley's Moral distress Questionnaire and Medication Error Questionnaire. Data were analyzed by parametric and nonparametric tests, spearman correlation coefficients and poison regression through SPSS software (version 19). The result indicated that average and standard deviation for total values of medication errors were (5.13±4.9). Maximum mean and standard deviation of errors in the education system was (2.4±2.3). Intensity and frequency of moral distress were (2.44±0.9) and (2.27±0.83), respectively. There was a direct and statistical relationship between medication errors and moral distress, (p=0.04). According to Regression test, the most affective variables on medication errors were independent job, frequency of moral distress, pharmacology education and accommodation status. Considering the impact of medication errors on Patient Safety, the study suggested that training and nursing clinics should take action to change the Method of Teaching Clinical Pharmacology, have more supervision on nursing student's job, and reduce moral distress in clinical milieu. Similarly, these factors have a direct impact on medication errors

Keywords: Medication errors; Prescription drug; Nursing students; Moral distress; Patient safety

Introduction

Prescription drug is one of the main tasks of nurses [1]. Medication errors can lead to severe injuries or even death [2]. These errors will be made by doctors, nurses, and other clinical personnel. Since it is expected to make such errors, some plans should be organized to prevent and decrease errors [3]. According to various studies, almost thousands of people die due to medication errors in America every year. Financial costs of medicinal effects are about 77 billion dollars per year [4] According to Golf, less than %3 of nursing students committed Medication errors resulting in patient injuries [5] Mc Carthcl et al. illustrated that % 48.5 of nursing students made medication errors. In this sense, forgetting prescription drug is regarded as the most common error [6] Annually, 47 to 98 thousand of people died from drug side effects in America, of which 7000 were medication errors. [1] From instructors' point of view, medication errors in nursing students were because of medication miscalculation. [7] Joolly & Merlin stated that the following factors have a prominent role in medication errors: lack of medical information, weakness in education, medication is calculation, doctor's illegible handwriting and drug packing. In this regard, They also noted that some issues including lack of time, fatigue, inadequate personnel and facilities have an indirect role in medication errors [8] According to various research, students believed that the following have been regarded as clinical education problems: inattention to clinical education, inaccessibility of sufficient clinical instructors,

lack of cooperation in clinical education faculty. [9] Nurses need to deal with ethical issues rather than other professions [10]. It is noteworthy that nurses will encounter some problems without ethical issues, such as low self-esteem, disorder of interpersonal relationship, mental complications, physical symptoms, change of behavior, confusion and tension [11] Moral Distress has a negative effect on quality of nurse work such as patient care. Thus, moral distress would be cause of dissatisfaction and exhaustion for nurses and also jeopardize their position [12]. Coppen described moral distress as a negative feeling and mental imbalance. He also showed that moral distress occurs when an individual is not able to make a decision to solve the problem. [13] Lomis et al. [14] illustrated that this issue is common among students. The difficult circumstances provide a poor quality of education. Thus, students leave education following stress and dissatisfaction. In this sense, it increases costs in education system [15]. Considering the significance of this phenomenon in education system, its impressive effect on students, patients, health system, and lack of domestic and foreign studies in this field, the research aimed to investigate the relationship between medication errors and Moral Distress on senior nursing students in order to decrease the knowledge gap.

Materials and Methods

This research was a cross-sectional descriptive correlation study conducted on 120 senior nursing students of Kerman University of medical sciences in 2017. The census method was used in this research. The statistical society included all senior nursing students at Kerman University of medical sciences. Likewise, the study was carried out at three faculties of nursing and midwifery Kerman, Zarand, and Sirjan. In this sense, data collection tool was a questionnaire consisted of three parts:

a) Background information,

b) Medication Error Questionnaire,

c) Corley's Moral Distress Questionnaire. A brief explanation of each is provided herein

Background information: This part composed of background information of participants in research. It is concerned with age, gender, marital status, term, address, city, student affairs, independent job (duration), pharmacology score, total grade point, participation in a workshop on ethics, making an error, error reporting, drug calculations, and medication errors.

