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Children's Mask-Wearing Behaviors and the Factors that go along with them during the COVID-19 Pandemic

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ABSTRACT

Background and Objective: Based on WHO, mask wearing may prevent coronavirus disease 2019 (COVID-19) transmission. The aim of the present study was to investigate the prevalence of mask wearing and its related factors in Zahedan, southeastern Iran.

Methods: This cross-sectional study was carried out to investigate mask wearing in 408 children aged 2 to 18 years who were referred to specialized pediatric clinics at Zahedan University of Medical Sciences in Zahedan, Iran. The study ran in 2021-2022, and participants or their parents were asked about age, gender, number of children in the family, father's and mother's occupation, father's and mother's education, and family socioeconomic status. The SPSS 20 with a significance level of 0.05 was used to analyze the data.

Findings: The rate of mask wearing was 61.52%. Of the children who adhered to wearing masks, 57.77 % wore three layers, 94.42% wore well-fitting masks, and 65.34 % changed their masks at least three times per day. About 53.50% of the parents of the children who refused to wear masks did not believe in this behavior, and the others had economic problems. Mask-wearing was significantly influenced by all socio-demographic factors ($p< 0.001$).

Conclusion: It was found that 62% of the children wore masks. The majority of children, who adhered to wearing masks used three layers, were adapted and changed masks at least three times per day. The majority of those who refused to wear masks did not believe in this treatment. Socio-demographic factors had a significant impact on mask wearing.

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Introduction

Due to its high human-to-human transmission in coronavirus disease 2019 (COVID-19) infection, the virus is now a pandemic worldwide [1]. According to the recommendations of the WHO and UNICEF, wearing masks as part of a comprehensive package of public health interventions, along with other measures such as maintaining physical distance, hand hygiene, breathing, and ventilation in closed environments, can prevent the transmission of some viral diseases of the respiratory tract, including COVID-19 [2]. At present, the extent of children's involvement in SARS-CoV-2 transmission is unclear but according to WHO, laboratory-confirmed cases, and other studies, 1-7% of COVID-19 cases have been reported in children, with relatively few deaths compared to adults [3, 4]. Studies on the viral load and duration of transmission of the infectious virus among children are also limited compared to adults. A published study suggests that viral load in infected patients may vary with age, and that virus transmission is longer in symptomatic children than in asymptomatic children [5].

Some studies have reported that viral RNA levels in respiratory secretions and feces were lower in children less than five years of age than in school children, adolescents, and adults [6, 7]. On the other hand, a study from the United States found that children under five years of age with mild to moderate COVID-19 viral RNA in the upper respiratory tract had higher levels than older children and adults [8, 9]. Since COVID-19 has widespread susceptibility throughout the world population, adherence to health advisories and mask use have been repeatedly emphasized worldwide [9]. The aim of the present study was to determine the rate of mask wearing and the factors affected in southeastern Iran.

Methods

This descriptive cross-sectional study sought to identify mask-wearing behaviors and the associated factors during the Covid-19 pandemic. The study's population consisted of children aged 2 to 18 years old who were referred to the pediatrics outpatient clinic at Zahedan University of Medical Sciences, Zahedan, Iran. From December 2021 to April 2022, 408 children based on accessibility were entered into the study. Using the following formula, the sample size with 10% attrition calculated 422 children. $N=Z^2*p*(1-p)/d^2$ where in Z=1.96, P=51.6 and d=0.05. From these samples, 14 questionnaires were excluded due to missed data. The rate of using masks (p=51.6) was derived from a pilot study.

A pilot study with 15 participants was conducted to assess the items on the questionnaire's applicability and comprehension before data collection. The pilot program's questionnaire questions remained unchanged, and the pilot program participants were not included in the research sample. Information from the questionnaire included the family's age, sex, number of children, father's and mother's jobs, education levels, family history of coronary heart disease, whether or not family members wore masks, and the family's socioeconomic status. The parents provided an "informed consent form" before the data collection process. One of the parents signed this form. The questionnaire was completed in a face-to-face interview in 10 to 15 minutes. The data collection and the interview were done by a trained medical student.

