



Original Article

Practices On Safe-Handling of Cytotoxic Drugs Among Oncology Nurses in Two Public Sector Hospitals

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ABSTRACT

Administration of cytotoxic medicines (CDs) and occupational exposure to them are global issues. Inappropriate handling can lead to harmful residues getting into patient care areas, hospitals, and even the homes of patients. **Objectives:** To access the practices of nurses regarding safe handling of cytotoxic drugs and to evaluate the association among the level of practices and socio-demographic profile of the participants. **Methods:** Analytical cross-sectional study was carried out among 183 nurses of oncology department of public sector tertiary care hospitals, Lahore, Pakistan. The nurses working in oncology departments of age ranges 20 years to 50 years and having at least six months' experience in oncology units were included in the study. **Results:** The majority (56%) of the nurses reported "Good Practices" regarding safe handling of cytotoxic drugs followed by Fair practices (38%) and poor practices (6%). No significant association was reported among the level of practices and socio-demographic profile of the participants. **Conclusions:** Safe handling of cytotoxic drugs is very important aspect and the nurses can prevent their selves as well as the patients from complications. Overall, good practices were reported by the nurses regarding safe handling of cytotoxic drugs but still a large proportion of the nurses have fair and poor practices. Effective measures are needed to enhance the practices of nurse's working in oncology nurses regarding safe handling of cytotoxic drugs.

INTRODUCTION

Cancer is the most common cause of death in people. It is a debilitating condition that has an extremely high morbidity and fatality rate [1]. Cancer is a disease that does not target a particular age group but rather can strike people at any point in their lives. Cancer is ranked as the second leading cause of mortality worldwide [2]. It is anticipated that there are 443.4 new cases of cancer for every 100,000 men and women. In addition to this, the death rate due to cancer is 158.3 for every 100,000 men and women [3]. Cancer patients' chances of survival are directly influenced by how quickly the disease is diagnosed and by the treatment options that are made available to them [4]. There are only a few alternatives available to treat cancer; chemotherapy and radiation therapy are the two most important and frequently utilized treatments. The most effective form of

treatment for people with cancer is chemotherapy [5]. Chemotherapy includes cytotoxic agents, immunotherapies, biologics, hormone therapies, targeted pharmacological therapies, and a few additional drugs. A hematopoietic stem cell transplant is a popular cancer treatment. Typically, chemotherapy is used to treat cancer [6]. In the early part of the 20th century, cytotoxic medications were first used for the treatment of cancer. Since then, these drugs have been successfully used to treat a wide variety of cancers [7]. Cytotoxic drugs (CDs) are one of the important groups of medicines which are used for the treatment of cancer. These drugs are also known as antineoplastic, anticancer or cancer chemotherapy drugs [8]. Because of their high level of toxicity, chemotherapy medicines not only have an effect on patients but also pose

a threat to the medical professionals who administer them. The administration of chemotherapy is primarily the domain of registered nurses, who serve as the primary caregivers [9]. The safe and correct handling of cytotoxic medications is a topic of concern on a global scale, and more than 5.5 million health care staff were at risk of being exposed to the potentially harmful effects of the cytotoxic agent [10]. Occupational exposure of nurses to the toxic drugs lead to severe problems such as abdominal pain, hair loss, contact dermatitis, allergic reactions, nasal sores, skin injuries and eye injuries. Exposure to these drugs also leads to severe complication in reproductive outcomes including miscarriages, premature births, abortions, fetal loss and disabilities in offspring. As these drugs are cytotoxic, therefore, safe handling of these medications is very important and the basic responsibility of the staff who handle these medicines [11]. Safe handling of the cytotoxic drugs is the main responsibility of the nurses. It not only prevents the patients from harmful effects but also affects the health care professionals. The term "safe handling" refers to the accurate and careful receiving, processing, planning, and administration of cytotoxic medications, as well as their subsequent cleaning and disposal [12]. Therefore, in order for nurses to effectively handle chemotherapy and quality practices, they require certain abilities, knowledge, techniques, and judgments [13]. Since more than 20 years ago, it has been suggested that nurses should follow the standard guidelines of safe handling of cytotoxic drugs to protect not only their selves but the other health care professionals and patients. However, due to unsafe practices of administration of chemotherapy among the nurses, occupational exposure of nurses to cytotoxic medications has persisted for decades [14]. When compared to other types of medical professionals, nurses are the ones that spend the most of their time working directly with patients who are going through the process of getting cancer treatment in the form of cytotoxic medications [15]. Because of this, the primary responsibility of nurses is the management of cytotoxic drugs. This is due to the fact that nurses are regarded as the first line of managers for the management of cytotoxic drugs [16]. Adequate understanding and standard safe handling practices regarding safe handling of cytotoxic drugs is very important for every nurse in any health care facility to protect the patients, care givers and their selves from the adverse effects of chemotherapy [17]. Previous research studies suggested that nurses should have satisfactory and good practices to threaten patient's safety, family and the health care workers safety [18]. In addition, the nurses should be aware regarding the drugs included in cytotoxic drugs, side effects, precautions, personal protective equipment's needed for the nurses

