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ASSESS THE KNOWLEDGE OF CHILD IMMUNIZATION AMONG NURSING STUDENTS AT GOVERNMENT COLLEGE OF NURSING, KHYBER TEACHING HOSPITAL, PESHAWAR, PAKISTAN

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Abstract

Background:

Immunization is one of the most effective public health interventions for preventing childhood diseases. Nursing students, as future healthcare providers, play a crucial role in educating parents, promoting vaccine acceptance, and ensuring adherence to immunization schedules. Assessing their knowledge is essential to strengthen immunization services.

Materials and Methods:

A cross-sectional descriptive study was conducted at Government College of Nursing, Khyber Teaching Hospital (KTH), Peshawar, Pakistan, from July to December. A convenience sample of 169 nursing students was recruited. Data were collected using a validated questionnaire and analyzed using SPSS version 27.

Results:

Most participants were aged 21–23 years (56.8%) and female (89.3%). High mean scores were observed for basic vaccine concepts (0.99 ± 0.077), while lower scores were noted for active (0.70 ± 0.460) and passive immunity (0.75 ± 0.433). Overall, 63.9% had good knowledge, 31.4% poor knowledge, and 4.7% excellent knowledge.

Conclusion:

Although nursing students demonstrated good theoretical knowledge of child immunization, gaps were identified in vaccine scheduling and practical aspects. Strengthening targeted educational and clinical training programs is recommended.

INTRODUCTION

Immunization is the process of administering vaccines to induce immunity against infectious diseases and is widely recognized as one of the most effective and cost-effective public health interventions worldwide (1,3). Childhood immunization programs are specifically designed to address the vulnerability of infants and young children to infectious diseases, taking into account their developing immune systems (2). Vaccination has substantially reduced childhood morbidity and mortality, preventing an estimated 2–3 million deaths annually and contributing to

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nearly 87 million fewer deaths among children under five between 1990 and 2019 (8,9). Despite these achievements, global immunization coverage remains suboptimal, particularly in low- and middle-income countries. According to the World Health Organization, global vaccine coverage declined from 86% in 2019 to 83% in 2020, leaving approximately 23 million children under one year of age without basic immunization, the highest number since 2009 (13). Vaccine-preventable diseases continue to account for a significant proportion of childhood deaths, especially in Africa and Asia (15).

Healthcare professionals play a pivotal role in the success of immunization programmes by influencing parental decision-making, addressing vaccine hesitancy, and ensuring adherence to vaccination schedules (5,16). Nurses, in particular, are often the first point of contact for parents seeking vaccine-related information. Nursing students, as future frontline healthcare providers, are therefore expected to possess sound knowledge of immunization principles, vaccine-preventable diseases, national immunization schedules, and communication strategies (6,17). However, studies from various regions have reported notable knowledge gaps among nursing students, particularly regarding vaccine contraindications, cold chain management, adverse effects, and risk–benefit communication (18–21,23–25). Inadequate knowledge or misconceptions may undermine confidence, contribute to vaccine hesitancy, and negatively affect immunization practices in clinical settings (22,26,27).

In Pakistan, despite ongoing efforts under the Expanded Programme on Immunization (EPI), challenges related to immunization coverage and healthcare worker preparedness persist. Existing studies have largely focused on parental awareness, medical students, or vaccinators, with limited evidence specifically addressing nursing students' knowledge of child immunization (29). Khyber Teaching Hospital (KTH), Peshawar, serves as a major clinical training site where nursing students actively participate in pediatric and community health services. Assessing their knowledge of child immunization is therefore essential to identify educational gaps, strengthen training programmes, and enhance their competence in preventive healthcare delivery. This study aims to assess the knowledge of child immunization among nursing students at Government College of Nursing, Khyber Teaching Hospital, Peshawar, to support evidence-based improvements in nursing education and immunization practices.