Statistical analysis

To analyze data SPSS 20.0 (SPSS Inc., Chicago, IL, USA) was used. Statistical indices are presented as mean±SD or frequency for numeric or categorical data respectively. The Chi-square test was applied to find the association between two categorical variables and the goodness-of-fit test was used to find the difference between observed and expected frequency. For all the tests P value < 0.05 was considered as a level of significance.

Results

The study aimed to assess the mask-wearing behavior in 408 ill children who were referred to the pediatric ward. The children who entered the study were aged 2 to 18 years. The number of children in

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the households ranged from one to eight. Table 1 showed that about 55.64% were boys and the mask-wearing rate was 61.52 % (251 individuals). The 171 (41.91%) of the children's fathers had lower education than diplomas, while 152 (26.96%) had no formal education. Exactly, the mothers of 157 (38.48%) and 110 (37.25 %) children lacked formal education. The remaining mothers had college degrees or higher. Approximately 353 (86.52%) of the fathers had self-employment or were unemployed, while this rate for the mothers was 374 (91.67 %).

The majority of the children lived in urban areas and 312 (76.47%) had no family history of Covid-19, about 60.29% had a medium income level, followed by poor households (34.56%), and only 6 (1.47) households had a good income. Table 2 resulted that, of 251 worn mask children, 12.75%, 9.16%, 57.77%, and 20.32% were wearing simple, fabric, three layers, and three-dimensional masks. Well-fitted mask wearing was another behavior factor that checked in the worn mask children. Wearing a well-fitted mask along with vaccination, self-testing, and physical distancing helps protect you and others by reducing the chance of spreading COVID-19. The table resulted that, 237(94.42%) of the children had worn well-fitted masks and about 20.32%, 14.34%, and 65.34% had changed their masks daily 1, 2, and 3, or more times.

Of 157 children who rejected mask wearing, 53.50% of the parents did not believe and 46.5% were poor. Comparing the factors between children who obeyed mask-wearing and those rejected, is shown in table 3. The table observed that sex distribution between the groups was similar(X^2=0.559, p=0.455). All the demographic and socioeconomic factors of parental education and job, income level, and place of living had a significant effect on mask-wearing (p<0.001). Table 4 showed that different treatments towards the type of mask worn, well-fitted and, frequent mask use significantly different with expected frequency (p<0.001). In those children who rejected mask-wearing, in normal it is expected that half of these children have had economic problems the results showed this trend and it means the reasons for not wearing masks have the same frequency (p= 0.38) (Table 5).

Table 1. Distribution of grouping data in different status

Variables	Status	Frequency	Percent
Gender	Male	227	55.64
	female	181	44.36
Fathers' Education	illiterate	110	26.96
	<diploma	171	41.91
	diploma	74	18.14
	license	53	12.99
Mothers' Education	illiterate	152	37.25
	<diploma	157	38.48
	diploma	58	14.22
	Bachelor	39	9.56
	Higher than Bachelor	2	0.49
Fathers' job	employee	55	13.48
	Jobless of self-job	353	86.52
Mothers' job	employee	34	8.33
	Jobless of self-job	374	91.67
place of living	Urban	312	76.47
	Rural	96	23.53
Family History of Covid-19	yes	162	39.71
	no	246	60.29
Income level	poor	141	34.56
	medium	261	63.97
	good	6	1.47
Total		408	100

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Table 2. Prevalence, behaviors of children who obeyed and rejected mask wearing

Variables	Status	Frequency	Percent
Mask Wearing	yes	251	61.52
	no	157	38.48
Type of mask	simple	32	12.75
	fabric	23	9.16
	Three layers	145	57.77
	Three dimensional	51	20.32
Well-fitted masks	yes	237	94.42
	no	14	5.58
frequent use	1 time	51	20.32
	2 times	36	14.34
	3 or more times	164	65.34
Reason for not mask wearing	economic	73	46.5
	Beliefs	84	53.5

Table 3. Comparing the factors between children who obeyed mask wearing and those rejected

