

***ADDIS ABABA UNIVERSITY FACULTY OF  
MEDICINE***

***DEPARTMENT OF COMMUNITY HEALTH***

***Developing a Scale for Measuring perceived  
barriers to behavioral change towards  
HIV/AIDS prevention***

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# LIST OF ABBREVIATIONS

ABC- Abstinence, being faithful and condom use  
AIDS- Acquired immunodeficiency syndrome  
ARRM- AIDS Risk Reduction model  
BCC- Behavioral Change Communication  
BSc- Bachelor of Science  
CSA- Central Statistical Authority  
EPHA- Ethiopian Public Health Association  
FHI- Family Health International  
HAPCO- HIV/AIDS prevention & control office  
HBM- Health Belief Model  
HIV- Human Immunodeficiency virus  
IEC- Information, Education & Communication  
KMO- Kaiser-Meyer-Olkin  
KR-20- Kuder-Richardson -20  
MOH- Ministry of Health  
MPH- Master of Public Health  
PBBC- Perceived Barriers to behavioral change  
PCA- Principal Component Analysis  
PFA- Principal Factor Analysis  
PLWHA- People Living with HIV/AIDS  
PPS- Probability Proportional to Size  
Q-Q plot- Quantile-by-Quantile plot  
SPSS- Statistical package for Social sciences  
TRA- Theory of Reasoned Action  
UNAIDS- United Nations AIDS  
VCT- Voluntary HIV/AIDS counseling and testing  
WHO- World Health Organization

## **ABSTRACT**

Despite the extensive interventions, there hasn't been a corresponding decline in the rate of Sero-prevalence of HIV/AIDS. Why could this be the case? In contrary to the increased knowledge, there appears to be little change in behavior. What is then the challenge in connecting knowledge to actual behavior change? These challenges haven't been identified and measured in local contexts.

The objective of this study was to develop a scale for measuring perceived barriers to behavioral change towards HIV/AIDS prevention. More specifically, to identify & describe perceived barriers to behavioral change; to construct a scale for measuring perceived barriers to behavioral change; to evaluate the reliability and validity of the scale, and to determine the relative importance of the barriers.

A cross-sectional study with qualitative & quantitative phases was conducted at Debu University on regular students. The qualitative part, comprising of in-depth interview and free listing, is designed to identify the major perceived barriers to behavioral change. A preliminary likert-type scale of items, after pilot test and expert review, was administered to 480 students, selected using stratified random sampling technique, for rating.

Item analysis criteria selected 28 of the 55 items for factor analysis. Principal component analysis yielded 5 components explaining 63% of the variance after deletion of two other items. The total scale has 0.845 reliability and 0.642 validity. The components were found to measure a single construct. This resulted in a 26-item PBBC instrument. The enjoyment component was found to have higher weight in regression and the risk components have higher relative importance in summated scores.

In conclusion, the instrument developed has acceptable reliability and validity. Further refining, revising and optimizing of the instrument were recommended.



## **1. INTRODUCTION**

HIV/AIDS has become an international and national concern in the past two decades. Currently, there are 40.3 million people living with the virus worldwide. Half of these are women & more than half live in sub-Saharan Africa. Young people accounted for half of new infections worldwide in 2005 (UNAIDS, 2005). Recent estimates in Ethiopia suggest that there are about 1.5 million peoples living with the virus. The majority of new infections occur among young people 15-24 years of age (MOH, 2004).

To date, different programs strategies and approaches of intervention have been implemented, most of them being on Information, Education and Communication (IEC). Despite all these efforts, there is no corresponding decline in the rate of sero-prevalence of HIV/AIDS (FHI, 2003). In contrast to the increased awareness & knowledge on HIV/AIDS, there appears to be little change in behavior (CSA, 2001). The central challenge remains to link peoples' knowledge with the actual behavioral change towards HIV/AIDS prevention.

Several discrete studies have been carried out both in the medical and social aspects of HIV/AIDS in Ethiopia (EPHA, 2005). Most of these studies assessed whether what is known about HIV/AIDS is known by the community. However, a few studies indicated why people don't use condoms and VCT services (Lemma, 2000). Some other studies also incriminated basic underlying social variables such as socioeconomic and socio-cultural factors as main determinants of behavioral change. Among these factors poverty was considered as leading in sub-Saharan Africa (UNAIDS, 2004).

But how are these determinants expressed in the community? It is clearly by indulging in risky sexual behaviors and attaching a certain belief to the immoral act. The beliefs usually emphasize on the negative aspects of the positive behavior or on the positive aspects of the risk behavior or both. The internal lack of commitment to change behavior within an individual reflected as belief on the behavior constitutes individual perceived barriers to behavioral change (PBBC). These perceptions influence attitude & subjective norms in the community in different ways. Attitude and norm in turn influence intention to change behavior which is the best predictor of behavioral change (Janz & Becker, 1984).

Knowledge of perceived barriers to behavioral change is relevant to design effective behavioral interventions. In order to get a wider insight in to perceived barriers to behavioral change, one has to identify what these barriers are and which ones are more important in a defined community. This needs a careful consideration of the background of the population to be assessed and the utilization of standard instrument, which could be applicable under local contexts. However, such a standard instrument to measure these perceived barriers hasn't yet been developed in local context (Befkadu, 2004).

Therefore, the envisaged study was designed to examine how a method, with a scale for assessment, contributes to the understanding and measurement of barriers to behavioral change towards HIV/AIDS prevention. It was expected to address critical issues with regard to behavioral change by identifying the barriers & designing a scale for measuring them.

## **2. LITERATURE REVIEW**

### **BEHAVIORAL CHANGE MODELS**

How does behavior change occur? This question probably has as many answers as there are diverse populations and cultures. Every HIV prevention program, however, is based on theories about why people change their behaviors. These underlying principles may not be formally recognized as theories, but they focus HIV prevention efforts on the elements believed to be essential for individuals to enact and sustain behavior change (FHI, 2002).

**Health Belief Model (HBM):** HBM suggests that individuals weigh the potential benefits of the recommended response against the psychological, physical, and financial costs of the action when deciding to act. It is grounded on six key variables: perceived threat, perceived severity, perceived benefits, perceived barrier, cues to action and self-efficacy (Rosenstock, Stretcher and Becker, 1994). In review of all HBM studies, Perceived barriers are identified as the most influential variable for predicting and explaining health-related behaviors (Janz and Becker, 1984). However, this model has been criticized for not taking in to account external factors that could possibly affect behavioral change.

**AIDS Risk Reduction Model (ARRM):** ARRM provides a framework for explaining and predicting the behavior change efforts of individuals, specifically in relation to HIV/AIDS. It incorporates several variables from other behavior change theories, as well as the hypothesized factors that influence the successful completion of each stage

(Catania, Kegeles and Coates, 1990). A general limitation of this model is its focus on individual (McGrath et al., 1993).

**Stages of change model:** This model assumes six stages of behavioral change: Precontemplation, contemplation, preparation, action, maintenance & termination. These stages are considered to be components of the cyclical process that varies for each individual (Prochaska, 1994). A major limitation of this model is that it focuses on individual without the role that structural & environmental issues may have on person's ability to enact behavioral change (Posner & Higuera, 1995).

**Theory of Reasoned Action (TRA):** The TRA is based on the premise that humans are rational and that the behaviors being explored are under volitional control, the theory provides a construct that links individual beliefs, attitudes, intentions, and behavior (Fishbein, Middlestadt and Hitchcock, 1994). Some limitations of the TRA include the inability of the theory, due to its individualistic approach, to consider the role of environmental and structural issues and the linearity of the theory components (Kippax and Crawford, 1993).

#### **PERCEIVED BARRIERS TO BEHAVIORAL CHANGE (PBBC)**

Perceived barriers include all the potential negative consequences that may result from taking a particular health action, including physical, psychological and financial demands. It includes two major cognitive structures. The first are behavioral beliefs, which are combination of a person's belief regarding the outcomes of a defined behavior

and the person's evaluation of potential outcomes. The second are normative beliefs, which are combination of a person's belief regarding other people's views of a behavior and the person's willingness to conform to those views. These two structures shape person's intention to change behavior: Labeling, commitment & Enactment.

**Barriers to abstinence:** Abstinence is being perceived as an intervention impractical for youth (MOH, 2003). Exploratory behavior of the youth and mistrust are the leading social barriers to sexual abstinence. Increase in the time-period between puberty and marriage & in the length of the marriage process have favored cohabitation. Moreover, "pregnancy no more a deterrent", "Everyone is doing it" and "I am not a virgin any more, so who cares?" thinking make young people feel that it is pointless to stay abstinent (Darroch, Haas & Ranjit, 1995)

**Barriers to faithfulness:** Having multiple partners is becoming a usual practice. Young people feel that having multiple partners is a sign of "pride and superiority" (MOH, 2003). It is also perceived that faithfulness works only for "Religious" people. Separation due to jobs, provocative dressing, being disadvantaged and inability to decide at sexual situation are also claimed to be barriers to faithfulness (Telling the Truth Project, 2002)

**Barriers to condom use** Most young couples don't use condoms because they perceive that they have trust in each other and see no need to do so. Concern that condom use reduces the pleasure of sex, concern that condoms reduce emotional intimacy, concern that what partner will think if you suggest using condoms, concern about what friends will think if they knew you use condoms, concern about how to talk with your partner

about condom use, the belief that you have no need to use condoms, and concern that condoms have associated health risks are the common perceived barriers to condom use (Adegbona, 2001).

