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Nurses' Knowledge regarding Infection Prevention in Neutropenic Patients at Tertiary Cancer Hospital, Nepal

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ABSTRACT

Background: Neutropenia is one most common risk factor for infection and the leading causes of death in cancer patients that may results in unexpected hospitalizations and disruption in treatment plans and regimens.

Method: A cross-sectional study was carried out among 100 nurses to assess the knowledge regarding infection prevention in neutropenic patients to those who are working least 6 months in chemotherapy of B.P. Koirala Memorial Cancer Hospital (BPKMCH). A non-probability purposive sampling technique was adopted to select the sample and the data was collected through a structured self- administered questionnaire. Data were analyzed by using Statistical Package for Social Science (SPSS) version 22.

Result: The study findings summarized the level of knowledge into three categories where more than half (51%) of the respondents had good level of knowledge, 46% had moderate knowledge and 3% had poor knowledge regarding infection prevention in neutropenic patients.

Conclusion: Though majority of the respondents had good and moderate level of knowledge regarding infection prevention in neutropenic patients but there is still lack of Guideline/Protocol on infection prevention measures and gap in knowledge regarding daily nursing assessment. So, there is still need to develop and implement infection prevention guidelines/ protocols and regular trainings on infection prevention from concern authority of hospital management.

Key words: knowledge, infection prevention, neutropenic patients, nurses, cancer hospital.

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INTRODUCTION

Chemotherapy is a cornerstone in cancer treatment, but its use often leads to neutropenia, a condition marked by dangerously low levels of neutrophils, compromising the body's ability to fight infections. Neutropenia is a primary dose-limiting side effect of chemotherapy, radiation therapy, and conditions affecting the blood. It significantly increases the risk of infections, which can escalate rapidly and lead to sepsis, potentially fatal if not promptly managed.[1,2] In neutropenic patients, infections are considered emergencies requiring immediate intervention due to their potential to progress rapidly. Nurses play a critical role in managing neutropenia-related infections by implementing preventive measures, educating patients and caregivers on infection signs, and ensuring prompt medical attention when necessary.[3,4] Preventive protocols such as protective isolation, hand hygiene, neutropenic diet, and prophylactic antibiotics are crucial in reducing infection rates and improving patient outcomes.[5] Oncology nurses, with their specialized knowledge and skills, are pivotal in supporting patients through chemotherapy, mitigating neutropenia's impact, and improving quality of life. They educate patients on infection risks, provide supportive care, and collaborate within multidisciplinary teams to deliver evidence-based interventions.[6,7] Their compassionate care and expertise are essential in managing neutropenia effectively and minimizing its devastating effects on patients' well-being.[8]

METHODS

A quantitative cross-sectional survey was adopted to assess the knowledge regarding infection prevention in neutropenic patient among nurses working at BPKMCH with the sample of 100 nurses who were selected by using non probability purposive sampling technique. The inclusion criteria was at least six months of working experience at BPKMCH. A self-administered structured questionnaire was

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used for data collection about knowledge regarding infection prevention in neutropenic patients. Data was collected after submitting research proposal and getting administrative approval and ethical approval from concerned authority of BPKMCH. Objectives of the study were explained to each respondent, and informed written consent was taken for data collection. Written informed consent was taken before the data collection by explaining the objective of the study. Anonymity and confidentiality were maintained during and after data collection The data was collected, analyzed, interpreted, by using descriptive statistics in statistical package for social science (SPSS) version 22.

RESULTS

The demographic analysis in Table 1 presents a comprehensive overview of key characteristics observed among the 100 respondents surveyed. . The mean age of the respondents was 31.6 and SD was 7.423 with the maximum age of 53 years and minimum age of 22 years. Likewise, regarding work experience in oncology, 65% of respondents had experience of 1-5 years, 25% had experience of 10 years above and only 10 % respondents had experience of 5-10 years. Similarly, regarding education, majority of respondents (77%) had education of Bachelor in Nursing and only 3% had done Masters in Nursing.

Table 1. Socio-demographic characteristics of the respondents: age, oncology nursing experience, educational level. (n=100)

Variable	Frequency(%)
Age	
20-30	57(57)
31-40	31(31)
41-50	10(10)
51-60	2(2)
Mean ± SD: 31.64±7.423 Min (Max) : 22(53)	
Working Experience	
1-5 years	65(65)
5-10 years	10(10)
10 years above	25(25)
Education Level	
PCL nursing	20(20)
Bachelor In nursing	77(77)
Master in nursing	3(3)

Table 2 reveals that among 100 respondents, only 5% respondents had received training on infection prevention and less than one fifth (18%) of respondents had received oncology nursing training. Regarding availability of guidelines, only 37% respondents reported about the availability of written protocol / guidelines about the infection prevention in the ward.

Table 3 shows responses of common daily nursing assessment. Most of the respondents (95%) answered

Table 2. Socio-demographic Characteristics of the Respondents: Infection Prevention Training, Oncology Nursing Training and Availability of Guidelines (n=100)

Variable	Frequency (%)
Infection prevention training	
Yes	5(5)
No	95(95)
Oncology nursing training	
Yes	18(18)
No	82(82)
Availability of guideline	
Yes	37(37)
No	63(63)

to assess oral cavity every 12 hour followed by frequent monitoring of vital signs (92%), assess IV site/Central line catheter (86%), accurate record of intake output(72%) and assessment of perineal area (72%), skin assessment (67%) and weight 38% respectively.

