A Nationwide Survey on Some Hygienic Behaviors of Iranian Children and Adolescents: The CASPIAN-IV Study

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ABSTRACT

Background: This study aims to assess the frequency of some hygienic behaviors that is, tooth brushing and hand-washing, in Iranian school students at national level.

Methods: This nationwide study was conducted in 2011-2012 among 14,880 elementary, secondary and high school students who were selected by random cluster stratified multistage sampling from 30 provinces in Iran. We used the global school-based health survey questionnaire of the World Health Organization.

Results: The population of this survey consisted of 13,486 children and adolescents (participation rate of 90.6%) including 49.2% girls and 75.6% urban inhabitants. The mean age of participants was 12.5 years (12.3-12.6, 95% confidence interval) According to the self-report of students, 26.9% of them (20.2% of boys and 33.9% of girls) brushed their teeth more than once a day, 37.8% of boys and 42.1% of girls brushed their teeth once a day. In general, girls brushed their teeth more than boys. The frequency of those students who never brushed their teeth was twice in rural than in urban students (11.4% vs. 6.2%, respectively). In total, 3.4% of the students stated that their school had not an appropriate place for washing hands after toilet, with three-fold higher frequency in rural than in urban schools (6.8% vs. 2.3%, respectively). 85% of students (87% of girls vs. 83% of boys) reported that they had always washed their hands after toilet, 10.1% did it occasionally and 4.1% did not.

Conclusions: This nationwide survey revealed that Iranian students have an acceptable level of hygienic behaviors both in urban and rural areas; however, still it is necessary to improve school health facilities and hygienic habits in Iranian students.

Keywords: Children and adolescents, hygiene, Iran, school

Original Article

INTRODUCTION

Still a large proportion of the global morbidity and mortality is attributable to infectious diseases,[1] e.g. they cause 62% and 31% of all deaths in Africa and Southeast Asia, respectively.[2]

It is also estimated that 88% of diarrheal diseases is caused by unsafe water supply and inadequate sanitation and hygiene.[3] This trend is especially notable in developing countries, where acute respiratory and intestinal infections are the principal causes of morbidity and mortality among young children.[4] Inadequate sanitary conditions and poor hygiene practices play major roles in the increased burden of communicable diseases in low- and middle-income countries.

It is well-documented that children with proper hand-washing practices are less likely to report gastrointestinal and respiratory symptoms.[5,6] Hand-washing with soap can reduce diarrheal morbidity by 44% and respiratory infections by 23%.[2,7,8] However, globally, the rates at which hands are washed with soap range from only 0% to 34%.[1] A study conducted by the global public-private partnership for hand-washing, which included several sub-Saharan African countries including Kenya, Senegal, Tanzania, and Uganda, described that 17% of participants washed their hands with soap after using the toilet, whereas 45% used only water.[2]

Lack of resources, namely soap and water, as well as poor sanitation facilities may be two of the main reasons why children do not wash their hands.[9,10] A survey in rural Ethiopia found that only 8% of the population had access to adequate sanitation facilities.[11] In another survey in Ethiopia, only 21% of household latrines had hand-washing facilities, none of which contained soap, and <4% of households had access to adequate sanitation facilities.[9]

Clean hands play a significant role in preventing the transmission of infectious diseases. The physical quality of any toilet and hand-washing facilities is an important element of whether and how it is used, mainly for school children. Functional toilet and hand-washing services for children are important to diminish the incidence of infectious diseases[12] in both developing[13] and developed countries.[14,15]

Still many schools in low-, middle, and high-income countries lack adequate water and sanitation services, with associated potential detrimental effects on health and school attendance.[16,17]

School is the place where all children spend a major part of their time in developed countries. In all this school toilets and hand-washing facilities are normally provided. Yet how children use these facilities or whether children are ever willing to use them can depend on the physical quality, their attractive shape and functionality of the facilities.[14,18]

Furthermore, tooth brushing is an effective section of at-home self-care to remove plaque mechanically. This hygienic habit is commonly proprietary as the significant factor in preventing caries and periodontal diseases and one part of the educational messages given to children, adolescents and adults in plans to promote oral health.[19,20]

Children and adolescents who develop good oral hygiene practices are more likely than others to preserve these healthy behaviors in adulthood.[21,22] Early establishment of encouraging oral health behavior is considered a goal in the prevention of oral diseases in children.[23]

To have a general insight on the hygienic behaviors of Iranian children and adolescents, in this survey, we assessed the frequency of tooth brushing and hand-washing in school students at national level.

