



Original Research

## Knowledge and attitude regarding rotavirus and its vaccination among medical students in Karachi, Pakistan



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### ABSTRACT

**Objective:** The aim of this study is to determine the knowledge and attitude regarding rotavirus and its vaccination among medical students.

**Study design:** It is a cross sectional study.

**Methods:** Total 324 medical students were selected through stratified random sampling. A structured and validated questionnaire was used. Knowledge and attitude were recorded on scale. Independent *t*-test and ANOVA was used to determine the difference among gender and academic year. Regression and correlation analysis was done to determine the correlation of knowledge and attitude level with age and academic year of study. *p* value  $\leq 0.05$  considered as statistically significant.

**Results:** Mean and standard deviation score of students were  $7.88 \pm 2.46$  on knowledge scale and  $4.16 \pm 1.23$  on attitude scale. Total 87% of students were aware of rotavirus and its vaccination. Both knowledge and attitude level were increased significantly with increasing year of study and age. After adjustment of covariate, Age and academic year of study were the significant factors in determining the scores on knowledge scale. (beta coefficient 0.056 with *p*-value 0.003 and 0.433 with *p*-value-0.000).

**Conclusion:** Medical students were appropriate knowledge about the rotavirus but attitude toward rotavirus vaccination is unsatisfactory. It should be a part of the curriculum of not just medical students but all students from high school to undergrad level regardless of the course they are enrolled in and also be advertised by the government.

### 1. Introduction

According to WHO: Diarrhea has 3rd highest mortality amongst infectious diseases. Due to limited access to health resources gastroenteritis becomes a fatal disease in infants in Pakistan. Most deaths occur under 5 years. Rotavirus is common in infants and children caused by oral-fecal route and is contagious. Symptoms appear after 2 days and last for a week. According to sentinel sites' incidence due to rotavirus in Pakistan is 24%. According to EPI: it is number one cause of diarrhea and kills around 53,300 children in Pakistan each year [1–6].

Rotarix™ is currently being introduced in Pakistan's Expanded Program on Immunization (EPI). Evidence has proven that it is highly effective and economic in preventing rotavirus gastroenteritis, globally which is the second most common preventable cause of mortality and morbidity among children <5 years in developing countries like Pakistan [7,8].

Rotavirus immunization program has been predicted to prevent 3061 deaths annually in Pakistan at an estimated \$279/DALY averted. It was found to be cost-effective when the result for the base case was compared with Pakistan per capita gross domestic product (GDP) [9,10].

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The currently accepted rotaviral vaccines are Rotarix and Rota Teq. Both of the vaccines are oral and live attenuated. Two doses of Rotarix and three doses of Rota Teq are given [11].

The vaccine causes an increase in the serum anti-Rotavirus immunoglobulin A titer. It is contraindicated in individuals having history of hypersensitivity, intussusceptions or Severe Combined Immunodeficiency Disease (SCID). Rotavirus Efficacy and Safety Trial (REST) evaluated that RotaTeq was able to reduce the severity of the disease by 74%; its efficacy against severe disease was 98%. Prior to vaccine implementation, & >65% children had at least one rotavirus diarrhea by 5 years of age. Arguably, immunizations could be part of all healthcare encounters. Shared responsibility is paramount if deaths are to be reduced [12–15].

Steps should be taken to prevent rotavirus by promoting hygiene and immunization against the virus. Health care workers especially young medical students come in direct contact with infected patients and the community. They should have the knowledge of vaccines that are part of EPI and they should actively participate in promoting the practice of vaccination.

## 2. Methods

### 2.1. Study setting and participants

This study carried out at public sector medical college. Each year 350 medical students enrolled. Total five year of study medical education. Male and female students were included in the study.

### 2.2. Study design, sampling technique

This is the cross sectional study. The students were randomly chosen according to the probability of proportionate sizes of the classes – stratified random sampling. Those student willing to participate in the study, they were included in the study. The questionnaires were circulated after seeking verbal consent and students were requested to return them within weeks.

### 2.3. Sample size

Sample size was calculated through World Health organization statically software for sample size. Total 350 students sample required to fulfill the objective of the study at 95% confidence interval, 5% margin of error and 35% prevalence of awareness of rotavirus vaccine from previous study [15].

### 2.4. Questionnaire

A pre-tested, structured questionnaire was adapted with permission from questionnaire validated by previous study [8]. For adaptation of the questionnaire a thorough peer review and discussions was done. The questionnaire was then pre-tested on a group of students who were expected to identify questions most valid in ascertaining our objectives. These were accordingly modified to develop a final questionnaire. The questionnaire consisted of three parts namely; student's profile, evaluation of student's knowledge and attitudes of Rota vaccine. Demographic details of subjects included age, gender and year of study. Knowledge was assessed by 12 multiple choice questions. Each student, percentage of correct answers was calculated as representative knowledge score. Attitude was assessed by six questions. Each answer was scored on a scale of 0.0 which indicate negative attitude and 1.0 indicate positive attitude.