Materials and Methods

The study employed a descriptive cross-sectional design to assess the knowledge of child immunization among nursing students enrolled in the Generic BSN programme at Government College of Nursing (GCON), Khyber Teaching Hospital (KTH), Peshawar. The study setting was GCON KTH, a major clinical teaching institution where nursing students receive both theoretical and clinical training. The study population comprised all BSN nursing students studying at GCON KTH during the data collection period.

A sample size of 169 nursing students was calculated using a prevalence study sample size calculator, assuming a 95% confidence interval, 5% margin of error, and an effect size of 0.5. Participants were selected using a convenience sampling technique, including students from the 2nd, 4th, 6th, and 8th semesters who were present and willing to participate. Nursing students who were absent, on leave, or unwilling to participate were excluded from the study.

Data were collected using a structured questionnaire consisting of two sections. Section A included five items assessing sociodemographic characteristics, while Section B comprised a knowledge assessment quiz related to child immunization. The knowledge tool was adapted from the validated questionnaire developed by Dybsand et al., with additional items related to vaccine scheduling and administration. The final instrument contained 62 true-false and multiple-choice questions, covering knowledge of vaccines and immunity (8 items), the Expanded Programme on Immunization (EPI) schedule (37 items), and vaccine administration (17 items).

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Each correct response was awarded one mark, with a maximum achievable score of 62.

Permission to conduct the study was obtained from the administration of GCON KTH and the Postgraduate College of Nursing (PGCN), Peshawar. The researcher personally distributed the questionnaires after explaining the purpose of the study and obtained informed consent from all participants. Students were given sufficient time to complete the questionnaires, which were collected on the same day to ensure completeness and a high response rate.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics were used to summarize the data, with frequencies and percentages calculated for categorical variables and means with standard deviations for continuous variables. Findings were presented using tables and graphical representations to enhance clarity.

Results

Table 1: Demographic Characteristics of the Respondents (n = 169)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–20	60	35.5
	21–23	96	56.8
	≥24	13	7.7
Gender	Male	18	10.7
	Female	151	89.3
Semester	2nd	26	15.4
	4th	68	40.2
	6th	38	22.5
	8th	37	21.9
Marital Status	Single	161	95.3
	Married	8	4.7

Table 1 presents the demographic profile of the respondents. More than half of the nursing students (56.8%) were aged 21–23 years, and the majority were female (89.3%). Most participants were enrolled in the 4th semester (40.2%), followed by the 6th and 8th semesters. The vast majority of respondents were unmarried (95.3%), reflecting the typical demographic composition of undergraduate nursing students.

Table 2: Item-wise Mean and Standard Deviation of Knowledge of Vaccines (n = 169)

Knowledge Domain / Item	Mean	Standard Deviation
Knowledge of Vaccines (8 items)		
Vaccine stimulates immune response against a specific disease	0.99	0.077
Vaccines provide immediate protection against infectious diseases	0.86	0.350
Vaccination refers to administration of a therapeutic agent	0.88	0.331
Immunity protects against disease after exposure	0.88	0.331
Immunization develops immunity to a specific disease	0.93	0.258
Vaccine schedule is an age-based organized list of vaccines	0.93	0.247
Active immunity acquired via placental antibody transfer	0.70	0.460
Passive immunity involves body-produced antibodies after infection or vaccination	0.75	0.433
Knowledge of Childhood Vaccine Schedule (EPI) (3 items)		
Diseases covered under Pakistan EPI	7.12	3.626

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Diseases protected by hexavalent vaccine	4.73	2.672
Correct age for first vaccine dose	6.62	1.234
Knowledge of Vaccine Administration (4 items)		
Preparation of vaccine injection	2.79	1.367
Routes of vaccine administration	2.58	1.213
Preparation of injection site	2.26	0.953
Disposal of vaccine waste products	2.15	0.930

Table 2 presents the item-wise mean scores and standard deviations related to nursing students' knowledge of vaccines, the childhood immunization schedule (EPI), and vaccine administration. High mean scores were observed for basic vaccine concepts, indicating strong theoretical understanding. Lower mean scores were noted for active and passive immunity, suggesting conceptual gaps. Knowledge related to the EPI schedule and vaccine administration showed moderate mean values, highlighting areas where practical and schedule-based training may require strengthening.