Table 4 depicts that most of the respondent (98%) correctly answered that raw food should be avoided

Table 3. Respondent's knowledge about most common components of daily nursing assessment. (n=100)

Knowledge variable	Frequency (%)
Most common daily nursing assessment *	
Frequent monitoring of vital signs	92(92)
Assess oral cavity every 12 hour (minimum) for presence of mucositis	95(95)
Accurate record of the intake/output	72(72)
Weight	38(38)
Perineal area	72(72)
IV site/central line catheter	86(86)
Skin	67(67)

**Multiple responses*

in neutropenic patient to reduce the risk of getting an infection from food-borne bacteria. Similarly 88% of respondents had knowledge on egg with crack shells

and sharing utensils in neutropenic patient is unsafe. Likewise, 89% of respondents knew that drinking running tap water is unsafe during neutropenia and most of the respondents (96%) answered that well cooked food as neutropenic diet. Furthermore, 44% respondents knew that black tea and lemon is a food recommended during diarrhea in neutropenic patients. Table 5 depicts that majority of respondents (97%) knew that neutropenic patient should be kept away

Table 4. Respondent's knowledge about neutropenic precaution: neutropenic diet. (n=100)

Knowledge variable	Frequency (%)
Raw foods should be avoided in neutropenic patients to reduce the risk of getting an infection from food-borne bacteria	98(98)
Drinking running tap water is unsafe for neutropenic patients	89(89)
Egg with cracked shells should not be allowed for neutropenic patient	88(88)
Neutropenic diet includes well cooked food	96(96)
Sharing utensils in neutropenic patient is unsafe	88(88)
Food recommended during diarrhea in neutropenic patients are black tea with lemon	44(44)

from suspected respiratory infection, gastrointestinal infection and other transmissible illness whereas 85% of respondents reported that neutropenic patients are not allowed traveling in public transportation.

Table 6 shows that out of 100 respondents, almost all (99%) reported that the visitors and staff should wash

Table 5. Respondent's knowledge about neutropenic precautions: neutropenic isolation. (n=100)

Knowledge Variable	Frequency(%)
Neutropenic patient should keep away from suspected infection and transmissible illness	97(97)
Neutropenic patents are not allowed to travel in public transportation	85(85)

their hands and wear personal protective equipment before entering into the neutropenic room. Similarly most of the respondents (91%) knew that taking rectal temperature, medicine, and enema should be avoided in neutropenic patients. Likewise 87% of respondents knew that electric razor is safe than bladed razor, 86% of respondents stated that intravenous cannula site is necessary to check daily to assess the sign of infection, blockage and phlebitis, 85% of respondents knew that focal signs of infection may or may not be present in neutropenia and 73% of respondents knew that neutropenic patients' room should be cleaned daily with damp dusted. Similarly, equal frequency of respondents (67%) stated that daily skin assessment is necessary in neutropenic patients and fresh flower, plants should not be placed in patient's room followed by live vaccine should be avoided in neutropenia (54%) respectively.

Table 6. Respondents' Knowledge about Neutropenic Precaution: Infection Prevention and Control Measures (n=100)

Knowledge Variables	Frequency (%)
Visitors and staffs should wash their hands and wear personal protective equipments before entering into the neutropenic room	99(99)
Taking rectal temperature, medicine and enema for constipation should be avoided in neutropenia	91(91)
Daily skin assessment is necessary in neutropenic patient	67(67)
Intravenous cannula/PICC line site is necessary to check daily to assess the sign of infection, blockage, phlebitis	86(86)
The vaccine should be avoided in neutropenia is live vaccine	54(54)
Use of electric razor is safe than bladed razor in neutropenic patients	87(87)
Focal signs of infection may or may not present in neutropenic patient	85(85)
Fresh flowers plant should not be placed in patient's room	67(67)
The room should be cleaned daily and all surfaces damp dusted	73(73)

Table 7 depicts that majority of the respondents (92%) answered correctly on statement i.e. Hand washing should be done before entering into the neutropenic patient's room, preparation of food and before and after medication administration. Similarly, most of the respondents (89%) knew neutropenic patient should take bath daily and 88% of respondents knew neutropenic patient's linen should be changed daily. Likewise 77% of respondents knew that Hand-washing as safe effective and economic means of infection prevention, more than half respondents (56%) answered oral care should done twice a day by soft brush and 51% said Sitz bath is given to maintain perineal hygiene.