while handling the cytotoxic medication, written policies about cytotoxic drugs, preparation of chemotherapy, chemotherapy administration, cytotoxic drugs disposal, handling contaminated excreta and workplace safety [19]. Certain practices are very important to follow by the nurses to reverse these adverse effects. There has been a correlation established between the safe handling practices of cytotoxic medications in a hospital context and increased interaction with potentially hazardous elements. During the manufacture and administration of cytotoxic medications, the utilization of the labeled protective area, use of personal protective equipment's, use of safe needles, protection of light sensitive drugs, preparation of medication in chemotherapy cells and labeling of drugs are important [20, 21]. The current study is therefore designed to access the practices of nurses towards cytotoxic drugs and evaluate the association of practices with different socio-demographic variables.

METHODS

An analytical cross-sectional study was carried out in Public Sector hospitals, Lahore, Pakistan. Overall, 183 participants where cases were calculated in the study using previous proportion 37% [22]. All the nurses working in oncology departments within the age of 20 to 50 years, with at least six months experience and who have not received any training were included in the study. Data were collected using an adopted, reliable (Cronbach's alpha= 0.925) and validated "Cytotoxic drugs Handling Questionnaire". The tool is consisting of two sections. Section "A" is containing of Scio-demographic (age, sex, work experience, educational level and marital status) of the participants. Section "B" is consisting of 20 items Likert scale questions regarding the safe handling of cytotoxic drugs. Each item in section "B" has 3 response options with values of 0 = never, 1 = sometimes, and 2 = always. The practices of the participants were categorized as "Good", "Fair" and "Poor". A score of above 75% was considered as "Good Practices", score between 50% to 75% were considered as "Fair Practices" and below 50% of the score were considered as "Poor Practices". Data were entered and analyzed by using SPSS 25.0. the qualitative variables were presented by frequency and percentages. Chi square test was applied on different demographic variables and practices towards CDs. P-value <0.05 was considered as significant.

RESULTS

In this study the majority (42%) of the participants were from the age group of 36 to 45 years, followed by 25-35 years (36%) and 46-55 years (22%). In addition, the majority (52.2%) of the nurses was holding diploma in nursing and 47.5% of the nurses were educated to BSN level. 82.5% of

the nurses were married and 62.3% of the nurses were having experience less than five years. Results are given in Table 1.

Variables	Frequency (Percentage)	Valid Percent	Cumulative Percent
25-35 Years	65 (35.5%)	35.5	35.5
36-45 Years	77 (42.1%)	42.1	77.6
46-55 Years	41 (22.4%)	22.4	100.0
Bachelor in Nursing	87 (47.5%)	47.5	47.5
General Nursing	96 (52.5%)	52.5	100.0
Total	183 (100%)	100.0	
Married	32 (17.5%)	17.5	17.5
Unmarried	151 (82.5%)	82.5	100.0
Less than 5 Years	114 (62.3%)	62.3	62.3
5-10 Years	49 (26.8%)	26.8	89.1
More than 10 Years	20 (10.9%)	10.9	100.0
Total	183 (100%)	100.0	

Table 1: Socio-demographic profile of the participants, n=183

The practice of the participants was assessed using questionnaire. The majority (56%) of the nurses reported "Good Practices" regarding safe handling of cytotoxic drugs. 38% of the participants were reported Fair Practices while 6% of the nurses reported poor practices regarding safe handling of cytotoxic drugs (Figure 1).

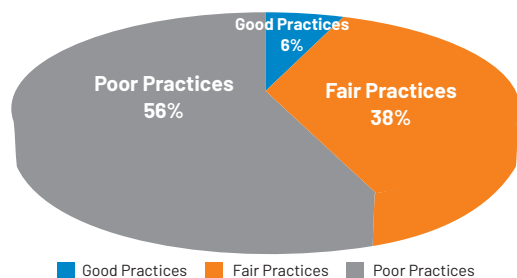


Figure 1: Pie-chart depicting overall practices of nurses regarding CDs

Association among different socio-demographic profile of the nurses and level of practices were accessed. The findings revealed no association among the level of practices towards safe handling of CDs with age, education, marital status and experience of the participants (Table 2).