METHODS

This national school-based study was performed in the framework of the national survey of school students high-risk behaviors, which was conducted as the 4th survey of the school-based surveillance system entitled childhood and adolescence surveillance and prevention of adult noncommunicable disease (CASPIAN – IV) study. It was conducted among 14,800 students, aged 6-18 years, living in 30 provinces in Iran. Details of the methodology are reported previously,[24] and herein we report it in brief.

The study populations were students from rural and urban areas of Iran who were selected by multistage, cluster sampling method from 30 provinces (48 clusters of 10 people in each province). Stratification was performed in each province according to location of residence (urban/rural), and school grade elementary/intermediate/high school) proportional to size and with equal sex ratio; that is, in each province, the number of boys and girls was the same, and the ratios in urban and rural areas were proportionate to the population of urban and rural students.

The questionnaire was prepared in Persian based on the questionnaire of the World Health Organization-global school-based student health survey (WHO), and some questions were added. The questionnaire's validity and reliability were confirmed.[25]

Data were collected about demographic characteristics, students educational level, patterns of hygienic behaviors include tooth brushing and hand-washing, also whether sanitary facilities for hand-washing in schools has been asked of them.

Each of this question has been asked of each student as details) more than once a day, once a day, at least once a week, only once in a week, less than once a week) that they were able to answer questions appropriate with their health behavior.

Availability to sanitary facilities at school was considered as a place for hand-washing after using the toilet and before a meal or snack.

Ethical concerns

The study procedures were reviewed and approved by Ethics Committees and other related national regulatory organizations. After explaining the study aims and protocols, written consent and verbal assent were obtained from students.

Statistical analysis

Categorical variables are reported as percentage (95% confidence interval [CI]). Statistical measures were assessed using survey data analysis methods in the Stata version 11.1 (Stata Corporation, College Station, TX, USA).

RESULTS

The population of this survey consisted of 13,486 children and adolescents (participation rate of 90.6%) including 49.2% girls and 75.6% urban inhabitants. The mean age of participants was 12.5 years (12.3-12.6, 95% CI).

Table 1 presents the frequency of tooth brushing based on demographic variables. According to the self-report of students, 26.9% of them (20.2% of boys and 33.9% of girls) brushed their teeth more than once a day, 37.8% of boys and 42.1% of girls brushed their teeth once a day. In general, girls brushed their teeth more than boys. The frequency of those students who never brushed their teeth was twice in rural than in urban students (11.4% vs. 6.2%, respectively).

Table 2 shows the frequency of availability of sanitary facilities at school according to gender, living area and the educational level.

In total, 3.4% of the students stated that their school had not an appropriate place for washing hands after toilet, with three-fold higher frequency in rural than in urban schools (6.8% vs. 2.3%, respectively). Moreover, 8.7% reported that of their school did not have any appropriate place for washing hands before a meal or snack.

Table 3 shows that 85% of students (87% of girls vs. 83% of boys) reported that they had always washed their hands after toilet; 10.1% did it occasionally and 4.1% did not. Moreover, about 80% of rural students reported that they always washed their hands after using toilet, whereas 20% to them did it sometimes or never.

Table 1: Frequency of tooth brushing according to demographic factors

	N (%)					
	More than once a day	**Once a day**	**At least once a week**	**Only once in a week**	**Less than once a week**	**Never**
Sex						
Male	1382 (20.2)	2588 (37.8)	1196 (17.5)	644 (9.4)	288 (4.2)	713 (10.4)
Female	2250 (33.9)	2796 (42.1)	773 (11.6)	325 (4.9)	163 (2.5)	297 (4.5)
Total	3632 (26.9)	5384 (39.9)	1969 (14.6)	969 (7.2)	451 (3.3)	1010 (7.5)
Residence area						
Urban	2777 (27.2)	4269 (41.9)	1443 (14.2)	694 (6.8)	330 (3.2)	635 (6.2)
Rural	855 (25.9)	1115 (33.8)	526 (16)	275 (8.3)	121 (3.7)	375 (11.4)
School level						
Elementary	1690 (27.3)	2309 (37.3)	992 (16)	486 (7.8)	199 (3.2)	500 (8.1)
Middle	979 (28)	1372 (39.3)	486 (13.9)	256 (7.3)	121 (3.5)	251 (7.2)
High school	963 (25.4)	1703 (44.9)	491 (12.9)	227 (6)	131 (3.5)	259 (6.8)

Table 2: Frequency of having access to a place for hand washing according to demographic factors

