Assess the Nurses Knowledge and Standard Practice Regarding the Prevention of Infection in Neutropenic Patients

Nadeem Khokhar[1]   Kausar Parveen[2]   Muhammad Afzal[3]   Prof. Syed Amir Gilani[4]

1.Post RN BSc Nursing Student at Lahore School of Nursing, The University of Lahore

2.Assistant Professor, Lahore School of Nursing, The University of Lahore

3.Associate Professor, Lahore School of Nursing, The University of Lahore

4.Dean, Faculty of Allied Health Sciences, The University of Lahore

Abstract

Neutropenia-associated infections can prolong hospitalization, increase re-admission, mortality and morbidity rates. Aim of research is to determine nurses' knowledge and infection control care practices in neutropenic patients. This descriptive study was conducted between January 2020 and April 2020, at tertiary hospital Lahore, Pakistan. Sample consisted of 150 staff nurses. Data were collected by a form included socio-demographic characteristics, neutropenia knowledge questions, and infection control care practices. Each nurse was observed by researcher for infection control care practices. For observation hand hygiene adherence was found low both in medication preparation, administration and vital signs assessment. Sterility disrupted in almost all preparation of parenteral medications. Even nurses' knowledge related with neutropenia and care of neutropenic patient was found above average their infection control care practices were found insufficient.Infected patients are a source of infection transmission to other patients, health care workers and visitors, in health care facilities. Healthcare-related infections have a significant influence on the morbidity and mortality rates in the hospital environment, resulting in an increase in the time spent in hospitalization, and are thus recognized as a serious world public health problem Neutropenia is one of the most common risk factors of serious infections in immune suppressed patients and can be the result of a variety of consequences, including from certain types of drugs, environmental toxins, vitamin deficiencies, metabolic abnormalities, as well as cancer or infections. In spite of the way that neutropenia bring about contaminations, numerous preventive treatment and care conventions are demonstrated to decrease the disease rates, and improve personal satisfaction. The counteraction and control of diseases are critical for a well-functioning health system. World Health Organization in 2011 defined infection control as infection prevention and control measures that aims to confirm the defense of those who might be susceptible to obtaining an infection both in the general community and in hospitals while obtaining care due to health problems.

Keywords: Nurses, Knowledge, practice, prevention, neutropenic patients.

DOI: 10.7176/JHMN/77-05

Publication date: July 31st 2020

INTRODUCTION

Infected patients are a source of infection transmission to other patients, health care workers and visitors, in health care facilities (Perl T. et al., 2011). Healthcare-related infections have a significant influence on the morbidity and mortality rates in the hospital environment, resulting in an increase in the time spent in hospitalization, and are thus recognized as a serious world public health problem (AFL et al., 2017).

Neutropenia is one of the most common risk factors of serious infections in immune suppressed patients and can be the result of a variety of consequences, including from certain types of drugs, environmental toxins, vitamin deficiencies, metabolic abnormalities, as well as cancer or infections (Maheshwari et al., 2012). Neutropenia associated infections can prolong hospitalization, increase readmission, mortality and morbidity rates (Celik et al., 2017). In spite of the way that neutropenia bring about contaminations, numerous preventive treatment and care conventions are demonstrated to decrease the disease rates, and improve personal satisfaction (Padilla et al., 2005). The counteraction and control of diseases are critical for a well-functioning health system (Bedoya et al., 2017). World Health Organization in 2011 defined infection control as infection prevention and control measures that aims to confirm the defense of those who might be susceptible to obtaining an infection both in the general community and in hospitals while obtaining care due to health problems.

Prevention of Infection:

Most health care infections are transmitted by health care employees who fail to practice proper hand washing procedures and change gloves between client contacts. That is the reason nurses play a critical role in preventing and controlling transmission of an infection through the application of basic precautions of the health care environment. All, medical attendants, can exhibit authority in contamination counteraction and control by utilizing their knowledge, skills, and judgment to initiate appropriate and prompt disease control procedures (Smith et al., 2008). Therefore, infection control strategies from the national and international organization have supported that hand washing remains the most effective measure in reducing the incidence of health care infections (Daniel et al., 2010). Without help for the adequacy of most nursing training in regards to the avoidance of disease, unproved

practices dependent on custom, propensity, and hypothetical contemplations keep on being utilized. Accordingly, varieties exist in what preventive measures neutropenic patients are instructed. What measures are really successful in forestalling contaminations in neutropenic patients?