Medication error questionnaire: This part consisted of Medication Error Questionnaire. After analyzing valid texts regarding medication errors, list of errors was designed as 30 items. Medication errors were reported as occurred, not occurred and near to occur. Finally, the number of errors ranged from 0

to 30. Higher score represented more errors within a period of month. After analyzing data collection, medication errors were classified into individual, education, and systemic errors. The numbers (2, 3, 4, 6, 7, 8, 9, 10, 16, 20, 22, and 29) referred to individual errors. The numbers (1, 5, 11, 12,13,14,15, 17, 24, 25, 26, 28, 30) and (18, 19, 21, 23, 27) were founded on education errors and systematic errors respectively. Therefore, validity of the specific analysis could be provided. In order to examine the validity of the questionnaire, 10 lecturers of nursing faculty made insightful suggestions. From their point of view, some items were added, some deleted or revised. Validity of questionnaire content was %88. Reliability of the tool was measured on nurses (n=20). Cronbach's alpha number (%95) obtained through internal correlation test. Corley Moral Distress Questionnaire was used by Cumming in 2009 [16]. The validity and reliability of this tool were examined by Borhani et al. Further, validity score was %88 and reliability was % 91 by use of internal correlation coefficient. Corley moral distress composed of 21 questions. In this survey, two scores were reported for intensity and frequency of moral distress. These questions could analyze the frequency and intensity of Moral Distress. The scale ranged from 0 (never) to 5 (frequently) for intensity and 0(never) to 5(frequently) for frequency (5). Minimum score in both scales was zero (0) and the maximum was 105. The mean score ranged from 0-5. Higher scores represented higher level of Distress. Lastly, the scores of this questionnaire were categorized into three levels: low (0-1), medium (2-3), and high (4-5).

Results

Considering the analysis, majority of participants were female (%69/2). The mean age of female participants (%93/3) was 20-25. Of the participants, %70.8 were single, %80 were in seventh semester. The findings indicated that, of the participants, % 22.5 reported Medication Errors to head nurse (Table 1). The mean score was 5.13 (±4/9) and the most common type of medication errors in education system was "prescription drug regardless of indication and counter indication" 44 (%36.7) and number 15 concerned with "inattention to symptoms of illness" 41 (%34.2), also the least referred to number 13 "error in drug registration." 7(%5/8). In this regard, mean score and standard deviation of educational errors were 2.4(±2.3) Table 2. According to spearman test, there was a positive correlation between mean score of medication errors, intensity, and frequency of Moral Distress in nursing students (Table 2). Statistically, this correlation was only defined as total errors p= (0.04) and individual errors P= (0.04) in intensity of Moral Distress. Since there was no normal distribution for medication errors, BNRR test was used to determine the impact of Demographic and Moral Distress variables on medication errors (Table 3).

Table 1: Medication error's relative and absolute frequency. (Never, close to occur and occurred). Senior nursing student's medication error scores in three aspects (individual, educational and systemic).

Aspects of Medication Errors	Never Absolute Frequency (Relative)	Close to occur Absolute Frequency (Relative)	Occurred Absolute Frequency (Relative)
Education Errors			
1)unfamiliarity with medication injection tools	40(33/3)	43(35/8)	37(30/8)
5)false medicine calculation experiences	43(35/8)	40(33/3)	37(30/8)
11) False medicine prescription because of being unfamiliar with brand name and generic name.	62(51/7)	44(36/7)	14(11/6)
12) Mistake in preparing the medicine with proper solution	72(60)	41(34/2)	7(5/8)
13) Mistake in medicine injection	63(52/5)	46(38/3)	11(9/2)
14) Not checking the prescribed medicine with identification characteristics (ID bond)	60(50)	49(40/8)	11(9/2)
15) inattention to patient status and symptoms	31(25/8)	48(40)	41(34/2)
17) Using abbreviation instead of medicine full name	41(34/2)	43(35/8)	36(30)
24) Prescription drug without paying attention to indications and counter indications.	32(26/7)	44(36/7)	44(36/7)
25) Mistakes because of being unfamiliar with contents of patient's medicine cardex	59(49/2)	47(39/2)	14(11/7)
26) inattention to specific instructions of patient's medicine	75(62/5)	33(27/5)	12(10)
28) Fulfill verbal orders without checking cardex	64(53/3)	35(29/2)	21(17/5)
30) Mistake in correct registration of medicine	78(65)	35(29/2)	7(5/8)
Average (±Standard deviation): (±2/3)2/4 Middle (Percentile25,75): (4,0/000) 2			
(Maximum- Minimum score): 0-10			
Individual Section Errors			
2)Repeating the patient medicine dose	63(52/5)	41(34/2)	16(13/3)
3) Inattention to PRN medicine orders.	69(57/5)	13(27/5)	18(15)
4) stress during prescribing emergency medicine	42(35)	49(40/8)	29(24/2)