**Barriers to VCT:** Perceived psychosocial barriers to using VCT include fear of stigmatization and discrimination, being afraid of getting HIV positive results, fear of reaction of partner, fear of dying quickly if results are positive, perceived lack of care and support, doubt about confidentiality of test results and lack of Vaccine or cure for HIV. Among the physical barriers, unavailability and inaccessibility of VCT services are the major barriers for getting counseled and tested for HIV (Deodatus, 2003)

**Barriers to Positive attitude to PLWHA:** More detailed knowledge of other aspects of HIV/AIDS is incorrect or missing altogether in most people. This combines with fear of causal transmission & result in avoidance of PLWHA. People also recognize the role of limited knowledge in perpetuating stigma & limiting themselves from interacting with PLWHA. As HIV is associated with socially “improper” sex, PLWHA are stigmatized for their perceived immoral behavior. Religious beliefs contribute to stigma by considering HIV as punishment from God for sexual sins. Lastly, stigma persists because people don’t recognize words and actions as stigmatizing (Laura, etal, 2001)

## **MEASUREMENT OF PBBC**

Most psychological constructs are measured using one or more of the five measuring techniques: Self-report, observation, individual's reaction of partially structured stimuli, performance of objective task and psychological reaction to an object. Among these, observation and self-report are the most commonly used measuring techniques for most psychological constructs (Fishben M, 1994).

Many techniques of scale construction have been developed. These include Thurstone's equal appearing interval scale; likert summated rating scale, Gutman's scaleogram, lazarsfeld's latent structure analysis and Osgood's et al Semantic difference. Of these, only the first two have come in to wide use. These methods involve either scaled statements (Thurstone's) or scales responses (Likert) (Bowling & Greenland, 1998).

The adequacy of a measuring instrument is determined by its reliability and validity. Two fundamental questions should be asked when designing a measuring instrument. First, does the instrument measure a variable in a consistent way? And second, is the instrument a true measure of the variable? The first is an indication of reliability while the second addresses the issue of validity (Bowling & Greenland, 1998).

### **Item discrimination power and reliability**

Inter-item correlation is used to check homogeneity of a scale. Item-total correlation on the other hand is used to check both homogeneity and discrimination power of an item. Another method of testing the discrimination ability of an item is the comparison of

upper 25% and lower 25% of the item scores using t-tests. Higher t-values in this comparison indicate higher item discrimination power (Hopkins, 2002).

Reliability measures the degree of consistency between two measures of the same thing. *Test-retest reliability* measures stability of test overtime. *Alternate reliability* measures equivalence of parallel tests. *Internal consistency* measures stability of performance over items in a single test administered once (Hopkins, 2002).

### **Validity and scale validation**

**Validity** is an assessment of whether an instrument measures what it is supposed to measure. It should include at least standards of translation validity (Face validity and content validity), criterion-related validity (predictive, concurrent,) and construct validity (convergent and discriminant validities), (Franklin S, 1989).

**Translation validity** refers to the degree to which the construct is accurately translated into operationalization. It includes *face validity*, which asses whether a test “on its face” seems good and *content validity*, which evaluates whether a test addresses the content domain of the construct to be measured.

**Criterion-related validity** checks the performance of the operationalization against some criterion. It includes *predictive validity*, ability of a test to predict something it should theoretically predict, and *concurrent validity*, ability of a test to distinguish between groups that it should theoretically be able to distinguish between.



**Construct validity** refers to the degree to which inferences can legitimately be made from the operationalization “land of observation” to the constructs “land of theory”. It assesses whether a test reflects the construct, the whole construct and nothing but the construct. It includes convergent validity, the principle that measures of theoretically similar constructs should be highly inter-correlated and, discriminant validity, the principle that measures of theoretically different constructs shouldn’t correlate highly with each other.

A variety of methods are used to investigate construct validity of a test. These include correlation of a test with other measures, factor analysis, internal structure, experimental manipulation, generalizability studies, and the multitrait-multimethod matrix. Correlation with other measures and factor analysis are the most commonly used methods of scale validation (Nunnely, 1978).

### **Factor analysis**

Factor analysis is a multivariable method that has its aim in the explanation of relationships among several difficult to interpret, correlated variables in terms of few conceptually meaningful, relatively independent factors. There are several types of factor analysis, with the most common being principal component analysis (PCA) and principal factor analysis (PFA). PCA seeks a linear combination of variables such that the maximum variance is extracted from the variables, whereas PFA seeks the least number of factors which can account for the common variance of a set of variables (Gorsuch, 1983).

There are also many factor analytic data modes. These include R-mode, Q-mode, O-mode, T-mode, and S-mode. Criteria for determining the number of factors include Kaiser Criteria, Scree plot, explained variance, Joliffe criteria and comprehensibility.

Rotation serves to make factor analysis output more understandable and is usually necessary to facilitate interpretation of factors. The commonly used rotation methods are orthogonal and oblique rotation. Varimax, quartimax, and equimax rotations are orthogonal. Direct oblimin and promax rotations are oblique (Gorsuch, 1983).

### **3. OBJECTIVES**

#### **General Objective**

- To develop a scale for measuring perceived barriers to behavioral change (PBBC) towards HIV/AIDS prevention

#### **Specific Objectives**

- To identify perceived barriers to behavioral change towards HIV/AIDS prevention
- To construct a scale for measuring perceived barriers to behavioral change towards HIV/AIDS prevention
- To evaluate the reliability and validity of the scale
- To determine the relative importance of identified perceived barriers

## 4. METHODOLOGY

### STUDY AREA AND PERIOD

This study was conducted at **Debub University**, SNNPR, Ethiopia, between the months of August 2005 and May 2006. This University, located 275 to 360kms south of Addis Ababa, has nine faculties and over 40 departments. This University has over 10,000 students enrolled in the different departments and years of study.

### STUDY DESIGN

This formative study has primarily followed a **cross-sectional** study design. It had two related phases. Phase I employed **qualitative** methods in order to identify the perceived barriers and construct a scale for measuring PBBC towards HIV/AIDS prevention. Phase II used **quantitative** methods to evaluate the reliability & validity of the preliminary scale for measuring perceived barriers to behavioral change and determining the relative importance of perceived barriers to behavioral change.

### SOURCE AND STUDY POPULATION

The source population of the study was **regular** students of the Debub University in the Academic year 2005/06. The study population was selected regular students of the University.

### SAMPLE SIZE DETERMINATION

Sample size determination is done using sample size formula for estimating **Pearson's correlation** under the following assumptions

Type I error =0.05

Type II error =0.20

Effect size (ES) = 0.2 ( $d_r$  =0.1)

$$N = \frac{(Z_{\alpha/2} + Z_{\beta})^2}{d^2} + 3 \text{ (StatsDirect Limited, 2004)}$$

Using the above formulae, traditional method, sample size was **787**. Taking half of this using the modern method for initial validation of an instrument (Hopkins, 2004) the required sample size will be **394**. Considering 20% non-response rate, the required sample size for this study became **474**

### **SAMPLING PROCEDURE**

For the qualitative part sampling was generally **purposive** with maximum variation for participants and selection of rich sources of information, experts & students. For the quantitative part sampling technique was proportional allocation to size. The calculated sample size was proportionally allocated to each sex and then to each years of study. Then respondents were selected randomly from each year & classes/departments of study.

### **DATA COLLECTION PROCEDURES**

**INSTRUMENTS:** For the qualitative phase of the study, the in-depth interview, the guideline and Free listing survey format was used (Annex I). For the quantitative phase of the study, the preliminary scale (Annex IV) was used. Besides, the barrier items, this scale have included the alternative scale items for concurrent validity analysis.

**PERSONNEL:** The principal investigator collected the qualitative data through recordings and note taking in in-depth interviews, and distributing freelist formats to selected respondents. Responses from the qualitative data were carefully changed in to items, which were later subjected to expert review & pilot study.

For the collection of the quantitative data, four facilitators with first degrees were trained for two days. Those facilitators were responsible for briefing students about the purpose of the study; distributing and collecting questionnaires and checking the questionnaires for completeness.

**QUALITY CONTROL:** The recorded qualitative data was reviewed on daily basis to check for completeness. All the data were coded accordingly. The context of the barrier description/ items in a certain stage of the study was elaborated in the next stage. In the preparation of the preliminary scale, items were **randomly** ordered within the subscale to eliminate the *order effect*. About half of the items were **reversed** in order to minimize *response style*. Moreover, six-point **forced choice** likert-type scale was considered to minimize *central effect*. The main survey was localized to minimize *heterogeneity effect*.

In the main survey, the completed questionnaires were checked after collection for completeness and consistency. They were then classified as complete, partially complete and incomplete. Fully completed and completed with few missing values were coded. The responses were entered in to SPSS software. About 5% of the data was double entered to verify the accuracy of data entry (average inter-correlation=0.98). Data clean

up was performed by running frequencies in SPSS and filtering values for each variable in Microsoft Excel 2003 to check for accuracy, consistency and missed values.

Reversly coded items were recoded before doing any form of analysis. For variables having less than 5% missed values the *linear interpolation* imputation method was used to replace these values. Variance for individual respondents was determined for each subscale to avoid *extreme effect*. Twenty respondents who have variance more than 5 for at least two of the subscales were excluded from subsequent analysis.

## OPERATIONAL DEFINITIONS

**Behavior:** Action undertaken by individuals in response to decision towards HIV/AIDS prevention, comprising of a) sexual practice b) deciding number of sexual partner c) condom use d) VCT e) positive attitude towards PLWHA.

**Behavioral change:** An establishment and maintenance of safe sexual practice (abstaining from or being faithful to or using condom), having VCT and positive attitude to PLWHA.

**Perceived barriers: peoples' perceptions on** abstinence, faithfulness, condom use, VCT, and having positive attitude to PLWHA that might prevent them from practicing them.

**Scale:** a likert-type of format with a response set from the negative to positive continuum used to assess the degree of agreement of individuals to specific perceived barriers to behavioral change.

**Factor analysis:** a multivariable method that has its aim in the explanation of relationship among several difficult to interpret correlated variables in terms of few conceptually meaningful, relatively independent factors.

**Factors:** are dimensions (or latent variables) identified with clusters of highly correlated variables, as computed using factor analysis.

**Factor loadings:** the correlations between the factors emerging from factor analysis and the original variables used in the construction of the factors.