Hand Washing:

Hand washing and individual cleanliness have all the earmarks of being significant systems for the avoidance of disease while thinking about that as an essential capacity of unblemished skin is assurance against microorganisms, that typical human skin is colonized with microorganisms (Boyce et al, 2002), and that a huge extent of contaminations in patients with neutropenia is related with patients' endogenous greenery or ordinary natural occupants. Upheld by solid proof, ebb and flow intercessions prescribed for patients and guardians in forestalling contamination in patients with malignancy by the PEP Team for Prevention of Infection are reliable and visit hand washing with cleanser and water when hands are obviously dirty or with cleanser and water or liquor based hand rubs when not noticeably filthy. Despite the fact that the checked on understanding training distributions teach patients and parental figures to wash their hands regularly or notice washing them before eating and in the wake of toileting, (Wivellet al., 2003) didn't list hand washing as one of the most widely recognized directions given to patients. Another worry with respect to hand washing is whether to educate patients on to what extent to wash their hands. A rundown of observational examinations on hand washing by medicinal services laborers demonstrated that the span of hand washing ranges from 6.6–24 seconds, with most of studies uncovering normal occasions of 12.5 seconds or less. Besides, easygoing perception of people washing their hands in open offices exhibit that most people don't comply with a 15-second rule. Since unblemished skin secures against contamination, one final concern in regards to quiet training available washing is whether data on applying hand moisturizers or creams to limit the event of aggravation contact dermatitis related with hand washing ought to be incorporated, as is emphatically suggested for human services laborers (Boyce et al., 2002).

Antiseptic Bathing

Despite the fact that the proof partner hand cleanliness with a diminished danger of disease is solid, the proof partner germicide washing with a decreased danger of contamination in the neutropenic populace isn't clear (Larson et al, 2001). Essential contaminations of the skin and delicate tissue are basic in neutropenic patients and may scatter by means of the circulatory system. Confined diseases regularly emerge at destinations of minor injury, venipuncture, or vascular catheters. Germ-killers have been appeared to diminish microbial relies on the skin in the careful populace; be that as it may, no investigations of clean washing explicit to the neutropenic populace were found (Larson and Nirenberg, 2004).

Oral Care

Patients encountering neutropenia after cytotoxic chemotherapy quite often have penetrates of physical resistance obstructions auxiliary to mucositis. Mucositis, which can include the oropharynx and the gastrointestinal tract, may fill in as an open door for nearby disease or direct intrusion into the circulatory system. Be that as it may, mucositis isn't the focal point of this article and won't be investigated (Rubenstein et al., 2004).

Significance of the Study

There are a very few researches about the knowledge and care practices of nurses for infection prevention in neutropenic patients. Using different approaches and epidemiological apparatuses and instruments in determining the effective ways to control and prevent the spread of the infection in neutropenic patients in Pakistan. It therefore, becomes necessary to conduct a baseline assessment for these patients. This study is designed to target nurses to assess their knowledge and care practices for infection prevention. This research will help the health sector create more effective programs to prevent the rampant spread of the disease.

Objectives of the Study

The purpose of this study is to investigate knowledge and care practices of nurses for infection prevention. Specific objectives are:

- To determine the nurses knowledge and care practices of nurses for infection prevention in neutropenic patients.

Keywords: Nurses, Knowledge, practice, prevention, neutropenic patients.

Literature Review

A cross-sectional study was conducted by Celik et al., 2017 on 51 staff nurses at oncology adult inpatient units of a university hospital in Turkey. The data included socio-demographic characteristics, neutropenia knowledge questions, and infection control care practices. The result of previously mentioned data shows that the mean score of nurses' knowledge was 21.3 ± 2.4. For all three adherence hand, hygiene observance was found low both in medication preparation, administration and vital signs evaluation. Desolation disrupted in almost all research of parenteral prescriptions. The study concluded that even a nurse's information related to neutropenia and care of the neutropenic patient was found above-average concerning their infection control care practices and was found

insufficient.

Naghdi et al., 2019, conducted a descriptive-analytical cross-sectional study. Two hundred and three (203) individuals of Kerman University of Medical Sciences participated in the study. A demographic questionnaire, a neutropenia knowledge questionnaire, and a checklist of nurses' care practice for infection control in cancer patients were used for data collection. Only 11.8% of the participants had good information of neutropenia. There was no significant relationship between the nurse's knowledge of neutropenia and their practices for infection control in cancer patients. The study determined that the nurse's information on neutropenia and their practice for infection control in patients with cancer are not optimum. Therefore, in addition to endorsing educational programs to improve nurse's information in the field, other factors affecting the elevation of nurse's practices in controlling infection in patients with cancer should also be identified.

