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Original Article

How do Students Conceptualise Health and its Risk Factors? A Study among Iranian Schoolchildren

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ABSTRACT

Background: To assess the concept of children concerning their health and its risk factors, a group of primary and middle school students were asked to draw a few relevant pictures in order to deeply explore the comprehension of this key group.
Methods: In this cross-sectional study 1165 students, aged 7-15 years old, selected through random stratified sampling, were asked to draw a number of eight paintings, four paintings on health concepts, and the other four on health risk factors. The paintings were then assessed by two independent observers, and their themes and contents were abstracted and analysed.
Results: The students drew a total of 2330 paintings, 1165 paintings on the concept of health, and 1165 paintings on health risk factors. The most and least expressed health concepts concerned "mental health" and "healthy diet" (73.3% and 4.8%, respectively). Considering health risk factors, "unhealthy diet" and the two concepts of "environmental hazards" and "neglected personal hygiene" had the most (95%) and least (1.4% each) frequencies. Students in public schools, primary level and girls drew more pictures about health concept or/and its risk factors ($P<0.05$). The association between parents' education level and the numbers of pictures were not statistically significant.
Conclusion: Although students had a broad view about health and its risk factors, generally little attention had been paid to some of the main aspects such as physical activity, healthy diet, mental and oral health, and environmental hazards. In addition, it seems that parents' educational level, as one of the main socio-economic factors, did not have any significant impact on their concepts.

Background

Nowadays, health and its dimensions broadly cover physical, psychological, and social aspects of human life; spiritual health has been considered the fourth dimension of health by the World Health Organization (WHO) (1). According to this new scope, health is considered as a complicated concept with various dimensions. However, people's perceptions of and beliefs in health vary over their life time (2). While middle-aged and old people regard their own health based on the existence of acute and persistent diseases or health problems, children in Hungary, considered psychosocial and psychological well-being as well as healthy behaviours, like sports and eating, as their healthy patterns (3).

One of the main challenges and difficulties researchers and health care providers have been facing, is to understand children's perception of health and diseases. Accordingly, health professionals can explain illness and develop preventive health programs for them (4). Children's understanding of health and disease are complicated and cognitive abilities play a considerable role in their perception of health problems (5,6). Unlike older children and adults, young children consider health according to their own experiences and have more positive attitudes regarding health (7,8). In order to constitute positive attitudes towards health, knowing the ways young children think about health and disease is crucial (9).

WHO has pointed that young children are generally more receptive to comprehending new knowledge; school-based programs probably can be an effective way to reach children

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health perceptions (10). Patil *et al*. declared that because children learn knowledge about health and subsequently follow the correct pattern, they will have a healthier life than older children and teenagers and will try to improve health of their acquaintance and societies (11). Accordingly, teaching children how to prevent some health disorders like malaria (12), schistosomiasis, HIV and practice health-related behaviours such as smoking and drinking is one of the most effective ways.

Effective communication with children mainly depends on having sufficient knowledge about children's cognitive development. Concerning the health care field, effective communication also depends on the understanding of children's ideas and beliefs about illness. Tuma stated that before meaningful interactions occur between health care providers and children and to establish a good communication between them, children's perceptions of illness must be taken into consideration (13). In exploring children's perceptions of health, this point must be taken into account that children may not be able to express adequately what they know. Most children leave formal or direct questions unanswered maybe because they have a limited set of vocabulary, have relatively less experience of the world and have a shorter attention span (14). Thus, we need suitable techniques to collect information from children concerning their special skills and cognitive abilities. However, Varni *et al*. stated patients as young as five years old age probably can report reliably and validly their health related quality of life if an age-related instrument is used (15). One of these techniques is to analyse children's drawings, and writings (i.e. the draw-and-write technique) (16,17). These techniques are now confirmed and used at the international level to evaluate health, illness and risks'. Our knowledge about the children's concepts of health in Iran is very limited. Our extended and systematic search of the literature in Iranian scientific websites and databases showed that there were not any relevant studies in this issue. To fill this knowledge gap, the present study explores the concept of health and its risk factors through content analysis of paintings. In so doing, the students in the city of Kerman, Iran, were asked to draw their views on this topic. The study focuses on the process of how schoolchildren demonstrate their active memory regarding their health.