Variables	Groups	Statistics	Wearing Mask		Total	Test Value	P-value
			Yes	No			
Gender	Male	N	136	91	227	0.559	0.455
		%	59.90	40.10	100.00		
	female	N	115	66	181		
		%	63.50	36.50	100.00		
Father Education	illiterate	N	31	79	110	98.482	<0.001
		%	28.20	71.80	100.00		
	<diploma	N	106	65	171		
		%	62.00	38.00	100.00		
	diploma	N	61	13	74		
		%	82.40	17.60	100.00		
	Bachelor and higher	N	53	0	53		
		%	100.00	0.00	100.00		
Mother Education	illiterate	N	69	83	152	83.585	<0.001
		%	45.40	54.60	100.00		
	<diploma	N	83	74	157		
		%	52.90	47.10	100.00		
	diploma	N	58	0	58		
		%	100.00	0.00	100.00		
	license	N	39	0	39		
		%	100.00	0.00	100.00		
	> license	N	2	0	2		
		%	100.00	0.00	100.00		
Fathers job	employee	N	55	0	55	39.763	<0.001
		%	100.00	0.00	100.00		
	freelance	N	196	157	353		
		%	55.50	44.50	100.00		
Mothers job	employee	N	34	0	34	23.2	<0.001
		%	100.00	0.00	100.00		
	freelance	N	217	157	374		
		%	58.00	42.00	100.00		
Place of living	city	N	213	99	312	25.518	<0.001
		%	68.30	31.70	100.00		
	village	N	38	58	96		
		%	39.60	60.40	100.00		
Income level	poor	N	70	71	141	15.523	<0.001
		%	49.60	50.40	100.00		
	medium	N	175	86	261		
		%	67.00	33.00	100.00		
	good	N	6	0	6		
		%	100.00	0.00	100.00		
Total		N	251	157	408	-	-
		%	61.50	38.50	100.00		

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Table 4. Chi-square goodness-of-fit test on behavioral factors for the children mask-wearing

Behaviors	Status	Observed N	Expected N	Residual	Chi-Square	P-value
Type of Mask	simple	32	62.8	-30.8	150.26	<0.001
	fabric	23	62.8	-39.8		
	Three layers	145	62.8	82.3		
	Three dimensional	51	62.8	-11.8		
Well-fitted mask	yes	237	125.5	111.5	198.12	<0.001
	No	14	125.5	-111.5		
frequency use	1	51	83.7	-32.7	117.04	<0.001
	2	36	83.7	-47.7		
	3<=	164	83.7	80.3		
Total			**251**			

Table 5. Chi-square goodness-of-fit test on reasons for not wearing the mask

Variable	States	Observed N	Expected N	Residual	Chi-Square	P value
Reason for not use	Economic problems	73	78.5	-5.5	0.771	0.38
	Not believe	84	78.5	5.5		
Total			157			

Discussion

The present study was conducted to find the rate of mask-wearing behavior and the effective factors. From the analysis issued that using masks rated 61.52% and from this children, 94.42% used well-fitted masks, and 65.34% were changing their masks at least three times per day. The study also revealed that mask-wearing practice was influenced by all demographic and socioeconomic factors significantly. There is low information regarding the definitive treatment for Covid 19 in children, as well as the strategic recommendations to lessen the likelihood of viral transmission, a reduction in community contact (protection of physical or social distance), and contact precautions that require separation [10]. Patients who are infected with the virus should wear masks, as this is one of the most effective methods for reducing the incidence of Covid 19 and preventing infection [10].

In children who wouldn't use the mask, it is conventionally expected that part of these children has money problems related to issues like the current outcomes [11-13]. A review conducted by Ayran et al. [11] to determine hand-washing rates, mask-wearing rates, and related factors found that 82.1% of the children used disposable clinical masks, 62.1% used appropriate masks, and 52.1% used masks for the entire day. Another review, by Xuyu Chen et al. [12] in Wuhan, China, on students examining mask-wearing and hand-washing behaviors revealed that 425.5% of them were hand-washers and 51.6% were mask-wearers. Hand hygiene was fundamentally linked to orientation, educational level, father's work, mother's education, and the location of the home where a mask was worn. Primary school students' hand-washing and mask-wearing behaviors have been influenced by orientation and grades. A study by Mueller et al. [13] expected to focus on the rate at which people wore masks when they left home, and it found that about 70% agreed with our review. The majority of subjects who participated in these studies and who rejected mask wearing had economic problems or negative attitudes toward it, which is consistent with the results of the present study, which showed low economic levels and no belief in this prevention method.