**Communality:** the squared multiple correlations for a variable using factors as predictors

**Eigenvalues:** the variance in all the variables that is accounted by a factor, computed as the sum of its squared factor loadings for all the variables.



## DESIGNING OF THE INSTRUMENT

### ITEM DEVELOPMENT

An **inductive approach** to item development was employed. **In-depth interviews** pertaining to PBBC were conducted with 10 staff members and 10 students of Debu University to make a pool of perceived barriers to behavioral change. Sex composition of those interview participants was 50%. The informants were selected purposively based on their closeness to the subject area being studied. Each in-depth interview was recorded and specific items on PBBC were pooled and transcribed.

**Free listing survey** was conducted on 60 purposively selected students of three campuses of the University: Awassa College of Agriculture, Debu University Main Campus, and Debu University College of Health Sciences. Concepts from those free listing surveys were captured and organized under five themes of perceived barriers to behavioral change: Abstinence, Being faithful, Condom use, VCT and Care and support for People Living with HIV/AIDS. A total of 91 items were identified from the free listing survey and the in-depth interviews.

With the incorporation of additional concepts from **literature review** and **parceling** of the resulting items, the initial item pool containing 60 items was developed. This initial item pool was forwarded to a *focus group* of eight students to evaluate its content, structure and language. In that item-by-item discussion six items were modified and no additional new item was added. With incorporation of their comments the initial item pool was rewritten.

**EXPERT REVIEW:** The rewritten item pool was prepared in a format for technical, psychometric and language review by twenty-five professionals from public health, clinical staff, behavioral sciences and language at Debub University. This review was arranged to verify whether the instrument reflects *the construct, the whole construct & nothing, but the construct*. (Annex- II).

Accordingly, 11 new items were added and the same number of items were discarded as a result of expert review. This review has also resulted in the modification and rewriting of 50% of the initial items. On the overall evaluation of the scale by experts, 84% rated ‘helpfulness of anchor points’ as very good, 54% rated ‘ease of use’ as very good, and 40% rated ‘appropriateness of language’ as very good. Only one respondent described appropriateness of language as poor. The item pool was revised based on the responses of these reviewers.

**PILOT TEST:** After revision, random ordering and reversing 50% of items a preliminary likert-type scale with spaces for unsolicited comments was prepared (Annex- III). This scale was administered to a pilot of 47 respondents not to be included in the main survey. Forty-four students have responded to all items. Five participants of the pilot study were asked to give their comments on the pilot instrument. This was targeted at assessing whether the respondents *understand* the items, understand items in the *same way* & understand them *as intended*. Accordingly, four items were modified and five items were discarded because of their low relevance and considerable difficulty.

Test of distribution of items from pilot test data indicated that **50%** of items were approximately normally distributed. Further analysis of pilot results yielded the following preliminary reliabilities (Table 1).

Table 1: Preliminary pretest reliabilities of PBBC instrument, at Debub University, 2005/2006

| <b>A priori subscales</b>  | <b>Reliability (alpha)</b> |
|----------------------------|----------------------------|
| Abstinence                 | 0.6133                     |
| Faithfulness               | 0.6058                     |
| Condom use                 | 0.5275                     |
| VCT                        | 0.4237                     |
| Care & support             | 0.5539                     |
| <b>Total scale (alpha)</b> | <b>0.7284</b>              |

A modified scale, which had 5 subscales and 60 items (including the five alternative scale questions), was prepared to be administered to the representative sample using a 6-point likert-type scale. Since some respondents might not have sexual partner, an instruction that asked respondents to imagine what they will perceive if they have was included. (Annex -IV).

## **ITEM ANALYSIS AND SELECTION**

For all items of each a priori subscale the mean, median, item-subscale correlation, item-scale correlation, median-mean difference, item-alternative scale correlation, and communality, and factor loadings were computed to identify items to be retained.

Distribution of item scores, determined by median-mean difference, skewness, kurtosis, normality plots and Q-Q plots, was used to identify non-normally distributed items. The acceptable values for all the above item analysis criteria were settled within the following limits (Table 2).

Table 2: Item selection criteria and their acceptable ranges at Debub University, 2005/2006

| S.N | Item analysis criteria        | Acceptable values    |
|-----|-------------------------------|----------------------|
| 1   | Mean values of items          | Between 2.5 & 4.5    |
| 2   | Item-subscale correlation     | Greater/equal to 0.2 |
| 3   | Item-scale correlation        | Greater/equal to 0.2 |
| 4   | /Median-Mean/                 | Less than 0.5        |
| 5   | Communality                   | Greater than 0.3     |
| 6   | Skewness & kurtosis/ their SE | Between -2 and +2    |

## RELIABILITY ANALYSIS

**Chronbach's alpha** was determined for each subscales and the whole scale, both in the preliminary and final instruments. Average item-total correlation was determined for components and the scale. Split-half reliability and Kuder-Richardson-20 were also computed after dichotomizing responses to determine the reliability of the scale.

## VALIDITY ANALYSIS

**Content validity** and **face validity** were addressed by methodological triangulation in item development. **Consensual validity** was dressed through expert review and pilot testing of the draft instrument. **Concurrent validity** of remaining items was examined by correlating each item with an additional item placed under each subscale. Similarly,

concurrent validity of subscales was computed by correlation subscales with the same alternative scale placed at the end of each subscale. **Construct validity**, discriminate and convergent validity, were estimated by running correlations between factors and items under same and different dimensions. Higher-order component (component of components) was determined to check whether the factors measure a single construct.

## FACTOR ANALYSIS

As the inter-subscale correlation in the a priori scale is significant, exploratory factor analysis, principal component analysis was conducted to reveal the underlying factor structure of the PBBC instrument. The statistics for the factor analysis were set at the following values (Table 3).

Table 3: Acceptable values for statistics of the PCA of PBBC items at Debub University, 2005/2006

| S.N | Preconditions                           | Acceptable values |
|-----|-----------------------------------------|-------------------|
| 1   | KMO measure of sampling adequacy        | Greater than 0.5  |
| 2   | Bartlets test of sphericity             | P-value <0.05     |
| 3   | Factor loadings                         | Greater than 0.4  |
| 4   | Component-total correlation             | Greater than 0.2  |
| 5   | Item-higher order component correlation | Greater than 0.2  |

## FURTHER ANALYSIS OF FACTORS

**Linear regression** model was used to explain the relationship between the factors and the whole scale. **Tukey's test of additivity** was used to check whether the factors were additive or not. **Hotteling's T-square** was applied to test whether the means of the

factors were different or not. The **Z-transformation** was used establish the norm for respondents' total score.

Relative importance of items and their factors (perceived barriers) were determined using summated scores. Subscale scores were also compared across different demographic characteristics of respondents using **t-test** and **analysis of variance** with multiple comparison tests (Bonferonni method). The overall score for PBBC was also compared across the five demographic variables..

## **STATISTICAL PROCEDURES**

Basic statistical procedures used for analysis included Mean and median values, variance & standard deviation, skewness, kurtosis, Pearson's correlation coefficient, spearman's correlation, Chronbach's alpha, student's t-test, analysis of variance, linear regression, Principal component analysis with direct oblimin rotation and factor extraction, method of summated scores and spearman-brown prophecy formula. P-values less than 0.05 was considered to be statistically significant for all cases.

## **ETHICAL CONSIDERATIONS**

Ethical clearance was obtained from the Department of Community Health and Faculty of Medicine, Addis Ababa University. Letter of consent was obtained form Debub University, College deans, faculties & departments to be involved in the study. Verbal informed consent was obtained at each step from respondents. Confidentiality of respondents' information was also assured.

## 5. RESULT

### BACKGROUND INFORMATION

The main survey format containing 60 items in five a priori subscales (Abstinence, being faithful, condom use, VCT and care & Support) was administered to a total of 480 respondents for rating. Four hundred forty-five (93.96%) questionnaires were returned, where 435 (90.6%) of those were acceptably completed and were included in this study. The variance of 20 subjects was very large ( $>5.0$ ), while the maximum expected was 7.14 for at least two of the five subscales. After exclusion of those subjects, the rest 415 subjects were considered for the analysis.

The sex ratio of the respondents was 3:1 in favor of males. About four-fifth of the study subjects were in the 20-24 age group. The Oromo and Amhara ethnic groups each constituted about one-third of the respondents, while the Tigray Ethnic group constituted one-sixth of the total respondents. About 60% of the respondents were orthodox Christians. Concerning marital status, almost all (96.1%) of the respondents were single.

### ITEM ANALYSIS & SELECTION

**MEAN VALUES:** a total of 9 items [*Two items* (3,9)) in the abstinence subscale, *5 items* (3,5,7,9,10) in the faithfulness subscale, *2 items* (2,11) in the care and support subscale] had mean values out of the 2.5-4.5 ranges. But all of them had item-subscale correlation  $>0.3$ .

**ITEM-SUBSCALE CORRELATION** (corrected for self-correlation): A total of 15 items [*One item* (7) in the abstinence subscale, *5 items* in the faithfulness subscale (1,2,4,8,11), *3 items* in the condom subscale (1,9,10), *4 items* in the VCT subscale (4,6,9,10) and *2 items* in the care & support subscale (3,4)] had item-subscale correlation less than 0.2. Accordingly, these **15 items** were deleted from their respective subscales.

**ITEM-SCALE CORRELATION** (corrected for self-correlation): A total of 10 items [*Two items* (6,14) in the abstinence subscale, *1 item* in the faithfulness subscale (6), *3 items* in the condom subscale (2,3,6), *2 items* in the VCT subscale (2,8) and *2 items* in the care & support subscale (6,8)] had item-scale correlation less than 0.2. Accordingly, these **10 new items** were also discarded from the scale.

