An Analytical Comparison of Knowledge, Attitudes, and Practices Regarding HIV/AIDS Among Medical and Non-Medical Students in Iran

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Background and Objectives: Young people are the main group at risk of HIV/AIDS due to factors such as curiosity, peer pressure, lack of knowledge and skills, unsafe sexual behaviors, and drug abuse. The present study was conducted to compare the knowledge, attitudes, and practices regarding HIV/AIDS among medical and non-medical students in Iran.

Methods: This cross-sectional descriptive-analytical study was conducted on a population consisting of the students of Shahid Beheshti University (SBU) and Shahid Beheshti University of Medical Sciences (SBMU). A total of 303 students were randomly selected from the two universities. Data were collected using a researcher-made HIV/AIDS knowledge, attitude, and practice questionnaire. Data were then analyzed using the independent t-test, Mann–Whitney’s U-test, the ANOVA, and the Kruskal–Wallis test in SPSS-18. P<0.05 was set as the level of significance for all the tests.

Findings: The frequencies of marital status, education, smoking, alcohol and psychotropic substance use, employment status, and source of information differed significantly between the medical and non-medical students. There was a significant difference between the two groups regarding knowledge (P<0.001) and practice (P=0.019) regarding HIV/AIDS. Meanwhile, there was no significant difference between the two groups in terms of their attitude toward HIV/AIDS (P=0.503). The results of the ANOVA revealed a significant correlation between marital status and practice (P=0.022), education and attitude (P=0.004), and smoking and knowledge (P=0.008) among the medical students. Meanwhile, there was no significant difference between the demographic variables and knowledge, attitudes and practices regarding HIV/AIDS among the non-medical students (P>0.005).

Conclusion: The present findings showed that designing and developing appropriate educational programs, offered through group media, scientific seminars, courses, lectures, and group discussions, can be effective in enhancing the students’ knowledge and changing their attitudes and should be incorporated into healthcare programs.

Keywords: knowledge, attitude, practice, students, HIV/AIDS

Introduction

Despite the extensive efforts made by governments and international organizations to prevent new HIV/AIDS infections and reduce sexually-transmitted infections (STIs) by 2015, evidence indicates that harmful infections continue to grow, with an increasing number of people dying in developing countries.1–3 One of the most important global health challenges is HIV/AIDS, which affects millions of active
people in societies every year; is considered the second
leading cause of disease and death in Africa, the fourth
leading cause of death among all diseases, and the fifth
cause of death due to infectious diseases worldwide.4,5
Currently, 6800 people are infected with HIV and 5700
die on a daily basis due to this disease.5,6 Existing studies
indicate that HIV/AIDS is a major health problem and its
dimensions are rapidly growing in Eastern Mediterranean
and Middle East countries, such as Iran.7 The incidence of
the disease is significantly higher among young people,
with approximately 40% of the new cases occurring in
people aged 15–25 years.8 Young people are the main
group at risk of HIV/AIDS throughout the world due to
factors such as curiosity, peer pressure, lack of knowledge
and skills, unprotected sex, sex with multiple partners,
traveling to high-risk zones, and drug abuse. Currently,
education and prevention are the best methods to fight
HIV/AIDS.9–11

This reemerging disease is one of the most important
health problems around the world due to the series of
mental, behavioral, emotional, and physical problems it
causes.12 It affects all body organs and systems, as it
involves the immune system,12,13 and reduces the quality
of life and life satisfaction.14 HIV/AIDS is transmitted
through a number of ways, including sex, condensed coa-
gulants, contaminated blood components, and multiple
non-sterile injections. HIV/AIDS can be isolated from
certain body fluids such as blood, saliva, semen, urine,
cerebrospinal fluid.11 Since the incubation period is long
and may last five to ten years or longer, HIV/AIDS infec-
tion is likely to persist for life, and carriers can transmit
the virus to others during this period.15

In addition to disrupting all the aspects of the patient’s
life, HIV/AIDS also causes problems at the social level by
affecting the active age groups of the society, having a
high lethality rate and the high costs of disease care
and control, which impose a heavy burden on the
society.7 Once diagnosed and after learning of their dis-
ease, people face countless problems, especially in their
social relationships, including stigmatization and social
exclusion as their major unpleasant social experiences.16
Furthermore, the disease is associated with significant job
changes and financial pressures in such a way that it
changes the patients’ lifestyles, reduces their self-
confidence, and makes them more vulnerable.8,17

