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The Awareness And Implementation Of Anti-Neoplastic Drug Waste Management In Karachi's Healthcare Facilities And Daycares

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Abstract

To achieve long-lasting environmental sustainability and protect public health, it is crucial to adopt appropriate management strategies for healthcare waste. This study aims to evaluate the knowledge and attitudes towards waste management practices for anti-neoplastic drugs in hospitals daycare facilities situated in Karachi. The data was collected from the daycare of oncology departments of all the hospitals participating in the study. An exhaustive analysis was conducted to consolidate the findings of the survey. The results suggest a significant lack of knowledge among the participants regarding the proper handling of waste contaminated with anti-neoplastic drugs, as well as their attitudes towards using Personal Protective Equipment (PPE). When asked about the [1]correct method of disposing waste products that are contaminated with anti-neoplastic drugs, only 37% of the participants agreed that it is necessary to separate and package each contaminated material individually. The survey results support the implementation of a comprehensive waste management program that would be maintained through ongoing training and supervision.

Keywords: *Anti-neoplastic drugs, waste management, Oncology Daycare, Hospital facilities and Personal Protective equipment.*

Introduction

The toxicity linked to antineoplastic drugs has been widely acknowledged since their initial introduction in the 1940s. Antineoplastic drugs, which have a nonselective mechanism of action, affect both cancerous and noncancerous cells, resulting in well-documented side effects. During the 1970s, evidence surfaced indicating that health care workers might encounter detrimental consequences as a result of being exposed to antineoplastic drugs in their work environment (Polovich, 2004). Antineoplastic drugs are categorised as "hazardous drugs" within a larger classification (NIOSH, et al., 2004). A hazardous substance is defined as any drug or substance that has the potential to endanger an individual's health when they come into contact with it. A hazardous drug is a substance that demonstrates one or more of the following qualities in humans: genotoxicity, carcinogenicity, reproductive toxicity, teratogenicity, or other developmental toxicity. Hazardous drugs encompass therapeutic agents, including

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antineoplastic and cytotoxic agents. According to Power and Polovich (2012), these drugs have the capacity to pose risks to human health.

Effective handling of anti-neoplastic waste requires the assisting units to establish specific requirements. These requirements cover a range of factors including categorisation, separation, packaging, storage, collection, transportation, treatment, and ultimate disposal, while considering the physical, chemical, and biological characteristics of the waste. Furthermore, it is recommended to give importance to the reduction or pre-treatment of potential hazards in order to minimise the adverse effects on the welfare of workers and the environment (Rocha et al., 2004).

Regarding worker health, it is crucial to acknowledge that being exposed to waste from these drugs can potentially lead to mutagenic, carcinogenic, and teratogenic consequences (Kyprianou et al., 2010; Yanqin et al., 2012). In addition, there have been reported cases of contact dermatitis, skin local reactions, abdominal pain, headache, dizziness, nausea, and alopecia linked to the exposure of anti-neoplastic drugs (Krstev et al., 2003). The observed effects frequently resemble those encountered by patients themselves. These effects have been observed in healthcare workers who are engaged in the process of preparing, administering, or handling these medications. This phenomenon is particularly noticeable when individuals neglect to use personal and collective protective equipment.

The typical routes of exposure to this waste include breathing it in, coming into contact with it through the skin, swallowing it, and getting injured by sharp objects. The main ways in which people can be exposed to anti-neoplastic drugs are by breathing in tiny droplets in the air, absorbing them through the skin, swallowing them, or getting accidentally pricked by a needle while handling them (Ziegler et al., 2002; Turk et al., 2004; Connor and McDiarmid, 2006). The handling of cytotoxic drugs involves several potentially dangerous activities, such as drug transportation, preparation, administration, storage, management of cytotoxic spillage, waste disposal, and handling of patient excreta (Ahmad, 2001; Connor and McDiarmid, 2006). According to a study conducted by Connor and McDiarmid in 2006, nurses who engaged in occupational activities in healthcare settings had elevated levels of mutagenic substances in their urine compared to workers in other professions.

Therefore, the objectives of this study are to assess the present condition and identify any shortcomings in the handling of waste related to anti-neoplastic drugs. This will be accomplished by assessing the expertise, consciousness, and proficiency of staff members regarding the disposal protocols for anti-cancer medications implemented by daycare oncology departments in medical facilities.