6) Fail to prescribe medication at a specified time	48(40)	40(33/3)	32(26/7)
7) Fail to prescribe medication because of doctor's illegible handwriting	45(37/5)	31(25/8)	44(36/7)
8) Give less prescribed dose to the patient	49(40/8)	47(39/2)	24(20)
9) Give more prescribed dose to the patient	57(47/5)	41(34/2)	22(18/3)
10) Prescribe medication in inappropriate time	49(40/8)	54(45)	17(14/2)
16) Forget to give the patient dose in the shift work time	60(50)	45(37/5)	15(12/5)
20) Prescribe medication because of one patient to another one	64(53/3)	47(39/2)	9(7/5)
22) Mistake in prescribing drugs because of similarity in their names	58(48/3)	51(42/5)	11(9/2)
29) Mistakes due to mental disorder	60(50)	46(38/3)	14(11/7)
Average (±Standard deviation): (±2/2)2/1 Middle (Percentile25,75): (3/75, 0/000)1			
(Maximum- Minimum score):0-10			
Systemic Errors			
18) mistake in prescribing medication because of inadequate personal	47(39/2)	51(42/5)	22(18/3)
19) Apparent similarities in various drugs)	49(40/8)	50(41/7)	21(17/5)
23) Mistake in prescribing drugs because of similarities in their names	70(59/3)	43(35/8)	7(5/8)
24) Mistake in prescribing medication because of false medicine label tags	64(53/3)	44(36/7)	12(10)
27) mistake in prescribing medication because of different routine in different hospital units for calculation of the prescribed medicines	63(52/5)	46(38/3)	11(9/2)
Average (±Standard deviation): (±0/99) 0/61 (Maximum- Minimum score): 0-5 Middle (Percentile 25,75): (1,0/000) 0/000			
Total Average (±Standard deviation) :(±4/9) 5/13 (Maximum- Minimum score): 0-25 Middle (Percentile 25,75): (8, 1) 4			

Table 2: Relation between medicine errors and the aspects with moral distress intensity and times. Of moral distress in last -year nursing students.

Variable	Education Error	Individual Error	Systemic Error	Total
Distress frequency	r = 0/05	r = 0/15	R = 0/12	r = 0/12
	P= (0/58)	P = (0/11)	P = (0/18)	P = (0/21)
Distress intensity	r=0/13	R = 0/19	r = 0/08	r = 0/18
	P = (0/15)	P = (0/04)*	P = (0/36)	P = (0/04)*

Table 3: Binomial Negative Regression (BNR) results and number of effects of demo graphic and moral distress variables on last-year nursing students.

	Goodness of Fit	Pearson Chi- Square =0/95
	Omnibus Test	p value= 0/77
Gender	B	P value
Female	-	0/78
Male	0/07	-
Age	0/2	0/66
Marital status	-	-
single	-	0/6
Married	-0/15	-
Semester	-	-
7	-	0/89
8	0/04	-
Accommodation status	-	-
Local	-	-
Dormitory	-0/25	0/33
Rental	-0/07	0/85
City	-	-
Kerman	-	-
Zarand	0/02	0/9
Sirjan	0/03	0/99
Student job	-	-
Yes	-	0/8
No	-0/05	-
False training of medicine calculation or medication error	-	-
Yes	-	-
No	-0/19	0/57
Independent job	-	-
Yes	-	0/09
No	-0/54	-
Participate in moral workshop	-	-
Yes	-	0/67
No	-0/14	-
Pharmacology score	-0/09	0/12
Total grade	-0/03	0/75
Duration of independent job	-0/04	0/47
Moral distress intensity	0/03	0/89
Moral distress frequency	0/17	0/4