Methods

This was a cross-sectional study conducted in Kerman city, Iran, 2010-2011. Kerman is located in south-east of Iran and has a population of 620000 (based on the 2011 census). Generally, Kerman has a middle socio-economic status in Iran. Study population was children selected from primary (grads 1 to 5) and middle (grads 6 to 8) schools of Kerman using the stratified random sampling method. Schools were stratified according to their educational level (primary and middle), gender of children (boys and girls) and types of schools (private and public). From each stratum (eight strata overall), one school was selected randomly. Afterwards, students of one class from each grade (20 classes out of five grades in primary schools and 12 classes out of three grades in middle schools) were recruited. Using this sampling scheme, 1165 students from 32 classes were selected.

Having coordinated with the education authorities in Kerman Education Department, permission was obtained regarding assessing the schoolchildren's concepts of health and its risk factors. Students felt free to not take part in the study. Also, the research was carried out when almost all students were present.

A trained coordinator, who was one of the research team, explained the objectives of this study to all students in the simplest possible way. Students were asked to draw at most eight paintings four of which related to health concept and four of which to health risk factors. During a 90-minute session, students were encouraged to illustrate their concepts individually. In order to maximize their contributions, at the end of their painting, students were given gifts.

At the same time, we asked the school principals to write very basic information about the education level of students' parents. Based on the recommendation of the ethics committee of Kerman University of Medical Sciences, no more personal information was directly recorded about students.

In the next step, the contents of the paintings were deeply analysed. Two independent observers, who were familiar with the objectives of this study and trained by a psychologist, explored all paintings independently and wrote their understandings in very simple forms. The concepts of most of paintings were very clear and the observers could review the pictures with high confidence. Although most children wrote, and in many cases explained, on their paintings what they painted, but any discrepancies between two observers were discussed by adding a third observer from the team, and the final conclusion was drawn based on a consensus. Two trained observers explored and coded main extracted categories obtained from each child's painting. The main meaning of the children's paintings was virtually easy to understand, because they drew some simple, basic and meaningful ones. Before starting to paint, the coordinator emphasized and explained that the quality of paintings was not important at all. The students were even told to draw their paintings by black-pen, although some children used the coloured pen in order to show their talents. Among the paintings, there were both clean (organized, coloured, beautiful) and messy (black-painted, messed up, disorganized) paintings with the same meaning and concept which were categorized in the same theme, regardless of their talent or ability of painting; we just followed their concepts.

Statistical analysis

To find the main themes, content analysis and coding were used as the qualitative part of the study. The extracted themes, demographic information of students, and education level of parents entered into SPSS 16 (SPSS Inc., Chicago, IL, USA). The main independent and demographic variables in this study were private versus public schools, boys versus and girls, primary versus middle schools and the parents' education levels (illiterate (0), only writing and reading without any education, primary (1-5 years), middle (6-8 years), high school to undergraduate (9-14 years), bachelor degree (15-16 years) and finally postgraduate degree (>16 years). Dependent variables were the number and the theme of paintings related to health concept and

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its risk factors. The absolute and relative frequencies of the main themes and qualitative variables were then presented as descriptive statistics. To compare the frequency of sub-themes in sex, school's type and education level of the students, chi-squared test and Fisher's exact tests were used, if appropriate. To determine the effect of independent variables on the number of students' paintings, univariate and multivariate linear regression models were performed. To examine the effect of the parents' education levels on the dependent variables, linear trend was also presented. *P* less than 0.05 was considered as statistical significant.

Results

All participated students attempted to draw their main idea on the health and its risk factors (the response rate was 100%). Of 1165 enrolled schoolchildren; 563 (48.4%) students were girls, 713 (61%) were in primary schools, and 528 (45%) studied in public schools.

The four main themes extracted concerning the health concept included: 1) personal hygiene, 2) public hygiene, 3) healthy diet, and 4) mental health (see Table 1). In addition, there were five main themes about health risk factors, including 1) smoking and illegal drug use, 2) unhealthy foods, 3) environmental hazards, 4) affective troubles, and 5) neglecting personal hygiene. Figure 1 and 2 illustrate some examples of children's paintings related to health concept and its risk factors, respectively. Figure 1 shows a boy planting a tree as a symbol of environmental health (public health), a box of milk as a symbol of healthy diet and a girl who is exercising and playing as symbol of playing sports, and finally a kid who is reading a book as a symbol of mental health. Figure 2 displays the risk factors associated with health, so that some cars polluting the air serve as a symbol of environmental hazards, soft drinks and some fast foods like pizza and hamburger serve as a symbol of unhealthy diet, and a man while he is smoking serves as a symbol of illegal drugs.

