The role of integrative model of behavioral prediction in voluntary counseling of individuals with sexual high-risk behavior

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Abstract:

BACKGROUND: Voluntary counseling and testing (VCT) is one of the main efforts for the prevention of high-risk sexual behavior, including HIV/acquired immunodeficiency syndrome (AIDS). The aim of this study was to determine cognitive determinants related to voluntary counseling and HIV testing among Iranian adults based on the integrative model of behavioral prediction (IMBP).

MATERIALS AND METHODS: This cross-sectional study was conducted in 2018 among Iranian adults with high-risk sexual behaviors, including drug abuse and unprotected sex, in western Iran. A total of 300 adults were randomly selected to participate voluntarily in this study. Participants filled out a self-administered questionnaire, including the background data and IMBP constructs. Data were analyzed by SPSS version 21, using statistical treatments, such as bivariate correlations, Chi-square test, t-test, and logistic regression at a 95% significant level.

RESULTS: Almost 73.3% of the participants had a history of VCT. The highest probability of VCT use was in participants who were in high level of VCT skills (odds ratio: 9.635; 95% confidence interval [CI]: 3.255, 28.514]), following environmental constraints (odds ratio: 6.274; 95% CI: 2.166, 18.171). Furthermore, the IMBP constructs accounted for 85% of the variations in the outcome measure of the VCT use intention.

CONCLUSIONS: Based on the result, it appears that the design and implementation of educational programs to improve upon skills and environmental constraints toward VCT use among adults with high-risk behaviors could be useful to the promotion of VCT.

Keywords:

Counseling, HIV, integrative model of behavioral prediction, sex worker, voluntary program

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Introduction

Acquired immunodeficiency syndrome (AIDS) is one of the greatest public health challenges in the new millennium and is known as the fourth leading cause of death worldwide.[1,2] A major challenge in controlling the outbreak of AIDS in most prone areas, such as Africa and Asia, is the lack of awareness among a large number of HIV-positive people about their condition.[3] According to the World Health Organization (WHO), about 70 million people worldwide have been affected by the disease, 35 million of which are dead. However, by the end of 2015, about 36.7 million people were infected with HIV, with 2.7 million new infections and 1.8 million deaths per year associated with this infection worldwide.[4] Iran is at a critical stage of the HIV epidemic, such that 46% of infected individuals in Iran are at the ages of 25–34 years.[5]

According to the latest official information from the Iranian Ministry of Health, by the end of June 2017, the total number of identified number of positive HIV infection cases reached 32670, of which 54% were 21–35 years old. Furthermore, according to the WHO, the number of people affected by the disease in developing countries is at least 5 times more than the reported figures. Indeed, the number of HIV victims in Iran may be estimated between 83,000 and 120,000.[6] According to a report issued by Kermanshah University of Medical Sciences (KUMS), there are 3551-diagnosed HIV victims in Kermanshah Province in western Iran. Although the city of Kermanshah has only 2.5% of the national population, it has about 11% of all HIV-identified persons in Iran with an increasing trend. Currently, 90–110 new HIV/AIDS cases are identified in the province each year.[7]

The importance of preventive programs in the world has been emphasized since the outbreak of AIDS. Voluntary counseling and testing (VCT) became first available in 1995 as an important step and has served as an important tool in the prevention and spread of HIV infection ever since.[8,9] VCT is a dialog between counselor and client to offer information about HIV/AIDS testing, benefits, and risks associated with the disease. This approach aims to provide information about the means of transmission, prevention, treatment, and care of HIV/AIDS and assesses the risk of HIV infection in affected individuals.[8] VCT is a cost-effective means of controlling and preventing HIV/AIDS and encourages people to adopt safe sexual life and healthy injections as well as makes people at high-risk aware of the HIV/AIDS status. Therefore, it helps to break the transmission chain of the HIV infection.[9] These facts necessitate the implementation of educational programs to promote VCT, especially among high-risk individuals.[10-13]

Conversely, designing and developing effective educational programs require proper understanding of the underlying causes and the related influential factors.[14-18] Many factors contribute to decision-making and persuade people toward VCT in an effort to prevent the disease. The important factors include attitude, subjective norms, self-efficacy, environmental constraints, and other necessary skills. The above factors form model structures, better known as "integrative model of behavioral prediction (IMBP)."[10-13,19] The goal of many researchers is to understand which behaviors are related to the person's intention, which helps develop communication to influence their health behaviors.[20]

Due to lack of studies in developing countries, our IMBP-based study aimed to explore cognitive factors related to the use of VCT in a sample of adults in western Iran with high-risk behaviors.

Materials and Methods

Participants and procedure
This cross-sectional study was conducted in 2018 on a sample of Iranian men and women in Kermanshah who had a history of high-risk sexual behaviors, such as drug abuse and/or unprotected sex. The sample size of 300 men and women was estimated based on a pilot study. Data were collected between April and July 2018. Of this population, 285 (95%) signed the consent form and voluntarily agreed to participate in the study. This study was approved by the Institutional Review Board of KUMS, in Kermanshah, Iran (Registration#: KUMS. REC.1395.615).