Discussion

The purpose of this study was to investigate the relationship between medication errors and moral distress in senior nursing students. The results indicated that frequency of medication errors was low, moral distress was medium and there was a direct and meaningful relationship between medication errors and moral distress. It suggested that more medication errors result in more distress, and vice versa. The findings revealed that intensity of Moral Distress and frequency of Moral Distress were medium. Corley et al. noted that ethical workplace environment influenced Moral Distress. He also added, 22 percent of nurses left the profession following distress [17] According to Median (2008), nurse's Moral Distress was lower in America. This report wasn't consistent with the present study. The difference referred to culture and research tools [18]. Kamachuchat et al [18]. found that higher moral distress among emergency nurses correlated with life dilemmas. According to the results, the men score of medication errors was 5.13(±4.1) representing reduction in medication errors among nursing students. Hajbabae et al. [19] also reported that the mean score for medication errors of nurses was medium. Therefore, it was in contrast with the study. This discrepancy was that Ross investigated on nurses while this paper examined on students [20] The study reflected that more moral distress led to more medication errors. The results were consistent with other research [21] The relationship between Moral Distress and Medication Errors would be because of negative effect of high anxiety and tension on students' clinical learning. This factor can influence their performance [22] Based on results, students whose pharmacology score was below 15 committed more medication errors. Thus, more moral distress occurred. It's worth mentioning that program revision didn't include senior nursing students and the students didn't take pharmacology course either. But some of these students attending education workshops committed more Medication Errors (%19) rather than those didn't participate in the workshops. It seems that the content of these workshops didn't contain the necessities of vital medicines and functional medicines. Similarly, clinical pharmacy was impressive since it emphasized on ingredients in vital medicines and their usage. Some students participating in workshop on nursing ethics committed more medication errors (%14) in comparison to those didn't attend. It supposed that ethics workshop on teaching methodology wasn't effective. According to the results, moral education could influence people on their performance. In this sense, Moral Distress increased and then, more medication errors occurred. May hew & Murphy have asserted that although nurses attended education workshops on moral judgment, the development of ethical behavior was not noticed. It was consistent with the present study [23]. Numminen et al. [24]. believed that nurses participating in education workshops on nursing ethics had less anxiety in making an ethical decision in comparison to those who didn't participate. It wasn't consistent with the study. The results showed that students at dormitory committed less error (%25) rather than indigenous people. It seems that students at dormitory shared their information with one another. Therefore, they acquired more experience. Dormitory milieu can enhance cooperative learning and improve students' learning. According to Pike, dormitory milieu has a prominent role in individual and job growth [25]. In this study, students with independent job committed more medication errors (%54) than others. In this sense, the students involved in clinical work spent less time studying. Thus, their performance could be affected. It associated with the present study [26]. Rafati et al. noted that if the nursing students have clinical experience during their studies, they will feel more confident and get more clinical experience. On the other hand, the students suffer from higher physical and mental stress in such situation [27]. The research confirmed that if independent clinical job increases, medication errors will be reduced (%4). Hassan et al. presented that the students with clinical experience can accomplish tasks on their own [28]. One of the results of this study was reporting the students' errors. The students are more inclined to report errors to the head nurse, then to charge nurses and classmate. The research can be discussed in further studies. Reporting medication errors is one of the most important factors for their identification and also for selecting the right way to avoid errors [18]. It seems that the reason is fear of punishment, score, disciplinary actions, and lack of information about reporting error. Nouhi pointed out concerning about the state of being inefficient, the effect of error on annual assessment, and concerning about the news publication should be the factors preventing from medication errors. In the present study, errors referred to education system were ranked first in medication errors. It is noteworthy that the items: 'prescription drug regardless of indication and counter indication', also 'inattention to symptoms of illness' were ranked first in medication errors among nursing students. It represented a warning of students' scientific skills about drug knowledge. Their practical clinical skills were badly affected as well. Inattention to patients' clinical status during prescription drug can endanger patients' life. Insufficiency of skills in nurses conducted by ZeidAbadi et al. would bring along suggestions for more education of nursing students [29]. Nouhi et al. [30] asserted that quality in nursing education is not provided appropriately. Moreover, providing effective education for nursing students can avoid medication errors.

Conclusion

Considering positive and meaningful relationship between medication errors and moral distress, it can be suggested that a great deal of time and effort would be required to reduce medication errors in educational and clinical milieu. Thus, the focus of the present research was improving pharmacology education for nursing students, setting up practical pharmacology course in skill lab for nursing students in first semesters, reducing moral distress in students, and using the Mentor Method in hospitals by nursing students before being graduated, but constant supervision is recommended.

Acknowledgement

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