

Development and Psychometric Evaluation of a Reproductive Health Assessment Scale for HIV-Positive Women

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Abstract

Background: Promoting the reproductive health of women with HIV is very important.

Objectives: The aim of this study was to design a reproductive health assessment scale for this vulnerable group and determine its psychometric properties.

Patients and Methods: This study adopted an exploratory mixed-methods design and included three phases. In the first qualitative phase, a sample of 25 HIV-positive women participated in semi-structured interviews and a focus group discussion. In the second part, item pools were generated. In the last phase, face validity, content validity, and construct validity were assessed using exploratory factor analysis. Internal consistency and test-retest methods were used to estimate the reliability of the scale.

Results: Forty-eight items were included in the psychometric evaluation stage of the scale. Based on the assessment of the content validity ratio (CVR), content validity index (CVI), and exploratory factor analysis, 12 items were omitted, leaving 36 items in the final scale. The exploratory factor analysis revealed six factors: disease-related concerns, life instability, coping with the illness, disclosure status, responsible sexual behaviors, and the need for self-management support. The reliability according to Cronbach's alpha was 0.713, and the external reliability, as evaluated by the test-retest method and the intraclass correlation, was 0.952.

Conclusions: The proposed tool, which consists of six factors and 36 items, is a reliable and valid scale for assessing the reproductive health of HIV-positive women. The findings of these measurements will be helpful when identifying and planning for improved health outcomes of this group of patients.

Keywords: Psychometric, Reproductive Health, HIV-Positive Women, Exploratory Mixed Methods

1. Background

The human immunodeficiency virus (HIV) was identified over three decades ago. HIV infection is a major public health problem worldwide including developed and developing countries. The number of people with HIV in Iran has risen to about 74,000 (51-110,000), 19,000 (12-32,000) of them are women aged 15 and up, a warning over the increase in the number of HIV-infected infants (1). Most infected women and men are of reproductive age (2). People living with HIV, in common with those without HIV, have the right to become pregnant and have sexual satisfaction and sexual relations (3). However, they have trouble about striking a balance between own fertility desires and need to protect themselves and their sexual partners from re-infection and also give birth to a child without HIV (4). For many, being a parent is rewarding experience, but they also feel a commitment to family and community (5). Unpro-

tested sexual relations with women with HIV increases the risk of unwanted pregnancies (6). Indeed, combining preventive interventions and strategies with culture, which shapes individual sexual behaviors leads to greater success (7).

Given the increase in the number of HIV-positive women, along with extended life expectancies due to the use of antiretroviral therapy, there is a need to increase this group of patients' knowledge on reproductive and sexual health and, also, making reasonable decisions (8). Addressing the sexual and reproductive health needs of infected women can help them to gain self-confidence in having control over own sexual life that leads to improved participation in public health through reduction in maternal and neonatal morbidity and mortality (9). Global interest is focused on the reproductive health needs of HIV-infected women, and identifying interventions that can meet these

needs seems essential. Despite resource constraints and limitations, as well as an increasing demand for health services, priority should be given to effective interventions (10). Given the importance of the sexual and reproductive health of HIV-positive women, the influence of socio-cultural conditions on it, lack of standardized scale to evaluate the reproductive health of women with HIV in the context of the Iranian culture.

2. Objectives

The present survey aimed to determine the reproductive health components and to design a valid and reliable scale for the assessment of these in HIV-infected women.

3. Patients and Methods

This study adopted a sequential exploratory mixed-methods design, including three qualitative and quantitative phases.

3.1. First Phase

In the first phase, a qualitative approach was applied to determine the components of sexual and reproductive health.

3.1.1. Participants

The participants took part in individual semi-structured interviews and focus group discussions until saturation was achieved. The study consisted of 25 HIV-positive women referred to the high-risk behavioral counseling center of Tehran Emam Khomeini hospital. All the participants were of reproductive age (15 - 49). They were all sexually active, had no fertility problems, and did not have a diagnosis of advanced-stage disease. In addition, none of the participants were taking drugs. The qualitative data collection was carried out from November 2013 to March 2014. The conventional five-stage content analysis method of Graneheim and Landman was used to analyze the data (11). MAXQDA 10 was used for retrieving encoded data.

For trustworthiness participants with different experiences were selected by combining several convenient collection methods, interview, focus group discussions, evaluated by participants and reviewed by the researchers. The interviews were conducted by the researcher and encoded by the first and second supervisors. For transferability of the information, summarization and categorization process of meaning units and, also, method for creation of themes were explained. Then, the writers tried to pave the way for many other researchers to follow the study by

recording a detailed report on the implementation of the research and decisions made.