Mask wearing has been shown to be effective in previous studies [14- 16]. Although experience in China [15] and South Korea [16] has demonstrated that mask use has been an effective factor, some Western nations currently oppose mask use by the general population in general [15]. Surgical masks and N95, for instance, can prevent respiratory viruses like influenza, respiratory syncytial, and Covid-19 from entering the body [15].

Similar to our findings, a study by Chen et al. found that gender was an effective factor; 55.64% in

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boys and 44.36% in girls. The knowledge of the children, age, grade level, emphasis on health, and instructional effectiveness all had an impact on the mean mask-wearing behavior score [12]. According to a study conducted on students at the University of Vietnam, 57.6% of students wear medical masks, 17.7% wear fabric masks, and 2.2 percent wear N95 masks. About 12.75%, 9.16%, 57.77%, and 20.32% of the 251 children in the present study who were wearing masks used plain, fabric, three-layer, and three-dimensional masks, respectively. A study reported that none of the children used N95 masks, probably because of the high cost [17].

According to Ayran et al, 28% of the children were changing their masks every 2 to 4 hours, 52.1% every day, 13.2% every 2 to 5 days, 2.7% every more than 5 days, and 3.4% continue to use the same contaminated mask [11]. However, approximately 20.32%, 14.34 %, and 65.34% of our subjects changed their masks one, two, or three times per day, respectively. Chao et al, study, revealed that the majority of participants repeatedly and for an extended time used masks [18]. Even though there is no evidence that disposable masks can be disinfected, the majority of people use them multiple times [19]. In this regard, they employed some strategies to preserve masks for future use, including wearing fabric masks that could be easily washed with soap and water, boiling a piece of gauze in a disposable mask, using alcohol, or hanging the mask inside the house [20].

The current study revealed that the use of masks was significantly influenced by the location of residence, maternal education and occupation, and household income. One study found that the location of residence and parental education were significant factors in the behavioral practice of wearing a mask, particularly for mothers. They may have a better understanding of public health and use a mask to care for their child's immunity [12], which is roughly in line with our findings, and the mother's level of education could be attributed to her increased awareness. It has been observed that people's preferences and behaviors regarding preventive measures vary. In particular, in nations with low incomes, there aren't many masks because of this. Additionally, there may be a reason why masks are not selected appropriately. Children ought to be required to wear masks regularly due to the additional financial burden placed on the family [21]. Concerning the outcomes of our review and the parental employment, these results were trustworthy; the use of the mask was influenced by both the resident's location and income level. The use of face masks by children referred to pediatric clinics was the focus of this study, which yielded useful findings.

Limitations of the study

The results of this study cannot be generalized to the entire population of children, which is a limitation.

Conclusion

The study concluded that about 62% of children or their parents were positive about wearing masks. Most children who followed this protocol wore three layers of masks, knew how to put on their masks, and changed their masks at least three times a day. The children who did not wear masks were either not financially well of or their parents did not believe in this protocol. All socio-demographic factors had a significant effect on the mask wearing. The results of the study' need to be considered in a particular society to reduce the prevalence of COVID -19, especially in terms of changing attitudes and addressing economic issues. For example, one suggestion would be to offer free masks to those who are unable to pay.

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Ethical Approval

To conduct research, first, the license of the ethics committee dated 07/09/1400 and the number IR.ZAUMS.REC.1400.297 was received from the ethics committee of human research at Zahedan University of Medical Sciences. Written consent was then obtained from the parents in the study, and they were fully informed of the investigation and explained that they were free to participate in the investigation.

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Conflict of interest

The authors would like to declare no conflict of interests.

Authors' contribution

Gholamreza Soleimani supervised the study and main concept and critical view. Saeedeh Yaghoubi drafted the manuscript and data collection. Alireza Teimouri contributed to data analysis, drafting of the manuscript, and the final correction.

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