**MEDIAN-MEAN:** The difference between median and mean ( $M_d - M$ ) was used as indicator of whether the item score distribution followed a normal distribution or not. In doing so, **one new item in the abstinence subscale [item 9]** was found to have large differences between their medians and mean ( $>0.5$ ) although there was no specified cut off point. After eliminating that item, final check up of the distribution of scores of the rest of items was explored using normality plots and Q-Q plots.



**COMMUNALITY** based on principal component analysis (PCA) was also applied for item selection within a priori subscales. In that procedure, no new items were eliminated.

Based on the above item analysis criteria a total of **26 items** were discarded from their respective subscales. The remaining **29 items** were subjected to statistical analysis of skewness, kurtosis, and reliability.

**INTERNAL CONSISTENCY:** In most cases, Chronbach's alpha, average item-total correlation; average inter-item correlation and composite reliability were used as measures of internal reliability. The reliabilities of PBBC *a priori* subscales with the remaining items were good ranging from 0.6 to 0.9. After deletion of **one item** [abs3] using alpha if item deleted, the total a priori scale with the same items had Chronbach's alpha of 0.84.

**CONCURRENT VALIDITY:** All the items retained till those stages were found significantly correlated with their respective alternative items ( $p < 0.01$ ). The a priori subscales were also correlated with those alternative scales (Table 4).

**Table 4: Concurrent Validity of PBBC subscales at Debu University, 2005/2006**

| A priori subscales | Concurrent Validity |
|--------------------|---------------------|
| Abstinence         | 0.580**             |
| Being faithful     | 0.465**             |
| Condom use         | 0.452**             |
| VCT                | 0.304**             |
| Care/support       | 0.603**             |

\*\*All are significant at 0.01 levels

**SKEWNESS AND KURTOSIS:** Positive kurtosis (platykurtic) values indicate that the observation cluster more and have longer tail than normal distribution and vice versa. Positive skewness values indicate a long right tail and vice versa. The skewness and kurtosis values of the five subscales are shown in Table 5.

**Table 5: Skewness and Kurtosis of PBBC subscales at Debu University, 2005/2006**

| Subscales      | No of items | Skewness | SE of skewness | Kurtosis | SE of Kurtosis |
|----------------|-------------|----------|----------------|----------|----------------|
| Abstinence     | 6           | 0.117    | 0.120          | -0.089   | 0.239          |
| Being faithful | 5           | 1.155    | 0.120          | 0.944    | 0.239          |
| Condom use     | 5           | -0.107   | 0.120          | 0.158    | 0.239          |
| VCT            | 5           | 0.152    | 0.120          | 0.525    | 0.239          |
| Care/support   | 7           | -0.085   | 0.120          | -0.140   | 0.239          |

As shown in the preceding table, almost all subscales, except being faithful subscale, which was right skewed, had approximately normal distribution. Two subscales [being faithful and VCT subscales] showed **positive kurtosis** distribution (platykurtic).

In addition, the nature of the distribution of PBBC subscales had been checked using graphs (Q-Q plot) and normality plot and it was found to be consistent with the result presented in the above table.

## INTER-SUBSCALE CORRELATION

Table 6: Inter-correlation between the a priori subscales at Debub University, 2005/2006

|                    | A    | B    | C    | D    | E |
|--------------------|------|------|------|------|---|
| Abstinence (A)     | -    |      |      |      |   |
| Being faithful (B) | .293 | -    |      |      |   |
| Condom use(C)      | .165 | .090 | -    |      |   |
| VCT (D)            | .362 | .261 | .191 | -    |   |
| Care/support (E)   | .372 | .378 | .090 | .383 | - |

\*\*P<0.05 for all cases

As the inter-subscale correlation matrix indicates, four of the five subscales (Abstinence, faithfulness, VCT, and care and support subscales) are significantly correlated to each other. The average inter-subscale correlation was found to be 0.26 (Table 6).

## FACTOR ANALYSIS

After omitting 27 items, exploratory factor analysis considered to analyze the remaining 28 items. The value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is **0.8**, which was greater than 0.5. This KMO value indicates that the sample was adequate for factor analysis.

Bartlett's test of sphericity was statistically significant ( $\chi^2=1556.815, df=302, P\text{-value}<0.000$ ). It showed that the entire sample population correlation matrix was not an identity. These evidences suggest that factor analysis was appropriate for these data.

Although the PBBC consisted of five a priori subscales, the R-mode exploratory instead of confirmatory factor analysis was chosen, instigated by Cole & Kazarian (1988) suggestion that four of the five prior subscales showed considerable inter-correlation and might thus expected to reflect only one factor.

In the exploratory principal component analysis (PCA), 7 components with Eigenvalues greater than 1 emerged, together explaining **67.17%** of the variance. But examination of the scree plot (Figure 1) and prior scale suggested that a five-factor solution would be more appropriate.

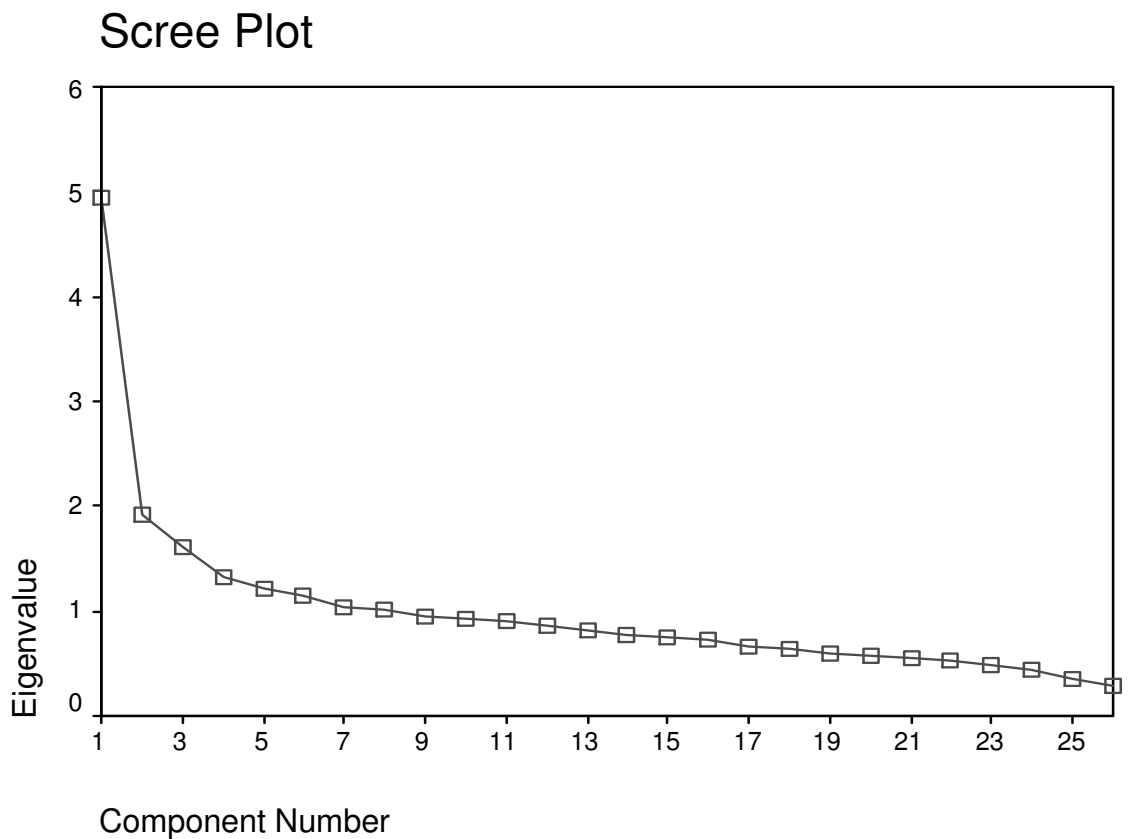


Fig 1: Scree plot of the components of PBBC instrument

After direct oblimin rotation and deletion of **2 items** [cas1, and cas5] with factor loadings smaller than 0.4, the five-factor solution explained **63.04%** of the variance (Table 7).

Table 7: Percentage of variance explained and eigenvalues of extracted components at Debub University, 2005/2006

| <b>Factors/components</b> | <b>N<sub>o</sub> of items</b> | <b>% Variance explained</b> | <b>Eigenvalues</b> |
|---------------------------|-------------------------------|-----------------------------|--------------------|
| Component 1               | 6                             | 16.813                      | 4.372              |
| Component 2               | 5                             | 14.774                      | 3.841              |
| Component 3               | 5                             | 13.570                      | 3.528              |
| Component 4               | 5                             | 10.253                      | 2.666              |
| Component 5               | 5                             | 7.627                       | 1.983              |
| <b>Total</b>              | <b>26</b>                     | <b>63.04</b>                | <b>16.390</b>      |

Those components were labeled as enjoyment, benefit, risk, commitment & fear. The **Enjoyment component** consisted of 6 items with factor loadings ranging from 0.496 to 0.838, all originated from the a priori subscale abstinence. Items in that component emphasized on the importance of sex before marriage. It described the perception that sex should be exercised before marriage. It also included statements indicating that abstinence decreases trust, intimacy, and sexual maturity. It also added that abstinence is against the rule of nature and makes one unable to find sexual partner.

The **Benefit component** comprised of five items having factor loadings ranging from 0.713 to 0.995 all originated from the a priori being faithful subscale. Items in that factor described peoples' perception on the benefits of having many sexual partners (sexual compatibility, social acceptability, and social interaction).

The **Risk component** comprised of five items from the a priori condom use subscale. Items in that component had factor loadings ranging from 0.782 to 0.915. All the items in that component reflected perceived risks associated with the use of condom (physical, Social, and Psychological).

The **Commitment** component comprised of five items, having factor loadings from 0.501 to 0.934, all from the a priori VCT subscale. Those items reflected peoples' reasons for not being tested for HIV that could possibly emanate from lack of commitment. It also addressed ignorance on VCT due to lack of commitment.

