Research Paper
Prevalence of COVID-19 Protective Behavior (The Use of Face Mask) Among Pedestrians in the Southwestern Regions of Iran: An Observational Study

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ABSTRACT

Background: Protective behavior is recommended to prevent COVID-19. However, the existing gap is no reliable evidence of protective behavior in southern urban areas in Iran. This study aims to estimate the prevalence of face mask usage and shield use among pedestrians in the Abadan, Khoramshahr, and Shadegan southern cities of Iran.

Methods: This population-based cross-sectional study was conducted from June to August 2021 in the southwestern urban population of Iran. In this study, 7 425 pedestrians were selected from 85 neighborhoods. Sampling was conducted using a multi-stage method. The data were collected by observation passers on the street with a checklist and analyzed by SPSS software, version 26 statistical and WINPEPI software. The acceptable significance level was $P<0.05$.

Results: A total of 55.4% of the subjects were men. The prevalence of face mask usage was 3990(53.8%) (95% CI, 52.7%-55%). The correct use of the face mask and shield were (38.5% and 0.4%), respectively. The use of a face mask was higher in men than women (54.3 vs 53%). Pedestrians under 10 years (39.2%) and over 70 years (44.7%) had the lowest use of the mask. The use of face mask was more in the evening and night (58.1% vs 54.3%), and a significant relationship was observed between the use of the face mask and age ($P<0.05$).

Conclusion: The prevalence of the use of face mask is relatively low. Therefore, the possibility of controlling the infection may be difficult. Promoting media literacy, emphasizing the perceived benefits of preventative behavior, and setting rules may improve mask use.

Keywords: COVID-19, Pedestrians, Face mask, Preventative behaviors, Observational study

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Introduction

Severe acute respiratory syndrome coronavirus (SARS CoV 2) has affected many people and caused countless deaths. The impact of this disease on welfare, economy, employment, and other aspects of daily life has been observed throughout societies and individuals [1]. Early stages of COVID-19 pandemic, public health messages about wearing face masks use were contradictory and accompanied by various opinions that caused public dissatisfaction and confusion. Finally, the recommendations evolved with scientific understanding [2]. Current strategies, such as physical distance of at least one meter and more, face mask use, and hand washing have been suggested [3]. Data show that wearing a mask protects all people, including healthcare workers and the public, from infection with the virus and can have more benefits [1]. The main advantage of these measures is the reduction of further transmission of the virus and consequently the reduction of adverse outcomes, number of hospitalizations, and deaths [4]. Research has shown that face mask usage reduces the daily growth rate of infection between 47%-70% [5, 6]. A face mask can also reduce the initial risk of respiratory infection by 6%-15% [4]. However, resistance still exists among people to use this tool for personal protection and the use of masks has been reported to be moderate or low among some people [7, 8]. Face masks can vary in terms of filtration efficiency and breathability [9]. In addition, some people found that long-term use of the mask in hot environments is uncomfortable, and covering the nose and mouth may prevent verbal and non-verbal communication [10]. Others also believe that using a face mask is associated with oxygen decrease and prefer not to use it. However, the available data do not support these cases [11]. Iran is also one of the countries with the highest infection and death rates due to COVID-19 [6]. One way to control the coronavirus in Iran is to encourage face mask usage [1]. Therefore, it is necessary to know the prevalence of mask use in some areas. This study was conducted to estimate the prevalence of face mask use among pedestrians in Abadan, Khorramshahr, and Shadegan cities with different characteristics.

Methods

This population-based cross-sectional study was conducted in Abadan, Khorramshahr and Shadgan in southwestern cities of Iran from June to August 2021.

Inclusion criteria

The inclusion criteria included all the pedestrians of determinate neighborhoods in Abadan, Khorramshahr and Shadgan in the southwest cities of Iran.

Exclusion criteria

The exclusion criteria included covering the face with something other than a mask so that the observer cannot recognize the pedestrian's face mask.

Sample size

The minimum sample size was determined based on the formula to estimate a population proportion in a cross-sectional study with the characteristics of P>0.456, d=0.05, α=0.05 and z=1-α/2 was determined 381 subjects. According to the sampling method and applying the planned effect of 1.5, the minimum sample size was 571 for each region. Due to the unequal size of an area and using a proportional, the final sample size was 6 852. According to the municipal areas the statistical population and measuring the two issues, surely, this number of samples can be representative of measuring southern urban areas.

Accordingly, 34 262 284 and 1 142 people were considered for the urban population of Abadan, Khorramshahr and Shadgan in the southwest cities of Iran. Finally, 7 425 pedestrians were observed in this study, which were 135 clusters of 55 people from 85 urban neighborhoods

Sampling

We employed nine observers with bachelor's degrees. During two educational sessions, the main researcher trained the observer on how to select subjects and complete the observation checklist. Also, daily monitoring on observer was done by the supervisors. The location of the stations was selected by a purposeful method among the busy passages in Abadan, Khorramshahr and Shadegan neighborhoods. In the last stage, sampling was performed by the non-probability sampling method. In each station, observer, including three men and six women filled out the data. The form contains the studied variables for individual. The observers recorded the variables of gender, age, face mask usage, gloves, shield and type of face mask and correct use of a face mask. Incorrect use of face mask was stated in the checklist with insufficient coverage of the mouth and nose and wearing mask upside down. Observation during busy hours

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of each area was done from 8:00 AM to 13:00 PM and 17:00.00 PM to 00:00 AM.