Material and Methods

An investigation was carried out to evaluate the knowledge and attitudes of a cohort of 70 nurses employed in daycare oncology departments at different hospitals. The individuals in inquiry were the specifically assigned nurses who were responsible for administering chemotherapy treatments to patients suffering from different malignant diseases in the daycare. The investigator developed the survey questionnaire by consulting various guidelines and previous studies. The questions were formulated to collect data on participants' comprehension, consciousness, and individual encounters concerning the disposal of anti-neoplastic drugs. The data was collected through face-to-face interviews with the participants. The responses obtained from the questionnaire were documented and analysed using Microsoft Excel, specifically version 2010. The data was analysed using descriptive statistics, and the findings were presented as frequencies and percentages.

Results

The initial section of the questionnaire collected sociodemographic data, which encompassed information regarding gender, age, education level, professional category, and years of experience in the field. 83% of the individuals were female, which is in line with the expectation, as nursing has traditionally been a profession predominantly occupied by women. Male constituted the remaining 17%. The age range of the individuals spanned from 25 to 45 years. Regarding the length of time professionals have been practicing in the anti-neoplastic chemotherapy service, a study revealed that 67% of them had over ten years of experience. In addition, 19% of individuals had a tenure of less than five years, while 14% had worked for less than two years. Regarding education, 85% of individuals had achieved a bachelor's degree, while the remaining 15% had finished their education at the high school level.

Regarding waste management, the participants have identified items that are causing concern. All respondents identified the saline drips containing chemotherapeutic drugs. Furthermore, 43% of respondents specifically mentioned the utilisation of gloves and catheters in the process of administering chemotherapy. In addition, 39% of respondents emphasised that materials such as syringes, needles, needle covers, caps, tape, cotton, and gauze were contaminated by chemotherapy. Only 18% of the participants indicated the importance of separating and individually packaging all materials that have been contaminated by chemotherapy (Figure: 1).

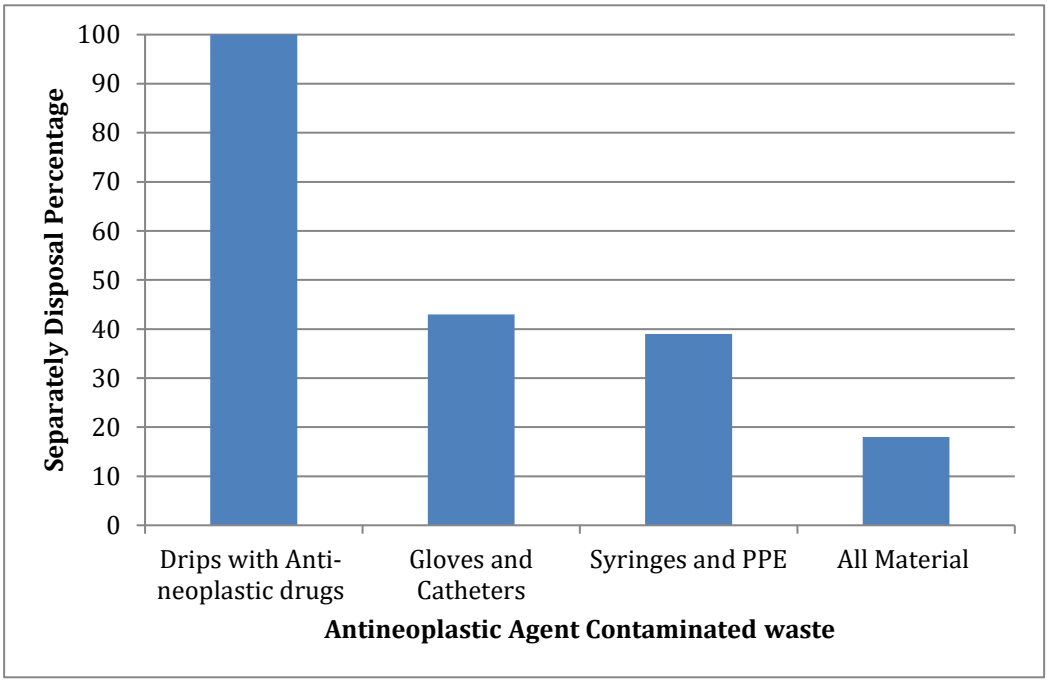

Figure: 1. Knowledge to separately dispose the waste contaminated by anti-neoplastic agents.

Regarding the comprehension of safe handling practices and the corresponding attitudes, a survey revealed that 52% of individuals hold the belief that using full personal protective equipment (PPE) is unnecessary. 68% of individuals were knowledgeable about proper spillage management. Approximately 79% of the staff have undergone training in the appropriate handling and disposal of anti-neoplastic agents through multiple sessions. Just 64% of the staff properly disposing of anti-neoplastic contaminated waste (Figure 2).