The items in **fear component**, having factor loadings ranging from 0.409 to 0.713, describe peoples' fear associated with care and support for AIDS patients. It also encompassed the reactions people take to avoid this fear i.e. through flight (fear of contacting HIV due to the care) (for more details see table V1 at Annex V).

In the subsequent **reliability** analysis of the emerged factors, **Chronbach's alpha** coefficients for internal consistency were good with values ranging from 0.60 to 0.95 (Table 8).

Chronbach's alpha for the whole scale was found to be **0.845** and standardized item alpha was **0.858** whereas the average item-total correlation was **0.64**. The component reliability was **0.82** and KR-20 was **0.81**. Composite reliability of the scale was **0.97**.

Table 8: Mean values of component reliability statistics at Debub University, 2005/2006

| <b>Components</b>  | <b>Item means</b> | <b>Item covariance</b> | <b>Inter-item correlation</b> | <b>Item-total correlation</b> | <b>Con.val</b> | <b>Chronbach's alpha</b> |
|--------------------|-------------------|------------------------|-------------------------------|-------------------------------|----------------|--------------------------|
| Enjoyment          | 2.89              | 0.53                   | 0.31                          | 0.45                          | 0.601          | 0.72                     |
| Benefit            | 2.18              | 1.41                   | 0.82                          | 0.88                          | 0.396          | 0.95                     |
| Risk               | 3.55              | 0.67                   | 0.70                          | 0.80                          | 0.546          | 0.92                     |
| Commitment         | 2.94              | 0.52                   | 0.61                          | 0.71                          | 0.253          | 0.88                     |
| Fear               | 2.63              | 0.41                   | 0.23                          | 0.35                          | 0.616          | 0.60                     |
| <b>Total Scale</b> | <b>2.85</b>       | <b>2.67</b>            | <b>0.20</b>                   | <b>0.375</b>                  | <b>0.642</b>   | <b>0.845</b>             |

The **concurrent validity** of the whole PBBC instrument was found to be **0.642**. If the scale had **convergent validity**, we would expect that the items that belong to similar factors would be more associated with other items in the same category. Calculation of the correlations among all the items of the scale indicated that there were higher inter-correlations among the items of the same factor suggesting convergent validity (mean inter-correlation of items within the same component is **0.534**).

Similarly, items that belong to a certain factor are expected to be less associated with items in other categories if the scale had **discriminant validity**. The inter-correlation among items of different factors was generally moderate in size, suggesting discriminant validity (mean inter-correlation of factors is **0.18**). These correlation coefficients indicated that each factor measured different aspects of PBBC, although with some overlapping characteristics.

## HIGHER-ORDER COMPONENT

After identification of the five components of the scale further analysis of the components was done (Table 9). Examination of the inter-relationship between the components revealed the presence of underlying construct. As the factor cosines show, there is a strong positive correlation (mean inter-correlation=0.2143,  $\alpha$ =0.5770) among subscales (components).

Hence, the inter-component correlation matrix was subjected to another round of principal component analysis (PCA) to see whether higher-order component (component of the components) could be identified. Such components could represent a broader level of generalizability that could further clarify the construct being measured. Using the PCA, one component solution emerged. This indicated that all the components could measure one single construct.

**Table 9: PCA of components at Debu University, 2005/2006**

| Subscales  | Component-total correlation | Communality | Factor loading |
|------------|-----------------------------|-------------|----------------|
| Enjoyment  | 0.686                       | 0.502       | 0.708          |
| Benefit    | 0.644                       | 0.296       | 0.544          |
| Risk       | 0.452                       | 0.127       | 0.356          |
| Commitment | 0.614                       | 0.481       | 0.694          |
| Fear       | 0.642                       | 0.516       | 0.718          |

Following the higher order component identification, the final phase of item reduction could occur. Items having item higher order component correlation greater than 0.2 were retained. This resulted in a final **26-item** of the PBBC scale.



## WEIGHTS OF COMPONENTS

The simple linear regression model was used to investigate the relationship between the five subscales and the total scale (Table 10). Accordingly, the following coefficients were obtained.

Table 10: Coefficients of the linear regression model at Debub University, 2005/2006

|            | Unstandardized<br>Coefficients |            | Standardized<br>Coefficients | t      | Sig. |
|------------|--------------------------------|------------|------------------------------|--------|------|
|            | B                              | Std. Error | Beta                         |        |      |
| (Constant) | 8.641E-02                      | .031       |                              | 2.789  | .006 |
| Enjoyment  | .260                           | .007       | .387                         | 38.543 | .000 |
| Benefit    | .205                           | .005       | .422                         | 44.130 | .000 |
| Risk       | .217                           | .006       | .314                         | 34.112 | .000 |
| Commitment | .217                           | .008       | .290                         | 28.864 | .000 |
| Fear       | .132                           | .007       | .195                         | 19.149 | .000 |

Dependent Variable: total average,  $R^2=0.967$

When we fit the coefficients in to the model, we will find the following equation.

$$\text{PBBC} = 0.0864 + 0.260F + 0.205E + 0.217C + 0.217R + 0.132B$$

Since the weights (coefficients) of components are different, all components of the scale cannot be considered as having equal power in determining individuals' PBBC. As a result simple summation of the scores of the components couldn't determine the total HIV/AIDS PBBC score. **Tukey's test of additivity** was also consistent with this finding. Tukey's estimate of power to which components must be raised to achieve additivity was about **2.5**. Items in all components except the commitment component (items must be squared to achieve additivity) were additive.

## ESTABLISHING NORM

The total scale has a mean of 74.02 and a standard deviation of 14.51. The 95% confidence interval of the mean was [72.6, 75.4]. Skewness and kurtosis of the scale divided by their standard errors are within the +2 to -2 range suggesting that the data are normally distributed (Figure 2). The quantile-by-quantile plot also confirms this indication.

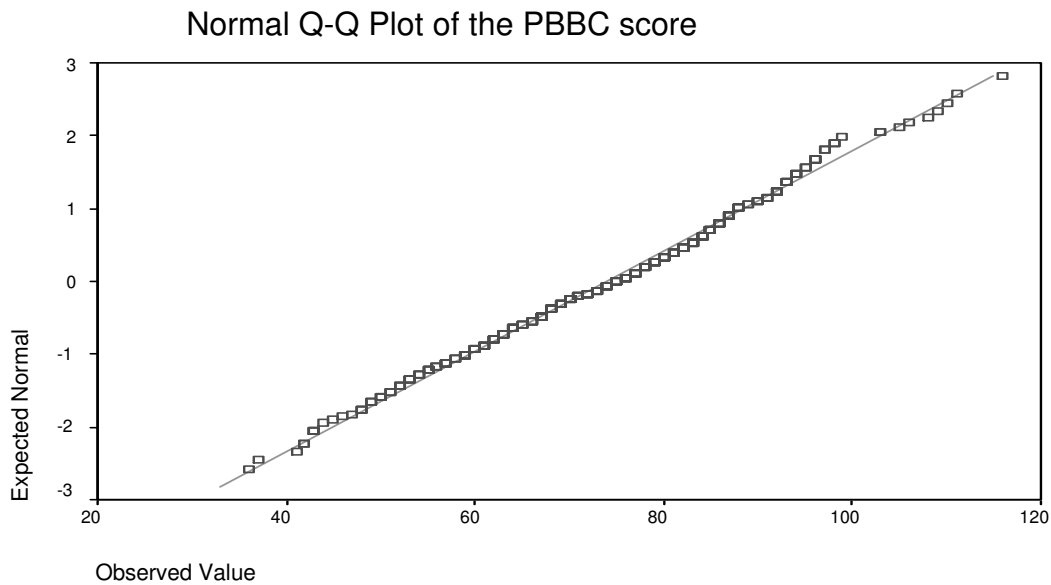


Fig 2: Normal Q-Q plot of the total PBBC score

Thus, to know how each respondent's PBBC score compares with the rest of the population, one can use the following norm of the PBBC instrument.

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$$\text{Z-score} = \frac{(\text{Respondent's score}) - (74.02)}{14.51}$$

---

From this norm one can extrapolate that **68%** of respondents' scores will be within one standard deviation of the mean ( $74.02 \pm 2(14.51)$ ) and **99%** within three standard deviation of the mean ( $74.02 + 3(14.51)$ ).

## RELATIVE IMPORTANCE OF THE BARRIERS

The relative importance of the PBBC in the new subscale was determined using the method of summated scores (see table V2 in Annex-V) .As depicted in Table 11, the Risk subscale had the highest score, followed by the enjoyment and commitment subscales.

The fear subscale had the lowest summated scores among the subscales.

Table 11: Descriptive statistics for the five subscales of PBBC at Debub University, 2005/2006

|                | <b>Enjoyment</b> | <b>Benefit</b> | <b>Risk</b> | <b>Commitment</b> | <b>Fear</b> |
|----------------|------------------|----------------|-------------|-------------------|-------------|
| Mean           | 17.3301          | 10.9012        | 17.7831     | 14.7108           | 13.2964     |
| Std. Deviation | 5.2764           | 6.0507         | 4.2779      | 3.9267            | 4.1571      |
| Sum            | 7192.00          | 4524.00        | 7380.00     | 6105.00           | 5518.00     |

Comparisons of means of the subscales using **Hottelings T-square** test revealed that the means of the five components were different. Comparison of components' sores among respondents of different demographic characteristics showed that Commitment and fear subscales showed a significant difference ( $P<0.05$ ) across years of study. Year II students scored higher on these subscales compared to year IV students. The fear and benefit subscales were found to have significantly higher scores for females than males. The benefit subscales also showed a significant difference across age groups, being highest for lower age groups. Subscale scores did not significantly vary across religion & Ethnic groups.

The overall importance of PBBC was evaluated for different groups observed above. It varied across years of study (year II having highest scores), and sex group (females having highest scores).