Another cross-sectional study was conducted by Iliyasuwt al., 2016. A total of 200 responses were analyzed of which 152 were nurses while 48 were doctors. A self-administered structured questionnaire was distributed to the study group. Data on knowledge and practice of infection control were obtained and analyzed which demonstrated that about 52% of doctors and 76% of nurses have repetitive hand hygiene in between patient care and the median age and years of performing knowledge of the respondents were 35 years and 7 years, respectively. The study concluded that gaps have been identified in information and practice of infection control among doctors and nurses in the study; hence, it will be helpful for all HCW to obtain formal and periodic enhancement training.

Materials and Methods
Study Design
A descriptive cross-sectional study will be conducted.
Study Technique
It will be a Convenience Sampling.
Study Area and Study Population
The study population will be carried out at tertiary care hospitals of Lahore, Punjab, Pakistan. All nurses who are working in the selected tertiary care hospitals and involved in a direct contact with patients will be invited to participate in this study.
Sample Size
Epidemiological information system (EPI) will be utilized to calculate the sample size of the study. A total number of 150 respondents will be considered to fulfillment of our work.
Research Subjects
Inclusion Criteria
Health professionals who work at least 2 months in the direct care of patients.
Exclusion Criteria
Health workers who were extremely ill and on annual leave during data collection were excluded from the study.
Duration the Study
6 months after approval of synopsis.
Data Collection
A self-administered questionnaire will be used for the purpose of data collection which contains items related to knowledge and practice of regarding the prevention of neutropenic infection. It is divided into the following four sections:
Section I is related to demographic information of the individuals: age, gender, level of education, current position, duration of work, have taken infection prevention training, available infection prevention guidelines, type of shifts.
Section II is related to knowledge of neutropenic infection which consists of 18 questions.
Section III is related to knowledge of prevention neutropenic infection which consists of 9 question
Section IV is related to Practice of prevention neutropenic infection which consists of 15 questions.

Operational Definition of Variable
Outcome Variable
The main outcome variable will be the knowledge and practice of healthcare workers towards infection prevention in neutropenic patients.
Independent Variables
The independent variables include various socio-demographic characteristics (age, sex, religion, level of education, work experience, current position, duration of work, have taken IP trainings, have taken IP guidelines, type of shifts). Knowledge about infection, prevention and practice of the prevention was measured using the cumulative score of questions each with two possible responses.

Statistical Analysis
Statistical package for Social Sciences (SPSS) version 23.0 IBM Corporation Armonk, New York, USA) will be

Journal of Health, Medicine and Nursing
www.iiste.org
ISSN 2422-8419   An International Peer-reviewed Journal
Vol.77, 2020

used for data entry and analysis. Initial analysis will be included; computing frequency distribution for categorical variables, mean values (±standard deviation) and median values (with interquartile range [IQR]) to describe the continuous data with and without normal distribution, respectively. Kolmogorov–Smirnov tests and Skewness–Kurtosis will be used to analyze whether the data is normally distributed. Data obtained will be observed and analyzed using independent two-sample t-tests and differences between observed practices of nurses will be compared using the Cochran's Q test.

Ethical Considerations
- The approval for the study will be obtained from the educational authorities of University of Lahore.
- The approval for the study will be obtained from the research and ethics committees of the university and the participating hospitals.
- Confidentiality, anonymity and privacy of all participants will be guaranteed at all levels of this study.
- Written informed consent will also be obtained from each participant.

RESULTS
A total of 150 health professionals were interviewed yielding a response rate of 95% and majorities, 93(62%) were male. More than half of, 82(54.66%) were in the age group between 26 and 30 years old. The mean age of the respondents was 25.25 (SD ± 4.5) and a higher proportion (47%) of the respondents was diploma and 55.3% of healthcare worker were staff nurses (Table 1).

The mean score of medical caretakers was 21.3 (SD = 2.4), with a base score of 17 and limit of 27. All attendants addressed after things accurately, "Urinary catheterization must be performed to quantify the pee yield" and "Medical caretakers ought to illuminate the patient and family about disease control methods." most of attendants (96.1%) knew the elements of neutrophils and 68.6% of them knew the basic scope of neutrophil checks. In any case, 94.1% of them didn't reply or didn't furnished a right response following the announcement "One of the indications of contamination in patients with neutropenia is glycosuria," 68.6% of them offered wrong response to "Neutropenia is portrayed by an abatement in neutrophils and thrombocytes," and 66.7% of them furnished wrong response to "It is hard to recognize the signs and side effects of disease in patients with neutropenia" (Table 2).

