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SHORT COMMUNICATION

# Application of the Information-Motivation and Behavioral Skills (IMB) model in risky sexual behaviors amongst male students



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## KEYWORDS

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**Summary** As AIDS is not merely a hygienic problem but a disease that creates a great deal of economic, cultural, and social problems, it is necessary for most of the state and nongovernmental organizations and individuals to participate in both controlling AIDS and preventing it. As no effective vaccine or therapy for this disease exists currently, the only method for avoiding being afflicted by this disease is prevention. The present study aims to examine the Information-Motivation and Behavioral Skills (IMB) model in risky sexual behaviors. For this purpose, a group of 151 male students was sampled using a multistage random sampling method to complete the quality of HIV information questionnaire, national AIDS questionnaire, international AIDS questionnaire and global positive attitude to AIDS questionnaire. The results show that there is a significant relationship between the perception of HIV infection risk and sexual behavior. Thus, the perception of risk is considered the first step toward modifying sexual behaviors from risk-taking behaviors to safer behaviors.

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## Introduction

The results of many studies have played significant roles in both theorizing and designing

effective methods for HIV prevention. Studies have developed and analyzed prevention strategies and assessed HIV risk perception. However, HIV risk prevention studies have been conducted less frequently within Iranian Society. In Iran and many other countries, the young populace is the group that is most vulnerable to HIV infection. For example, CDC research in the United States (2004) has shown that young adults under age thirty are

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infected by HIV more than any other age group (34%) [1].

An estimated 33.3 million people worldwide were living with HIV at the end of 2009. During the same year, an estimated 2.6 million people became newly infected with HIV, while another estimated 2.8 million lost their lives to AIDS [2]. In 2008, out of an estimated 6800 new infections a day, 45% occurred in young people between 15 and 24 years of age [3]. In fact, adolescents are currently considered to be at the highest risk of HIV infection [2]. Many young people at risk of HIV infection or already infected with HIV live in the world's poorest regions [4].

Until 2006, the percentage of identified HIV cases in Iran that were caused by sexual transmission remained relatively stable at 5-8%; however, the absolute value of sexually transmitted HIV cases has been rising continuously and has gone from 50 cases in 2000 to almost 150 cases in 2006. This trend has continued, and the percentage of sexually transmitted HIV cases reached approximately 13% in 2008 and beyond [5].

Clearly, the most important factor for preventing this disease is the development and implementation of behavioral modification models that include methods for decreasing risk taking behaviors.

Thus, research is necessary in Iranian society in order to identify social-cognitive structures that influence the success or failure of methods for preventing HIV. Efforts to prevent the spread of HIV/AIDS have been guided by several models of health behavior and health behavior change. One theoretical approach that has received a considerable amount of attention in the area of HIV prevention research is the Information-Motivation-Behavioral Skills (IMB) model.

The aim of this research was to investigate the relationship between the IMB model and risky sexual behaviors.

### The Information-Motivation-Behavioral Skills (IMB) model

The Information-Motivation-Behavioral Skills (IMB) model developed by Refs. [6,7] was designed to predict HIV preventive behavior and the necessary elements of HIV prevention. The IMB model is based on the concept that HIV prevention information, motivation, and behavioral skills are the fundamental determinants of HIV preventive behavior. The model assumes that HIV prevention information and motivation affect risk-reduction behavioral change largely through behavioral skills. Information and motivation may also have direct effects on HIV

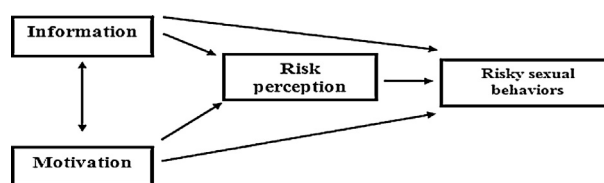


Figure 1 Information – motivation and risk perception.

preventive behavior, particularly when the behavior requires relatively uncomplicated behavioral performances. Furthermore, HIV prevention information and motivation are regarded as independent constructs, demonstrated by well-informed people who are not motivated to practice preventive behaviors and by individuals who are motivated to practice preventive behaviors but are not well informed [6,8].

The IMB model has been tested with a broad range of risk populations. For example, the IMB model was tested on samples of college and high school students and gay and bisexual men of unknown risk recruited from gay community services. These studies have supported the construct validity of the model but have not done much to support the use of the model in high-risk populations [9,10].

In our opinion, three factors are related to risky behaviors: the level of knowledge of the individual about HIV, her/his motivation to avoid those infected by the HIV virus, and her/his level of personal perception regarding the risk of being infected by AIDS. These factors act alone and in relation to each other.

Therefore, it is necessary to examine the relationship of these three factors concerning the risk management of HIV, and a model of this has been presented in Fig. 1.