## **6. DISCUSSION**

Two conceptual issues underlie the measurement of perceived barriers to behavioral change. First, there is no consensus about the definition of “Perceived barriers to behavioral change”. The description of perceived barriers include, perceived risks associated with changing behavior, motivators of negative behavior, and inhibitors of positive behavior. Some also consider underlying factors like socio-economic, cultural and demographic conditions, which might predispose individuals to have different perception, under perceived barriers (Kippax and Crawford, 1993).

Second, there is lack of consensus about who should measure perceived barriers or who should be measured for perceived barriers. Some argue that professionals could only assess perceived barriers, whereas others claim that individuals’ assessment of their own perceived barriers is valid. But due to ease of use, self-reported measures are common (Dignan, 1995).

The aim of this study was to design and evaluate a scale for measuring the perceived barriers to behavioral change towards HIV/AIDS prevention among university students. As perceived barrier is a broad psychological construct, which is difficult to be measured directly, the first step of item development was identifying some important measuring issues through which student’s perception on HIV/AIDS prevention methods can be measured.

As it is best to measure a group with a measurement developed with consideration of its characteristics, a qualitative study was used to identify the scale items. The items selected for inclusion in to the scale covered priority areas of behavioral change dimensions in HIV/AIDS prevention: Abstinence, being faithful, Condom use, VCT, and Care for People living with HIV/AIDS.

The study data were obtained from sample of students in Debu University, using analytical technique that was appropriate and robust for this sample. Although it is difficult to generalize and apply the findings to other population groups, there are, nevertheless, some implications for both the use of the scale cross-culturally and for its utilization in programs to prevent HIV/AIDS in university students.

First, the assessment of the **design** of the measuring instrument was encouraging. Respondents found it to be quick and acceptable. Evidences from both expert judges and respondents suggested that the scale covered the most important perceived barriers to behavioral change in HIV/AIDS prevention.

Second, **reliability** assessment for each item and the overall scale was acceptable. The difficulty associated with measuring test-retest reliability of such an instrument is that psychological construct measured (PBBC) varies overtime. To overcome this difficulty, internal reliability was considered. The reliability of this HIV/AIDS PBBC instrument is about 0.845. This is acceptable according to Nunnally's recommendation for reliability, which is 0.7(Nunnally, 1978).

Third, there is strong support for the **validity** of the measurement scale. The lack of gold standard instrument to serve as a criterion necessitated the use of indirect method of validation. The factor analysis indicated that the five dimensions were inherent in the scale. Support for the construct validity was provided by finding that the identified components represent important dimensions which were considered as hypothesized influences in AIDS risk reduction model. The correlation coefficients obtained from factor structures indicated that the factors were relatively different, but with some overlapping. As there was only one higher order component, it was evident that all the components measure one underlying construct. Therefore, those findings provided support for construct validity of the HIV/AIDS PBBC instrument (Nunally, 1978).

Fourth, the **generalizability** of this instrument should be taken carefully. The reliability study sample was random, but was taken from one site, whereas there were large variations in the philosophy, structure and type of perceptions on HIV/AIDS prevention methods. Nevertheless, an effort was made to make the sample as representative as possible by including participants from different institutions in different phases of this study. Assessing a construct from different perspectives was one of the main concerns of this study. The item pool was extracted from experts, students and literature. Hence these undertakings during the study are in favor of the generalizability of this study.

Fifth, the instrument has **implications** for health and social services. A valid and reliable PBBC instrument for university students will be a useful research tool. The increasing costs of public health intervention activities and lack of consensus about the most

effective way of changing risky human behavior, led the government policy to be increasingly informed by evidence based practice. The PBBC instrument contributes to this by encouraging perception-led service provision. However, the PBBC was not designed as an outcome measure, so other appropriate instruments should be used when measurement of change overtime is required.

The data collected have also implications for the **prevention of HIV/AIDS** in university students, and possibly in other population groups with similar cultural background. This data indicate that assessing the individual for his/her perception on HIV/AIDS prevention methods can make the prediction of individual's susceptibility to HIV/AIDS. Such predictions can be made based on the height of an individual's barriers to behavioral change, which can be obtained from the scores on each of the five dimensions of the scale relative to the norm scores for the group of persons to which the individual belongs.

This method of assessing the perceived barriers to behavioral change may be considered to be adequate. Although the data are based entirely on self-reporting, the method is suitable for obtaining personal perceptions with PBBC. Furthermore, the method may be used to asses factors that hinder the effectiveness of HIV/AIDS prevention efforts. The scale has also been judged to be useful for assessing the predisposition of individuals to use HIV/AIDS prevention methods in their future encounters. But two areas of concern about the HIV/AIDS PBBC instrument have emerged: difficulty with its use in busy routine university settings, and the potential loss of useful and detailed information caused by the structured nature of the instrument. These issues need further investigation.

## **7. STRENGTHS AND LIMITATIONS**

### **STRENGTHS**

- ✓ Item generation is based on qualitative study
- ✓ Triangulation of methods and data used
- ✓ Expert reviewed items were utilized
- ✓ Different strategies of quality control considered
- ✓ Sequential and multiple data analysis steps employed

### **LIMITATIONS**

- ✓ Narrow scope of the study area & population
- ✓ Absence of external validity & reliability tests
- ✓ Absence of clear cut standards for item analysis
- ✓ Interval data assumption for the ordinal data
- ✓ Absence of similar previous studies done under local contexts



## **8. CONCLUSION**

- ▶ The findings of this study suggest that the PBBC instrument has acceptable reliability and validity when used under the research conditions of the study.
- ▶ The scale appears appropriate for general descriptive purposes, and findings show that quantitative measurement of perceived barriers to behavioral change is possible with relatively simple methods.
- ▶ More data on its utility and feasibility are required. These characteristics will be established with its application in routine settings in the long term.
- ▶ A continuing study aimed at revising & optimizing the test, and investigating the feasibility & utility of the instrument's use in routine university settings is underway.

## **9. RECOMMENDATIONS**

The aim of this study was to develop a scale for measuring perceived barriers to behavioral change towards HIV/AIDS prevention. The two potential groups that could make use of this instrument are researchers and measurement experts. The researcher would like to forward his recommendation on the following lines.

### **TO RESEARCHERS:**

- ▶ As the development of this instrument is at its initial stage, and the study population used is limited, it would be advisable to evaluate this instrument at least for reliability in all circumstances before utilization

### **TO MEASUREMENT EXPERTS:**

- ▶ As the development of this instrument is progressive, experts are encouraged to evaluate and contribute their part for further improvement of the quality of the instrument.

### **GENERAL:**

- ▶ It is desirable to expand the scope of the results of this study to cover wider populations.
- ▶ Further evaluation of the scale needs to be conducted on other population groups in the country, with the aim of improving and refining the method

***“To make a test best is to live with it”***

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# **ANNEX-I INSTRUMENTS FOR QUALITATIVE STUDY**

## **A. INTERVIEW QUESTIONS**

**ADDIS ABABA UNIVERSITY**

**FACULTY OF MEDICINE**

**DEPARTMENT OF COMMUNITY HEALTH**

### ***Developing a scale for measuring PBBC***

1. What perceptions prevent people from abstaining till marriage?
2. What perceptions prevent people from being faithful to one sexual partner?
3. What perceptions prevent people from using condoms consistently?
4. What perceptions prevent people from getting counseled and tested for HIV?
5. What perceptions prevent people having a positive attitude to people living with HIV/AIDS?

## B. FREE LISTING FORMAT

AAU-MF

### DEPARTMENT OF COMMUNITY HEALTH

#### *DEVELOPING A SCALE FOR MEASURING PBBC*

This free listing survey format is prepared to make a pool of Perceived barriers to behavioral change (**PBBC**) towards HIV/AIDS prevention. You are kindly requested to write your free opinion on the following lines.

In your own opinion:

1. Write perceptions that prevent people from *sexual abstinence* till marriage?

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2. Write perceptions that prevent people from *being faithful* to one sexual partner?

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3. Write perceptions that prevent people from *using condoms* in sexual practice?

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4. Write perceptions that prevent people from getting *counseled and tested* for HIV?

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5. Write perceptions that prevent people from having *a positive attitude* to Persons living with HIV/AIDS?

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Thank you!

## **ANNEX-II EXPERT REVIEW FORMAT**

### **ADDIS ABABA UNIVERSITY**

#### **DEPARTMENT OF COMMUNITY HEALTH**

##### **DEVELOPING HIV/AIDS PBBC INSTRUMENT**

This instrument contains 60 items on Perceived Barriers to Behavioral Change (PBBC) towards HIV/AIDS prevention. The items/statements are findings from a qualitative study conducted in Debu University. You are kindly requested to read and comment these items. If you feel there is other remaining item write it on the spaces provided. Finally, rate the whole instrument on a five point likert scale placed at the end of this format

| <b>A. Abstinence</b>                              | <b>Comments</b> |
|---------------------------------------------------|-----------------|
| Abstinence is against biological need of people   |                 |
| Abstinence reduces trust between partners         |                 |
| Abstinence decreases intimacy of sexual partners  |                 |
| Abstinence reduces sexual performance             |                 |
| Abstinence increases the risk for casual sex      |                 |
| Abstinence till marriage needs long time          |                 |
| Abstinence makes one not to feel as an adult      |                 |
| Abstinence makes one to be traditional            |                 |
| Abstinence is a pointless activity                |                 |
| Abstinence is a rare practice                     |                 |
| Abstinence makes life empty                       |                 |
| Abstinence makes getting steady partner difficult |                 |
| Abstinence decreases ones sexual pleasure         |                 |
| Others _____                                      |                 |

| <b>B. Being faithful</b>                                          | <b>Comments</b> |
|-------------------------------------------------------------------|-----------------|
| Being faithful is a sign of loss & inferiority                    |                 |
| Being faithful works only for religious people                    |                 |
| Being faithful is a sign of mental rigidity                       |                 |
| Being faithful weakens one's emotional connection with people     |                 |
| Being faithful works against one's unmet sexual needs             |                 |
| Being faithful prevents emotional enjoyment of sex                |                 |
| Being faithful has been replaced by open marriage                 |                 |
| Being faithful prevents sexual freedom of getting better partners |                 |
| Being faithful is difficult as one's partner may not be faithful  |                 |
| If one become unfaithful, nobody cares                            |                 |
| Being faithful is impossible for mobile peoples                   |                 |
| Others _____                                                      |                 |
| <b>C. Condom use</b>                                              | <b>Comments</b> |
| Condom use causes partners to have lack of trust                  |                 |
| Condom use reduces the pleasure of sex                            |                 |
| Condom use is a difficult issue to discuss with partner           |                 |
| Condom use causes one to be religiously guilty                    |                 |
| Condom use reduces fertility                                      |                 |
| Condom use is a sign of multisexuality                            |                 |
| The process of wearing condom decreases ones sexual interest      |                 |
| Condom may allow HIV through it                                   |                 |
| Condom is too oily & makes sex messy                              |                 |
| Condom slips during sexual intercourse                            |                 |
| Condom burst during sexual intercourse                            |                 |
| Condom itself may carry HIV                                       |                 |
| Others _____                                                      |                 |
| <b>D. HIV/AIDS counseling &amp; testing (VCT)</b>                 | <b>Comments</b> |