Recently, there has been an increase in the incidence of
new HIV/AIDS infections in the 15–24-year age group com-
pared to other population segments in many countries.8,18

Many domestic studies have shown that the Iranian youth are
less informed about HIV/AIDS, especially its transmission
routes, due to the cultural, religious, and social conditions
prevailing in the country.7 In addition, considering the partic-
ular circumstances of the population pyramid of Iran,
approximately 61% of the country’s population is in the
15–64-year age group, which demands special attention to
HIV/AIDS education.16,19 In Iran, education on high-risk
sexual behaviors, including HIV/AIDS, is not provided at
the primary and secondary school levels. Any information
will be provided in post-secondary schools, ie at the univer-
sity. Medical students are familiar with the subject because of
the nature of their courses, but non-medical students do not
receive any training when in college or university. The pre-
sent study was conducted based on the assumption that there
are differences between medical and non-medical students in
terms of their knowledge, attitudes, and practices regarding
HIV/AIDS.

Methods
This cross-sectional descriptive-analytical study was con-
ducted at a research setting including the non-medical stu-
dents of Shahid Beheshti University (SBU) (n=4), and
medical students of Shahid Beheshti University of Medical
Sciences (SBMU) (n=11) in Tehran city in 2019. The study
population consisted of medical and non-medical students.
The medical students were students studying medicine, nurs-
ing, midwifery, health, pharmacy, etc., at the Faculty of
Medical Sciences. The non-medical students were students
studying toward degrees in literature, engineering, law, social
sciences and economics, etc. in non-medical universities.
The sample size was calculated as 132 per group using the
sample size formula used in similar studies and taking into
account the following: The probability of type-1 error being
α=1.96, the probability of type-2 error being β=1.28, test
power being 0.90, and observed effect size of the mean
difference being d=0.40.7 To take account of a potential
attrition of 15% in the follow-up, 155 medical students and
148 non-medical students studying in the covered faculties
were selected and a total of 303 students entered the study.
Each faculty was taken as a category. Considering the pro-
portion of students in the faculties, 13 samples were selected
from each of the medical faculties and 37 samples from each
of the non-medical faculties. The samples were randomly
selected based on their national ID number being odd or
even. The inclusion criteria were informed consent to partic-
ipate in the research and being a university student. The
exclusion criterion was returning incomplete questionnaires.
The questionnaires were completed through face-to-face interviews. The research objectives were explained to the participants and they were ensured of their information being kept confidential and the data being used solely for research purposes and eventually be published in general. The participants signed written consent forms and were guided in the case of any ambiguities.

\[ n \geq \frac{(z_{\alpha/2} + z_{\beta})^2 \sigma^2}{(\mu_1 - \mu_2)^2} \]

**Data Collection Tools**

The data collection tool included four questionnaires: Demographic, knowledge, attitude, and practice questionnaires.

The demographic questionnaire inquired about variables including gender, marital status, education, smoking status, psychotropic substance and alcohol use, employment status, beliefs, and sources of information.

The knowledge assessment was performed using a researcher-made questionnaire taken from several validated questionnaires assessing medical and non-medical students’ level of knowledge.\(^6,14,20-23\) The initial questionnaire consisted of 35 items examining the students’ knowledge in areas such as public information, transmission and prevention methods regarding HIV/AIDS. A 10-member expert panel consisting of infectious disease specialists (n=3), midwifery professors (n=2), and community health nursing experts (n=5) assisted in determining the validity of the questionnaire. According to the panel’s opinion, the initial 17 items were all confirmed. The reliability of the questionnaire was calculated and confirmed based on the internal consistency (Cronbach’s alpha coefficient= 0.79). The response options for each item were designed based on a 5-point Likert scale [“Strongly Agree” (5), “Agree” (4), “No Comments” (3), “Disagree” (2), “Strongly Disagree” (1)]. The score range was 17–85. Some items were scored in reverse. An example of the items was: “If a member of a family such as a spouse gets AIDS, must leave”.