The sampling method employed a gatekeeper with prior experience in working with high-risk people at various health and medical counseling centers. Meetings with individuals were held to complete a questionnaire at a face-to-face interview. At further stages, snowball method was used to recruit individuals with high-risk behaviors.

Study procedures
Measures
The questionnaire included three sections, consisting of 36 items: demographic factors (5), VCT use-related questionnaires (1), and IMBP-related questionnaires (30).
- Demographic questions investigated such information as age, gender, economic and marital status, and education level
- VCT use-related questionnaires assessed whether or not the participants ever had a history of VCT counseling with a yes or no response option
- IMBP-related questionnaires included 30 items divided into six major domains.[10-13] To test the questionnaire's reliability, a pilot study was conducted on 30 women and men with a similar status to estimate the study duration. An expert panel was consulted on questions, validity, design, and contents.

Five items were designed to measure attitude toward the use of VCT (e.g., the use of VCT is useful for the prevention of HIV/AIDS). Six items were designed to measure subjective norms encourage to use VCT (e.g., those people who are important to me would want me to use VCT). Seven items were designed to measure self-efficacy toward the use of VCT (e.g., "I could use VCT very easily, if I want."). Four items were designed to measure environmental constraints, encouraging the use of VCT (e.g., "I'm sure consultants and experts in voluntary counseling and AIDS testing centers are reliable and keep secret.") and four items were designed to measure skills toward the use of VCT (e.g., "I have enough skills for identification centers for voluntary

counseling and HIV testing."). Furthermore, the intention toward the use of VCT (e.g., "I intend to use of VCT in the next 6 months.") measured by four items.

The estimated reliability levels of the questionnaire's IMBP constructs, using alpha Cronbach's coefficient, were as follows: attitude (α = 0.81), subjective norms (α = 0.86), self-efficacy (α = 0.87), environmental constraints (α = 0.74), and skills (α = 0.82).

Statistical analysis

The data were analyzed, using SPSS software for Windows version 21, (SPSS Inc, Chicago, Ill, USA). The associations between background variables with VCT were measured by Chi-square and *t*-tests. Bivariate correlation analyses were performed to determine the magnitude and direction of the associations among the IMBP constructs. Stepwise multiple logistic regression analysis was performed to analyze the variation in the VCT relevant to IMBP. The behavior of VCT use was considered as the dependent variable, and the IMBP constructs were introduced in the model as independent variables. In the further approach, the intention was considered as dependent variable, and all IBMP constructs were regarded as independent.

Results

The mean age of participants was 24.29 years (standard deviation: 4.39), ranging from 18 to 35 years. Almost three-quarters of the participants were women, one-third of them being married. Only 5.6% of the respondents reported their socioeconomic status as being very good. Surprisingly, almost half of the participants had academic education. Furthermore, 73.3% of the participants had a history of VCT [Table 1].

To understand the relationship between the VCT use and demographic variables, a series of Chi-square and *t*-tests were performed. As seen in Table 1, there was no significant relationship between age, sex, marital and economic status, education level, and VCT.

Table 2 shows bivariate correlations between the IMBP constructs (*P* = 0.01). The intention variable has a strong correlation with skill and environmental constraints. Self-efficacy has a strong correlation with attitude and subjective norms. As Table 2 indicates, there is a strong correlation between attitude and subjective norms.

As seen in Table 3, IMBP constructs were statistically significant for predicting VCT, which accounted for 85% of the variation in VCT intention (adjusted R^2 = 0.85, F = 801.067, and $P < 0.001$).

A backward stepwise model building procedure was conducted, and finally, at the 4th step, the procedure

Table 1: The relationship between demographic variables and voluntary counseling and testing use

Variables	VCT use, mean (SD)		*P*
	No, *n* (%)	Yes, *n* (%)	
Age	24.25 (4.26)	24.33 (4.45)	0.886*
Sex			
Women	56 (26.8)	153 (73.2)	0.936**
Men	20 (26.3)	56 (73.7)	
Marital status			
Single	51 (27)	138 (73)	0.873**
Married	24 (26.2)	68 (73.9)	
Economic status			
Weak	11 (35.5)	20 (64.5)	0.569**
Average	43 (24.3)	134 (75.7)	
Good	18 (29.5)	43 (70.5)	
Very good	4 (25)	12 (75)	
Education status			
Under diploma	12 (25)	36 (75)	0.791**
Diploma	31 (29)	76 (71)	
Academic	33 (25.4)	97 (74.6)	

*The independent sample *t*-test, **The Chi-square test. VCT=Voluntary counseling and testing, SD=Standard deviation

Table 2: Predictor variables of voluntary counseling and testing based on bivariate correlation analysis

IMBP constructs	X^1	X^2	X^3	X^4	X^5
X^1. Attitude	1				
X^2. Subjective norms	0.964**	1			
X^3. Self-efficacy	0.941**	0.971**	1		
X^4. Environmental constraints	0.437**	0.447**	0.433**	1	
X^5. Skill	0.476**	0.482**	0.470**	0.857**	1
X^6. Intention	0.480**	0.487**	0.479**	0.901**	0.947**

**Correlation significance at 0.01 level (two-tailed)

was stopped and the best model was selected among the IMBP constructs. The odds ratio for skills estimate was 9.635 (95% confidence interval [CI]: 3.255, 28.514) and that for environmental constraints was 6.274 (95% CI: 2.166, 18.171) [Table 4].

