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ORIGINAL PAPER

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Assessment of Nurse's Safe Behavior Towards Chemotherapy Management

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ABSTRACT

Introduction: The management of chemotherapy in the hospital environment has been associated with increased risk of exposure to harmful factors. The use of the designated protective area and equipment during the preparation and the administration of chemotherapy is considered the gold standard of prevention. **Aim:** The aim of the study was to assess nurse's behavior in one public and one private hospital during the management of chemotherapy. **Methods:** A cross sectional study design, using a self-completing questionnaire was used to collect the data, the final sample consisted of n=82 nurses, employed in the oncology and haematology department of Limassol general hospital and the bank of Cyprus oncology center. **Results:** Most of the sample had a positive attitude towards the management and preparation of chemotherapy and kept the personal protection measures 52,4%. Inadequate aeration system was found to exist in both the health care centers 17,1%. The knowledge levels of the nurses employed in the bank of Cyprus oncology center was found to be statistically higher than the nurses employed in Limassol general hospital (84,4% Vs 23,4%, p<0,001). **Conclusion:** Educational programs need to be designed and implement to update nurses with the latest safety techniques and procedures, aiming at the protection of the employees from side effects as a result from the exposure to chemotherapy. The management of the healthcare institution need to ensure that the workplace environment fulfils all the safety standards and health regulations regarding the preparation of chemotherapy. Lastly more studies need to be conducted to monitor the knowledge and attitudes levels, and the implementation of safety and health regulation from the health care organizations regarding the safe management and preparation of chemotherapy.

Keywords: Nurses, Chemotherapy, Behaviour, Knowledge, Attitudes.

1. INTRODUCTION

According to the World Health Organization (1), every year more than eleven million people are diagnosed with cancer and six million die from it, ranking cancer as the number one cause of death worldwide. One of the main forms of treatment is the administration of chemotherapy.

Chemotherapies are therapeutic agents that are mainly used in the treatment of cancer, their main mechanism of action is to inhibit the reproduction and function of cancer cells (2). In our days, the medical advancements have improved the detection time of the disease leading to longer and larger number of chemotherapy schemes administration (3, 4).

The extensive use of chemotherapies has increased the health risks for the professionals managing them (5, 6), as these treatments have been found to be mutagenic and teratogenic and they have been linked with side effects such as weakness, nausea, hair loss and the loss of appetite if inadequate protective measures are taken (7). Since the health care professionals that are responsible for the preparation and administration of chemotherapy are exposed, they are at increased risk (8).

Occupational hazards vary according to the frequency and duration of preparation and administration, the toxicity of the medication and the personal tolerance of the health care professional (9). The main sources of exposure to hazardous factors are the inhalation of droplets in the form of aerosol, the absorption of the medication from the skin, swallowing, and more rarely the infusion of the medication through needle injury (10).

Several studies report that the prevention of exposure to chemotherapy is of high importance, and the use of all the designated occupational preventative measures during the

preparation and administration of chemotherapy should be followed (4, 10).

In Cyprus chemotherapy is mainly prepared by nurses in hospitals and day units. This group of health care professionals should possess high levels of knowledge and positive behaviors towards the safe management of chemotherapy.

2. AIM

The main aim of the study is to investigate the attitudes and behaviors of the health care professionals that are employed in the public and private oncology department in Cyprus regarding the safe preparation and administration of chemotherapy.

3. METHODS

The study design was descriptive in the form of a cross sectional study, a convenience sample was used. The sample consisted of nurses that were actively employed in one public hospital, Limassol general hospital (LGH) oncology and haematology department, and one private, Bank of Cyprus Oncology Centre (BOCOC). All participants were actively involved in the preparation and administration of chemotherapy. Eighty-two questionnaires were returned which consists the final sample of the study (n=82), the percentage that participated in the study (78,1%) is considered adequate, in the effort to minimise information bias (11).

