Original Article

Oncology nurses awareness of drug interactions

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ABSTRACT

Objective: The aim of this study was to determine oncology nurses awareness of drug interactions. **Methods:** This descriptive study was conducted with nurses working in the oncology clinics who are a member of Oncology Nursing Association of Turkey. A total of 115 nurses (response rate %20) were responded to the online survey that consists of 28 questions. **Results:** The mean age of the nurses was 33 ± 6.8. The majority of nurses work in university hospital (60%) as a clinical nurse (62.6%) and have a Bachelor Degree in Nursing (63.5%). The mean working years in oncology was 4 years. Half of them stated receiving information on drug interactions mostly through in-service education and courses/congresses in last 5 years. The majority of them (84.3%) indicated that they are considering the possibility of drug interactions when they are scheduling the medication administration time. More than half of the responders (59.1%) encountered drug interactions; however, few explored drug interactions with food, drinks, and nutritional supplements. Their practices to assess possibility of drug interactions were reviewing the drug prospectus (78.3%); consulting with their colleagues (58.3%) and searching on the available website (42.6%) and looking at the drug interaction (39.1%). More than half (65.2%) stated lack of any system to identify drug interactions in their workplace. Nearly half of them indicated to including the drug interaction into patient education mostly for food-drug (73.9%) and drug-drug (63.5%) interactions. **Conclusions:** Almost all indicated the needs for further education on drug interactions and suggested to have guideline/packet guide.

Key words: Drug interaction, oncology nursing, patient safety, oncology patients

Introduction

The term "drug interaction" is most often used to describe drug-drug interactions, but there are various substances such as food and nutritional supplements that can alter the pharmacokinetics and/or pharmacodynamics of medications.[1-3] According to Food and Drug Administration, 3%-30% patients experienced the drug-drug interaction.[4]

Drug-drug interaction is a growing problem with the addition of medications for chemotherapeutic agents for cancer to other health problems.[5,6] In a study, 12.4% of the unplanned admission to hospital ($n = 1275$) in cancer patients were considered to be associated with a drug-related problems, and 94.5% of these problems were adverse drug reactions.[7]

Although several studies have evaluated the frequency and

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consequences of medication errors, few have explored their causes. In particular, nurses' knowledge regarding medications has been evaluated minimally.

Nurses are uniquely positioned in the prevention of drug interactions. Little is known about nurses' knowledge regarding this area; therefore, the aim of this study is to determine awareness of nurses working in oncology about drug interactions.

Methods

Study design

A descriptive and cross-sectional design was used to determine awareness of oncology nurses about drug interactions, organization treatment of the patients in the oncology clinics and taking into account the situation of drug interactions in patient teaching.

Instruments

Data were collected via a questionnaire developed by researchers based on the relevant literature.[5,7,8,9] The questionnaire consisted of 28 items with both fixed-choice and open-ended questions on demographic and professional characteristics (institution, educational status, place of work, position, working years in oncology), education about drug interaction, problems with drug interaction, nurses' opinion, and preventive practice for drug interactions and what they have done to determine drug interaction risk was used. This form was converted electronically, and it was filled as online survey system that is named as Surveey.

Sampling procedure and settings

Nurses who are a member of the Oncology Nursing Association of Turkey (TONA) work in oncology clinics and have an E-mail address were the sample of this study. TONA was established in 1989. TONA aims to develop knowledge and comprehension of oncology nursing and spread this knowledge and comprehension. At the time of the study, there were 600 members of TONA in the Turkey.

An E-mail explaining the aim of the study and link to the survey was sent to the nurses. A reminder was sent again 2 weeks later for the nurses who did not respond. Four nurses requested sending data collection tool directly to their E-mail address as an attachment. The process of the data collection was performed between March and August in 2014. A total of 115 nurses (response rate %20) were responded. A presentation about drug interaction prepared by the first author was sent to nurses per their request.

Statistical analysis

Data were transferred to version 17.0 (SPSS for Windows, Chicago, IL, USA) packed program. Percentages and means were used to illustrate the descriptive properties of demographic characteristics. The open-ended questions were grouped into themes and summarized as percentages.

Ethical considerations

Permission to undertake this study was obtained from the Turkish Oncology Nursing Association Board and nurses.

Limitation of the study

The response rate (20%) was low. The low response rate may be caused by recently using online survey system for studies in Turkey. Hence, nurses may not be familiar with surveys.

Results

In the sample, 95.7% were women, and the mean age of the nurses was 33 ± 6.8 (range: 18-52). The majority of nurses worked in university hospital (60%) as a clinical nurse (62.5%) and had a Bachelor Degree in Nursing (63.5%) and also 38.7 of them worked in the oncology clinics between 2 and 5 years. The mean number of years in oncology was 4.7 years (range: 0.1-22 years) [Table 1].