Of 1152 paintings related to health risk factors, the maximum and minimum number of the paintings belonged to unhealthy food (95%) and both environmental hazards and neglecting personal hygiene (1.5% together). Risk factor of unhealthy diet among primary school children was higher than that of middle ones (97% vs. 91.7%, *P*<0.001), but smoking and illegal drug use was painted significantly higher among private school children (*P*<0.001). Paintings about unhealthy diet among boys was more than girls (97.3% vs. 92.8%, *P*<0.001), while smoking and illegal drug use was drawn more by girls than boys (*P*<0.001). Painting of smoking and illegal drug use was illustrated among private school children significantly more than public one (4.9% vs. 1.9%, *P*=0.01; Table 2).

According to multivariate linear regression results, the adjusted mean numbers of paintings about the health concept and its risk factors in girls was 0.24 times more than that in boys (*P*<0.001). Furthermore, primary school students drew 0.27 more pictures regarding health concepts (*P*<0.001); and students in public schools drew 0.39 more pictures about the risk factors of the health (*P*<0.001). The linear association between the parents' education and the number of the paintings was not significant (Table 3).

Totally, students drew 0.95 more paintings about the health risk factors in comparison to health concepts; although it was not statistically significant (*P*=0.26). This difference was more considerable among students in secondary schools and public schools (Figure 3).

Discussion

The results of this study showed that student' paintings concerning the concepts of health and its risk factors were distinct. Some factors such as mental health were taken into a great deal of consideration, while less emphasis was put on personal hygiene and healthy diet. Regarding risk factors, environmental hazards and personal hygiene like physical activity, oral health and behavioural problems were ignored. No positive relationship was found between the parents' education and the number of the drawings related

Table 1. Main extracted categories and their codes; the frequency of paintings in each extracted code is shown within parentheses

Health Concept (%)	1- Mental health 852 (73.3%) Reading appropriate newspapers and mass media 405, pleasant spirit within family and community 300, praying, satisfying living condition 147.
	2- Public health 129 (11%) Green spaces 60, environmental health 44, remark to traffic rules 25.
	3- Personal hygiene 126 (10.8%) Rest and sleep 50, exercise and playing 40, personal hygiene 30, visiting doctor- medicines and vaccines, body protection, oral and dental health 6.
	4- Healthy diet 56 (4.8%) Fruits and vegetables 20, healthy food related concepts 15, diary 11, healthy beverages 10.
Health Risk Factors(%)	1- Unhealthy food 1094 (95%) Harmful foods and snacks 800, sweets, chocolates and ice-cream 100, contaminated foods (fungi and …) 100, fast foods 60, harmful beverages 34.
	2- Smoking and illegal drug use 41 (3.6%) Addiction to hubble-bubble, illegal drugs and psychedelics 30, cigarette 11.
	3- Neglecting personal hygiene 9 (0.8%) Obesity 4, lack of physical activity, over-sleeping 3, failure to observe personal hygiene, little sleep, taking extra risk, incomplete breakfast 2.
	4- Environmental hazards 8 (0.6%) Air and water pollution 5, cutting down and burning trees, garbage 3.
	5- Behavioral problems 0 (0%)[a] Terrible friends, fighting, misuse of television, computers or mobile, noise pollution, risky games 0.

[a] There was not any painting in this domain.

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Figure 1. Some paintings which are the examples of health concept