Data collection

Data were collected by observation. In this research, a multi-stage sampling method was used. First, cities were divided into several categories based on the division of urban areas. Then in each area according to its population, several observation stations were randomly selected from the list of neighborhoods.

Participants

Pedestrian areas of urban stations determined in the study.

Data analysis

Data were analyzed with WINPEPI (accurate determination of confidence interval) and software, version 26. We used descriptive tests (reporting gender, age and sex, use of masks, etc.). The prevalence rate was estimated with a 95% confidence interval (95% CI), chi-square (the relationship between gender and the use of face masks), and Fisher's exact tests. The Statistical significance was acceptable if P<0.05. The normality of the data was checked by the Kolmogorov-Smirnov test.

Results

A total number of 7425 pedestrians were assessed in this study. Most pedestrians observed were in the age group of 21-30 years (23.7%). Most subjects were men 4115(55.4%). Among the pedestrians, 3997(53.8%) people used facemasks. Table 1 presents demographic characteristic of pedestrians and preventive behaviors. The prevalence of facemask usage was 53.7% (95% confidence interval [95% CI, 52.7%, 55.0%). The highest prevalence of mask use was observed in the age group of 31-40 years (59.8%) and the lowest in the age group of 70 years and older (44.7%). In the present study, usage masks among men more than women (54.3% vs 53.0%). The prevalence of mask use was the highest in Abadan City and it was the lowest in Khorramshahr City. The most commonly used mask among pedestrians was the

Table 1. Demographic characteristic protective measures among pedestrians

Variables		No. (%)
	2-9	457(6.2)
	10-20	1098(14.8)
	21-30	1672(23.7)
	31-40	1605(21.6)
Age (y)	41-50	1045(14.1)
	51-60	695(9.4)
	61-70	501(6.7)
	>70	262(3.5)
Sex	Male	4115(55.4)
	Female	3310(44.6)
Face mask use	Yes	3997(53.8)
	No	3428(46.2)
Type of face mask	Surgical mask	2756(68.9)
	Cloth mask	1035(25.8)
	Filtered mask	148(3.7)
	Other	57(1.4)

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Variables		No. (%)
City	Abadan	3400(45.8)
	Khoramshahr	2880(38.8)
	Shadegan	1145(15.4)
How to use a face mask	Correct use	2848(35.9)
	Uncovered mouth and/or nose	804(20.11)
	Inside-out	327(8.18)
	Upside-down	18(0.45)
Sheild use	Yes	26(0.4)
	No	7399(99.6)
Time	Morning	2030(27.3)
	Noon	1300(17.5)
	Afternoon	1639(21.9)
	Evening	664(8.9)
	Night	1802(24.3)

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surgical mask (37.1%) and the lowest were filtered mask (2%). The usage of filter masks was higher among the age group of 10-20 years (2.6%). The most common use of surgical masks was in the age group of 21-30 years (40.9%). Older people aged 61-70 used more cloth masks than others (15.4%). The use of masks was more in the morning and at night (25.4% vs 24.5%, P<0.001). The usage face mask and type of it was related to the age of pedestrians (P<0.001). No relationship was found between gender and mask use and mask type (P=0.05). Pedestrians observation were at 9-10 AM (23.7%), 11 AM (13.4%) and 8 PM (11.6%). Pedestrians usage of face mask was related to observation times (P<0.001). Pedestrians in the age group of 21-30 years, 26.67% more used face masks correctly (Table 2). In the present study, only 35.9% used the mask correctly. Also, the correct use of the mask was slightly higher in men than women, but no significant relationship was observed (P=0.115).

A significant relationship was observed between correct use of the mask and age (P=0.05). The use of shield was more in women. The use of shield was related to sex (P<0.001) (Table 3).

Discussion

This study was conducted to investigate the prevalence of mask use and its types in age groups. The prevalence of face mask use among pedestrians in this study is still lower than Southeastern Iranian population and pedestrians in Hong Kong, Poland, Vermont, India, and the United Arab Emirates. In this study, the prevalence of mask use was higher than pedestrians in Bangkok, Paris and Lima [3, 12-16]. This difference may be due to individuals' cultural characteristics, beliefs and attitudes. In other words, cultural context plays an essential role in face mask use. Therefore, Sadeqi Arani and Kemmelmeier indicated that the mask use in society is a kind of cultural behavior [17, 18]. Out of the age groups, the elderly used the face mask less than other age groups. The results of this study are inconsistent with the Raihmi research and may be due to differences in sample size and less leaving home by elderly [7]. However, the elderly are vulnerable to infection, hospitalization, and even death from COVID-19. It is essential to pay attention to them until the end of the epidemic. Kwan aimed to explore health beliefs and face mask wearing behaviors among older people and indicated that promoting health beliefs can be a strategy to encourage face mask among the elderly [19].