Although it was not presented in the table, the mean number of years in nursing was about 11 years (range: 1-34 years), and bed capacity of hospitals was approximately 23 in cancer clinics; nurses care for approximately 11 patients per shift. 51.3% of nurses stated receiving information on drug interactions and 75% of the nurses had it through in-service education. Most of the nurses (93.3%) stated receiving information on drug interactions in last 5 years, and 92.3% had information from in-service education in last 5 years.

Forty percent of the nurses reported that they encountered drug interaction in oncology clinics during their career, and 22.6% encountered it in the last year. The majority of them (84.3%) indicated that they consider the possibility of drug interactions when they schedule the medication administration time.

While 46% of the nurses indicated that they always discuss drug interaction in patient teaching, 48.7% of the nurses reported that they sometimes discuss it. More than half (65.2%) stated the lack of any system to identify drug interactions in their workplace [Table 2].

Some results were not shown in the tables; nearly half of them indicated including drug interaction into patient

Table 1: Characteristics of the nurses (*n* = 115)

Characteristics	*n* (%)
Gender	
Male	5 (4.3)
Female	110 (95.7)
Age (years) (mean±SD) 33±6.8 (minimum=18, maximum=52)	
<25	13 (11.3)
25-35	61 (53.0)
>35	41 (35.7)
Education	
High school	13 (11.3)
Vocational school	18 (1.7)
Bachelor's degree	73 (63.5)
Graduate (master) degree	11 (9.6)
Working institute	
University hospital	69 (60.0)
State hospital	27 (23.5)
Private hospital	11 (9.6)
Other	8 (7.0)
Clinical positions	
Head nurse	29 (25.2)
Clinical nurse	72 (62.6)
Other	14 (12.2)
Working duration in the oncology clinics (mean±SD) 4.7±4.8 (minimum=1-month, maximum=22 years)	
<2 years	38 (33.0)
2-5 years	44 (38.3)
>5 years	33 (28.7)

SD: Standard deviation

Table 2: Nurses' practices for drug interactions

Practices	*n* (%)
Encountered drug interactions	
Yes	46 (40.0)
No	69 (60.0)
Encountered drug interactions in last year	
Yes	26 (22.6)
No	89 (77.4)
Considering drug interactions when scheduling the drug?	
Yes	97 (84.3)
No	2 (1.8)
Sometimes	16 (13.9)
Teaching to patients about drug interaction	
Always	53 (46.1)
Sometimes	56 (48.7)
Never	6 (6.2)
Having any system to identify drug interactions in the workplace	
Yes	75 (65.2)
No	40 (34.8)

education, mostly for food-drug (73.9%) and drug-drug (63.5%) interactions.

More than half of the responders (59.1%) sometimes encountered drug-drug interactions; 40.9% of them sometimes encountered drug-food interaction. Nurses sometimes explored drug interactions with drinks (27.8%), herbal (24.3%), substance (29.6%), and intravenous medication equipment (41.7%). 6.1%-9.6% of the nurses reported that they always take into account different drug interactions [Table 3].

Although it was not indicated in the table, nurses reported that they encountered chemotherapeutic agents-herb interactions, and they also indicated mercaptopurine interacting with allopurinol which causes elevation of liver function (alanine transaminase, aspartate aminotransferase) tests.

Nurses reported they observed nausea-vomiting (70.4%), dizziness (40%), toxicity (35.7%), elevation of the liver function tests, and headache (34.8%) due to drug interactions in cancer patient [Table 4].

Their practices to assess possibility of drug interactions were reviewing the drug prospectus (78.3%), consulting with their colleagues (58.3%), reviewing drug guide (53%), searching on the available website (42.6%), and checking the drug interaction charts (39.1%) [Table 5].

Although it was not presented in the table, 94.8% of the nurses indicated they need education about drug interaction and they suggested performing training program in regular periods (30.6%) and developing brochure, guidelines, and tables (17.1%) to increase awareness of the drug interactions.

Discussion

"A drug interaction is a situation in which a substance affects the activity of a drug, that is the effects are increased or decreased, or they produce a new effect that neither produces on its own."[10] It is reported that 20%-30% of all adverse reactions to drugs are caused by interactions between drugs.[11] Drug interaction is a common reason for adverse events in cancer patients,[6] and 3%-5% are preventable adverse events.[4]

In a study, an estimated prevalence (36%) of drug interactions in cancer patients (*n* = 347) were found.[12] In an another study performed by Riechelmann *et al.*,[13] 276 potential drug interactions were observed in 405 cancer patients, and they also identified at least one drug interaction in 109 cancer patients in Canada. Considering the result of studies, drug interactions are a common problem in cancer patients. In this study, 40% of the nurses also encountered drug interaction during their clinical practice, and one-third