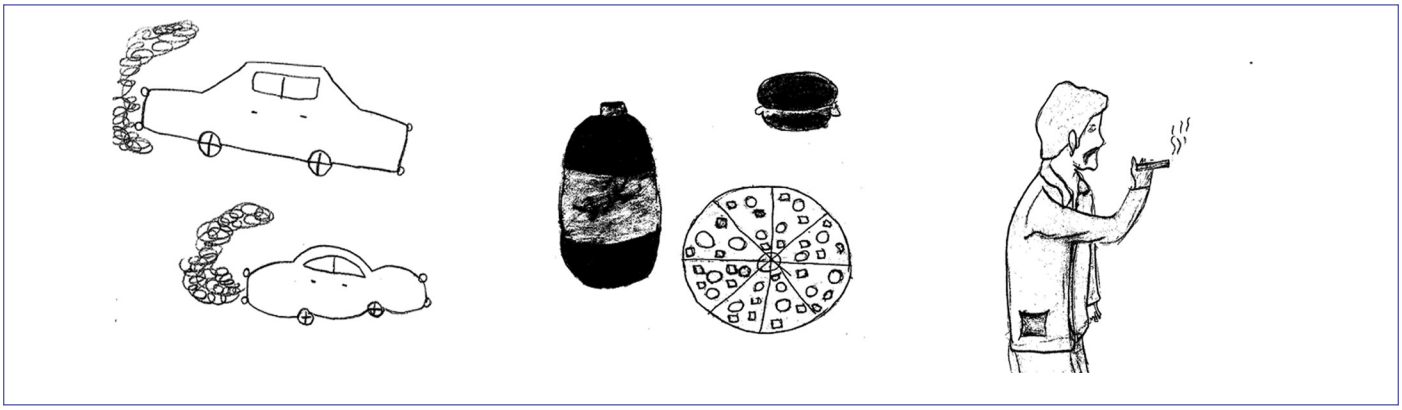

Figure 2. Some paintings which are the examples of health risk factors

to the health concept and its risk factors.

The number of paintings could be representative of this fact that how many problems or health challenges students were involved in or actively thought about them. However, this result was not our main goal, it was just a secondary or supporting objective. It can also show how many problems they encounter during their real life. In assessment of active memory, the number of items might be important. It meant that those who painted more pictures might have more insight toward the health and its risk factors. Health has a comprehensive concept that cannot be limited merely to medical aspects; social, mental and even spiritual aspects have their salient places in this very concept (18). From this point of view, it seems that students had an acceptable concept about health and did not consider merely medical services as the key element.

In social determinants of health context, great emphasis is put on all individuals and social organizations. People have to play an inevitable role to improve the level of health in the whole community (19). To obtain this key target, such a concept should be taught from the early ages. Therefore, the results of this study help to assess the concepts of students about health and find pitfalls in order to create a more comprehensive definition for health in the mind of people from the beginning (20). This study revealed that some key aspects of health and its risk factors were ignored by students which might be an important message for health authorities and educational system.

Non-communicable diseases are, and will be, the biggest health challenges for health authorities in Iran. Cardiovascular diseases, cancer, road traffic injuries, mental illness, addiction and depression remain major causes of public health burden (21). Considering their risk factors, individual and social behaviours such as sufficient physical activity, healthy diet, and following driving rules and regulations are main preventive tools to reduce their burden (22-25). Unfortunately, the latter were paid the least attention among the paintings, pointing the fact that children are not familiar with community health problems and their risk factors. Although less attention was paid toward the healthy diet, the risks of unhealthy food were over-illustrated in the paintings. It can be concluded that

the positive impacts of healthy diet was not as important as the negative impacts of unhealthy foods in the minds of students.

Although there are multiple evidences reporting the importance of mental health, environment protection, and personal hygiene in improving the level of health in a community, children did not have a clear idea about these issues. Besides, improper social relationships and negative effects of violence have an unquestionable effect on shaping children characters and personality (26). Unfortunately, the studied children disregarded these issues; a matter that calls for serious actions.

There was no association among some demographic variables such as parents' education and students attitudes. Educated parents might have less time to work with their children, or they do not have a comprehensive view about health and its risk factors themselves to pass appropriate messages to their children. Alternatively, students might obtain most messages from other sources such as multimedia, friends, or schools. It seems that deep exploration of this point is a real need and would be an appropriate research topic for further studies.

Another finding of the study was gender- and age-related differences between girls and boys in terms of health concept, especially on the personal hygiene domain. The girls paid their attention mainly to personal hygiene. In contrast, the boys focused significantly on their public and mental health. Generally it is clear that girls pay more attention to their bodies and body images compared with boys. In the other dimensions the differences between girls and boys were not considerable. In Piko and Bak study, which the schoolchildren were asked to draw or describe the health in their own views, two kinds of basic definitions of biomedical and holistic were identified. The results of Piko's study also showed that although there was not a significant difference between the girls and boys, but older schoolchildren significantly drew substance use and illegal drugs more often (17).

An important point in this study was the absence of any association between parents' education, as an index to show socioeconomic status (SES) of children, and number of paintings related to health concept and its risk factors. Generally speaking, to measure SES, three main variables of occupation, education and income (as the main social determinants of health) are used. In this study, parents' education was used to evaluate SES and its effect on health concept and its risk factors. Results revealed that parents' education had no effect on number of drawings and no significant trend was observed in this regard. In a study carried out to examine primary school children's (aged 6-11) perception, knowledge and belief of medicine using self-reporting and its relationship with their SES, Bozoni *et al*. showed that children with higher SES had higher knowledge of medicine compared to children with low SES. Students with higher SES gained information mainly by their parents and physicians, while other students received information through media, TV and books. They concluded that students with different SES had different knowledge of medicine (27). Other studies in this field revealed that decreased SES could be a factor in increasing medicine use (28,29). In another cross-sectional study on a group of population more than 16 years of age, Nielsen *et al*. showed that as SES decreased, medicine use increased; results were employed to study medicine use by groups with different SES (30). Bush and Iannotti, Almarsdottir and Zimmer showed that children's knowledge of medicine was positively related to age, SES (measured based on education) and health locus of control (31,32). Although contexts of these studies are not similar to the present study, they show the point that SES is generally an important index for children's ignorance of medicine and negative aspects of health; no comparable result was found in the present study.

