Original Article

Educating Nurses about Safety measures in Handling Chemotherapy Drugs: A Pre-experimental Study

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Abstract

Background: Chemotherapy is used to treat cancer. Occupational exposure to chemotherapy drugs produce many side effects and continue to be a hazard in health care setting. It is therefore highly important for oncology nurses to apply proper drug handling technique and procedures with great care to prevent such exposure.

Objectives: 1. To assess the level of existing knowledge of student nurses regarding safety measures in handling of chemotherapy drugs. 2. To determine the post-test level knowledge of student nurses regarding safety measures in handling of chemotherapy drugs. 3. To evaluate the effectiveness of structured teaching programme on knowledge regarding safety measures in handling of chemotherapy drugs. 4. To associate the post-test knowledge scores of the student nurses regarding safety measures in handling of chemotherapy drugs with their selected demographic variables.

Design: Pre-experimental one group pre test post test design was selected for the study. Fifty 2nd year GNM students were selected through non-probability convenience sampling technique. A self-structured knowledge questionnaire was used to collect the data.

Result: Findings of the study revealed that 36(72%) participants had inadequate knowledge & 13(26%) participants had moderately adequate knowledge in pre test. 28(56%) of the participants had adequate knowledge and 22(44%) had moderately adequate knowledge in post test. The obtained "t" value -12.22 was found to be highly significant at $p<0.05$ level.

Conclusion: Teaching programmes are effective in improving the knowledge and hence must be conducted at regular intervals to retain the information.

Key words: Knowledge, Safety measures, Chemotherapy drugs

Introduction

There are many diseases that are affecting our health and can lead to death too. The World Health Organization (WHO) reports non-communicable

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diseases such as cancer is the leading cause of death worldwide.[1]

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. These contrast with benign tumors, which do not spread. Over 100 types of cancers affect humans.[2] Possible signs and symptoms include a lump, abnormal bleeding, prolonged cough, unexplained weight loss, and a change in bowel movements. Tobacco use is the cause of about 22% of cancer deaths. Another 10% are due to obesity, poor diet, lack of physical activity or excessive drinking of alcohol. In the developing world, 15% of cancers are due to infections such as Helicobacter pylori, hepatitis B, hepatitis C, human papilloma virus infection, Epstein–Barr virus and human immunodeficiency virus (HIV).[3]

According to WHO, the most common cancer cases in 2020 were Breast Cancer (2.26 million cases), Lung Cancer (2.21 million cases), Colon and Rectum Cancer (1.93 million cases), Prostate Cancer(1.41 million cases), Skin Cancer(1.20 million cases) and Stomach Cancer(1.09 million cases).[4]

According to estimates from the international agency for research on cancer (IARC), in 2018 there were 17 million new cancer cases and about 9.5 million cancer deaths worldwide. By 2040 the global burden is expected to grow to about 27.5 million new cancer cases and about 16.3 million cancer deaths simply due to the growth the aging of the population. The future burden will probably be even larger due to increasing prevalence of factors that increase risk such as smoking, unhealthy diet, physical inactivity. [4]

Cancer treatment is evolving at a very rapid rate through newer discoveries. The most common approaches for treatment of cancer include chemotherapy, radiation therapy or surgery or combination of these approaches. Chemotherapy is the most common method used to treat various cancers in which cytotoxic drugs are used to destroy the cancerous cells. Although these drugs are very effective in treating cancers, they have potential threat to normal cells as well, as they interfere with cell division.

Many times the health care professionals handling these drugs fail to follow the safety guidelines while handling these drugs and hence are more vulnerable to the toxic effects of these cytotoxic drugs. Nursing personnel's play a significant role during chemotherapy preparation and administration.[5]

Therefore, the present study was undertaken with the aim to educate the nursing students in their early education period, so that they can practice the safety measures while handling chemotherapy drugs during their professional practice of nursing.

Objectives:

The objectives of this study were as follows

1. To assess the level of existing knowledge of student nurses regarding safety measures in handling of chemotherapy drugs.
2. To determine the post-test level knowledge of student nurses regarding safety measures in handling of chemotherapy drugs.
3. To evaluate the effectiveness of structured teaching programme on knowledge regarding safety measures in handling of chemotherapy drugs.
4. To associate the post-test knowledge scores of the student nurses regarding safety measures in handling of chemotherapy drugs with their selected demographic variables.