### 2.5. Statistical analysis

Data was entered and analyzed in Statistical Package for Social Sciences 13.0 (SPSS, Inc., Chicago, IL, USA). Mean and proportion was

calculated for descriptive statistics. Multiple linear regression model was used to test association of age and year of study with the knowledge and attitude. ANOVA and *t*-test were used to look for similar putative associations of type of high school, mode of study and gender. Results were recorded as frequencies, means  $\pm$  standard deviations (SD), *p*-values, and standardized and unstandardized regression coefficients. For all purposes, a *p*-value of <0.05 was considered as the criteria of significance.

## 3. Results

Table 1 shows the baseline characteristics of study participants. Mean age and standard deviation of students was  $2.43 \pm 0.58$ . Majority (77.5%) of students were female. Most (46.3%) of students were from fourth academic year.

Table 2 shows the proportion of medical students falling in different score category. Most of the students were in third quartile in knowledge score and second quartile in attitude score.

Table 3 shows medical students knowledge and attitude towards rotavirus infection and its vaccination related to gender and academic year of study. Mean scores [ $\pm$  Standard Deviation] on a knowledge and attitude scale were also compared. Female score is better than the male score. Final year academic student's scores were better than other academic year. Among gender and academic year of study, there is difference in terms of knowledge and this difference is statistically significant. *P*-value 0.004 and *p*-value 0.001.

Table 4 shows the predictors of scores on knowledge and attitude scale through multivariate linear regression. Age and academic year of study were the significant factors in determining the scores on knowledge scale.

Fig. 1 shows the awareness level regarding rotavirus among different academic year of students.

## 4. Discussion

The study finding revealed that students have appropriate knowledge regarding rotavirus but the attitude towards is unsatisfactory. About 30% of students were in third quartile in knowledge scale and 59% of students were second quartile in attitude scale.

This study result is consistent with other study results. Previous study conducted with same questionnaire among medical students. Mean knowledge score level was same but lower mean score of attitude level. This score is good represents the baseline knowledge affects of basic pre clinical education on knowledge and attitude for medical students [16]. A Previous study was conducted in five low- and middle-income countries, on medical students, researchers discovered knowledge level were low [17], while our new estimates show that 248 out of 324 medical students (76.54%) knew that rotavirus causes diarrhea. In a study

**Table 1**  
Base line characteristics of study participants.

No	Characteristics	Frequency (n)	Proportion (%)
1	Age (Mean $\pm$ SD) (Years)	2.43 $\pm$ 0.58)	
	16–21	171	52.8
	22–27	153	47.2
2	Gender		
	Male	73	22.5
	Female	251	77.5
3	Academic Year of Study		
	First	32	9.9
	Second	52	16
	Third	42	13
	Fourth	150	46.3
	Final	48	14.8
4	Awareness about Rotavirus Vaccine		
	Yes	283	87.3
	No	41	12.7

**Table 2**  
Proportion of Medical Student falling in Different score category.

Score Category (Quartile)	Knowledge Student %	Attitude Student %
1 Less than 25	25.8	27.1
2 25-50	29.5	59.4
3 50-75	30.5	12.0
4 Greater 75	14.2	1.5

**Table 3**  
Medical students Knowledge and Attitude towards Rotavirus infection and its vaccination according to Gender and academic year of study.

	Knowledge		Attitude		p-value
	Mean ± SD	p-value	Mean±		
Gender					
Male	7.43 ± 2.62	0.040 <sup>a</sup>	4.12 ± 1.20		0.724 <sup>a</sup>
Female	8.00 ± 2.40		4.18 ± 1.24		
Academic Year of Study					
First	5.59 ± 2.72	0.001 <sup>b</sup>	4.00 ± 1.24		0.108 <sup>b</sup>
Second	6.13 ± 2.44		3.94 ± 1.46		
Third	8.45 ± 1.94		4.47 ± 0.96		
Fourth	8.34 ± 2.07		4.11 ± 1.24		
Final	9.37 ± 1.78		4.43 ± 1.04		
Total	7.88 ± 2.46		4.16 ± 1.23		

<sup>a</sup> Independent t-test.

<sup>b</sup> ANOVA.

conducted in Malaysia 65% of the participants were aware of the route of transmission of rotavirus [18] similarly our study also shows that 65.4% of the students knew that rotavirus transmission occurs via the oro-fecal route.