As results showed, students could well point to both health concepts and its risk factors. Although drawing or pointing of some concepts such as smoking, drug abuse, junk foods and personal hygiene were not unexpected, children's ignorance of behavioural problems like misusing TV, computer, dangerous games and relations with friends must be taken into consideration. The best justification in this case is that children have some experience about consumption of harmful foods, their effects or problems. They have understood and perceived their importance through mass media or have achieved some information by their friends. On the other hand, they may have no time to experience their behavioural problems. Experience plays a great role as Hennessy *et al*., showed in a review article that children can recognize diseases by seeing their friend's problems, especially their psychological and mental problems (33). There is no doubt that involving the children, especially schoolchildren , accompanied with their teachers to develop the preventive programs can be an effective method. Onyango-Ouma *et al*. showed that after applying malaria education in schools, positively there was behavioural change towards its prevention (34). These positive consequences were achieved by implementing child-to-child approaches, which the importance and effectiveness of health education through these kinds of methods (child-to-child method, teachers participation approach and school-based methods) has been identified and reported (12,34). Other empirical researches in African countries have suggested that children are significantly playing and taking an effective role in their own health care and also other family members (35-38).

The main limitation of this study was that we only studied students in only one major city of Iran, Kerman. In order to present more comprehensive conclusions, we recommend a nationwide study. It helps us find differences between provinces, rural and urban areas; and check the impacts of different cultures. Another limitation was the fact that we did not have access to more personal information due to ethical issues so we could not study the relationship between these cases and more indices of socioeconomic status. Lastly, the students in a unit class were asked to draw their paintings in the same time, then they probably copied or shared their tasks of each other or at least asked each other on what to paint, even though our coordinator along with the teacher in each class kept their eyes on the students to eliminate this methodological error.

An important and worthy point about the present study is that we did not score paintings based on their qualities and we mentioned this to the students in the beginning and during their paintings; so we believe that their skill level

Table 2. Number of paintings on health concept and risk factors classified by the level and type of schools and sex of the students

	Total	Level of Schools			Sex			Type of School		
Explored Themes		Primary	Middle	*P*	Boys	Girls	*P*	Public	Private	*P*
A) Health Concepts										
Mental Health	852 (73.3)	547 (76.8)	305 (67.7)	0.22	436 (77.4)	416 (69.3)	>0.001	352 (67.3)	500 (78.5)	<0.001
Public Health	129 (11.1)	86 (12.1)	43 (9.5)	0.18	73 (13)	56 (9.3)	0.05	70 (13.4)	59 (9.3)	0.03
Personal Hygiene	126 (10.8)	45 (6.3)	81 (17.9)	<0.001	24 (4.3)	102 (17.1)	<0.001	79 (15.1)	47 (7.4)	<0.001
Healthy Diet	56 (4.8)	34 (4.8)	22 (4.9)	0.93	30 (5.3)	26 (4.3)	0.42	22 (4.2)	31 (4.8)	0.59
Total	1163 (100)	712 (100)	451 (100)		563 (100)	600 (100)		523 (100)	637 (100)	
B) Health Risk Factors										
Unhealthy Diet	1094 (95)	684 (97)	410 (91.7)	<0.001	542 (97.3)	552 (92.8)	<0.001	500 (95.5)	594 (94.6)	0.51
Smoking and Illegal Drug Use	41 (3.5)	12 (1.7)	29 (6.6)	<0.001	7 (1.3)	34 (5.7)	<0.001	10 (1.9)	31 (4.9)	0.01
Environmental Hazards	8 (0.7)	6 (0.9)	2 (0.4)	0.49	4 (0.7)	4 (0.7)	0.99	6 (1.1)	2 (0.3)	0.17
Neglecting Personal Hygiene	9 (0.8)	3 (0.4)	6 (1.3)	0.098	4 (0.7)	5 (0.8)	0.99	8 (1.5)	1 (0.2)	0.02
Total	1152 (100)	705 (100)	447 (100)		557 (100)	595 (100)		524 (100)	628 (100)	