	A place for washing hands after using the toilet (*N* (%))		A place for washing hands before a meal or snack (*N* (%))	
	Yes	No	Yes	No
Sex				
Male	6525 (95.3)	276 (4)	6128 (89.5)	617 (9)
Female	6419 (96.7)	181 (2.7)	6022 (90.7)	554 (8.3)
Total	12944 (96)	457 (3.4)	12150 (90.1)	1171 (8.7)
Residence area				
Urban	9904 (97.2)	233 (2.3)	9283 (91.1)	796 (7.8)
Rural	3040 (92.3)	224 (6.8)	2867 (87)	375 (11.4)
Educational level				
Elementary	5933 (95.7)	236 (3.8)	5646 (91.1)	482 (7.8)
Middle	3359 (96.2)	97 (2.8)	3147 (90.1)	292 (8.4)
High school	3652 (96.2)	124 (3.3)	3357 (88.4)	397 (10.5)

Table 3: Frequency of hand washing according to demographic factors

	Washing hands after using the toilet (*N* (%))				Washing hand before eating (*N* (%))		
	Never	Sometimes	Always		Never	Sometimes	Always
Sex							
Male	296 (4.3)	819 (12)	5679 (83)	Male	832 (12.2)	2173 (31.7)	3784 (55.3)
Female	262 (3.9)	547 (8.2)	5769 (86.9)	Female	735 (11.1)	2085 (31.4)	3791 (57.1)
Total	558 (4.1)	1366 (10.1)	11448 (84.9)	Total	1567 (11.6)	4258 (31.6)	7575 (56.2)
Residence area							
Urban	377 (3.7)	896 (8.8)	8839 (86.7)	Urban	1233 (12.1)	3276 (32.1)	5620 (55.1)
Rural	181 (5.5)	470 (14.3)	2609 (79.2)	Rural	334 (10.1)	982 (29.8)	1955 (59.3)
Educational level							
Elementary	250 (4)	813 (13.1)	5088 (82.1)	Primary	569 (9.2)	1927 (31.1)	3676 (59.3)
Middle	122 (3.5)	286 (8.2)	3044 (87.2)	Intermediate	392 (11.2)	1089 (31.2)	1979 (56.7)
High school	186 (4.9)	267 (7)	3316 (87.4)	High school	606 (16)	1242 (32.7)	1920 (50.6)

About washing hands before a meal or snack at school, 56.2% of students reported they always did it, 31.6% sometimes and 11.6% did not. These frequencies were not significantly different in terms of gender, living area, and educational level.

As presented in Table 4, about 50% of students reported that in the previous 30 days, they had always washed their hands with soap at school, 35.3% did it sometimes and 14.1% did not do it.

DISCUSSION

This nationwide survey studied some hygienic habits and health facilities of Iranian school students. It shows an acceptable level of hygienic habits and facilities. However they need to be improved and the existing regulations should be reinforced. These findings are comparable with some previous studies. A study in Colombia showed only 33.6% of school students reported that they always or very often washed their hands with soap and clean water before eating and after toilet. About 7% of students reported having regular availability to soap and clean water at school. Moreover, 82% of Columbian students washed their hands after toilet and 46% washed their hands before eating at school.[26] In our study, the corresponding figure was 85% and 56%, respectively.

In a study in Turkey 85% of students reported that they always washed their hands after toilet, about 14% of them did it sometimes, and 6% did not do it.[27]

A study in elementary school students in Tehran, which aimed to assess the relationship of hygienic habits with intestinal infections reported

Table 4: The frequency and percentage of responses to the question "How often in the last 30 days did you wash your hand with soap in school?

	N (%)		
	Never	**Sometimes**	**Always**
Sex			
Male	1099 (16.1)	2383 (34.8)	3320 (48)
Female	806 (12.1)	2375 (35.8)	3428 (51.6)
Total	1905 (14.1)	4758 (35.3)	6748 (50)
Residence area			
Urban	1414 (13.9)	3692 (36.2)	5037 (49.4)
Rural	491 (14.9)	1066 (32.4)	1711 (51.9)
Educational level			
Elementary	647 (10.4)	2087 (33.7)	3436 (55.4)
Middle	494 (14.1)	1259 (36.1)	1706 (48.9)
High school	764 (20.1)	1412 (37.2)	1606 (42.3)

that 93% of them washed their hands before eating snack at school.[28] This higher frequency compared to our study might be because of including the metropolitan Tehran and a younger age group with better hygienic condition.