Table 1: Demographic Characteristics of Nurse's Working in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Age		
21–25	58	38.7
26–30	82	54.7
31 and above	10	6.7
Sex		
Male	93	62.0
Female	57	38.0
Educational status		
Diploma Degree	70	47.0
Bachelor's Degree	60	40.0
Masters or Above	20	13.0
Work Experience		
< 5 year	111	74.0
5–10 year	29	19.3
> 10 years	10	6.7
Current Position		
Head Nurse	21	14.0
Staff Nurse	129	86.0
Had taken IP training		
Yes	53	35.3
No	97	64.7
IP guideline availability		
Yes	68	45.3
No	82	54.7

Table 2: Knowledge regarding Neutropenic Infection in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Neutropenia is characterized by a decrease in neutrophils and thrombocytes.		
TRUE	103	68.6
FALSE	47	31.4
Neutrophils provide the body's defense by phagocytosis of microorganisms.		
TRUE	144	96.1
FALSE	6	3.9
A patient is classified as neutropenic when the neutrophil count is 2500 cells/mm3		
TRUE	47	31.4
FALSE	103	68.6
Lymphoma is one of the diseases that cause neutropenia.		
TRUE	124	82.8
FALSE	26	17.2
Hypotension, an indicator for sepsis, is an important symptom for neutropenic patients.		
TRUE	147	98.0
FALSE	3	2.0
It is difficult to identify the signs and symptoms of infection in patients with neutropenia		
TRUE	50	33.3
FALSE	100	66.7
Neutropenic patients should avoid coughing and deep breathing Exercises		
TRUE	76	51.0
FALSE	74	49.0
Neutropenic patients' oral care is provided with sodium bicarbonate Solution		
TRUE	135	90.2
FALSE	15	9.8
Neutropenic patients must be placed in private rooms		
TRUE	135	90.2
FALSE	15	9.8

Table 2 (cont'd): Knowledge among Nurses regarding Neutropenic Infection in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Floor must be cleaned with a damp mop		
TRUE	79	52.9
FALSE	71	47.1
During patient care gowns, masks, and gloves should be worn.		
TRUE	76	51.0
FALSE	74	49.0
Urinary catheterization must be performed to measure the urine Output		
TRUE	0	0.0
FALSE	150	100.0
Drinking tap water is not recommended for neutropenic patients		
TRUE	144	96.1
FALSE	6	3.9
One of the signs of infection in patients with neutropenia is Glycosuria		
TRUE	9	5.9
FALSE	141	94.1
Neutropenic patients' oral care includes rinse of mouth three times a day.		
TRUE	59	39.2
FALSE	91	60.8
Neutropenic patients' diet includes plenty of fresh vegetables and fruits to meet vitamins needs.		
TRUE	29	19.6
FALSE	121	80.4
Nurses should inform patient and family about infection control Procedures		
TRUE	150	100.0
FALSE	0	0.0
Skin and mucous membranes should be assessed daily and Documented		
TRUE	138	92.2
FALSE	12	7.8

The mean score of the information questions was 5.29 (SD = 1.6). Right now, 127(84.6%) [95% CI: 23.3, 30.5] of the respondents were seen as learned about contamination anticipation. Among the examination respondents dominant part, 140 (93.3) and 141(94%) realized that purification and germicide forestall human services obtained contamination separately. One hundred and thirty-two (88%) human services laborers accepted that each gear needs disinfecting before sanitization. The less part of the respondents (31.4%) haven't known concerning to maintain safe environment (Table 3).

Table 3: Knowledge of Prevention Neutropenic Infection among Nurses in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Disinfection prevent health care acquired infections		
YES	140	93.3
NO	10	6.7
Antiseptic prevent health care acquired infection		
YES	141	94
NO	9	6
Chemical sterilization technique used for every equipment		
YES	58	37.3
NO	92	62.7
Physical sterilization (heat/radiation technique used for every equipment)		
YES	50	37.3
NO	84	62.7
All microorganisms including spores are destructed by autoclaving		
YES	110	82.1
NO	24	17.9
Every equipment need decontamination before sterilization		
YES	132	88.0
NO	18	12.0
Protective device minimizes health care acquired infection		
YES	131	87.3
NO	19	12.7
Wearing gloves replace the need for hand washing		
YES	55	36.7
NO	95	63.3
Maintaining safe environment.		
YES	103	68.6
NO	47	31.4

Table 4 shows the results of practice towards neutropenic infection prevention among nurses. The extent of social insurance laborers who had great practice towards disease counteraction exercises was seen as 86 (57.3%). Concerning hand washing practice, 66 (44%) and 100 (66.7%) of them were washing their hands with cleanser before tolerant consideration, after patient consideration or after contact with blood. Dominant part of the respondents hadn't worn goggle 108 (72%) and 107 (71.3%) doesn't inoculate for the regular pathogen. Concerning accessibility of Infection anticipation supplies, 50 (33.3%) of social insurance laborers doesn't utilize contamination counteractions supplies because of unfit to get accessible supplies. In spite of 38 (25%) of the social insurance supplier who doesn't utilize the accessible supplies due to being lack of regard (70%) and 30% due to don't seeing presentation.