Data collection

Data were collected using an anonymous self-completion questionnaire between February and March 2018. Participants were informed regarding the objective of the study and their voluntary participation. Questions or queries were answered by the researcher on the spot. A written consent was requested. The questionnaires were completed on site and collected on specific boxes located on the wards during the break time of nurses.

Ethical considerations

Permission to use the instrument were obtained via e-mail from Kyprianou et al. (4). The study was approved by the Ethics committee of Cyprus. Permission to conduct the study, were obtained from the Department of nursing of the Ministry of health of Cyprus, and the directorate of BOCOC and LGH. Access to the data was allowed only to the main researcher.

Statistical analysis

Descriptive and inferential statistics were performed. Parametric (Independent sample t-test, One-way ANOVA) and non-parametric tests (χ^2), where used where appropriate. Data were analyzed using the Statistical Package for Social Sciences (SPSS) v.22. The level of significance was set at $p < 0.05$.

4. RESULTS

Most of the nurses were employed in the LGH 58% (n=48), were women 52,4% (n=43) and had six to ten years of nursing experience 28,8%. 58% of the sample stated that they had up to five years of experience in their current department, and 35,4% had a postgraduate degree. Regarding the source of information towards the hazards of their profession 47,6% answered that they get informed by the educational department of their hospital (Table 1).

	NO%	YES %
Media	87,8	12,2
Hospital educational department	52,4	47,6
Unions	81,7	18,3
Professional Organization	75,6	24,4
Other	64,6	35,4

Table 1. From where you get informed regarding work related hazards

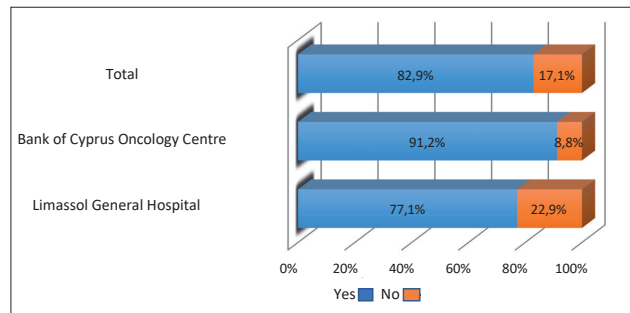


Figure 1. Is there adequate aeration in the chemotherapy preparation booth

The BOCOC was the hospital that provided the most training opportunities to his employees 85,3% compared to LGH 20,8%. None of the nurses (0%) employed at LGH prepares chemotherapy at the general medication counter were in the BOCOC 11,8% of the nurses reported to use this space. A percentage of 95,8% at the LGH and 76,5% answered that they use the biological safety booth for the preparation of chemotherapy. 17,1% of the overall sample stated that there is no adequate aeration in the chemotherapy preparation room (Figure 1).

Regarding the use of protective equipment 57,3% uses gloves, 54,9% uses robe, 17,1% glasses and 57,3% mask. An overall 52,4% uses all the before mentioned protective equipment compared to 1,2% that uses no equipment. The attitudes towards the preparation of chemotherapy were found to be positive as most of the sample answered that they never smoke or apply make-up (100%), eat (97,6%) or drink (95,1%) in the preparation area.

Nurses employed in BOCOC (n=34, M=0,67, SD=0,13), had statistically significant higher knowledge levels regarding the side effects of chemotherapy exposure than the nurses employed in LGH (n=48, M=0,50, SD=0,17), (84,4% Vs 23,4%, $p < 0,001$).

5. DISCUSSION

In our study we aimed at assessing the safe behavior of nurses towards the management and preparation of chemotherapy in one private and one public hospital in Cyprus. Nurses reported as their preferred source of information and training for the safe handling of chemotherapy the educational department of the hospital that they are employed (47,6%). In a study by Orujlu et al., (12) a percentage of 52% nurses reported that they received a form of training in their place of employment. Similar results were found in a study that took place in Jordan, were most nurses received training in the handling of chemotherapy in their place of employment (13).