Practice was measured using a researcher-made questionnaire. The initial questionnaire was derived from the questionnaires used to measure medical and non-medical students’ practice about public information, transmission and prevention methods regarding HIV/AIDS (\(^6,14,20-23\)) and included nine items. A 10-member expert panel consisting of infectious disease specialists (n=3), midwifery professors (n=2) and community health nursing experts (n=5) was consulted to determine the validity of the questionnaire. Three items were omitted and six were approved. The reliability of the questionnaire was calculated and confirmed via the internal consistency (Cronbach’s alpha coefficient=0.82). Each correct answer received 1 point and wrong answers received 0 points. The score range was 0–6. An example of the items was:

Which of the following do you choose for AIDS counseling and treatment? Referring to Health Centers - Referring to available clinics and hospitals - Getting advice from a private doctor - I don’t do anything special.

After data collection, data were entered into SPSS-18. Initially, the normal distribution of the variables was investigated using the Kolmogorov–Smirnov test. In the case of the normal distribution of the data, the independent \(t\)-test was used to compare the mean knowledge, attitude, and practice scores between the two groups, and its non-parametric equivalent (Mann–Whitney \(U\)-test) was used in the case of non-normal data distribution. The Chi-squared test was employed to compare the demographic variables between the two groups. The ANOVA was applied to measure the relationship between the demographic variables and knowledge, attitude as well as practice in both groups while its non-parametric equivalent (Kruskal–Wallis) was used in the case of non-normal distribution. \(P<0.05\) was taken as the level of statistical significance.

**Findings**

According to the findings of the study, the mean ± SD of age was 25.25 ± 7.48 years in the medical and 22.12 ± 2.8
years in the non-medical students. The proportion of men and women was 66.5% and 33.5% among the medical students and 35.8% and 64.2% among the non-medical students. Text-books and courses were noted as the sources of information by 58.1% of the medical students and 21.6% of the non-medical students. Table 1 presents the mean ± standard deviation of the other demographic information. A comparison of the demographic variables between the two groups of medical and non-medical students revealed a significant difference in terms of marital status (P<0.001), education (P<0.001), and smoking status (P=0.003), alcohol consumption (P=0.012), employment status (P<0.001), and information source (P<0.001), as shown in Table 1.

The comparison of knowledge, attitudes, and practices regarding HIV/AIDS among the medical and non-medical students showed a significant difference between the two groups in terms of their knowledge regarding HIV/AIDS (P<0.001). There was no significant difference between the two groups in terms of their attitude regarding HIV/AIDS (P=0.503). Nonetheless, there was a significant difference between the two groups in terms of their practice regarding HIV/AIDS (P=0.019), as shown in Table 2.

Examining the relationship of knowledge, attitude and practice regarding HIV/AIDS among the medical students with the demographic variables using the ANOVA showed a correlation between smoking and knowledge (P=0.008), attitude and education (P=0.004), and practice and marital status (P=0.022), as in Table 3. Nevertheless, there was no relationship between knowledge, attitude and practice regarding HIV/AIDS and the demographic variables among the non-medical students (Table 4).

### Discussion

The young generation, including university students, are a valuable human and scientific resource, the basis of the country’s future, and future parents, and their health plays an important role in the general health of communities. Since HIV/AIDS is recognized as a major public health concern worldwide, and the prevention and control of high-risk behaviors are the only way to prevent this disease, investigating the knowledge, attitudes, and practices of medical and non-medical students regarding this disease can be a prelude to designing systematic programs for providing the essential training. The present study revealed a significant difference between the medical and non-medical students in terms of their HIV/AIDS knowledge, as the medical students had higher knowledge about HIV/AIDS compared to their non-medical peers. The present findings are consistent with the results of previous studies in Iran. Medical students become familiar with HIV/AIDS, its symptoms, transmission routes, and treatments from the very beginning of their