3.2. Second Phase

Inductive and deductive approaches were applied to develop the study instrument. Based on the results of the first phase, the codes were converted into items (inductive). The most appropriate items were then selected from the existing literature (deductive). An item pool was generated for the reproductive health scale for HIV-positive women. The scale was retested during meetings with the research team, and overlapping and similar items were omitted or merged.

3.3. Third Phase

The third phase involved a psychometric analysis of the tool. Given the classic theory, the face validity, content validity, construction validity, and reliability of the designed questionnaire were measured to determine its psychometric properties.

3.4. Face Validity

The tool was distributed to 10 HIV-infected women referred to the behavioral counseling center of Tehran Emam Khomeini hospital to determine the quality of its face validity. The respondents completed the questionnaire in the presence of the researcher. They were also asked to identify any difficulties with interpretations of the words and questions (understanding phrases, expressions, and words). After revision of the tool based on the comments of the respondents, the qualitative method of item impact was used to reduce the number of items, deleting inappropriate phrases and determining the importance of each phrase. Finally, the participants scored the items using a Likert 5-point scale, from "not at all important" to "extremely important." The impact scores of the items were then calculated, and the items with an impact score of ≥ 1.5 were included in the subsequent analysis (12).

3.5. Content Validity

Both qualitative and quantitative methods were employed to determine the content validity of the survey. The qualitative analysis was based on expert suggestions. A professor of Persian language and literature was requested to assess the grammar and writing style of the inventory. In the panel of experts report the wording of same items were changed. In the quantitative analysis, the inventory was given to those 10 experts for their opinion to test the content validity of it and rate each item as: 1) essential 2) useful but not necessary, and 3) not necessary.

The content validity of each item was calculated; in Lawshe table an acceptable content validity ratio (CVR) value for 10 experts is 0.62. The content validity index (CVI) was then used to ensure that the items were properly designed. Thus, three criteria of simplicity, specificity, and clarity had been considered in a Likert 4-point scale for every item and asked 10 experts to evaluate them (13).

The method of Waltz and Bausell was used to determine the CVI, where an item with a CVI of > 0.79 is appropriate, one with a CVI between 0.70 and 0.79 should be modified, and one with a CVI of < 0.70 is unacceptable and should be omitted (14).

3.6. Construct Validity

The construct validity in the present study was determined by using exploratory factor analysis. Before extracting the impact factors, the Kaiser-Mayer-Olkin (KMO) index and Bartlett's test of sphericity were used to ensure adequate sampling (15). An acceptable minimum KMO value was considered 0.6 (16). Bartlett's test of sphericity was used to test the hypothesis that the correlation among the variables was not zero. In this research, an eigenvalue greater than 1 and a Scree plot were used to calculate the number of items in the questionnaire on the reproductive health of HIV-infected women. A Varimax rotation (a type of orthogonal rotation) was employed to simplify and clarify the factor structures. A load factor greater than 0.3 was considered acceptable.

3.7. Reliability

Cronbach's alpha was used to assess the reliability of the scale. The stability of the instrument was determined by the test-retest procedure (2-week interval). Cronbach's alpha is most commonly used to measure the internal consistency of a scale (17). An alpha value between 0.8 and 0.9 indicates high internal consistency, and an alpha value greater than 0.70 suggests desired internal consistency (18, 19). The measure of external stability used in this study was the test-retest reliability test, where the test-retest correlation ranged from zero to 1. In the present study, a correlation of more than 0.7 was considered good stability, and values of 0.5 - 0.75 and 0.5 indicated average and poor stability, respectively (20).

3.8. Participants in the Psychometric Assessment

The inclusion criteria for the quantitative and qualitative parts of the study were similar. Women who were referred to the high-risk behavioral counseling center of Tehran Emam Khomeini hospital, Iran participated in this study. The characteristics of the study participants are shown in Table 1. The self-reporting method was used to

complete the questionnaire, and the sampling method was convenience sampling. The sample size was determined based on the tool's items. There were five samples for each item (21). At this stage, the questionnaire was distributed to 200 HIV-infected women. The completed questionnaires were analyzed using SPSS/16.