### Knowledge of HIV/AIDS

According to the model, HIV prevention information that is directly relevant to preventive behavior (i.e., HIV transmission and prevention information) is a prerequisite for such behavior. The information component also includes HIV prevention, heuristics and implicit personality theories—simple decision rules that allow HIV-positive individuals to make relatively automatic and cognitively effortless (but often incorrect) decisions about a partner's HIV status and, by extension, about whether to engage in HIV preventive behavior. The use of such heuristics has been shown to be strongly negatively related to HIV preventive practices [11–13].

The purpose of educating the populace about the modes of transmission and methods of prevention

of the HIV/AIDS disease is to reduce unsafe/risky behavior. However, studies have revealed that knowledge does not necessarily reduce risk behavior. Knowledge is significantly related to condom use and participating in safe sexual behaviors, but knowledge alone is not sufficient to eliminate risk behaviors [14].

## Motivation

Motivation generally refers to the internal force that determines the direction and intensity of efforts to change behavior. Motivational constructs included in models of risk reduction behavior change represent multiple dimensions, including beliefs, attitudes, perceptions, moods, feelings and drive states associated with specific actions [15].

Motivation to engage in HIV preventive acts is an additional determinant of HIV preventive behavior and influences whether HIV-positive individuals are inclined to act on what they know about HIV risk and prevention. HIV prevention motivation includes an HIV-positive individual's personal motivation to practice HIV preventive behaviors (e.g., attitudes toward personally practicing specific HIV preventive acts) and his or her social motivation to engage in HIV prevention (e.g., perceptions of social support for performing such acts) [16,17].

In the present research, motivation is the tendency to avoid communicating with HIV patients.

## Risk perception

Risk perception refers to individuals' judgments of risk, which must be differentiated from objective risk assessments performed by technical experts. It seems reasonable to assume that people think about their personal risks in terms of numbers of probabilities. After all, these are the units that define risk theoretical estimates of probabilities or harm, and personal risk perceptions often deviate substantially from expert risk assessments [18–20]. Systematic biases in risk perception can range from environmental risks to more personal health risks.

Virtually all models of health behavior and health behavior change agree that a personal perception of being at risk is a prerequisite for the motivation to change risk behaviors [20,21].

With HIV being a socially transmitted risk, one's perception of risk depends on an evaluation of the risk posed by the potential partner. Available data indicate that people have a well-developed and accepted set of beliefs regarding which potential sexual partners are risky [22]. In general, people

are convinced that their sexual partners are safe [23,24]. Furthermore, they show overconfidence in their ability to detect unsafe partners and believe that others are much more likely to get involved with risky partners [25].

We define risk perception as the individuals' perception of the risk of their own infection by HIV; that is, the extent to which the individual thinks he/she is exposed to the risk of being infected by AIDS.

## Behavioral skills

Behavioral skills for performing HIV preventive acts are a third critical determinant of HIV preventive behavior. The behavioral skills component of the IMB model is composed of an individual's objective ability and perceived self-efficacy for the performance of the sequence of HIV-preventive behaviors involved in effective prevention [6,26,27].

Applying the IMB model to the present study, we hypothesized that levels of information, motivation and HIV risk perception are fundamental determinants of safe sex practices among college students.

The results of study [28] indicated that when knowledge increases, individual's attitudes and performances also improve. In addition, individuals with more positive attitudes about the disease exhibited safer behaviors.

Another study by Ref. [29] entitled "the perceptions and behaviors of the patients infected by AIDS" concluded that performing personal consultation with infected patients emphasizes the risk of transmission, informs them about the disease and increases supportive resources available to them. For instructing the public about AIDS, it is recommended to have an emphasis on religious beliefs and to use cognitive behavioral theories and domestic models of health instruction.

## Methods

### Participants

The research participants included 151 males that were all BA and MA Razi University students who studied during the 2010-2011 academic year. The sampling method was stratified random sampling. Participants ranged from 18 to 30 years of age and were selected from 7 departments: literature and human sciences, social sciences, physical fitness, engineering, basic sciences, agriculture, and veterinary sciences. This was a correlation study.

## Measures

The research instrument used here was a questionnaire to measure the following variables: knowledge, motivation, risk perception of HIV/AIDS morbidity, and risky sexual behavior. First, the questionnaire was translated into Persian, and then, it was retranslated into English. The Persian version was confirmed to be a valid translation based on Cronbach's alpha coefficient scale. The original English version achieved a 0.60 on that scale, and the second English version achieved a 0.73 [30,31]. This questionnaire measured knowledge regarding AIDS prevention, motivation for avoiding communication with HIV patients, risk perception of AIDS morbidity and risky sexual behavior. Each question included 5 answer choices based on the Likert Scale: totally agreeable=5, agreeable=4, without opinion=3, disagreeable=2, and totally disagreeable=1. The scoring of some questions was inverted. The questionnaire consists of the following four sub-questionnaires: HIV information questionnaire [32], national AIDS questionnaire [33], International AIDS questionnaire [34], and global positive attitude to AIDS questionnaire [35]. The research questionnaire had two sections, personal features and questions related to hypotheses testing; these are described below.