| Table 1 Comparison of the Demographic Variables Between the Two Groups of Medical and Non-Medical Students |
|---|---|---|---|
| | Medical (%) | Non-Medical (%) | P |
| **Gender** | | | |
| Female | 103 (64.5%) | 53 (33.8%) | 0.679 |
| Male | 52 (33.5%) | 95 (64.2%) | |
| **Marital status** | | | <0.001* |
| Single | 118 (76.1%) | 138 (93.2%) | |
| Married | 37 (23.9%) | 10 (6.8%) | |
| **Education** | | | <0.001* |
| Bachelor’s | 66 (42.6%) | 98 (66.2%) | |
| Master’s | 22 (14.2%) | 44 (29.7%) | |
| PhD | 67 (43.2%) | 6 (4.1%) | |
| **Smoking** | | | 0.003* |
| Yes | 8 (5.2%) | 23 (15.5%) | |
| No | 147 (94.8%) | 125 (84.5%) | |
| **Alcohol and psychotropic substance use** | | | 0.012* |
| Yes | 6 (3.9%) | 17 (11.5%) | |
| No | 149 (96.1%) | 131 (88.5%) | |
| **Employment status** | | | <0.001* |
| Employed | 54 (34.8%) | 24 (16.2%) | |
| Unemployed | 101 (65.2%) | 124 (83.8%) | |
| **Religious beliefs** | | | 0.142 |
| Not mentioned | 7 (4.5%) | 7 (4.7%) | |
| Not at all | 6 (3.9%) | 10 (6.8%) | |
| Somewhat | 14 (9%) | 24 (16.2%) | |
| Moderate | 44 (28.4%) | 48 (32.4%) | |
| Believing | 75 (48.4%) | 51 (34.5%) | |
| Religious | 9 (5.8%) | 8 (5.4%) | |
| **Source of information** | | | <0.001* |
| Friends | 3 (1.9%) | 2 (1.4%) | |
| Newspapers and magazines | 3 (1.9%) | 2 (1.4%) | |
| Radio and TV | 9 (5.8%) | 45 (30.4%) | |
| Books and university courses | 90 (58.1%) | 32 (21.6%) | |
| Internet | 47 (30.3%) | 63 (42.6%) | |
| Pamphlets and posters | 3 (1.9%) | 4 (2.7%) | |

Note: *P<0.05 is taken as the level of statistical significance.
education because of the nature of their discipline and courses; they thus acquire a good knowledge of this disease. This knowledge also helps them achieve a more positive attitude toward the various aspects of the disease. Nonetheless, prior to stepping into this field of study, they are not very familiar with the nature of STIs, especially HIV/AIDS, and have almost the same level of knowledge as others, given the cultural conditions and cultural taboos in the Iranian society. Furthermore, medical students are at the forefront of health care and play a key role in promoting the health status of different classes and groups of the society and global health; acquiring a deeper understanding of their knowledge, attitudes, and practices about people with HIV/AIDS is therefore mandatory. This deeper knowledge can help encourage medical students to be more supportive of people with HIV/AIDS.

Previous measurements in different societies indicate that young people have different levels of knowledge about HIV/AIDS as a result of several factors, such as socio-cultural factors, religion, political orientation, and parental knowledge. HIV/AIDS awareness-raising activities are therefore recommended to be included in students’ curricula in the form of short tutorials, discussions, conferences, workshops, and symposiums.

Table 2 Comparison of HIV/AIDS Knowledge, Attitude and Practice Among the Medical and Non-Medical Students

|                | Medical      | Non-Medical | P          |
|----------------|--------------|-------------|------------|
| **Mean (SD)**  | 20.68±4.59  | 17.34±5.32  | P<0.001*   |
| **Attitude**   | 65.13±6.88  | 65.71±6.67  | Z=0.669    |
| **Practice**   | 12.87±1.69  | 12.44±1.56  | P=0.019*   |

Note: *P<0.05 is taken as the level of statistical significance.

Table 3 Relationship of Knowledge, Attitude and Practice with Demographic Variables in the Medical Students

|                | Knowledge | Attitude | Practice |
|----------------|-----------|----------|----------|
| **Mean (SD)**  | 20.68±4.59| 65.61±5.9| 12.70±1.6|
| **Max-Min**    | 3–29      | 48–80    | 8–16     |
| **P**          | 0.848     | 0.126    | 0.022*   |

Note: *P<0.05 is taken as the level of statistical significance.
Examining the relationship between the demographic variables and the HIV/AIDS knowledge showed a significant difference only between knowledge and smoking among the medical students. Students with high HIV/AIDS knowledge smoked less frequently. The results of the present study are consistent with the findings of previous studies in Iran as well as in other countries. The present study found no statistically significant relationship between gender and knowledge, which is consistent with the results of other studies. This consistency could be attributed to the fact that both boys and girls have the same access to information sources and education.