Table 1. Demographic Characteristics of the Study Sample (Phase 2, n = 200)

Variable	Frequency
Women's age, y	33/39 \pm 8/002
Occupational status	
Housewife	131 (65/5)
Unemployed	26 (13)
Self-employed	25 (12/5)
Worker	7 (3/5)
Employed	11 (5/5)
Education	
Primary	30 (15)
High school and diploma	145 (72/5)
Graduate	25 (12/5)
Marital status	
Single	29 (14/5)
Married	137 (68/5)
Divorced	15 (7/5)
Widow	19 (9/5)
Number of children	
0	58 (29)
1	73 (36/5)
2	53 (26/5)
3	12 (6)
≤ 4	4 (2)

4. Results

The themes, categories, and subcategories extracted from the qualitative phase are listed in Table 2. The results from the interviews with the participants were used to define their reproductive Health. This definition was derived based on the qualitative part of the research as follows:

Trying to cope with parenting worries, psychological concerns, social issues, health problems, and sexual relations associated with responsible behavior.

In the next stage, 132 items were extracted from the qualitative interviews based on the concept of reproductive health from the HIV-positive women's viewpoints and

Table 2. Theme, Categories, and Subcategories Extracted in the First Phase

Theme	Category	Subcategory
Parental concerns	Unwilling to become pregnant	Uncertainty about the future
		Unpleasant experience of previous pregnancies
	Willing to get pregnant	Motherhood ensuring life stability
Social problems	Society responsibility toward AIDS	Stigma
		Disease disclosure
		Discrimination
	Health systems responsibility to AIDS	Access to health services
Physiological problems	Consequences of the disease	Lack of HIV knowledge and premarriage and prepregnancy HIV screening
		Physical complications
		Antiretroviral therapy complications
Psychological concerns	Psychological status	Psychological reaction to the diagnosis
	Life instability	Hatred of spouse
		Feel compelled to live
		Spousal violence
		Distrust spouse for diagnosis of AIDS
Sexual relations	Sex frequency	Frequency of sexual relations
		Sexual activity compared to prediagnosis
	Physical ability to have sexual intercourse	Sexual ability
		Belief in disease impact on sexual performance
	Sex quality	Psychological harassment after sex
		Sexual satisfaction
		Need for sexual counseling
	Attitudes toward sex	Negative thoughts about sexual encounters
Responsible behavior	Responsible sexual behavior	Positive thoughts about sexual encounters
		Multiple sexual relations
		Infection disclosure to partner
		Disagree with sexual relations with uninfected partners
		Using condom
Try to cope with the diagnosis	Living with AIDS	Obtain guidance on prophylactic measures
		Live a normal life
		Under-rating AIDS complications compared to other diseases
	Spiritual relations with God	Working hard to extend their life expectancy
		Having spirituality
	Need for support	Spousal support
		Family support
		Peer support
		Health workers' support

quotes from the interviews. At this stage, the themes in the qualitative data were converted into dimensions. Thus, the categories and respondents' quotes were extended to subdimensions and questionnaire items, respectively. The items were completed using the inductive approach.

A review of websites and databases was conducted to find studies conducted between 1990 and 2014 to find appropriate instruments. Additional items were then adopted from these studies, resulting in a pool of 140 items. Reviewing the statements and questions by the research team members during four sessions, the number was reduced to 48 based on the definition derived from the qualitative study, review of the literature, and similar items. Finally, a psychometric test was developed.

4.1. Statistical Analysis

4.1.1. Face Validity

In measuring the qualitative face validity, some modifications were made to the initial draft of the questionnaire based on the respondents' answers. For example, the item "I am informed about the side effects of multiple abortions" was modified to "I am informed about the side effects of consecutive abortions." The item impact score in the qualitative part was 1.8 - 4.7. None of the items were removed due to an impact score of > 1.5 . Thus, a total of 48 items were included.

4.1.2. Content Validity

For the quantitative analysis, the tool was given to 10 experts, and after calculating the reliability index formula based on the experts' comments and Lawshe's table, an acceptable CVR value for 10 experts is 0.62, four items from "parental worries," one from psychological concerns, and two from "social issues" were omitted, and the rest remained unchanged.

Finally, the experts determined the CVI of the 41-question tool. Based on Waltz and Bausell's index, where a CVI of > 0.79 is considered acceptable, two items on "responsible behavior" were removed. One of the questions with a score of 0.7 was considered questionable but remained unchanged. The construct validity of this 39-question inventory was then tested.