A growing body of evidence suggests that oral hygiene practices, as brushing teeth, might be effective in preventing oral diseases or improving conditions, and even having an effect greater than dietary modifications,[19,20,29] and might also reduce the frequency of some cardiometabolic risk factors.[30] The prevalence of regular tooth brushing has a large variation according to the age group and geographical region.[31-33]

School children have been consistently implicated in the spread of communicable diseases,[34] and schools are recognized as a very important setting for health promotion. The key primary barriers to the transmission of enteric pathogens are safe stool disposal and adequate hand-washing, especially after contact with fecal material during anal cleansing of both adults and children.[35]

In many populations, schools, particularly those in rural areas, lack safe water and hand-washing facilities; alternatively, where such facilities do exist they might be inadequate in both quality and quantity. Schools with poor water, sanitation and hygiene conditions, and intense levels of person-to-person contact, are high-risk environments for children and staff and exacerbate children's particular susceptibility to environmental health hazards.[13]

The school environment represents an important setting because many children's social habits and behaviors are learned at school.[36] According to WHO, 11% more girls attend school when sanitation is available.[37] Many children in both developing and developed nations spend some time absent from schools due to diseases related to the school environment.[38]

Professional recommendations for individual oral hygiene mostly include tooth brushing at least twice a day for 2-3 min with gentle force using the bass technique or its modifications.[39]

Tooth brushing is essential for the removal of plaque and debris in order to contribute to good dental and periodontal health. Most people, however, find it difficult to clean their teeth sufficiently, and the daily experience in dental practice is that patient's exhibit plaque even though they reportedly engage in oral hygiene. The American Dental Association recommends brushing the teeth twice a day with gentle force and with circling or sweeping movements.[27]

Oral health behaviors are established early in life, and these behaviors are associated with oral health conditions later in life.[40] Oral health in childhood is a major predictor of adult oral health.[41,42]

A study in Poland showed that 11.96% of boys and 18.95% of girls from the urban area and 6.67% boys and 8.77% of girls from the rural area brushed their teeth after every meal; 60.87% of boys and 68.42% of girls from the urban area and 43.33% of boys and 50.88% of girls from the rural area brush their teeth twice a day; 22.83% of boys and 11.58% of girls from the urban area and 26.67% of boys and 28.07% of girls from the rural area brushed their teeth once a day.[43] In our study, about 66% of students reported that they brushed their teeth at least once a day. Tooth brushing was more common in urban than in rural students and in girls than in boys.

The prevalence of daily tooth brushing in Mexican schoolchildren is reported to be 81.6%.[44]

A study in Germany showed that 11.7% of students brushed their teeth once a day, 79.6% twice a day, and 8.7% more than twice a day.[39]

Study about the frequency of tooth brushing or cleaning among middle school students from 44 low- and middle-income countries showed that in 39 of the 44 countries, more than 80% of students reported brushing or cleaning their teeth

at least once each day. In 23 countries, more than 5% of participants reported brushing their teeth less than once a day or never. In 37 countries, girls reported significantly higher frequency of tooth brushing or cleaning than boys.[45] However, it should be acknowledged that the specific method to evaluating the prevalence of tooth brushing is difficult because frequency can be reported as 1, 2, or 3 times a day (or more); or at least once a day.[31,46,47]

Proper hygienic habits such as hand-washing have been shown to decrease the risk of diarrhea by 42%,[7] and may reduce the prevalence of respiratory infections by 24%.[48] Respiratory illness and gastrointestinal diseases were fewer in youngsters who washed their hands regularly, that is, 4 times a day.[49]

World Health Organization has issued guidelines for water, sanitation, and hygiene implementation in schools in low-cost settings.[13] Implementation of these regulations at the national level could result in improved water and sanitation conditions in schools. Such regulations could serve to overcome barriers to education, particularly in low resource settings where schools, teachers, and administrators may not recognize the potential impact of water and sanitation on health and education.

A limitation of the current study is its cross-sectional nature and its questionnaire-based design, and the strengths of this study were its large sample size, the balanced distribution of samples at national level and used a valid questionnaire.

CONCLUSIONS

Although comparisons between different studies because of their assessment of health habits, type of study, methodology, study location (urban and rural), age group studied, and also differences in questions and categories is difficult, but as it looks in comparison with other regions and countries, Iran had equal or more positive health habits than some and lower than other country specialty in oral hygiene and tooth brushing.

We found that health habits, especially brushing frequency is more in girls than in boys, as well as in rural than in urban areas. Although the frequency of students who reported not to have access to appropriate places for hand-washing in schools was low, but still it is necessary to improve school health facilities.

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