

# Effect of Sociodemographic Factors on Knowledge and Attitudes of Nursing Staff toward Rotavirus Diarrheal Disease and Its Vaccines

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## ABSTRACT

**Background:** Rotavirus is a highly contagious virus that primarily affects infants and young children, causing severe diarrhea and sometimes leading to life-threatening dehydration. The nursing staff plays a critical role in vaccine administration and patient education.

**Method:** A descriptive study was conducted to assess nursing staff's knowledge and attitudes regarding rotavirus diarrheal disease and its vaccines in primary health care centers and to identify the factors that affect their knowledge and attitude toward rotavirus diarrheal disease and its vaccines, such as age, sex, education, and experience. The study began in November 2022 and lasted until June 2023. A simple random sample of 200 nurses who worked in primary health care centers was selected through the use of the probability-randomized method.

**Results:** This study found that the majority of nursing staff had a moderate level of knowledge and positive attitudes about the rotavirus diarrheal disease and its vaccines. There is no statistically significant association between the nursing staff's knowledge and their demographic data and also between attitude, level of education, and years of experience of nursing staff, while there is a statistically significant association between attitude and their age group and sex at  $p < 0.05$ .

**Conclusion:** The study found that the nursing staff had an adequate level of knowledge and a positive attitude about rotavirus diarrheal disease and its vaccines, and the level of knowledge was not affected by demographic factors, while there was an effect of sex and age on nurses' attitudes toward rotavirus diarrheal disease and its vaccines.

**Keywords:** Rotavirus; Attitudes; Knowledge; and Immunization

## INTRODUCTION

Rotavirus diarrheal disease is considered one of the most widespread infectious diseases globally, significantly affecting the health of both children and adults<sup>(1)</sup>. The main mode of transmission for rotavirus is through the fecal-oral route, either through direct person-to-person contact or indirectly by consuming food and water contaminated with the virus. Rotavirus is capable of causing intense dehydrating diarrhea, resulting in approximately two million hospitalizations and over 25 million outpatient visits globally<sup>(2)</sup>. Despite advancements in healthcare, the virus remains a significant contributor to the morbidity and mortality of children under five years old, particularly in developing nations that bear a disproportionate burden<sup>(3)</sup>. In this context, the implementation of rotavirus vaccination plays a crucial role in alleviating the prevalence of diarrheal illness among children. Research indicates that the incidence of rotavirus diarrhea can be diminished by as much as 60–70% through the use of rotavirus vaccines<sup>(4)</sup>. The successful implementation of rotavirus vaccination programs is contingent upon the knowledge and attitudes of healthcare professionals. Among these professionals, nursing staff play a critical role in vaccine administration and patient education. Understanding the perceptions, awareness, and attitudes of nursing staff towards rotavirus infection and available vaccines

is crucial for enhancing vaccine acceptance and coverage<sup>(5)</sup>. Many studies seek to delve into the knowledge and attitudes of nursing staff regarding rotavirus diarrheal disease and its vaccines. By exploring the factors that influence their knowledge and attitudes and how they affect facilitators to the successful implementation of rotavirus vaccination programs, in doing so, we aspire to contribute valuable insights that can inform targeted interventions to enhance nursing staff engagement, ultimately bolstering the success of rotavirus prevention efforts. Rotavirus is transmitted as a result of contamination of the hand with infected stool and then reaches the mouth or respiratory tract. The virus multiplies in the cells of the intestinal villi, which leads to a decrease in the ability of the intestine to absorb salt and water<sup>(6)</sup>. In most cases, symptoms include fever, nausea, and vomiting, followed by abdominal pain and regular watery diarrhea. Children with rotavirus disease can become dehydrated and may need to be hospitalized<sup>(2)</sup>. It may be accompanied by a cough and a runny nose. According to the World Health Organization, it is the cause of more than half of all acute diarrheal cases, and effective rotavirus vaccines are essential to prevent morbidity and mortality because no specific antiviral therapy is available. In 2009, the World Health Organization recommended that rotavirus vaccines be included in routine immunization protocols<sup>(1)</sup>.