Variables	Good Practices	Fair Practices	Poor Practices	Total	P-Value
Age	25-35	34	24	7	0.317
	36-45	46	28	3	
	46-55	22	18	1	
Total	102	70	11	183	
Education	Bachelor in Nursing	48	33	6	0.891
	General Nursing	54	37	5	
Total	102	70	11	183	
Marital	Married	20	8	4	0.91
	Unmarried	82	62	7	
Total	102	70	11	183	
Experience	Less than 5 Years	71	38	5	0.143
	5-10 Years	23	21	5	
	More than 10 Years	8	11	1	
Total	102	70	11	183	

Table 2: Association among the level of education and practices towards CDs, n=183

DISCUSSION

In this study the majority (42%) of the participants were from the age group of 36 to 45 years, 52.2% of the nurses was holding diploma in nursing and 47.5% of the nurses were educated to BSN level. 82.5% of the nurses were married and 62.3% of the nurses were having experience less than five years. However, it was lower compared to the findings of another study and reported that majority of the nurses were from the age group of 22 to 50 years. 70% of the participants were female, 88.3% of the nurses were holding bachelor's degree in nursing and 65% of the nurse were having more than four years working experience [1]. Supporting the current findings, another study in Pakistan provided relatively similar findings. The findings of the study reported that the majority (57.7%) of the participants were from the age group of 31 to 40 years. 96.2% of the participants were female and 52% of the nurses were diploma holders [23]. In this study the majority (56%) of the nurses reported "Good Practices" regarding safe handling of cytotoxic drugs following by fair practices (38%) and poor practices (6%). Supporting the findings of the current study a study reported partially similar findings and reported that the nursing working oncology departments have satisfactory practices regarding safe handling of cytotoxic drugs [1]. In contrast another study similar study provided totally different findings and the study reported that they nurse working in oncology department had unsatisfactory practices regarding safe handling of cytotoxic drugs [23]. In addition, Hosen *et al.*, inquiry into a separate topic revealed several practices. The survey's findings revealed that 58.3% of nurses lacked knowledge of safe chemotherapy handling techniques, and that only 33.3% of nurses actually adhered to these recommendations when administering chemotherapy [24]. Similar to the above findings, different study reported partially satisfactory practices regarding safe handling of

cytotoxic drugs [25]. Furthermore, the importance of nurse's education towards the safe handling of cytotoxic drugs and its impact on patients and health care providers should be the part of the interventions [26, 27]. Moreover, 63.6% of the group under study found the nurses' overall KAP scores for the secure management of CDs to be satisfactory. For knowledge, attitudes, and practices, the mean scores were 19.05 4.8 out of 26, 13.09 3.07 out of 16, and 8.87 1.35 out of 12, respectively. More over half of the nurses had prior oncology-related training. During various stages of handling CDs, improper personal protective equipment (PPE) use was noted. It was determined that the examined oncology nurses did not practice safe CD handling and did not apply guidelines in a satisfactory manner, necessitating more frequent in-service training and an audit system to track and assess their performance after training [28]. The majority of studies on nurses' knowledge and behaviors related the safe management of chemotherapy was undertaken in underdeveloped nations. A research study emphasizes the significance of managing chemotherapy safely since it can help healthcare professionals, particularly nurses, avoid complication [29, 30]. The basic reason of the poor or unsatisfactory practices can be the lack of training opportunities for the nurses working in the oncology units. Literature emphasized on the continuous education for the oncology nurses to learn the advance nursing practices of safe handling of cytotoxic drugs [31, 32]. In this study no association was observed among the level of practices and socio-demographic profile of the participants. In the similar context, a study carried out by Simegn *et al.*, provided totally different findings and it was reported that experience and age of the participants were significantly ($P=0.001$) associated with the level of practices [12]. Similarly, another study carried out by Kumari and Taksande provided totally different findings and the findings of the study reported that age in years, marital status, working experience and professional qualification of nurses, is associated with their practices regarding safe handling of Cytotoxic drugs [33].

CONCLUSION

The safe management of cytotoxic medications by nurses was satisfactory, however many nurses still reported unfair and subpar handling. The handling of chemotherapy was not a topic of training for all the nurses. The nurses' inadequate training was clearly visible. According to the study, nurses handled CDs more frequently while wearing gloves and masks as personal protection. However, no one employed all the protective gear when handling (preparing, administering, and discarding) CDs. The current finding for using gloves while preparing is lower, therefore it is crucial

to provide oncology nurses working in oncology facilities with training, safety surveillance systems, personal protective equipment, and standard practice guidelines..

Conflicts of Interest

The authors declare no conflict of interest.

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