A comparison of the mean attitude scores of the medical and non-medical students revealed no significant differences between them in terms of their attitude toward HIV/AIDS. Both groups had the same mean score of attitude toward HIV/AIDS. In addition, although medical students had a good knowledge about HIV/AIDS, they had the same perceptions as the non-medical students toward this disease. Meanwhile, other studies have shown that medical students have a more optimal attitude toward HIV/AIDS. This discrepancy may be attributed to the cultural context of the study population. The attitude of medical students is important, because it can lead to social stigma, exclusion, denial, avoidance of care, negligence and distancing from people with HIV/AIDS, which may in turn lead to discrimination in service delivery, poor quality of patient care, and increased treatment costs for these patients. Medical students receive sufficient training and face different cases of this disease throughout their studies, which may provide an opportunity to project a positive attitude toward all patients regardless of the nature of their infection. Non-optimal attitudes can lead to discrimination against HIV/AIDS patients and are the most important barrier to preventing further spread of the virus and providing optimal care and support to the infected people and their families. The period of residency is an opportunity for medical students to identify

| Table 4 Relationship of Knowledge, Attitude and Practice with the Demographic Variables in the Non-Medical Students |
|---------------------------------------------------------------|
| **Knowledge** | **Attitude** | **Practice** |
| Mean (SD) | Maximum | Minimum | P | Mean (SD) | Maximum | Minimum | P | Mean (SD) | Maximum | Minimum | P |
|-----------|---------|---------|---|---------|---------|---------|---|---------|---------|---------|---|
| **Marital status** | | | | | | | | | | | | |
| Single | 17.34±5.2 | 3–29 | 0.978 | 65.78±6.6 | 45–81 | 0.655 | 12.39±1.5 | 9–17 | 0.114 |
| Married | 17.30±6.6 | 5–25 | 0.417 | 64.70±7.02 | 51–74 | 0.865 | 12.25±1.5 | 9–17 | 0.114 |
| **Education** | | | | | | | | | | | | |
| Bachelor’s | 17.70±5.4 | 5–25 | 65.71±6.5 | 48–79 | 0.865 | 12.25±1.5 | 9–17 | 0.114 |
| Master’s | 16.45±5.2 | 3–25 | 65.90±6.8 | 45–81 | 0.81±1.4 | 9–15 |
| PhD | 18.0±3.7 | 13–23 | 64.33±8.2 | 56–74 | 0.83±1.9 | 11–16 |
| **Smoking** | | | | | | | | | | | | |
| Yes | 17.31±5.1 | 3–29 | 0.954 | 65.59±6.3 | 45–79 | 0.599 | 12.50±1.5 | 9–17 | 0.293 |
| No | 17.39±6.2 | 5–28 | 66.39±8.5 | 48–81 | 0.13±1.5 | 9–15 |
| **Alcohol and psychotropic substances use** | | | | | | | | | | | | |
| Yes | 17.58±5.2 | 3–29 | 0.139 | 65.65±6.6 | 45–81 | 0.764 | 12.48±1.5 | 9–17 | 0.451 |
| No | 15.52±5.6 | 5–26 | 66.17±7.0 | 51–78 | 12.17±1.5 | 9–14 |
| **Source of information** | | | | | | | | | | | | |
| Friends | 16.0±4.2 | 13–19 | 0.780 | 72.50±3.5 | 70–75 | 0.602 | 12.50±2.1 | 11–14 | 0.613 |
| Newspapers and magazines | 14.00±1.4 | 13–15 | 61.0±0.0 | 61–61 | 0.0 ±0.0 | 13–13 |
| Radio and TV | 16.66±5.6 | 5–28 | 66.17±7.2 | 45–78 | 12.68±1.3 | 9–15 |
| Books and university courses | 18.12±5.6 | 5–25 | 65.28±6.6 | 51–81 | 0.03±1.6 | 9–16 |
| Internet | 17.52±5.0 | 3–29 | 65.65±6.5 | 48–79 | 12.46±1.6 | 9–17 |
| Pamphlets and posters | 18.25±5.1 | 12–23 | 64.00±4.0 | 58–67 | 12.50±0.5 | 12–13 |

Note: P<0.05 is taken as the level of statistical significance.
and correct their negative attitudes that cause discrimination against HIV/AIDS patients. The present study revealed a statistically significant difference between the attitude toward HIV/AIDS and education in the medical students. Nonetheless, as revealed in other studies, there were very low negative attitudes toward HIV/AIDS-infected people, as students and the educated class show a positive attitude toward these people. The present findings are consistent with the results of other studies. It can be noted that, as students become more familiar with HIV/AIDS at higher levels of education, they experience a change in their attitudes toward the disease.