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## MATERIALS AND METHODS

### Study design

A descriptive quantitative design is used to carry out this study through the period from 3 November 2022 to 15 June 2023. The study aims to assess the knowledge and attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines and to recognize the relationship between the knowledge and attitudes of nurse's staff toward rotavirus diarrheal disease and its vaccines and their demographic characteristics (age, sex, education, and experience) in primary health care centers in Kerbala City, South-Central Iraq.

### Data collection

The research was carried out in 11 primary health care centers and selected 200 nurses from these centers using the probability-randomized method (simple random sample). The instrument of this study has been modified by reviewing relevant literature (7, 8, 9). Many of the data in this questionnaire have been modified and developed to increase the validity of this tool in order to be more suitable for achieving the goals this study. The final instrument of study was composed of three parts: the first part had sociodemographic factors consisting of four items (age, sex, educational level, and years of experience); the second part included eighteen items related to knowledge about rotavirus diarrheal disease and its vaccines; and finally, the third part of the questionnaire consisted of ten items that included the attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines.

### Rating and statistical analysis

The items were rated and scored based on the following scoring: three levels were rated using Likert scales (I know = 3, Uncertain = 2, and I don't know =1) for knowledge and (Agree = 3, Undecided = 2, and disagree =1) for attitude. Assessment of nurses' knowledge were based on mean of score (1-1.9 mean of score was considered as a low; 2-2.4 mean of score was considered as a moderate and 2.5-3 mean of score was considered as a high). Assessment nurses' attitudes were based on the mean score (negative = 1-1.9; positive = 2-3).

### Data analysis

The data collected was entered into the computer to be analyzed using the statistical package for social science (SPSS, version 22). The statistical procedures that were applied for the data analysis and assessment of the results included the following: Statistical tables include frequencies, percentages, mean of score (M.S.), and standard deviation (S.D.) used to summarize the data. ANOVA was used to look for associations between demographic factors and the total level of knowledge and attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines. A p-value of <0.05 was considered as the criteria for significance.

### Validity and reliability

The content validity of the early-developed instrument is determined by using a panel of experts (with more than 5 years of expertise in the field) to investigate the clarity, relevance, and adequacy of the questionnaire in order to meet the current study's objectives. A preliminary version of the questionnaire was created and distributed to eight experts tasked with going over the questionnaire. The majority of experts thought that the questionnaire was suitably prepared and produced to measure nursing staff knowledge and attitudes toward rotavirus diarrheal disease and its vaccines. In addition to the experts' comments, their recommendations were considered. So, the modifications have been made, and the final copy of the constructed instrument is ready to be

used in the study. A pilot study is being conducted to determine the reliability of the study instrument. The reliability of the questionnaire detected through the use of the alpha correlation coefficient was computed for the determination of the internal consistency reliability, which was ( $\alpha = 0.71$ ; 0.80) for the standardized alpha of the internal scale of nursing staff's knowledge and attitudes, respectively.

## RESULTS

The results of this study show that 40.5% of nursing staff were in the age group of 20–30 years old, and most (55.5%) of them were female, while 44.5% were male (table 1). The educational level of 44% of participants was diploma, and it also shows the years of experience that 75.5% of nursing staff have (less than 10 years) (table 1).

**Table 1:** Distribution of nursing staff by their socio-demographic characteristics

NO.	Variables	Frequency	Percentage	
	Age(year)	20-30	81	40.5
		31-40	48	28
		41-50	39	19.5
		51 and more	32	16
		Total	200	100
	Gander	Male	89	44.5
		Female	111	55.5
		Total	200	100
	Educational	High school	36	14
		Diploma	88	44
		Bachelor	69	34.5
		Post-graduate	7	3.5
		Total	200	100
	Years of Experience	<10	151	75.5
		10-20	36	18
		>20	13	6.5
		Total	200	100