4.1.3. Construct Validity

The KMO value of all the variables was 0.752, and the P value for Bartlett's test of sphericity was $P < 0.000$. In the study, 56% of the participants were aged 31 - 35 years, 65.5% were housewives, 30.5% had a middle-school level education, 72% had a HIV-infected partner, 29% were childless, 68.5% were married, 5% were addicted, and 28% reported having had multiple sexual partners.

For determination of the number of factors, the criterion of survey Scree plot and eigenvalue were used. Six factors with an eigenvalue of > 1 accounted for 47% of the variance. The first factor "disease-related concerns" represented 14.172% of the variance, and the second factor "life instability" accounted for 10.08% of the variance. The third and fourth factors (coping with AIDS and disease disclosure, respectively) represented 6.714% and 5.937% of the variance, respectively. The fifth factor "responsible behavior" accounted for 5.26% of the variance, and the sixth factor "need support for self-care" represented 4.98% of the variance.

4.1.4. Reliability

The internal consistency of the questionnaire was determined using Cronbach's alpha in a sample of 200 HIV-infected women. The total coefficient was 0.713 based on the validity of the tool and omitting three questions. The questionnaire's stability, test-retest reliability was conducted, so that 20 infected participants filled the final questionnaire two times with an interval of 2 weeks. The intraclass correlation coefficients for all the items and the dimensions of the questionnaire were 0.952 and 0.914 - 0.981, respectively.

5. Discussion

The results of the literature review revealed that most surveys used researcher-constructed tools, with nonstandard validity and reliability. In a survey of reproductive health-related sexual behaviors of HIV-positive individuals in Nairobi, the authors used an instrument they designed, together with other methods, including the family health international questionnaire, Behavioral surveillance survey, which is a behavioral survey of population at risk of HIV, demographic and health survey, and patient medication Adherence questionnaire, which assesses self-reported adherence in HIV-infected patients. This researcher made measure consisted of five parts: participants' demographic characteristics, clinical and medical information, including the treatment received and treatment adherence, sexual behaviors of HIV-infected individuals, fertility desires, use of contraceptive methods, and social factors. The latter part consisted of 10 questions intended to measure patients' knowledge of AIDS, 6 questions investigating attitudes toward treatment and social support, 15 questions on stigma surrounding the disease, and 10 questions on mental health problems, including depression, giving a total of 157 questions. However, answering so many questions can be tedious (22). Furthermore, the instrument used in that study was not based on appropriate tool design principles, and the questionnaire

Table 3. Factors Extracted from the Factor Analysis (Varimax Rotation)^a

	Items	Load factor					
		1	2	3	4	5	6
1	People staring make me nervous.	0.875					
2	I feel shy discussing my disease with my children.	0.795					
3	Given my disease, having a baby is wrong.	0.803					
4	I feel worry and anxiety.	0.755					
5	I suffer from recurrent genital ulcers and infections.	0.749					
6	I have access to contraceptive methods.	0.710					
7	AIDS makes me feel like a failure in life.	0.609					
8	It is difficult to me to go to behavioral health counseling services.	0.553					
9	I feel sad and cry for no reason	0.515					
10	I feel I am forced to live with my spouse/sexual partner.		0.751				
11	I have no desire to have sex with my husband/partner.		0.742				
12	I can't trust my husband/partner.		0.645				
13	I hate my married life.		0.643				
14	I've lost the ability to work.		0.574				
15	My husband/partner doesn't treat me well.		0.571				
16	My husband/partner is unwilling to have sex with me.		0.527				
17	Physically, I feel very weak.		0.415				
18	I believe I can overcome difficulties on my own.		-0.398				
19	I think AIDS is more tolerable than other diseases, such as cancer.			0.700			
20	I work hard to forget all about my illness.			0.655			
21	I live a normal life.			0.628			
22	This illness makes me feel closer to God.			0.649			
23	My husband/partner supports me emotionally.			0.523			
24	I am satisfied with my sex life.			0.331			
25	I am nervous about disclosing my status to my family				0.714		
26	I don't inform other doctors/health care providers about my diagnosis.				0.669		
27	I go to a counseling center outside my coverage area to prevent disclosure of my status.				0.592		
28	I feel calm when I communicate with other HIV-positive individuals.				-0.387		
29	I will attend a behavioral health counseling services in the event of an unwanted pregnancy to have an abortion.				0.303		
30	If a condom breaks during intercourse, I will go to a behavioral health counseling center.					0.783	
31	I use a condom when having sex of any kind (oral or anal)					0.676	
32	Before sex, I informed my husband/partner about my HIV status.					0.616	
33	I use a condom, in combination with other methods.					0.421	
34	I will inform the behavioral health counseling center if I plan on getting pregnant.					0.286	
35	I get a pap smear test every year.						0.574
36	I encourage my partner to use a condom.						0.536
37	In the case of unprotected sex, I will use emergency contraceptives (taking two pills up to 120 h).						0.506
38	I have my doctor's support						0.497
39	I have my family's support						0.301

^a After extracting the factors, three items, which had load factors of <0.3, were omitted.

on HIV-infected women's reproductive health was not validated.