Table 7. Respondents Knowledge about Neutropenic Precaution: Hygiene (n=100)	
Knowledge Variable	**Frequency (%)**
Neutropenic patient should take bath daily	89(89)
Sitz bath is given to neutropenic patients for maintaining perineal hygiene	51(51)
Oral care should be done minimum twice a day using a soft brush	56(56)
Hand washing should be done before entering into the neutropenic patient's room, preparation of food and before and after medication	92(92)
Neutropenic patient's linen should be changed daily	88(88)
Hand washing is the Safe effective economic means of infection prevention	77(77)

Table 8. Level of Knowledge on Infection Prevention in Neutropenia. (n=100)	
Levels of knowledge	**Frequency(%)**
Poor level of knowledge	3(3)
Moderate level of knowledge	46(46)
Good level of knowledge	51(51)

Table 8 reveals that half of respondents (51%) had good level of knowledge, 46% had moderate level of knowledge and only 3% had low level of knowledge on infection prevention in neutropenia.

DISCUSSION

Knowledge regarding most Common Components of Daily Nursing Assessment: Regarding the knowledge on most common components of daily nursing assessment, majority (95%) of respondents knew the oral cavity and mucous membrane is one of the most common components of daily nursing assessment followed by monitoring of vital signs (92%), assessment of IV site/Central line catheter (86%), record of intake output (72%), assessment of perineal area (72%), skin assessment (67%) and weight measurement (38%) respectively This finding shows that nurses have still lack of knowledge regarding weight measurement and skin assessment in neutropenic patients. A study conducted in Bekaa Lebanon showed that 96.3% of respondents knew that skin and mucous membrane must be assessed daily.[1]

Knowledge regarding Neutropenic Diet: In relation to knowledge regarding neutropenic diet, most of the respondents (98%) knew the fact that raw food should be avoided in neutropenic patients to reduce the risk of getting an infection from food-borne bacteria. This finding is closely supported by the finding of the study conducted by Mallah et al. in 2023.[9] Similarly,88% of respondents had knowledge on egg with crack shells and sharing utensils in neutropenic patient is unsafe. Likewise, 89% of respondents knew that drinking running tap water is unsafe during neutropenia and most of the respondents (96%) answered correctly that well cooked food as neutropenic diet. Furthermore 44% responded knew that black tea and lemon is recommended during diarrhoea in neutropenic patients. This finding of the study is consistent with the studies conducted by Mallah et al [9] and by Kim and Jeong [10] which showed 76% and 88.8% nurses had knowledge on neutropenic diet respectively.

Knowledge regarding Neutropenic Isolation: Regarding knowledge on neutropenic isolation, 97% knew neutropenic patient should be kept away from suspected respiratory infection, gastrointestinal infection and other transmissible illness and 85% of respondents reported that neutropenic patients are not allowed traveling in public transportation. This finding is supported by the study conducted by Khokhar et al.[11] in Pakistan which revealed that 90.2% respondents had knowledge on neutropenic patient must be placed on private rooms.

Knowledge regarding Infection Prevention and Control Measures: Regarding infection prevention and control measures, almost all (99%) of respondents knew the fact that the visitors and staffs should wash their hands and wear personal protective equipment before entering into the neutropenic room whereas a similar study of Mortada and Moussa [1] conducted in Lebnan showed majority (69.1%) of respondents did not know about gloving, gowning during patient's care. Similarly, most of the respondents (91%) knew that taking rectal temperature, medicine, enema should be avoided in neutropenic patients followed by electric razor is safe than bladed razor (87%) , intravenous cannula site is necessary to check daily to assess the sign of infection, blockage and phlebitis (86%), focal signs may or may not be present in

neutropenia (85%), neutropenic patients' room should be cleaned daily with damp dusted (73%), daily skin assessment is necessary in neutropenic patients and fresh flower, plants should not be placed in patient's room (67%) and live vaccine should be avoided in neutropenia (54%) respectively. Similar study conducted by Eskander et al.[12] showed that less than 75% had unsatisfactory knowledge on infection prevention and control measures.

Knowledge Regarding Hygiene: Majority (92%) of respondents knew that hand washing should be done before entering into the neutropenic patient's room, preparation of food and before and after medication administration. Likewise, 89% of respondents knew that neutropenic patient should take bath daily followed by changing neutropenic patient's linen daily (88%), hand washing as safe effective and economic means of infection prevention (77%), oral care should be done twice a day by soft brush (56%) and Sitz bath is given to maintain perineal hygiene (51%) respectively. This finding of the study is supported by the study conducted by Mortada and Moussa (2021) in Lebanon and the study of Asadollahi et al. [13] which showed that moderate and good level of knowledge on hand hygiene respectively.

Level of Knowledge regarding Infection Prevention in Neutropenic patient: In this study, it was found that more than half of the respondents (51%) had high level of knowledge, 41% had moderate level of knowledge and only 3% had low level of knowledge on infection prevention in neutropenia. This finding of the study is consistent with the study conducted by Tarakcioglu Celik and Korkmaz (2017) in University Hospital in Turkey.[4]

CONCLUSIONS

Based on the findings of this study, it can be concluded that majority of nurses working at BPKMCH have good and moderate level of knowledge on infection prevention in neutropenic patients but there is still lack of Guideline/Protocol on infection prevention in respective wards and gap in knowledge regarding daily nursing assessment. So, there is still need to develop and implement infection prevention guidelines/protocols and regular trainings and refresher courses on infection prevention from the concerned authority.

Conflict of Interest: None

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