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VCT is a difficult issue to discuss with partner

VCT involves voluminous counseling process

VCT pressurizes one to notify his/her partner(s)

VCT makes one to separate from his/her partner

VCT counselors may not keep test results secret

VCT causes one to be rejected if test result is positive

VCT causes one to die quickly if test result is positive

VCT makes one to be hopeless if test result is positive

VCT makes one to be dependent if test result is positive

VCT results may not be completely true

VCT is needed only for multisexual individuals

VCT makes no difference in one's life decisions

Others \_\_\_\_\_

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**E. Care & Support of AIDS patients**

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**Comments**

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Care & Support makes the caregiver to be infected with HIV

Care & Support for multisexual AIDS patients is immoral

Care & Support is time consuming

Care & Support doesn't benefit the caregiver

Care & Support makes no difference for AIDS patients

Care & Support makes the caregiver to be rejected

Care & Support exposes one to revenge of AIDS patients

Care & Support is costly

Care & Support makes AIDS patients dependent

Care & Support increases anxiety of AIDS patients

Care & Support increases rejection of AIDS patients

Care & Support is boring due to nature of the disease

Others \_\_\_\_\_

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Please rate the **Whole instrument** on the following scale

| Criteria                     | Very poor | Poor | Satisfactory | Good | Very good |
|------------------------------|-----------|------|--------------|------|-----------|
| Helpfulness of anchor points |           |      |              |      |           |

|                             |  |  |  |  |  |
|-----------------------------|--|--|--|--|--|
| Ease of use                 |  |  |  |  |  |
| Appropriateness of language |  |  |  |  |  |

Thank you for your cooperation!

**ANNEX-III PILOT TEST FORMAT**

**ADDIS ABABA UNIVERSITY**

**DEPATMENT OF COMMUNITY HEALTH**

**DEVELOPING HIV/AIDS PBBC INSTRUMENT**

**DEAR RESPONDENT:**

This questionnaire contains statements on Perceived Barriers to Behavioral Change (PBBC) towards HIV/AIDS prevention. It is designed to develop HIV/AIDS PBBC instrument. There are no right and wrong answers. The statements are just your own perceptions about the topics. There are five demographic questions as well. All the information you provide will be kept confidential. You are kindly requested to read each statement and respond accordingly. If you have other similar statements write on the space provided.

**INSTRUCTION:** **READ** each statement; **SELECT** your degree of agreement and

**MARK** (✓) **on** one of the following:

**VSD= VERY STRONGLY DISAGREE**

**SD= STRONGLY DISAGREE**

**D= DISAGREE**

**A= AGREE**

**SA =STRONGLY AGREE**

**VSA=VERY STRONGLY AGREE**

**CONTENT:**

- I. Personal information**
- II. Perceptions on HIV prevention**
  - A: Abstinence**
  - B: Faithfulness**
  - C: Condom use**
  - D: Voluntary HIV/AIDS counseling & testing (VCT)**
  - E: Care for AIDS patients**

*Note: If you do not have a partner, please imagine what you will perceive if you have.*

Thank you for your participation!

### III. PERSONAL INFORMATION (Circle your choice)

1. Sex: 1. Male 2. Female
2. Age (years) 1. 15-19 2. 20-24 3. 25-29 4.  $\geq 30$
3. Religion: 1. Orthodox 2. Protestant 3. Muslim
- IV. Others (Specify) \_\_\_\_\_
4. Ethnicity: 1. Amhara 2. Oromo 3. Tigre
- V. Others (Specify) \_\_\_\_\_
5. Marital status: 1. Single 2. Married 3. Divorced
- VI. Others (Specify) \_\_\_\_\_

### VII. PERCEPTIONS (Mark on your choice)

#### A: Abstinence/ No sex before marriage/

| Statements                                               | VSD | SD | D | A | SA | VSA |
|----------------------------------------------------------|-----|----|---|---|----|-----|
| 1. Abstinence till marriage is a long time*              |     |    |   |   |    |     |
| 2. Premarital sex delays sexual partner selection (R)    |     |    |   |   |    |     |
| 3. Abstinence is useful (R)                              |     |    |   |   |    |     |
| 4. Sex at younger age is more pleasant *                 |     |    |   |   |    |     |
| 5. Abstinence prevents unplanned sex (R)*                |     |    |   |   |    |     |
| 6. Everybody abstains till marriage (R)                  |     |    |   |   |    |     |
| 7. Abstinence is a modern practice (R)                   |     |    |   |   |    |     |
| 8. Abstinence is against the rule of nature              |     |    |   |   |    |     |
| 9. Abstinence makes life meaningless                     |     |    |   |   |    |     |
| 10. Abstinence decreases intimacy in unmarried couples   |     |    |   |   |    |     |
| 11. Abstinence makes one unable to find sexual partners  |     |    |   |   |    |     |
| 12. Abstinence decreases trust between unmarried couples |     |    |   |   |    |     |
| 13. Abstinence makes one sexually immature               |     |    |   |   |    |     |
| 14. Sex before marriage is a wrong practice (R)          |     |    |   |   |    |     |
| 15. Other (Specify) _____                                |     |    |   |   |    |     |

### B: One-to-one Faithfulness/Sex with only one partner/

| Statements                                                 | VSD | SD | D | A | SA | VSA |
|------------------------------------------------------------|-----|----|---|---|----|-----|
| 1. Faithfulness is not an imprisonment (R)                 |     |    |   |   |    |     |
| 2. Faithfulness is a modern thought (R)                    |     |    |   |   |    |     |
| 3. Faithfulness decreases one's interaction with people    |     |    |   |   |    |     |
| 4. Unfaithfulness solves problem of sexual incompatibility |     |    |   |   |    |     |
| 5. It is wrong to have many sexual partners (R)            |     |    |   |   |    |     |
| 6. Faithfulness doesn't make life boring (R)               |     |    |   |   |    |     |
| 7. Faithfulness is a sign of being uncivilized             |     |    |   |   |    |     |
| 8. Most sexual relations are temporary                     |     |    |   |   |    |     |
| 9. Faithfulness is a sign of being not much-loved          |     |    |   |   |    |     |
| 10. Faithfulness is only for religious guys                |     |    |   |   |    |     |
| 11. Faithfulness can't prevent from sexual enjoyment (R)   |     |    |   |   |    |     |
| 12. Other (Specify)_____                                   |     |    |   |   |    |     |

### C: Using Condom

| Statements                                             | VSD | SD | D | A | SA | VSA |
|--------------------------------------------------------|-----|----|---|---|----|-----|
| 1. Condom itself doesn't contain HIV (R)               |     |    |   |   |    |     |
| 2. Using Condom makes one feel religiously guilty      |     |    |   |   |    |     |
| 3. Process of wearing condom decreases sexual interest |     |    |   |   |    |     |
| 4. Condom bursts during sexual intercourse             |     |    |   |   |    |     |
| 5. Using Condom doesn't affect sexual satisfaction (R) |     |    |   |   |    |     |
| 6. Condom doesn't allow HIV to pass through it (R)     |     |    |   |   |    |     |
| 7. Using Condom decreases trust between partners       |     |    |   |   |    |     |
| 8. Condom makes sexual intercourse unclean             |     |    |   |   |    |     |
| 9. Condoms are not irritating (R)                      |     |    |   |   |    |     |
| 10. Condom slips during sexual intercourse             |     |    |   |   |    |     |



|                                                           |  |  |  |  |  |  |
|-----------------------------------------------------------|--|--|--|--|--|--|
| 11. Using Condom is a sign of having many sexual partners |  |  |  |  |  |  |
| 12. Other (Specify)_____                                  |  |  |  |  |  |  |

#### **D: Voluntary HIV/AIDS counseling & testing**

| Statements                                                       | VSD | SD | D | A | SA | VSA |
|------------------------------------------------------------------|-----|----|---|---|----|-----|
| 1. HIV counseling doesn't force one to report sexual partners(R) |     |    |   |   |    |     |
| 2. HIV test is needed for everybody (R)                          |     |    |   |   |    |     |
| 3. Asking for HIV test increases distrust between partners       |     |    |   |   |    |     |
| 4. HIV test results are accurate (R)                             |     |    |   |   |    |     |
| 5. Being positive for HIV makes one to be stigmatized            |     |    |   |   |    |     |
| 6. HIV test makes a difference in one's future life plan (R)     |     |    |   |   |    |     |
| 7. Being positive for HIV makes one to be hopeless               |     |    |   |   |    |     |
| 8. HIV counselors keep HIV test results secret (R)               |     |    |   |   |    |     |
| 9. HIV test causes separation of sexual partners                 |     |    |   |   |    |     |
| 10. HIV counseling involves short steps (R)                      |     |    |   |   |    |     |
| 11. Being positive for HIV makes one die quickly                 |     |    |   |   |    |     |
| 12. Other (Specify)_____                                         |     |    |   |   |    |     |