Discussion

Our findings indicated that 73.1% of the participants had at least one experience with VCT. This result is higher than those reported by other studies. For example, Omer and Haidar carried out a study on teachers of Harari Region in Ethiopia and indicated that more than half (53.7%) had never used VCT services.[10] In addition, Gu *et al*. stated that the prevalence of using lifetime and 12 month of VCT was 56.5% and 39.4%, respectively, among men who had sex with men in Hong Kong.[11] These results may be good news for health policymakers in western Iran because most of our participants at high-risk behaviors came from that region.

The main aim of this study was to determine the cognitive determinants related to VCT among Iranian

Table 3: Predictors of the integrative model of behavioral prediction constructs for voluntary counseling and testing intention

Model	Unstandardized coefficients, *B*	SE	Standardized coefficients, β	*t*	Significant
Final model - step 3					
Self-efficacy	0.077	0.022	0.089	3.477	0.001
Environmental constraints	0.961	0.028	0.879	34.160	0.001

SE=Standard error

Table 4: Logistic regression analysis for integrative model of behavioral prediction variables related to the use of voluntary counseling and testing

Variables	B	SE	Odds ratio	95% CI		P
				Lower	Upper	
Final model: Step 4						
Environmental constraints	1.836	0.543	6.274	2.166	18.171	0.001
Skills	2.265	0.554	9.635	3.255	28.514	<0.001

SE=Standard error, CI=Confidence interval

adults with HIV infection. Our findings indicate that the skills toward VCT and the environmental constraints encourage the victims toward VCT. The two main constructs of IMBP were associated with Iranian adults with AIDS who had risky behaviors. Regarding VCT, few studies have underlined the predictive role of cognitive determinants, such as attitude, skills, self-efficacy, and subjective norms about VCT.[10-13] For example, Omer and Haidar[10] indicated that attitude, subjective norms, and perceived behavior control correlated significantly with VCT and the behavioral effects of this service.

Furthermore, Robbins and Niederdeppe[21] have suggested that control of perceived behavior and attitude was the strongest predictor of healthy sleep habits among students. Of course, the study was conducted among high-risk individuals, but the general population was investigated in other studies, for example, in the study of Omer and Haidar.[10] In Ethiopia, the target groups were teachers, so this difference may be the reason for the different outcomes. Differences in research tools may also account for the obtained differences in the outcomes. In an interventional study, behavioral attitudes, self-efficacy, and social subjective norms were the most significant reasons for the use of condom.[22] Therefore, sexual interaction was the basis for the positive prediction.

Consequently, the results confirm suggestions that the IMBP is a suitable theoretical basis for designing health promotion programs for the promotion of VCT among high-risk groups. Although the literature on the predictive power of IMBP in risky behaviors is abundant, a review of the literature revealed a small number of IMBP references in relation to VCT.[10-13] Furthermore, high-level skills were found to be good predictors of VCT among the study's participants. In a study among

Kenyan youths,[23] skills were strong predictors of behavioral changes toward the use of condom.[23]

Although effective VCT does not require special skills, some studies have shown that people's fear of the test results and the embarrassment of communicating their stories with counselors and health-care workers can affect the using or avoiding VCT.[22] A study by Fishbein and Ajzen found that skills and environmental factors played a major role in modifying intent behaviors.[20] The environmental constraint was another cognitive determinant that had an important role in VCT. A bivariate correlational analysis has shown that the environmental constraints were strongly related to the individual's intention toward VCT.[24] Access, transportation problems, and the cost also add to the environmental barriers of using VCT. In this regard, a study has suggested that environmental constraints should be considered. For example, Myers *et al*.[24] indicated that improvement of counseling methods' usefulness leads to improved VCT experience. In addition, the integration of VCT with other primary health-care services has been suggested.[25] These include rapid testing technologies, couple counseling, the use of mobile VCT facilities, and improved links between VCT and support programs for HIV victims.[25]

Study limitations
Our study has certain limitations. First, the information is based on self-reporting, which always faces the risk of recall bias, and we do not know how it could have affected the study. Second, data collection occurred in a sample of adults with a history of high-risk behaviors in western Iran, which may not be generalized to other Iranian populations or regions. Finally, the present study investigated VCT history, using a "yes/no" scale, which may be a major limitation of the study. Therefore, the results should be interpreted with caution.

Conclusions

There are multiple important factors for the prediction of the VCT effect among adults with high-risk behaviors. The present study cautiously confirms the applicability of the IMBP about VCT among adults with HIV/AIDS history in western Iran. We found some support for the use of IMBP to develop and implement field practice guidelines. Our findings indicated that health promotion

programs and planning can improve individuals' skills. We should also educate them about the environmental constraints regarding VCT.

Conflicts of interest

There are no conflicts of interest.

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