**Table 2:** Knowledge of nursing staff toward rotavirus diarrheal disease and its vaccines

NO.	Items	Mean of score (Std. Deviation)	Evaluation
1	Children infected with rotavirus suffering from a fever	2.33 (.791)	Moderate
2	Rotavirus spreads through hand-to-mouth contact and can be picked up from surfaces such as toys, Dirty hands or diapers	2.71 (.516)	High
3	Rotavirus is spread in the air through sneezing and coughing.	1.93 (.829)	Low
4	Children under the age of five are more susceptible to rotavirus infection	2.68 (.632)	High
5	Rotavirus causes death in children when not vaccinated	1.80 (.761)	Low
6	Rotavirus can be prevented by vaccination	2.80 (.537)	High
7	Diarrhea caused by rotavirus can be treated with oral rehydration solution (ORS).	2.70 (.609)	High
8	Washing hands and keeping surfaces clean can help reduce the spread of rotavirus	2.81 (.511)	High
9	The child is likely to suffering from a fever after receiving the rotavirus vaccine	2.14 (.876)	Moderate

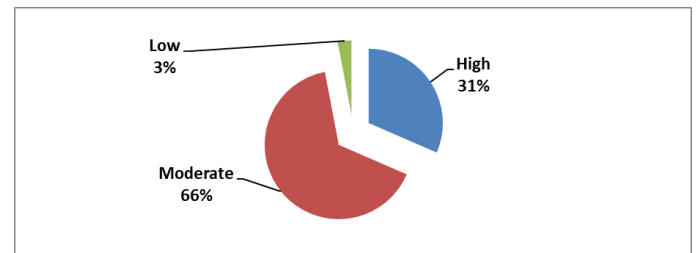
10	The rotavirus vaccine is given intramuscularly	1.65 (.843)	Low
11	The rotavirus vaccine is included in the national immunization program in Iraq	2.78 (.492)	High
12	The rotavirus vaccine is given in three doses according to the national immunization program	2.23 (.848)	Moderate
13	You must stop taking the vaccine in case of hypersensitivity to it	2.44 (.734)	Moderate
14	Children with severe diarrhea and high fever should not be given rotavirus vaccine	2.51 (.722)	High
15	You must stop taking the vaccine in case of hypersensitivity to it	2.72 (.577)	High
16	Children should be examined before vaccination if the child's immune system is weak	2.16 (.825)	Moderate
17	The vaccine gives permanent immunity	2.26 (.798)	Moderate
18	The vaccine should be kept in refrigeration at a temperature between 2-8 degrees Celsius	2.60 (.583)	High

This table reveals the knowledge of respondents toward rotavirus diarrheal disease and its vaccine. This table indicates that most participants have a high mean score on items (2, 4, 6, 7, 8, 11, 14, 15, and 18) and a moderate level on items (1, 9, 12, 13, 16, and 17), while they found a low level on items (3, 5, and 10).

**Table 3:** Attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines

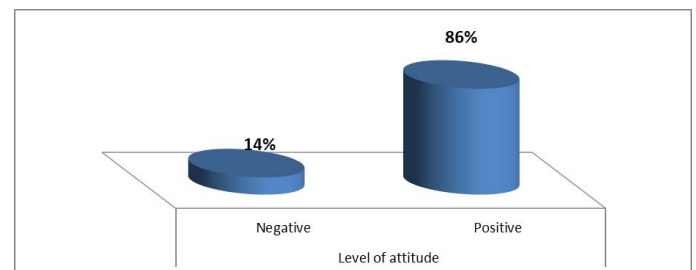
NO.	Items	Mean of score (Std. Deviation)	Evaluation
1	I think that the rotavirus vaccine is not a heat-sensitive vaccine	1.88 (.842)	Negative
2	I believe that rotavirus infection poses a threat to the lives of children under the age of five.	2.51 (.743)	Positive
3	I think it is not possible to give a child who has asthma the rotavirus vaccine	1.65 (.755)	Negative
4	I believe that the side effects of the rotavirus vaccine do not threaten the lives of children.	2.33 (.809)	Positive
5	I think it is not possible to give the rotavirus vaccine when the child's temperature rises more than 39.5 degrees Celsius and there is a need to postpone its appointment	2.52 (.749)	Positive
6	I think all children must get the Rota vaccine	2.74 (.611)	Positive
7	I think, before giving the vaccine, making sure that the mouth is free of any infections or other barriers is necessary	2.39 (.795)	Positive
8	I advise not to give the child the rotavirus vaccine if he is allergic to penicillin.	1.63 (.725)	Negative
9	I believe that a dose of the rotavirus vaccine can be given to a child over 3 months old if he has not received any dose	1.63 (.809)	Negative
10	I think that most children are susceptible to rotavirus	2.65 (.670)	Positive