The present study also showed that medical and non-medical students had different levels of practice about HIV/AIDS, as the medical students showed better mean practices. Since medical students are more familiar with HIV/AIDS and are also exposed to blood and its products or HIV/AIDS patients due to their work conditions, they are more likely to be at risk of infection. Therefore, medical students are more likely to adhere to safety precautions and prevention guidelines compared to non-medical students. The present study also revealed a significant difference between marital status and practice in the medical students. The married medical students felt more responsible, considering their HIV/AIDS knowledge, and showed greater appreciation of loyalty to the family. The present findings are consistent with the results of some other studies as well. This study revealed no significant correlation between knowledge, attitude, and practice and demographic variables among the non-medical students (Table 4). It should be noted that the non-medical students had poorer knowledge, attitude, and practice regarding HIV/AIDS due to the circumstances of their education in non-medical faculties and course types. Furthermore, considering the prevailing cultural conditions of the Iranian society, in which there is no training on STIs at the pre-university level, and since no information on HIV/AIDS and other STIs is provided later in universities either, a large portion of the country’s young generation have insufficient knowledge about HIV/AIDS. This inadequate knowledge puts this group at risk of diseases as a result of their unsafe activities during late adolescence, including increased prevalence of high-risk sexual behaviors. Educational materials are therefore recommended to be incorporated into the courses of non-medical students. Weaknesses in spiritual beliefs, poor skills for dealing with sexual emotions, poor training and performance, and the absence of effective interactions in the family are among the main factors leading some young people toward risky behaviors. As such, it is necessary to place a greater emphasis on sexual health education to empower people to discern sexual risks, adopt healthy attitudes toward sex and gender, build self-confidence and the ability to say “no”, and gain the ability to analyze sexual issues to control the most important STD targeting young people worldwide.

Concerning the sources of information, the medical students received most of their HIV/AIDS information from university textbooks and courses, while the non-medical students received the bulk of their HIV/AIDS information from the internet and cyberspace. The majority of previous studies on university students’ HIV/AIDS knowledge have also confirmed that university textbooks are the best and most important source of information for medical students, while the internet and cyberspace are the most important source of information for non-medical students. Nevertheless, academic resources play a very weak role in notifying students about the risk of HIV/AIDS, as only a small percentage of the students stated that they used university textbooks to access information on HIV/AIDS. Students who do not have access to academic medical content may receive wrong and inaccurate information, since the information obtained from other sources is not verified in terms of either quality or quantity. In the meantime, the mass media and cyberspace play a significant role in promoting knowledge and the right attitude toward HIV/AIDS, since the general public, especially young people, have access to the internet throughout most of the day. The limitations of this study included the significant differences in demographic variables between the medical and non-medical groups. One of the strengths of the study was the fact that sampling was carried out in first-class universities of Iran that had all the possible faculties. The lack of control over the effects of the self-report nature of the questionnaires, the students’ mental state, and individual differences were the weaknesses of this study. It is recommended that future studies focus more on psychological, social, and cultural factors.

Conclusion

HIV/AIDS imposes a heavy cost on the healthcare system of the country; however, it is among the most preventable chronic diseases; therefore, HIV/AIDS prevention should be one of the major goals of the healthcare system in all countries. Young people are at a greater risk and are more vulnerable due to their conditions and needs at this stage of life. The youth, especially the students, need to increase their knowledge of this disease, particularly regarding transmission routes, control, and prevention. The enhancement of their knowledge enables them to make informed decisions.
about their behaviors and avoid risky behaviors. Since one of the most important prevention measures and methods is to increase the level of knowledge, training programs are recommended to be designed based on the needs of the students and offered through mass media, scientific seminars, and group discussions.

Acknowledgments
This article is the result of a project approved by the Research Council of the Student Research Committee of Shahid Beheshti University of Medical Sciences with the Ethics Code IR.SBMU.RETECH.REC.1396.676. Hereby, the authors would like to express their gratitude to the Student Research Committee along with the Vice-Chancellor for Research and Technology of Shahid Beheshti University of Medical Sciences for funding this study. Mehdi Safari is currently affiliated with the Department of Health in Disasters and Emergencies, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Disclosure
The authors report no conflicts of interest in this work.

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