The first section, personal features, includes four questions regarding age, sex, educational level and marital state. The second section includes questions about hypothesis testing. The questionnaire items were measured and evaluated through factor analysis. Then items related to the variables were differentiated, and 38 items were selected. Questions 1–6, 8–11, 13, 14, 30, and 32–34 measured the level of knowledge. The scoring for questions 6, 9, 11, 13, 30, and 32 was inverted (totally disagreeable=5, disagreeable=4, without opinion=3, agreeable=2, and totally agreeable=1).

Questions 15–23, 29 and 35 measured the level of motivation. The scoring of all except number 35 was inverted. Questions 7, 27, 31, and 36–38 measured the risk perception of AIDS morbidity, and the scoring on number 27 was inverted.

Questions 12, 24–26 and 28 measured risky sexual behaviors, and all of those questions were inverted except number 28.

Cronbach's alpha scale was used to determine the reliability of this questionnaire. The original version achieved a 0.60 Cronbach's alpha coefficient [30,31]. The Cronbach's alpha coefficient for the level of information about HIV transmission methods was 0.73. For prevention, it was 0.79. For avoidance motivation, it was 0.77. For risk

perception, it was 0.81, and for risky sexual behaviors, it was 0.77.

## The method of implementation

After random selection, the proportion of students from each department was determined: social sciences=23 (15.2%), literature and human sciences=34 (23.2%), physical fitness=5 (3.2%), agriculture=18 (11.73%), engineering=31 (20.53%), basic science=37 (24.53%), and veterinary sciences=3 (1.6%). Then, the students were asked to participate in the study, and the researcher provided them with the necessary information regarding cooperation, completing the questionnaire and the confidentiality of the students' information. In the case of students' content, the questionnaire would offer information regarding students' content. The questionnaire does not include a field for the name of the respondent, but some of the subjects asked to receive conclusions based on their personal responses as compensation for their cooperation. This was done. The study was conducted over 1 month.

## Results

In total, 151 participants who met the research criterion filled in the questionnaire. The age of all respondents ranged from 18 to 31 years, with an average of 23 years. In regards to educational status, most Razi University respondents scored higher 123 (81.5%), with a high proportion scoring as master 28 (18.5%). Another important characteristic to note is marital status: 138 (91.4%) of all participants were single, while 13 (8.6%) were married.

The mean and standard deviation (SD) for knowledge level was  $\bar{X} = 56/23$ ;  $SD = 5/27$ . The mean and SD for motivation was  $\bar{X} = 29/89$ ;  $SD = 7/94$ . The mean and SD for risk perception was  $\bar{X} = 22/37$ ;  $SD = 2/95$ . The mean and SD for risky sexual behavior was  $\bar{X} = 13/14$ ;  $SD = 3/34$ .

The results from the Pearson correlation analysis showed significant relationships between risky sexual behaviors and information level ( $r = -0.36$ ), motivation ( $r = -0.16$ ) and risk perception ( $r = -0.37$ ) ( $p < 0.05$ ).

## Regression analysis

Different hierarchical regression analyses are performed to examine the relative contribution of different explanatory variables.

**Table 1** The summary of regression analysis of information, motivation, and risk perception and sexual behavior.

Variables	<i>F</i>	<i>R</i>	<i>R</i> <sup>2</sup>	<i>q</i>	<i>t</i>	<i>p</i>
Information	16.96	0.32	0.10	-0.32	-4.12	0.001
Motivation	24.09	0.37	0.14	-0.37	-4.91	0.001
Risk perception	48.30	0.50	0.25	-0.50	-6.95	0.001

Every table presents the standardized beta ( $\beta$ ) coefficients, the level of statistical significance ( $p$ ) and the explained variance ( $R^2$ ).

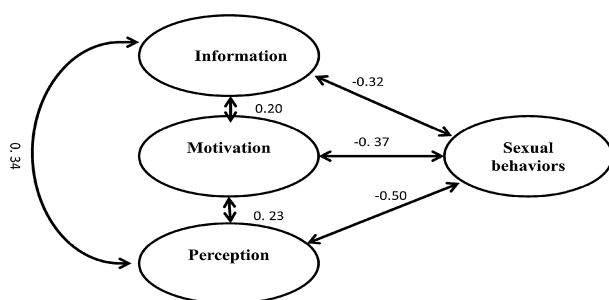
As is shown in [Table 1](#), knowledge ( $R^2 = 0.10$ ,  $\beta = -0.32$ ,  $p < 0.001$ ), motivation ( $R^2 = 0.14$ ,  $\beta = -0.37$ ,  $p < 0.001$ ) and risk perception ( $R^2 = 0.25$ ,  $\beta = -0.50$ ,  $p < 0.001$ ) are significantly negatively correlated with risky sexual behaviors.