This table reveals the attitudes of respondents toward rotavirus diarrheal disease and its vaccines. The table indicates that the participant has a positive score on items (2,4,5,6,7, and 10) and a negative score on items (1,3,8, and 9).



**Figure 1:** Total level of knowledge of nursing staff toward rotavirus diarrheal disease and its vaccines

This figure reveals that the majority (66%) of nursing staff have a moderate level of knowledge, 31% of them have a high level of knowledge, and only 3 percent have a low level of knowledge toward rotavirus diarrheal disease and its vaccines.



**Figure 2:** Total level of attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines

This figure reveals the total attitudes of respondents toward rotavirus diarrheal disease and its vaccines. This table indicates that the majority (86%) of nursing staff have a positive attitude, while 14% of them have a negative attitude.

**Table 4:** Association between demographic characteristics and total level of knowledge of nursing staff toward rotavirus diarrheal disease and its vaccines

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Demographic Characteristics	Age	.032	.052	.064	.620	.536
	Sex	.084	.089	.075	.949	.344
	the level of educational	.040	.051	.056	.779	.437
	Years of Experience	.034	.095	.036	.359	.720

a. Dependent Variable: 1

Df= Degrees of freedom F= Frequency. Sig=Significant at p<0.05.; NS=Non-Significant at P>0.05

This table shows that there is no statistically significant association between the nursing staff's knowledge of rotavirus diarrheal disease and its vaccines and their age, sex, educational level, and years of experience (p<0.05).

**Table 5:** Association Between Demographic Characteristics and Total level of Attitudes of Nursing Staff Toward Rotavirus Diarrheal Disease and its Vaccines

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
Demographic Characteristics	Age	-.075	.032	-.235	-2.309	.022
	Sex	-.116	.056	-.164	-2.086	.038
	the level of educational	.002	.032	.004	.059	.953
	Years of Experience	.034	.060	.057	.573	.568

a. Dependent Variable: 1

Df= Degrees of freedom F= Frequency. Sig=Significant at  $p < 0.05$ .; NS=Non-Significant at  $P > 0.05$

This table shows that there is a significant association between the nursing staff's attitudes toward rotavirus diarrheal disease and its vaccines and their age group and sex, while there is no statistically significant association between the nursing staff's attitude and their level of education and years of experience at  $p < 0.05$ .

## DISCUSSION

The discussion aims to analyze the findings of research conducted among nursing staff, investigating their understanding of rotavirus, awareness of its associated risks, and attitudes towards the available vaccines. The exploration of these aspects provides valuable insights into potential barriers and facilitators for vaccine acceptance within the community.

After the analysis of participant socio-demographics, the study findings indicate that slightly more than a third (40.5%) of nursing staff were in the age group (20–30) years old, and most (55.5%) of them were female. Concerning the level of education, the study finding indicates that slightly less than half (44%) of the study sample were diplomas. In regarding years of experience that 75.5% of nursing staff have (less than 10 years). This finding is consistent with a recent study conducted by Hamza et al. (2021), which claimed that the majority of participants in this study ranged in age from 20 to 29) years old and comprised 50.9 percent of the study sample. In terms of sex, the majority of the research participants (69.6%) were female, and the diploma of nursing graduates comprised 78.5%. The majority of them have less than ten years of experience in the immunization unit.