Table 4: Practice towards Neutropenic Infection Prevention among Nurses in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Wash hands with soap before patient care		
YES	66	44
NO	85	56
Wash hands with soap after patient care/contact with fluid		
YES	100	66.7
NO	50	33.3
Wash hands without soap before and after patient care		
YES	70	46.7
NO	80	53.3
Used all type of personal protective equipment (PPE)		
YES	42	28.0
NO	108	72.0
Type of PPE in patient care: Gloves		
YES	128	85.3
NO	22	14.7
Type of PPE in patient care: Goggles		
YES	140	93.3
NO	10	6.7
Type of PPE in patient care: Mask		
YES	42	28.0
NO	108	72.0
Type of PPE in patient care: Gown		
YES	62	41.3
NO	78	58.7
Changing time of chlorine solutions: Every 24 hours		
YES	85	56.7
NO	65	43.3
Changing time of chlorine solutions: After 2 Days		
YES	45	30.0
NO	105	70.0
Changing time of chlorine solutions: Don't know		
YES	20	13.0
NO	130	87.0
Used Infection prevention guideline/evidence		
YES	53	35.3
NO	97	64.7
Recap needle before disposing		
YES	48	32.0
NO	102	68.0
History of contact for blood, fluid or stick injury		
YES	98	65.3
NO	52	34.7

Table 4 (cont'd): Practice towards Neutropenic Infection Prevention among Nurses in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Frequency	Percentage
Measures used after exposed for blood/stick injury: Taking PEP		
YES	59	60.0
NO	39	40.0
Measures used after exposed for blood/stick injury: Clean by Alcohol		
YES	70	71.5
NO	28	28.5
Measures used after exposed for blood/stick injury: Washing with water		
YES	85	86.7
NO	13	13.3
Give health education for patients about Neutropenic Infection		
YES	97	64.7
NO	53	35.3
Cover wounds on the skin before you start your work		
YES	98	65.3
NO	52	34.7
Vaccinated against common pathogen		
YES	43	28.7
NO	107	71.3
Used needles or sharps put on containers		
YES	97	64.7
NO	53	35.3
Containers disposed of when they are three quarters full		
YES	60	40.0
NO	90	60.0

In the bivariate analysis factors which were altogether connected with information about disease counteraction was: age, instructive status, working experience, sex of the members, calling and consistently taking preparing in contamination avoidance strategies. In the wake of controlling the jumbling in multivariate calculated relapse examination, age, instructive statuses, working experience, sex of the members and consistently taking preparing on disease avoidance were seen as essentially connected with information on contamination counteraction. Thus, those nurses who age 31 and above were around multiple times more

Knowledgeable about contamination anticipation than when contrasted with those matured 21–25 (AOR = 3.15,95%, CI = [2.467–5.025]). Those male nurses were multiple times more probable learned than those female nurses laborers (AOR = 2.05, 95%, CI = [2.139–5.816. This examination uncovered that the working experience was discovered another solid indicator of information towards disease avoidance which shows that Healthcare laborers who had work. experience of over ten years was multiple times almost certain learned on contamination counteraction than those had work understanding of less than five years (AOR = 4.03, 95%, CI = [1.229–5.68]).]). Nurses with an instructive degree of MSc or above and were multiple times (AOR = 3.034, 95%, CI = [1.856–4.756]) and BSC were multiple times (AOR = 2.15, 95%, CI = [3.245–8.789]) almost certain proficient than Diplomas.

Moreover, numerous relapse appeared, Healthcare experts who haven't taken Infection avoidance preparing were75% more uncertain educated (AOR = 0.25, 95%, CI = [1.689–3.95) about disease counteraction than those had taken preparing in contamination anticipations (Table-5).