None of the nurses employed in the Limassol general hospital reported that prepares chemotherapy on the general medication counter compared to the BOCOC were only a small percentage (11.8%) reported that uses this space. On the contrary in both health care centers most nurses prepare chemotherapy in the designated biological safety booth. Additionally, a percentage of 17,1% mentioned that there is no adequate aeration in the designated preparation area. Al-Azzam et al., (13), findings come in agreement as in their study the space where chemotherapy was prepared was found to be unsafe. Similar results were noted in other studies contacted in Europe (14, 15).

Most of the nurses in the present study (52,4%) comply with the use of protective equipment (gloves, gown, glasses, mask), only a small percentage (1,2%) stated that they use no protective measures, the rest of the sample reported that they use some of the protective equipment. The inadequate use of protective equipment has been documented in other similar studies (16, 17). The lack of training might have an impact on the correct use of protective equipment, in a study contacted by Schreiber et al., (18) it was found that the use of protective equipment was improved after training and information actions was offered to nurses.

An important finding is that most nurses, was found to have positive attitudes and behaviours towards the management of chemotherapy, 97.6% of the sample did not eat and 95.1% did not drink in the designated chemotherapy preparation area, similar 97,6% stated that they never store food and drink in the designated areas. On the contrary Chaudhary and Karn (17) demonstrated that more than 62% of the nurses in their study had developed one or more dangerous behaviours in the designated chemotherapy preparation area.

Headache, dizziness, eczema, hair loss, sickness and allergies where the most frequent observed side effects reported. Kyprianou et al., (4) and Orujlu et al., (12) reported that hair loss and headaches where the most frequent presented side effects. In a different study by Constandinidis et al., (19) found that central nervous system side effects such as headaches, sickness and dizziness where the most observed. In two studies that took place in Iran nurses answered that eczema and headaches where the most observed side effects (20, 21). The application of personal protection measures during the preparation and management of chemotherapy could reduce the exposure of nurses to harmful factors resulting in a reduction of side effects presentation (12).

Finally, nurses employed at the BOCOC had statistically significant higher knowledge levels compared to nurses employed in LGH regarding the side effects, protection equipment and correct management techniques of chemotherapy. This might be a result of the higher percentage of trained nurses in the management of chemotherapy in the BOCOC 84,4% compared to the LGH nurses 23,4%. Inadequate knowledge levels regarding the management of chemotherapy where also observed in several studies (4, 17, 22). Knowledge levels can be improved with the development of a training program regarding the safe management of chemotherapy. Keat et al., (23) found improved levels of knowledge in their study after the nurses attend a train-

ing program.

6. CONCLUSION

The finding of the present study demonstrated that the knowledge of the nurses towards the management and preparation of chemotherapy needs to be improved. The design and implementation of educational and training programs will keep the nursing staff updated with the latest safety techniques and procedures, aiming at the protection of the employees and the prevention of side effects as a result from the exposure to chemotherapy.

The management of the healthcare institution need to ensure that the workplace environment fulfils all the safety standards and health regulations regarding the preparation of chemotherapy. Adequate preparation equipment and space needs to be available to healthcare professionals managing and preparing chemotherapy.

Lastly more studies need to be conducted in the future to monitor the knowledge and attitudes levels, and the implementation of safety and health regulation from the health care organizations regarding the safe management and preparation of chemotherapy.

Study limitations: The study limitation was the inclusion in the study of two healthcare settings (one public and one private) this applies a degree of caution upon the generalizing of the results in the general population. The data where obtained during the brake time of nurses and the responses may have been influenced by pressure as an effect of the lack of time. In addition, as the data where obtained through self-reports some errors might have occurred. Lastly contamination of data is likely to have affected the results of the study, as the participants were not observed while completing the tool and could have consulted information resources to respond to the questions.

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