The nursing staff's knowledge related to rotavirus diarrheal disease and its vaccines showed that the majority of questions were answered correctly. This finding revealed that the majority (97%) of the nursing staff in primary health care centers have a sufficient level of information regarding rotavirus diarrheal disease and its vaccines, with 66% of nursing staff having moderate knowledge and 31% having a high level of knowledge. However, there was still a lack of nursing staff's knowledge, particularly in terms of (rotavirus is spread in the air through sneezing and coughing, rotavirus causes death in children when not vaccinated, and the rotavirus vaccine is given intramuscularly) (tables 2 and 3) and figure 1.

This finding is consistent with a recent study conducted by Shah et al. 2021 and Shamkh et al. 2022, which found that the majority (96.1%) of healthcare providers had a good degree of rotavirus awareness, whereas (82.5%) had vaccination awareness, and the study conducted by Tagbo et al. (2013), which stated that the majority of health care providers were aware of rotavirus disease.

While the findings of this study disagree with the previous study conducted by Hamza et al. (2021), which revealed that the majority (60.7%) of nurses had poor knowledge about the rotavirus vaccine for children, and the study conducted by (12; 13), which revealed that the midwives and nurses interviewed. Regarding the nursing staff's attitude toward rotavirus diarrheal disease and its vaccines, The findings showed the nursing staff had positive scores on all items except for items that included (I think that the rotavirus vaccine is not a heat-sensitive vaccine, I think it is not possible to give a child who has asthma the rotavirus vaccine, I advise not to give the child the rotavirus vaccine if he is allergic to penicillin, and I believe that a dose of the rotavirus vaccine can be given to a child over 3 months old if he has not received any dose), which had negative attitudes towards it. Concerning the total level of attitudes of nursing staff toward rotavirus diarrheal disease and its vaccines. This study reveals that the majority (86%) of nursing staff have a positive attitude, while only 14% of them have a negative attitude. This is an important result because attitudes toward health professionals are a major factor affecting the administration of the vaccine. Other findings show that there is no statistically significant association between the nursing staff's knowledge of rotavirus diarrheal disease and its vaccines and their demographic characteristics, at  $p < 0.05$ . Other findings show that there is no statistically significant association between the nursing staff's attitudes toward rotavirus diarrheal disease and its vaccines and their demographic characteristics except for age and sex. There is a statistically significant association between the nursing staff's attitude and their age and sex at  $p < 0.05$ .

This finding is associated with the previous study conducted by Tate et al. (2016), which showed that there is no significant relationship between the knowledge of nurses about the rotavirus vaccine and its demographic variables at a  $p$ -value  $> 0.05$ . while disagreeing with the other finding of this study, which stated that there is a significant relationship between experience years in the unit of immunization at a  $p$ -value  $\leq 0.05$ .

## CONCLUSION

**The nursing staff have moderate knowledge and positive behavior toward rotavirus diarrheal disease and its vaccine. However, there is still a lack of knowledge in terms of the spread of rotavirus in the air through sneezing and coughing, its cause of death in children when they are not vaccinated, and the possibility of administering the rotavirus vaccine by intramuscular injection. The level of nurses' knowledge was not affected by their demographic factors, and with regard to attitudes, the age and level of education factors had an impact on them. Therefore, the study recommended improving the nursing staff's information by subjecting them to a training program, preparing posters about the importance of rotavirus vaccines, activating monitoring and motivation systems, and expanding the future study to the largest number of nursing staff and other health care workers throughout Iraq.**

**Authorship Contribution:** All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes

**Ethical Consideration:** The Ethics Committee of the University of Kerbala, College of Nursing, Iraq, obtained ethical approval for this study through scientific codes (UOK. CON. 23.025). The intent of the study and ethical points such as the lack of a need for a name, the right to withdraw from the research, free participation, and information

confidentiality were clarified to the participants at the start of the interview.

**Potential Conflicts of Interest:** None

**Competing Interest:** None

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