Table 2. Prevalence of face mask usage by sex, age group, city and time

Variables		No.	Number of Observed Pedestrians		P
			Prevalence	Confidence Interval (95%)	
Overall prevalence		3997	53.8	52.7-55	
Sex	Male	1757	53	51.4-54.8	P=0.251*
	Female	2240	54.3	52.9-56	
Age group (y)	2-9	179	39.2	34.7-43.8	P<0.001**
	10-20	566	51.5	48.5-54.5	
	21-30	1035	58.7	54.6-61.1	
	31-40	960	59.8	57.4-62.2	
	41-50	549	52.5	49.5-55.6	
	51-60	347	49.9	46.1-53.7	
	61-70	243	48.5	44-53	
	>70	118	45	38.9-51.3	
City	Abadan	2106	61.9	60.3-63.6	P<0.001**
	Khoramshahr	1261	43.8	42-45.6	
	Shadegan	630	55	52.1-57.9	
Time	Morning	1016	50	47.9-52.2	P<0.001**
	Noon	702	53.9	55.1-60.5	
	Afternoon	948	58.1	55.8-60.6	
	Evening	350	52.6	44.8-56.6	
	Night	981	54.3	52.1-56.8	

*Chi-square test,**ANOVA test.

In this study, the percentage of correct use of the face mask was lower than the results of Rahimi (75.6%) and the studies of Gunasekaran (Malaysia) and CW Tam 2020 (Hong Kong) [7, 13, 15]. Face mask use and its correct use were higher in men than women but statistically no difference was observed between them. Men seem to be more present in public places than women are, while our results are inconsistent with the results of other studies[3,6, 16]. In this study, the most commonly used face mask were surgical masks which is consistent with the study of Rahimi and Tom [7, 13]. In addition pedestrians aged 30-40 years preferred the surgical mask, and people aged 50-61 years preferred the cloth mask; perhaps the reason is its cost-effectiveness and health reliability [20]. Filtered face mask were also significant among people aged 70 years and older [7]. We found that the pedestrians wore face mask more at 5 PM and 1 PM. Crowds during these hours seem to have affected the behavior of using a respirator. In the present study, shields were very low and were more common among females. Gender differences seem to be effective in preventive behaviors [16]. In our study, the use of face mask was related to age and other demographic variables, which is similar to other studies [2, 7, 16, 21]. Due to the use of the observation method in data collection, we cannot estimate the education and income level variables. The strengths of this study were estimating the prevalence of face mask use over a long period after the COVID-19 pandemic, sampling with a large sample size in 3 cities and use of the observation method that is more accurate than self-reporting.

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Table 3. Association between personal protective behavior and sex among pedestrians

Variables		No. (%)		P
		Male	**Female**	
Type of face mask	Surgical mask	1543(68.88)	1213(69.03)	P=0.821
	Cloth mask	580(25.89)	455(25.89)	
	Filtered mask	85(3.79)	63(3.58)	
	Other	32(1.42)	25(1.4)	
How to use a face mask	Correct use	1630(72.76)	1219(69.37)	P=0.115
	Uncovered mouth and/or nose	436(19.4)	368(20.04)	
	Inside-out	168(7.5)	159(9.04)	
	Upside-down	9(0.4)	9(0.4)	
Shield	Yes	7(0.2)	19(0.2)	P<0.005*
	No	4108(99.8)	3291(99.6)	

*Chi-square test.

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Conclusion

The prevalence of mask use and its correct use was low among pedestrians. Individual resistances and misconceptions still were observed about using this protection tool. However, health care providers should not be discouraged but should make more efforts to health education, and comprehensive support, setting rules, and supervision can help correct beliefs and encourage the use of face masks until the end of the epidemic and vaccination of a high percentage of the population.

Ethical Considerations

Compliance with ethical guidelines

This research is approved by the Research Ethics Committee of Abadan University of Medical Sciences (Code: IR.ABADANUMS.REC.1400.001). The data collection method was observational and no participants were observed, informed consent was not obtained following the regulations. Material and intellectual rights and information of individuals remain confidential.

Authors' contributions

Conceptualization: Maryam Changizi; Methodology: Maryam Changizi, Bahman Cheraghian and Shokrollah Salmanzadeh; Investigation: Maryam Changizi , Hooshang Mohamadian and Bahman Cheraghian; Data collection: Hooshang Mohamadian and Maryam Changizi; Data analysis: Fatemeh Maqsoodi, Maryam Changizi and Bahman Cheraghian; Writing the original draft: Maryam Changizi; Review and editing: Maryam Changizi and Bahman Cheraghian; Supervision: Maryam Changizi, Hooshang Mohamadian and Sasan Ghorbani Kalkhajeh.

Conflict of interest

The authors declared no conflict of interest.

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