Table 3: Domain-wise Mean and Standard Deviation of Knowledge of Vaccines (n = 169)

Knowledge Domain	Mean	Standard Deviation
Knowledge of vaccines	6.92	1.152
Knowledge of childhood vaccine schedule (EPI)	18.47	5.219
Knowledge of vaccine administration	9.78	3.430

Table 3 presents the domain-wise mean scores and standard deviations of nursing students' knowledge regarding child immunization. The highest mean score was observed in knowledge of the childhood vaccine schedule (EPI), indicating relatively better familiarity with vaccination timing and coverage. This was followed by knowledge of vaccine administration, while knowledge of vaccines showed the lowest mean score, suggesting gaps in foundational concepts. The variability observed across domains highlights the need for balanced theoretical and practical immunization training.

Table 4: Levels of Knowledge of Child Immunization among Nursing Students (n = 169)

Knowledge Level	Frequency (n)	Percentage (%)
Poor knowledge	53	31.4
Good knowledge	108	63.9
Excellent knowledge	8	4.7

Table 4 illustrates the overall levels of knowledge regarding child immunization among nursing students. The majority of participants (63.9%) demonstrated good knowledge, while nearly one-third (31.4%) had poor knowledge. Only a small proportion (4.7%) achieved an excellent knowledge level, indicating the need for strengthened educational strategies to enhance advanced and comprehensive understanding of child immunization.

Discussion

The present study was carried out to assess the level of knowledge regarding child immunization among nursing students enrolled at the Government College of Nursing (GCON), Khyber Teaching Hospital in Peshawar. This research aimed to measure students' theoretical and practical knowledge of vaccines, immunization schedules, and vaccine administration techniques. The findings reveal variations across different knowledge domains

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and highlighting both strengths and areas that require improvement in the current nursing curriculum. Overall, 31.4% students showed poor level of knowledge, while the majority of students 63.9% demonstrated a good level of knowledge and only 4.7% students achieved excellent scores.

The findings and results of the present study are consistent with national and international literature on the knowledge of immunization among nursing and healthcare students. Similar trends have been reported in studies carried out across various countries. A study conducted among South African final year nursing students demonstrated good overall vaccine knowledge, but there were significant gaps in their comprehension of cold chain/vaccine storage protocols and how vaccines confer immunity (6).

In a study from New Delhi, India, the majority of nursing students had poor knowledge of the immunization schedule, with only a small percentage achieving “good” knowledge (24). Similarly, a survey of medical students in Peshawar, Pakistan, revealed moderate rather than "excellent" levels of EPI knowledge, highlighting the need for improved hands on training (38).

Additionally, studies from Kuwait and Lahore confirmed that health sciences students and healthcare professionals often possess adequate theoretical understanding of vaccines but face gaps in procedural skills, schedule adherence, and vaccine handling (39). Collectively, these findings show that although there is a generally satisfactory theoretical understanding of immunization, there is still a lack of specific knowledge regarding schedules and technical procedures.

Conclusion

This study concludes that although nursing students demonstrated an overall good level of theoretical knowledge regarding child immunization, notable gaps were identified in critical areas. Items related to active and passive immunity showed the lowest mean scores, reflecting misconceptions that may adversely affect clinical decision-making, patient education, and interpretation of vaccine outcomes. Knowledge of the Expanded Programme on Immunization (EPI) schedule, particularly regarding diseases prevented by hexavalent vaccines (4.73 ± 2.67), was insufficient, highlighting limited understanding of combination vaccines commonly used in Pakistan. Furthermore, the comparatively lower mean score in the vaccine administration domain (9.78 ± 3.43), especially in injection site preparation and waste disposal, indicates inadequate practical training, which is essential for patient safety and effective immunization delivery. These findings underscore the need for targeted educational interventions and strengthened clinical training programmes to enhance both conceptual understanding and practical competencies in child immunization among nursing students.

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