The results of the regression analysis showed that there is a significant relationship between knowledge level, motivation, risk perception of being infected by HIV, and risky sexual behaviors. To examine the relationship between predictor variables and criterion variables, a multivariable regression analysis was performed. The results of this analysis indicated that risk perception of being infected by HIV is the best predictor of risky sexual behaviors, and motivation level is the second best predictor.

Taking into account the coefficients obtained in the data analysis, the final model has been provided ([Fig. 2](#)).

## Discussion

These results show that there is a meaningful relationship between knowledge level, motivation and risky sexual behavior in this study sample. We found that most of the college students who participated in the study were knowledgeable about HIV/AIDS and the risk behavior associated with the disease. The findings of this study seem to support previous research that showed that college students are

**Figure 2** Relationship between factors.

generally knowledgeable about HIV/AIDS and its risk factors [1,28,36–43].

Knowledge regarding the risk of HIV transmission and how to prevent it is of great importance in young people because knowledge influences attitude, which, to a great extent, influences behaviors.

The results of this study showed that there is a significant converse relationship between motivation and risky sexual behaviors ( $p < 0.001$ ). This means that when motivation increases, risky sexual behaviors decrease, and vice versa.

In a previous study [44], prior to instruction, a large proportion of students believed in separating those infected by HIV from the uninfected. According to experts, undesirable attitudes toward those affected by AIDS also results from a shortage of knowledge regarding AIDS. This lack of knowledge generates fear of being infected by the HIV virus and results in discrimination against these patients. This is the greatest obstacle for preventing HIV transmission, providing proper care for AIDS patients, and supporting AIDS patients and their families [45]. Taking into account the results of previous studies and comparing them with those of the present research the following conclusion can be drawn: regardless of whether the knowledge level of an individual regarding the methods of HIV transmission and how to prevent transmission is high or low, in our society the motivation to refrain from interacting with infected individuals is high. It can be claimed that this is due to discrimination based on the marks on the infected. This allows people to abstain from interacting with these patients. However, this leads to a negative correlation with risky sexual behaviors. The more one fears to associate with and is prejudice toward infected individuals, the more likely one is to show fewer risky sexual behaviors.

The results of our regression analysis showed that there is a significant inverted relationship between risk perception of AIDS and risky sexual behavior ( $p < 0.001$ ). This is consistent with the findings of previous studies in an African desert [46,47], found that there is a positive relationship between risk perceptions and risky sexual behavior. The perception of HIV risk is not static, but varies with context and over time.

Individuals may perceive different levels of risk at different stages in their lives and with different sexual partners, even when their actual level of risk remains constant. Some studies have shown that the perception of risk of HIV transmission may be high when a new sexual relationship is formed, but the perception of risk diminishes as the relationship progresses [46,48]. The IMB model, as it was originally formulated, seems best suited as a heuristic for conceptualizing the active elements of effective HIV prevention interventions [49].

## Limitations

The first and the most important limitation of this type of study is the shortage of contemporary research about risky sexual behaviors across our country.

Second, the data obtained about risky sexual behaviors were mainly self-reported information, which usually generates lower values than the true value.

Third, the plan is transient, which prevents us from reaching a conclusion about causal relationships. This also prevents us from determining the causality relationship between the understanding of risk and risky sexual behaviors: perceiving high risk repeatedly can lead to a change in a behavior, while, a minor change in a behavior may change the personal perception of risk of being afflicted without any significant change in actual risk. Moreover, risk perception is not stationary; rather, it differs with regard to background and type of sexual partner and differs over time.

## Recommendations

1. As this study is one of the first performed regarding AIDS using the IMB model in Iran, it is advised to find norms and make use of the scale that was used in this study.
2. Because this study uses the IMB model merely for risky sexual behaviors that are related to AIDS, performing other studies on other risky behaviors is recommended.
3. The findings of this research showed that, compared to other variables, the perception of the risk of being afflicted by AIDS is a stronger predictor of the type of risky sexual behavior a person will exhibit. Thus, it is recommended that this point should be taken into account more profoundly in plans for both prevention of disease and struggles against disease. Studies should focus on changing the level of perception.

The data should lead to the change of an individual's perception so that he/she does not feel immune to being afflicted by the disease.

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