Materials and Methods

This study was carried out using a pre-experimental one group pre-test post-test design. A Non-probability, convenience sampling technique was used to select the sample of 50 2nd year GNM students. The study was carried out after obtaining the informed consent from study participants by assuring that the responses obtained from them would be kept confidential and would be used only for the study purpose. And also the ethical clearance was obtained from the institutional ethical committee to conduct the study. Pre-tested structured knowledge questionnaire was distributed to the study participants and were provided with 60 minutes to answer the questions including the demographic data. Following this, a structured teaching program was conducted for the participants regarding safety measures to be followed while handling chemotherapy drugs and the toxic effects these drugs may have on health for 60 minutes. Post-test was

conducted after 1 week to know the effectiveness of teaching program on level of knowledge regarding safety measures in handling chemotherapy drugs using afore-mentioned questionnaire. Responses were scored as 1 point for correct answer and 0 point for incorrect answer. The obtained data were entered in Excel Sheet and analyzed using descriptive and inferential statistics.

Results and interpretation

This investigation was carried among 50 students studying GNM course intended at determining their knowledge regarding safety measures in handling chemotherapy drugs. Table 1 revealed the sociodemographic variables, where majority of male 6 (86%) were >20 years old, and majority of female 21 (49%) were between 19-20 years age group. Majority of the participants 23(46%) were >20 year old, 46(92%) belonged to Hindu religion, 41(82%) participants were from nuclear family, 26(52%) were residents of rural area and 45(90%) participants did not have any history of cancer in their families. 33(66%) of the participants gained information from books.

Table 1: Frequency and percentage distribution of nursing students according to their demographic variables n=50

Demographic Variable	Frequency	Male	%	Female	%
Age					
17-18	2	1	14	1	2
18-19	4	0	0	4	9
19-20	21	0	0	21	49
>20	23	6	86	17	40
Total	50	7	100	43	100
Religion					
Hindu	46	7	100	39	90
Muslim	2	0	0	2	5
Christian	2	0	0	2	5
Total	50	7	100	43	100
Type of Family					
Nuclear	41	5	71	36	84
Joint	9	2	29	7	16
Total	50	7	100	43	100
Place of residence					
Rural	26	5	71	21	49
Urban	24	2	29	22	51
Total	50	7	100	43	100
Family history of cancer					
Yes	5	2	29	3	7
No	45	5	71	40	93
Total	50	7	100	43	100

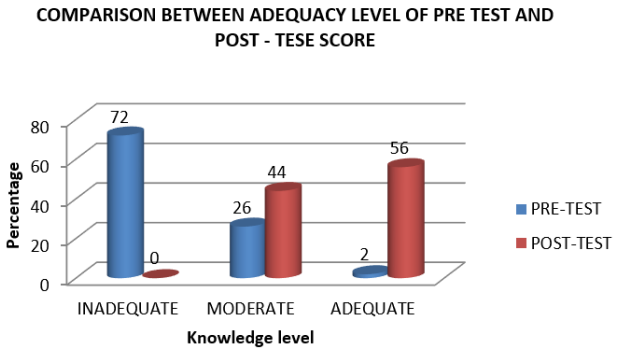

Fig 1: Comparison between adequacy level of pre test and post – test knowledge scores

Fig. 1 shows the responses obtained from study participants regarding level of knowledge demonstrated significant changes between the pre-test and post-test scores. Notable improvement in post test level of knowledge regarding safety measures in handling chemotherapy drugs indicated the effectiveness of teaching programme.

Table 3: Level of knowledge regarding biomedical waste management (n=50)

Level of knowledge	Mean	SD	Paired "t" value	p- value
Pre test	12.08	4.22	-12.22***	p<0.00001
post test	19.98	1.77		

***Highly Significant at p<0.05

Table 3 reflects the mean and standard deviation of knowledge scores of nursing students regarding safety measures in handling chemotherapy drugs. Study findings indicated that there was significant increase in mean scores of knowledge responses from pre-test to post-test with 12.08 ± 4.22 and 19.98 ± 1.77, respectively, which indicated a statistically (significant p<0.05) increase in knowledge scores after the intervention.