Table 5: Bivariate and Multivariate analysis on associated factors towards knowledge of infection prevention among Nurses in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Knowledgeable		P-value
	Yes	No	
Age			
21–25	48	10	*
26–30	73	19	0.30
31 and above	6	4	0.02 **
Sex			
Male	77	16	0.04**
Female	50	7	*
Educational status			
Diploma Degree	20	0	0.01**
Bachelor's Degree	48	12	0.04**
Masters or Above	59	11	
Work Experience			
< 5 year	94	17	*
5–10 year	23	6	0.05
> 10 years	10	0	0.00 **
Had taken IP training			
Yes	52	1	*
No	75	22	0.05 **
IP guideline availability			
Yes	55	13	*
No	72	10	

*The p –value cannot obtain from SPSS.

Shows statistical significance at p-value < 0.05

Table 6 shows that the age, conjugal status, instructive status, working experience, sex of the members, accessibility of individual defensive hardware and consistently taking preparing on disease counteraction techniques were factors which were fundamentally connected with training about contamination anticipation. Although, age, instructive statuses, working experience, consistently taking preparing on contamination avoidance and accessibility of disease counteraction supplies were seen as fundamentally related in the multivariate investigation. In regard to the period of social insurance laborers, with the age scope of 31and above were around multiple times bound to rehearse contamination avoidance exercises than those matured 21–25 (AOR = 2.04,95%, CI = [1.279–4.5793]).

Nurses at instructive level expands the act of contamination avoidance is expanded dependent on this investigation. Different calculated relapse of this investigation uncovered that medicinal services laborers with an instructive degree of MSc or above were multiple times (AOR = 4.15, 95%, CI = [1.381–7.41]) almost certain training contamination counteraction exercises than those human services works with recognition experts and BSC holders were multiple times (AOR = 1.959, 95%, CI = [1.970–4.685]) more probable rehearsed disease avoidance exercises than those social insurance works with certificate experts in individually. What's more, Healthcare laborers who had work understanding of over ten years had the most noteworthy chances of achieving disease counteraction practice/exercises than the individuals who had work understanding of less than five years (AOR = 3.17, 95%, CI = [1.98–5.674]). Social insurance laborers who had taken contamination anticipation preparing were multiple times bound to rehearse disease avoidance than those haven't taken preparing on contamination counteraction (AOR = 3.97, 95%, CI = [2.576–5.457]).

As per different relapse investigation of this examination, accessible inventory of disease anticipation expands the use of those provisions for the counteraction of Hospital-procured contaminations, Heath care works who get an accessible stock of contamination avoidance (as cleanser, cover, and contamination counteraction rule) had higher chances of rehearsed contamination anticipation exercises (AOR = 2.156, 95%. CI = [1.90–4.357]) than those social insurance works can't get disease anticipation supplies. Moreover, adherence in IP rule/proof was another huge factor related with the act of contamination anticipation of infection. Nurses who clung to IP rules were multiple times more probable rehearsed disease anticipation exercises (AOR = 4.02, 95%, CI = [2.45–6.359] than the individuals who doesn't cling to the rule (Table 6).

Table 6: Bivariate and Multivariate analysis on associated factors towards practice of infection prevention among Nurses in Tertiary Care Hospitals, Lahore, Pakistan (N = 150).

	Knowledgeable		P-value
	Yes	**No**	
Age			
21–25	33	25	*
26–30	47	35	*
31 and above	6	4	0.02 **
Sex			
Male	52	41	*
Female	34	23	*
Educational status			
Diploma Degree	42	28	0.001 **
Bachelor's Degree	30	30	0.0038**
Masters or Above	14	14	*
Work Experience			
< 5 year	54	64	*
5–10 year	20	9	*
> 10 years	9	1	0.02 **
Had taken IP training			
Yes	42	11	*
No	44	53	0.008 **
IP guideline availability			
Yes	38	15	0.005**
No	48	49	

*The p –value cannot obtain from SPSS.

** Shows statistical significance at p-value < 0.05

Discussion

Knowledge about neutropenic patient' care

To facilitate discussion of the results regarding to knowledge form, items were categorized as knowledge about nursing practice (Table 2, 3), and nursing care of neutropenic patients (Table 4).

Study results indicated that nurses' mean score of their answers to items was high. The rates of correct answers, including the functions of neutrophils (statement 2), nursing practice for patients and signs and symptoms of infection in neutropenic patients were also found high. Ertem (2004), who used the same knowledge form also reported high scores consistent with our results and interpreted these results as satisfactory. Study of Nirenberg, Reame, Cato, and Larson (2010) revealed that 86.0% of nurses answered more than 70.0% of the questions related with care of neutropenic patients correctly. These results are important because it implies that nurses transfer their knowledge acquired through both formal and in-service education to their working environment. It is believed that nurses who are highly knowledgeable, particularly in critical care fields (e.g. intensive care, emer-gency, and oncology units), generally provide better nursing care and patients feel safe and secure when cared by nurses with this competency (Kvale & Bondevik, 2010). On the other hand limited study results showed that, nurses' knowledge of infections (Aytac, Naharcı, & Oztunc, 2008; Cox, Simpson, Letts, & Cavanagh, 2014) and preventive measures for infection control (Atasoy, 2009,