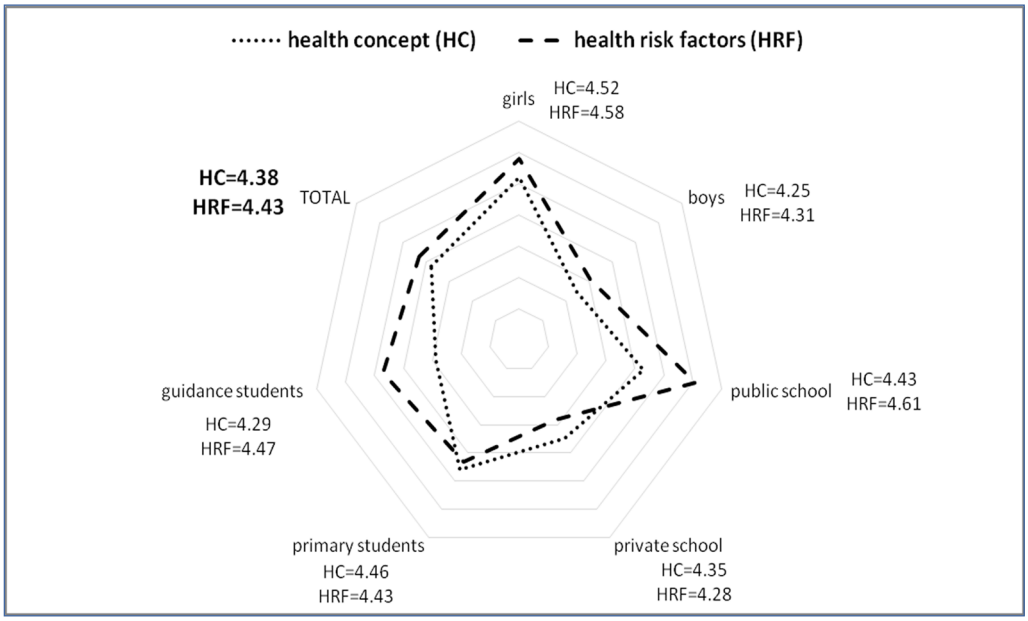

Figure 3. (Radar chart): mean number of paintings in terms of health concepts (HC) and its health risk factors (HRF) according to demographic variables

and painting education had minimum effect on the results of this study.

Conclusion

Students illustrated different aspects of health and its risk factors, and they did not concentrate mainly on medical aspects of health. However, they did not pay enough attention to some aspects such as physical activity, healthy diet, mental and oral health, and environmental hazards.

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Ethical issues

This study was approved by ethics committee of Kerman University of Medical Sciences (KMU).

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Table 3. Relationship between the numbers of paintings about the health concepts and its risk factors and demographic variables

Variables	Health concept			Health Risk Factors		
	Crude Means	Crude *P*	Adjusted *P*	Crude Means	Crude *P*	Adjusted *P*
Type of School						
Public	4.42	0.41	0.07	4.61	<0.001	<0.001
Private	4.36			4.29		
Sex						
Boys	4.52	<0.001	<0.001	4.57	<0.001	<0.001
Girls	4.25			4.31		
School Levels						
Primary	4.45	0.01	0.01	4.42	0.52	0.20
Middle	4.28			4.47		
Mothers education level						
Illiterate (0 year)	4.22			4.31		
Only Writing and Reading	4.22			4.33		
1-5 year	4.43			4.53		
6-8 years	4.24	-	-	4.51	-	-
9-14 years	4.38			4.43		
15-16	4.51			4.42		
>16 year	4.48			4.76		
Linear Effect		0.05	0.57		0.20	0.62
Fathers Education Level						
Illiterate (0 year)	4.36			4.32		
Only Writing and Reading	4.13			4.07		
1-5 year	4.33			4.90		
6-8 years	4.44	-	-	4.65	-	-
9-14 years	4.40			4.40		
15-16	4.44			4.47		
>16 year	4.63			4.66		
Linear Effect		0.24	0.17		0.59	0.70

Competing interests
The authors declare no competing interests.

Authors' contributions
AAH and AAA initiated the idea; AAA, MA, ME, and NH contributed to the data collection; AAH, AAA, and MS contributed to the data analysis; AAH, MS, ME, and AAA prepared the manuscript and revised and edited the final version of the manuscript.

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