Table 4: Association of post-Test knowledge scores of the nursing students regarding safety measures in handling chemotherapy drugs with their selected demographic variables. n=50

Demographic Variable	No. of subjects	Post-test score			p-Value
		<14	15-19	≥20	
Age					
17-18	2	0	1	1	0.993 NS
18-19	4	0	0	4	
19-20	21	0	11	10	
>20	23	0	10	13	
Total	50	0	22	28	
Gender					
Male	7	0	3	4	0.998 NS
Female	43	0	19	24	
Total	50	0	22	28	
Religion					
Hindu	46	0	21	25	0.598 NS
Muslim	2	0	0	2	
Christian	2	0	1	1	
Total	50	0	22	28	
Type of Family					
Nuclear	41	0	17	24	0.743 NS
Joint	9	0	5	4	
Total	50	0	22	28	

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Place of residence					
Rural	26	0	13	13	0.673 NS
Urban	24	0	9	15	
Total	50	0	22	28	
Family history of cancer					
Yes	5	0	1	4	0.377 NS
No	45	0	21	24	
Total	50	0	22	28	
Source of knowledge					
Books	33	0	13	19	0.907 NS
Internet	16	0	8	9	
Television	1	0	1	0	
Total	50	0	22	28	

Table 4 shows, the association of post knowledge score with demographic variables. Findings indicated that, there was no statistically significant association of post test knowledge scores with demographic variables like age, gender, religion, type of family, place of residence, family history of cancer and source of knowledge, as the calculated p- value was not < 0.05 (p- value <0.05 is considered significant).

Limitations of the study

1. Sample size was limited to 50 participants
2. Study included only students studying 2nd year GNM course.

Recommendations

1. Study can be done on larger sample size.
2. Comparative study can be conducted using different teaching methods.
3. Study can be done with control group.

Discussion

The current study showed that, in pre test 72% of the participants had inadequate knowledge level, 26% participants had moderately adequate knowledge and only 2 % participants had adequate knowledge. After undergoing teaching programme, in post test, 56% participants exhibited adequate knowledge, 44% participants had moderately adequate knowledge and no participant was found have inadequate knowledge about safety measures in handling chemotherapy drugs. Present study findings were consistent with many research studies. A descriptive study conducted on 40 staff nurses revealed that 40% of the participants had inadequate knowledge about safety measures to be followed while handling of chemotherapy drugs.[6] A study conducted by Mishra et.al., reported that the mean pre test knowledge score 17.5 ± 2.28 was enhanced 27.03 ± 1.73 in post test and the pre test practice score 9.13 ± 1.52 was improved to 13.8 ± 1.09 in post test indicated the effectiveness of teaching programme.[7] A descriptive cross sectional study conducted by Devi. S, et al. on nursing professionals revealed that 55% of the participants had poor knowledge level and 46.7% demonstrated mild positive attitude towards safe handling of chemotherapy drugs.[8]

Dhiaa. A.H, et al reported that the staff nurses have inadequate knowledge regarding chemotherapy drugs and its safe chemotherapy administration.[9] A study conducted by Naglaa. E. M, et al. showed that there was a significant difference between mean pre test and mean post test scores of knowledge, practice and attitude of nurses regarding safe handling of chemotherapy drugs.[10] Lee. J. L, et al. conducted a cross sectional survey on 106 nursing staffs and found that the mean knowledge score was 58.46±12.88. It was also found that there was no significant correlation between their knowledge with their professional experience and the experience in handling chemotherapy drugs indicating the need for more training and educational programmes.[11] In a study by Hanafi. S, et al. it was shown that nurses lack the knowledge regarding adverse effects of exposure to chemotherapy drugs and the safety

precautions to be followed and hence the need for educational programmes.[12] A cross sectional study carried out by Hosen. M. S, et al reported that nurses lack adequate knowledge regarding the personal safety equipments used while handling chemotherapy drugs as they have not undergone any training programme about the same.[13] A study conducted by Arul. PA revealed that 87.5% of the participants had moderately adequate knowledge & 9.4% had adequate knowledge in pre test. In post test 68.75% of the participants had adequate knowledge & 31.25% had moderately adequate knowledge.[14]

Conclusion

The authors concluded that the study participants had inadequate knowledge about safety measures in handling chemotherapy drugs. Structured teaching program in the present study was found effective in improving the knowledge of the participants. Hence, conducting more educational programs, health talks, seminars and workshops on safe preparation and administration of chemotherapy drugs will help improve the knowledge of nurses. The nursing curriculum must include safety guidelines about handling chemotherapy drugs in order to educate the nursing students.

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