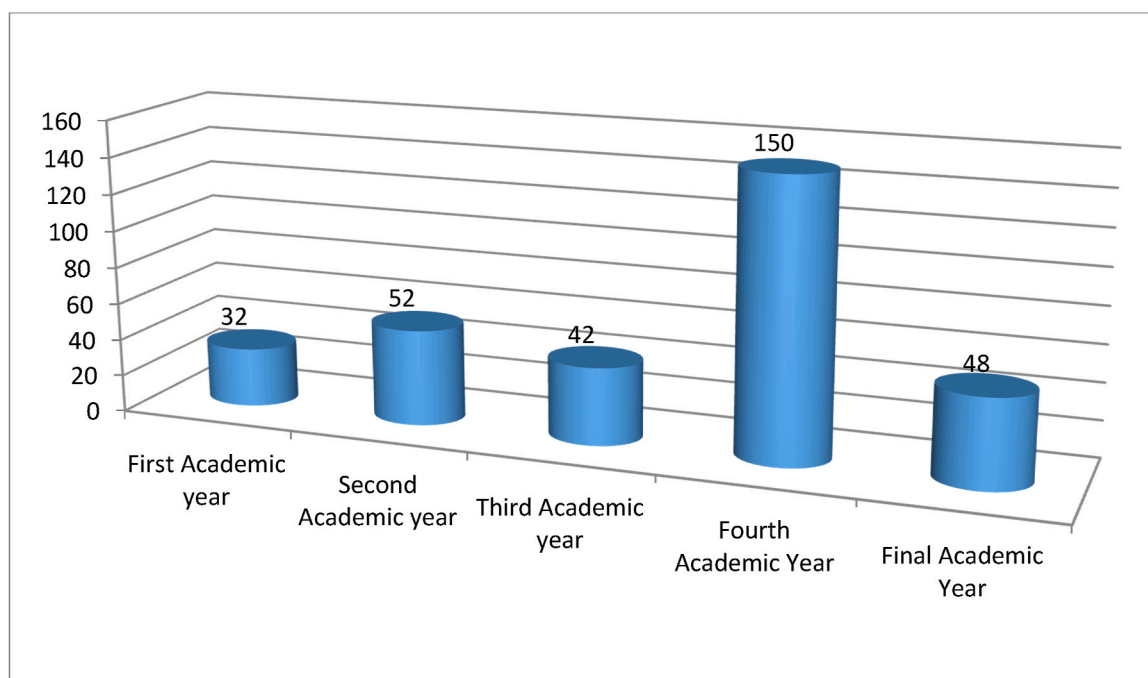
Student’s knowledge and attitude regarding rotavirus and its vaccination were significantly improved with increasing year of education at medical college. This is due to as students were moved from basic clinical sciences to clinical science year there knowledge level has been improved due to medical curriculum through well structured intensive training. Different studies were conducted which found that students knowledge regarding rotavirus and its vaccination has increased as year of education increased [19–21]. A study conducted in Canada showed that when a vaccination program was implemented medical students had a more positive attitude towards the vaccine [22].

Gender was also significant predictor of knowledge regarding rotavirus and its vaccination. In this study females were high mean score of knowledge and attitude. One reason is that most of the study participants were females. These results were consistent with other study results, which found that females have more knowledge, mean score compared to males [23].

The limitation of this study is that it’s a cross sectional study which cannot determine the temporality. Second there is an information bias in the study results. This study was conducted in one medical college to serve as pilot for large scale research. That why generalizability of results was low. We recommend further large scale study to be carried out across country level medical colleges.

**Table 4**  
Predictors of score on the Knowledge and Attitude scale among Medical Students.

Predictors	Knowledge		Attitude	
	Regression coefficient (b) (p-value)	Correlation Coefficient (r) (p-value)	Regression coefficient (b) (p-value)	Correlation Coefficient (r) (p-value)
Age	0.056 (0.003)	0.333(0.000)	0.106(0.146)	0.116(0.19)
Year of Academic study	0.433 (0.000)	0.469(0.000)	0.016(0.830)	0.083(0.67)



**Fig. 1.** Awareness regarding rotavirus among different academic year of medical students.

## 5. Conclusion

Our results indicate that the knowledge about the rotavirus is good but the awareness regarding the vaccine and its availability is unsatisfactory. This gap can be attributed to the fact that the vaccine program is not covered adequately in the curriculum. It should be a part of the curriculum of not just medical students but all students from high school to undergrad level regardless of the course they are enrolled in and also be advertised by the government.

## Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

## Funding source

No funding source, project is self-funded.

## Author contribution

THZ,RN,IS. study conceptualization and writing the manuscript, KS, AA, MY. Data curation, MZ formal analysis and writing, RZ and TS funding acquisition. THZ supervised the project. Research involving human participants: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Research involve human participants, research approved from ethical review committee from hospital, confidentiality of data has maintained, Informed consent inform consent was obtained from each participant,

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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