Observation of nurses' practice

We found that hand hygiene adherence in nurses were low. Nurses' hands can transfer microor-ganisms to patients either through direct contact or via contact with the patient's immediate environment. Hand hygiene is the simplest method for preventing the transmission of infection, and is among the highest priority of universal precautions (de Wandel, Maes, Labeau, Vereecken, Blot, 2010; Yuceer & Bulut, 2010). Studies on nurses' knowledge of hand hygiene revealed that their level of knowledge ranged from 12.0% to 87.0% (Atasoy, 2009, pp. 67–75; Demirdal et al., 2007; Katherason et al., 2010; de Wandel et al., 2010), whereas the rate of good hand washing was nearly 73.2% (Magnus et al., 2015). Hence, it must be major focus when educating patients with neutropenia and their families about infection control. Even though the hand hygiene facilities (sinks for hand washing) at the study settings were not suitable, alcohol-based hand rubs were available in all patient rooms. However, our observations revealed that nurses preferred not to use alcohol-based hand rubs because these products may have irritated their skin. Demirdal et al. (2007) also found that skin irritation is the main reasons for nurses' lack of adherence to hand

washing (22.7%). In the institution where this study was conducted, patients and families were educated on hand washing; however, as our observations indicated, nurses were not convincing in educating patient and their families for effectiveness of hand washing because nurses themselves did not comply with hand hygiene protocols.

Conclusion

The results of this study indicated that the nurses' general knowledge of the neutropenia was above average, but their infection control practices, especially during the assessment of vital signs, preparation, and administration of medications, were inadequate. This result indicated even nurses' knowledge level above average they are not paying attention and transfer this knowledge to their care practices. According to these results, we recommend further studies to investigate the reasons for the difference or gap between knowledge and practice in-depth.

REFERENCE

Bedoya, G., Dolinger, A., Rogo, K., Mwaura, N., Wafula, F., Coarasa, J., ...& Das, J. (2017). Observations of infection prevention and control practices in primary health care, Kenya. Bulletin of the World health Organization, 95(7), 503.

Daniel, R., Grendell, R. N., & Wilkins, F. R. (2010). Nursing fundamentals, caring & clinical decision making, and medication administration.

Desta, M., Ayenew, T., Sitotaw, N., Tegegne, N., Dires, M., &Getie, M. (2018). Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia. BMC health services research, 18(1), 465.

Iliyasu, G., Dayyab, F. M., Habib, Z. G., Tiamiyu, A. B., Abubakar, S., Mijinyawa, M. S., & Habib, A. G. (2016). Knowledge and practices of infection control among healthcare workers in a Tertiary Referral Center in North-Western Nigeria. Annals of African medicine, 15(1), 34.

Mathur, P. (2011). Hand hygiene: back to the basics of infection control. The Indian journal of medical research, 134(5), 611.

Naghdi, H., Forouzi, M. A., &Dehghan, M. (2019). Iranian Nurses' Knowledge of Neutropenia and Their Practice for Infection Prevention in Patients with Cancer. Journal of Cancer Education, 1-9.

Ohls, R. K., &Maheshwari, A. (2012). Hematology, Immunology and Infectious Disease: Neonatology Questions and Controversies: Expert Consult-Online and Print. Elsevier Health Sciences.

Smith, P. W., Bennett, G., Bradley, S., Drinka, P., Lautenbach, E., Marx, J., ...& Stevenson, K. (2008). SHEA/APIC guideline: infection prevention and control in the long-term care facility. Infection Control & Hospital Epidemiology, 29(9), 785-814.

Sousa AFL, Matos MCB, Matos JGNF, Sousa LRM, Moura MEB, Andrade D. Prevention and control of infection in professional nursing training: a descriptive study. Online Braz j nurs. 2017;2:199-208.

Sydnor, E. R., & Perl, T. M. (2011). Hospital epidemiology and infection control in acute-care settings. Clinical microbiology reviews, 24(1), 141-173.

TarakciogluCelik, G. H., &Korkmaz, F. (2017). Nurses' knowledge and care practices for infection prevention in neutropenic patients. Contemporary nurse, 53(2), 143-155.

Assess the Nurse's Knowledge and Standard Practices regarding Infection Prevention in Neutropenic Patients

Dear sir/ madam,

Assalam-o-Alaikum!