Table 3: Drug interactions and frequency as reported by nurses in clinical settings

Interactions types	Frequency		
	Never *n* (%)	Sometimes *n* (%)	Always *n* (%)
Drug-drug	36 (31.3)	68 (59.1)	11 (9.6)
Drug-food	58 (50.4)	47 (40.9)	10 (8.7)
Drug-drink	75 (65.2)	32 (27.8)	8 (7.0)
Drug-herbal	79 (68.7)	28 (24.3)	8 (7.0)
Drug-substance (alcohol, smoke)	74 (64.3)	34 (29.6)	7 (6.1)
IV medication equipment such as bag, line	58 (50.4)	48 (41.7)	9 (7.8)

IV: Intravenous

Table 4: Patient problems encountered from drug interactions in the clinics

Problems	*n** (%)
Nausea/vomiting	81 (70.4)
Dizziness	46 (40.0)
Drug intoxications	41 (35.7)
Headache	40 (34.8)
Impairment of liver functions	40 (34.8)
Heart rhythm problems	33 (28.7)
A sudden increase in blood pressure	33 (28.7)
A sudden decrease in blood pressure	33 (28.7)
Impairment of kidney functions	33 (28.7)
Chest pain	28 (24.3)
Increase of the drug level in the blood	17 (14.8)
Decrease of the drug level in the blood	11 (9.6)

*Multiple responses received

Table 5: Nurses' practices to learn about drug interactions

Practices	*n* (%)
Reviewing the drug prospectus	90 (78.3)
Consulting with their colleagues	67 (58.3)
Reviewing the drug handbook	61 (53.0)
Searching on available website	49 (42.6)
Looking at the drug interaction charts	45 (39.1)
Consulting with the hospital pharmacy	41 (35.7)
Searching computer program	34 (29.6)

of them indicated that they encountered drug interaction in the last year.

Drug interactions in oncology are of particular importance owing to the narrow therapeutic index and the inherent toxicity of anticancer agents.[1] Drug-drug interactions usually cause negative effects like toxicity or decreased therapeutic efficacy.[14,15] On the other hand, more than half of the drug interactions are preventable.[7] Nurses play a critical role to prevent drug interaction. Nurses should have adequate knowledge about medication administration, and they should consider drug interactions during medication administration.[16] In this study, while considering drug

interactions by most of the nurses (84.3%) was a positive result, approximately half of them reported having education and almost all of them indicated they need more information about drug interactions which should be taking into account. Only half of them also indicated they always spend time discussing drug interactions during patient education. The results of this study were similar to some studies that indicated medication knowledge of nurses was not at the desired level and nurses need more knowledge.[9,17,18]

In our study, nurses encountered drug-drug interactions and drug-food interactions more often than other interactions. In a study, 6 of 298 unplanned hospital admission were caused by drug-drug interactions that were related to warfarin, captopril, and anti-inflammatory agents.[19] In another study, drug combinations involving antihypertensive and long-term corticosteroids raised the risks for potential drug-drug interactions among patients with cancer.[7] Bayraktar-Ekincioglu[12] identified 229 drug-drug interactions in 126 cancer patients. Riechelmann *et al.*[5] found that at least one drug-drug interaction had occurred in 67% of the cancer patients. In another study performed by Riechelmann *et al.*,[13] at least one potential drug interaction was identified in 109 patients with cancer in Canada.

Drug interactions can lead to severe toxicity, a loss of therapeutic efficacy or an imbalance in physiological substrates.[1] According to Buajordet *et al.*[20] drug interactions seem to be the cause of death in 4% of cancer patients. In a study, 9% of the drug interactions were classified as major, and 77% of the drug interactions were classified as minor.[13] In our study, nurses reported problems with drug interactions like nausea-vomiting, and yet they gave limited examples for drug interactions that caused these problems. Some drug interactions that are reported by nurses may be confused with side effects.

The majority of the nurses reported that they read the drug prospectus to determine drug interactions, and they also use some alternative resources like drug handbooks and colleagues. Limited numbers of nurses have access to computer programs for drug interaction, and there are no any clinical pharmacists in oncology clinics. All these problems may cause limited access of the knowledge about drug interactions.

Conclusion

According to results of this study, approximately half of nurses encountered drug interactions in oncology clinics. Although oncology nurses take into account interactions

between chemotherapeutic agent, other drugs and products, they have low awareness and high demand for education on drug interactions. Only half of nurses provided education to patients about drug interaction. These problems and inadequate patient education related to drug interactions may negatively affect the quality of care.

In-service training programs should be implemented about drug interactions at the appropriate time and adequate number. Drug interaction guidelines should be developed for oncology nurses. Education program supported with materials should be organized for oncology patients.

Conflicts of interest

There are no conflicts of interest.

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