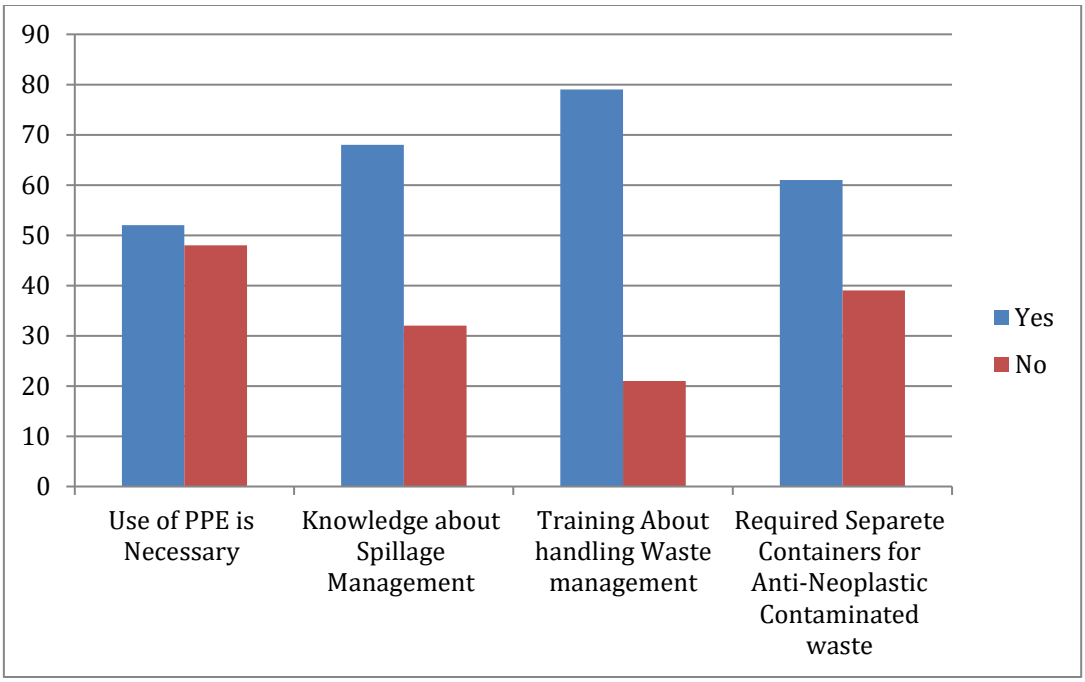

Figure: 2. Attitude and knowledge about the safe handling of waste contaminated by anti-neoplastic agents.

Discussion

The respondents' knowledge was deemed insufficient in terms of cultivating appropriate attitudes towards waste management in care practice. After examining the data on the packaging of sharp waste contaminated with chemotherapeutic drugs, it was noted that professionals had a limited comprehension of this procedure. The veracity of this situation has been validated through firsthand observation at the location. Furthermore, it is important to mention that two pieces of evidence gathered during the field observation further validated the inconsistency between the statements made by the staff and their actual execution. It was initially discovered that the container for general waste contained substances that were contaminated with Anti-neoplastic agents. It is customary to discard empty bottles of anticancer chemotherapy, saline bottles, catheters, gauze, cotton, and gloves that have been contaminated by these substances. These items should be placed in plastic bags and disposed of in containers specifically designated for toxic materials. Based on a prior investigation, economically disadvantaged countries require greater emphasis on promoting education and training in the management of medical waste. The application of state-of-the-art technologies in the handling of hospital waste, particularly biomedical waste, has the capacity to transform waste management practices in hospitals worldwide, including both developed and developing countries (Farooqi et al., 2022).

Nurses must possess a profound level of knowledge to ensure their adherence to safety protocols and foster their overall well-being. Nevertheless, it is worth mentioning that although knowledge is crucial, it does not necessarily ensure full compliance with precautionary measures (Turk et al., 2004; Kyprianou et al., 2010; Khan et al., 2012). The implementation of safety measures and improvement of organizational safety climate are dependent on various management actions, which not only enhance individual knowledge and attitudes but also contribute to overall safety. These actions include safety policies, procedures, reinforcement, and support for safety programs (Polovich and Clark, 2010).

Conclusion

Poor management of waste anti-neoplastic agents by nursing staff can increase the likelihood of occupational risks, such as cytotoxic, carcinogenic, mutagenic, and teratogenic effects. This can also affect other healthcare team members, the patient, and the environment. The findings of this study suggest that there is a requirement for enhancing the knowledge, attitude, and practices of nurses who are responsible for administering cytotoxic anti-neoplastic drugs. In addition, adequate education and training, along with policies, are effective means to enhance the safety environment in the daycare premises that provides active anti-neoplastic therapy.

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