We are conducting a research to assess the knowledge and care practices for infection prevention in neutropenic patients who would help us to promote and plan the better health strategy for neutropenic infected patients. Hence, to decrease the morbidity and mortality due to neutropenic patients. This will take about 15 minutes of your time. Your participation is voluntary. This is an anonymous research and all the information you provide will be kept strictly confidential. The results will be presented in aggregate form while preserving the identity of individuals and the institution where they get treatment. We request you to participate in this study.

Thank you!

Form Number #_____		Date: _____/_____/ 2020	
Demographic Information of the Subject			
Age (in years) : _____			
Gender:	☐ Male	☐ Female	☐ Change
Level of Education	☐ Diploma Degree	☐ Bachelor's Degree	☐ Master's Degree
Current Position	☐ Staff Nurse	☐ Head Nurse	
Duration of Work	☐< 5 years	☐ 5 – 10 years	☐> 10 years
Have taken IP training	☐ Yes	☐ No	

Available IP guideline   □ Yes   □ No

Type of shift   □ Rotating   □ Fixed

Knowledge of Neutropenic Infection

Sr. No	Statements	TRUE	FALSE
1.	Neutropenia is characterized by a decrease in neutrophils and thrombocytes.	T	F
2.	Neutrophils provide the body's defense by phagocytosis of microorganisms.	T	F
3.	A patient is classified as neutropenic when the neutrophil count is 2500 cells/mm3.	T	F
4.	"Lymphoma" is one of the diseases that cause neutropenia.	T	F
5.	Hypotension, an indicator for sepsis, is an important symptom for neutropenic patients.	T	F
6.	It is difficult to identify the signs and symptoms of infection in patients with neutropenia.	T	F
7.	Neutropenic patients should avoid coughing and deep breathing exercises.	T	F
8.	Neutropenic patients' oral care is provided with sodium bicarbonate solution.	T	F
9.	Neutropenic patients must be placed in private rooms.	T	F
10.	Floor must be cleaned with a damp mop	T	F
11.	During patient care gowns, masks, and gloves should be worn.	T	F
12.	Urinary catheterization must be performed to measure the urine output.	T	F
13.	Drinking tap water is not recommended for neutropenic patients.	T	F
14.	One of the signs of infection in patients with neutropenia is glycosuria	T	F
15.	Neutropenic patients' oral care includes rinse of mouth three times a day.	T	F
16.	Neutropenic patients' diet includes plenty of fresh vegetables and fruits to meet vitamins needs.	T	F
17.	Nurses should inform patient and family about infection control procedures.	T	F
18.	Skin and mucous membranes should be assessed daily and documented.	T	F

Knowledge of Prevention Neutropenic Infection

Sr. No	Statements		
19.	Disinfection prevent health care acquired infections	Yes	No
20.	Antiseptic prevent health care acquired infection	Yes	No
21.	Chemical sterilization technique used for every equipment	Yes	No
22.	Physical sterilization (heat/radiation technique used for every equipment	Yes	No
23.	All microorganisms including spores are destructed by autoclaving	Yes	No
24.	Every equipment need decontamination before sterilization	Yes	No
25.	Protective device minimizes health care acquired infection	Yes	No
26.	Wearing gloves replace the need for hand washing	Yes	No
27.	Maintaining safe environment.	Yes	No

Practice of Prevention Neutropenic Infection

Sr. No	Statements		
28.	Wash hands with soap before patient care	Yes	No
29.	Wash hands with soap after patient care/contact with fluid	Yes	No
30.	Wash hands without soap before and after patient care	Yes	No
31.	Used all type of personal protective equipment (PPE)	Yes	No
32.	Type of PPE in patient care:	Yes	No
	Gloves	Yes	No
	Goggles		
	Mask		
	Gown		
33.	Changing time of chlorine solutions:	Yes	No
	Every 24 Hours	Yes	No
	After Two Days		
	Don't Know		
34.	Used Infection prevention guideline/evidence	Yes	No
35.	Recap needle before disposing	Yes	No
36.	History of contact for blood, fluid or stick injury	Yes	No
37.	Measures used after exposed for blood/stick injury:	Yes	No
	Taking PEP	Yes	No
	Clean by Alcohol		
	Washing with Water		
38.	Give health education for patients about Neutropenic Infection	Yes	No

39.	Cover wounds on the skin before you start your work	Yes	No
40.	Vaccinated against common pathogen	Yes	No
41.	Used needles or sharps put on containers	Yes	No
42.	Containers disposed of when they are three quarters full	Yes	No

Thank You!