Two studies in Iran have focused on the development of reproductive health tools for HIV-positive individuals. One of these studies developed a reproductive health assessment instrument for HIV-infected men based on the health belief model in which the study population was HIV-positive men who used only a condom during sex (23). The other study designed a psychometric tool to assess sexual protective behaviors of women at risk of HIV/AIDS (24). That study focused on condom use, and the participants were women who did not recognize HIV situations.

The increased incidence of AIDS among women and the risk of transmission of the virus via sexual intercourse increase the risk of HIV infection in infants born to infected mothers. Women with HIV are a vulnerable group in society that sometimes leads to risky sexual behaviors and pregnancies. Given the aforementioned, we considered it necessary to design a reproductive health assessment questionnaire for HIV-positive women that was consistent with their culture and based on their experiences of reproductive health to identify the most important issues they face. So we tried the tool have high content validity, along with an appropriate number of questions, that not be lengthy and boring for the respondents to answer. The statements were modified according to feedback from experts during the different stages. As a result, the final tool consisted of items that were understandable by and acceptable to the infected women. The tool has a number of advantages. First, it is a short (but comprehensive) questionnaire, which can be applied to all female patients, irrespective of their marital status, race, and economic or social status. Second, it shows good reliability and validity. The content validity of the instrument was determined by 10 experts, who were familiar with the tool, and the CVR and CVI. A 5-point Likert scale was used in this study (from strongly agree to strongly disagree). One of the options was "neutral" (no idea). The analysis of the Likert scale is usually done by descriptive statistics, including correlation coefficients, content analysis, and an ANOVA, or by inferential statistics (25). After validation of the content, the final questionnaire, which contained 39 items, was distributed to 200 HIV-positive female participants. After performing an exploratory factor analysis, three more questions were omitted. Thus, the final number of items in the instrument was 36. The findings indicated that six factors explained the questionnaire's factor structure: disease-related concerns (8 items), life instability (8 items), coping with the diagnosis (7 items), disease disclosure (3 items), responsible behavior (4 items), and support needs for self-care.

After determining the validity of the tool, its reliability

was analyzed using internal consistency and test-retest methods. The Cronbach's alpha coefficient and intraclass correlation coefficient for all the items were satisfactory: 0.73 and 0.952, respectively. Thus, the female HIV-positive reproductive health is a questionnaire consisted of 36 questions and designed using qualitative methods with good reliability and validity. The first part of the tool consisted of 17 questions about patients' demographic characteristics.

5.1. Conclusion

Improving the sexual and reproductive health of HIV-positive women could lead to a reduction in the incidence rate and transmission risk of AIDS requires identifying its specific criteria. Therefore, it is necessary to develop an assessment instrument for assessing the sexual and reproductive health of women living with HIV. Given the lack of information on the reproductive health status of this group of people, along with much of inconsistency between culture society and items studies in these kinds of inventories, the present tool was adjusted to be consistent with Iranian culture was developed to evaluate the current reproductive health status of HIV-positive women living in Iran. This valid and reliable tool was developed which is usable in risk behaviors consulting services, all health centers and, also, studies on HIV-infected women.

5.2. Ethical Considerations

Approval of the ethics committee was received from Tehran University of Medical Science on 2 February 2014 (No: 92/2639/130/d). All the participants were informed about the purposes and methods of this study. All the participants who agreed to participate in the study signed informed consent letters. They were assured about the anonymity and confidentiality of the data they provided. All the participants were advised that they were free to participate in or withdraw from the study. No time limit was imposed to complete each questionnaire, and completion took approximately 15 min.

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Footnotes

Authors' Contribution: Sara Esmaelzadeh-Saeieh designed and performed all phases of the study. Zahra Behboodi-Moghadam supervised the implementation of

all phases of the study. Abbas Ebadi was consulted about the design of the psychometric questionnaire. Alireza Nikbakht-Nasrabadi was consulted about the qualitative phase of the study. Minoo Mohraz was consulted about the reproductive health of women with HIV and the sampling.

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