#### **E: Care for AIDS patients**

| Statements                                                        | VSD | SD | D | A | SA | VSA |
|-------------------------------------------------------------------|-----|----|---|---|----|-----|
| 1. Care makes AIDS patients psychologically dependent             |     |    |   |   |    |     |
| 2. It is morally acceptable to provide care for AIDS patients (R) |     |    |   |   |    |     |
| 3. Regardless of care, People with AIDS will die                  |     |    |   |   |    |     |
| 4. Care for people with AIDS prolongs their sufferings            |     |    |   |   |    |     |
| 5. People don't stigmatize providers of AIDS patients (R)         |     |    |   |   |    |     |
| 6. Care providers contract HIV from AIDS patients                 |     |    |   |   |    |     |
| 7. Care gives AIDS patients more time to transmit HIV             |     |    |   |   |    |     |
| 8. Care for AIDS patients is inviting (R)                         |     |    |   |   |    |     |
| 9. People with AIDS themselves want to die quickly                |     |    |   |   |    |     |
| 10. One can provide care for AIDS patients till they die (R)      |     |    |   |   |    |     |
| 11. Care for AIDS patients is the duty of family members only     |     |    |   |   |    |     |
| 12. AIDS patients intentionally transmit HIV to care providers    |     |    |   |   |    |     |
| 13. Care for AIDS patients is beneficial to care providers (R)    |     |    |   |   |    |     |

|                           |  |  |  |  |  |  |
|---------------------------|--|--|--|--|--|--|
| 14. Other (Specify) _____ |  |  |  |  |  |  |
|---------------------------|--|--|--|--|--|--|

Thank you!

**ANNEX-IV MAIN SURVEY FORMAT**

**ADDIS ABABA UNIVERSITY**

**DEPARTMENT OF COMMUNITY HEALTH**

**DEVELOPING HIV/AIDS PBBC INSTRUMENT**

**DEAR RESPONDENT:**

This questionnaire contains statements on Perceived Barriers to Behavioral Change (PBBC) towards HIV/AIDS prevention. It is designed to develop HIV/AIDS PBBC instrument. There are no right and wrong answers. The statements are just your own perceptions about the topics. There are five demographic questions as well. All the information you provide will be kept confidential. You are kindly requested to read each statement and respond accordingly.

**INSTRUCTION: READ** each statement; **SELECT** your degree of agreement and

**MARK** (✓) **on** one of the following:

**VSD= VERY STRONGLY DISAGREE**

**SD= STRONGLY DISAGREE**

**D= DISAGREE**

**A= AGREE**

**SA =STRONGLY AGREE**

**VSA=VERY STRONGLY AGREE**

**CONTENT:**

**VIII. Personal information**

**IX. Perceptions on HIV prevention**

*Note: If you do not have a partner, please imagine what you will perceive if you have.*

Thank you for your participation!

## I. PERSONAL INFORMATION (Circle your choice)

- 1) Sex: 1. Male 2. Female
- 2) Age (years) 1. 15-19 2. 20-24 3. 25-29 4.  $\geq 30$
- 3) Religion: 1. Orthodox 2. Protestant 3. Muslim  
1. 4. Others (Specify) \_\_\_\_\_
- 4) Ethnicity: 1. Oromo 2. Amhara 3. Tigre  
1. 4. Others (Specify) \_\_\_\_\_
- 5) Marital status: 1. Single 2. Married 3. Divorced  
4. Others (Specify) \_\_\_\_\_

## II. PERCEPTIONS (Mark on your choice)

**A: Abstinence/ No sex before marriage/**

| Statements                                              | VSD | SD | D | A | SA | VSA |
|---------------------------------------------------------|-----|----|---|---|----|-----|
|                                                         | 1   | 2  | 3 | 4 | 5  | 6   |
| 2. Sex should be exercised before marriage              |     |    |   |   |    |     |
| 3. Abstinence is useful (R)                             |     |    |   |   |    |     |
| 6.Everybody abstains till marriage (R)                  |     |    |   |   |    |     |
| 7.Abstinence is a modern practice (R)                   |     |    |   |   |    |     |
| 8.Abstinence is against the rule of nature              |     |    |   |   |    |     |
| 9.Abstinence makes life meaningless                     |     |    |   |   |    |     |
| 10.Abstinence decreases intimacy in unmarried couples   |     |    |   |   |    |     |
| 11.Abstinence makes one unable to find sexual partners  |     |    |   |   |    |     |
| 12.Abstinence decreases trust between unmarried couples |     |    |   |   |    |     |
| 13.Abstinence makes one sexually immature               |     |    |   |   |    |     |
| 14.Sex before marriage is a wrong practice (R)          |     |    |   |   |    |     |

|                                                    |  |  |  |  |  |  |
|----------------------------------------------------|--|--|--|--|--|--|
| <b>15. Being abstinent should be supported (R)</b> |  |  |  |  |  |  |
|----------------------------------------------------|--|--|--|--|--|--|

## **B: Faithfulness/Sex with only one partner/**

| <b>Statements</b>                                          | <b>VSD<br/>1</b> | <b>SD<br/>2</b> | <b>D<br/>3</b> | <b>A<br/>4</b> | <b>SA<br/>5</b> | <b>VSA<br/>6</b> |
|------------------------------------------------------------|------------------|-----------------|----------------|----------------|-----------------|------------------|
| 1) Faithfulness is not an imprisonment (R)                 |                  |                 |                |                |                 |                  |
| 2) Faithfulness is a modern thought (R)                    |                  |                 |                |                |                 |                  |
| 3) Faithfulness decreases one's interaction with people    |                  |                 |                |                |                 |                  |
| 4) Unfaithfulness solves problem of sexual incompatibility |                  |                 |                |                |                 |                  |
| 5) It is wrong to have many sexual partners (R)            |                  |                 |                |                |                 |                  |
| 6) Faithfulness doesn't make life boring (R)               |                  |                 |                |                |                 |                  |
| 7) Faithfulness is a sign of being uncivilized             |                  |                 |                |                |                 |                  |
| 8) Most sexual relations are temporary                     |                  |                 |                |                |                 |                  |
| 9) Faithfulness is a sign of being not much-loved          |                  |                 |                |                |                 |                  |
| 10) Faithfulness is only for religious guys                |                  |                 |                |                |                 |                  |
| 11) Faithfulness can't prevent from sexual enjoyment (R)   |                  |                 |                |                |                 |                  |
| <b>12) Being faithful should be opposed</b>                |                  |                 |                |                |                 |                  |

## **C: Using Condom**

| <b>Statements</b>                                      | <b>VSD<br/>1</b> | <b>SD<br/>2</b> | <b>D<br/>3</b> | <b>A<br/>4</b> | <b>SA<br/>5</b> | <b>VSA<br/>6</b> |
|--------------------------------------------------------|------------------|-----------------|----------------|----------------|-----------------|------------------|
| 1) Condom itself doesn't contain HIV (R)               |                  |                 |                |                |                 |                  |
| 2) Using Condom makes one feel religiously guilty      |                  |                 |                |                |                 |                  |
| 3) Process of wearing condom decreases sexual interest |                  |                 |                |                |                 |                  |
| 4) Condom bursts during sexual intercourse             |                  |                 |                |                |                 |                  |
| 5) Using Condom doesn't affect sexual satisfaction (R) |                  |                 |                |                |                 |                  |
| 6) Condom doesn't allow HIV to pass through it (R)     |                  |                 |                |                |                 |                  |
| 7) Using Condom decreases trust between partners       |                  |                 |                |                |                 |                  |

|                                                           |  |  |  |  |  |  |
|-----------------------------------------------------------|--|--|--|--|--|--|
| 8) Condom makes sexual intercourse unclean                |  |  |  |  |  |  |
| 9) Condoms are not irritating to human body (R)           |  |  |  |  |  |  |
| 10) Condom slips during sexual intercourse                |  |  |  |  |  |  |
| 11) Using Condom is a sign of having many sexual partners |  |  |  |  |  |  |
| <b>12) Using condom should be Supported (R)</b>           |  |  |  |  |  |  |

#### **D: Voluntary HIV/AIDS counseling & testing**

| Statements                                                   | VSD<br>1 | SD<br>2 | D<br>3 | A<br>4 | SA<br>5 | VSA<br>6 |
|--------------------------------------------------------------|----------|---------|--------|--------|---------|----------|
| 1) HIV test is needed for everybody (R)                      |          |         |        |        |         |          |
| 2) HIV counseling forces one to report name of partners      |          |         |        |        |         |          |
| 3) Asking for HIV test decreases trust between partners      |          |         |        |        |         |          |
| 4) HIV test results are accurate (R)                         |          |         |        |        |         |          |
| 5) Being positive for HIV makes one to be outcasted          |          |         |        |        |         |          |
| 6) HIV test makes a difference in one's future life plan (R) |          |         |        |        |         |          |
| 7) Being positive for HIV makes one to be hopeless           |          |         |        |        |         |          |
| 8) HIV counselors keep HIV test results secret (R)           |          |         |        |        |         |          |
| 9) HIV test causes separation of sexual partners             |          |         |        |        |         |          |
| 10) HIV counseling process involves short steps (R)          |          |         |        |        |         |          |
| 11) Being positive for HIV makes one die quickly             |          |         |        |        |         |          |
| <b>12) HIV counseling &amp; testing is supported (R)</b>     |          |         |        |        |         |          |

#### **E: Care for AIDS patients**

| Statements                                                       | VSD<br>1 | SD<br>2 | D<br>3 | A<br>4 | SA<br>5 | VSA<br>6 |
|------------------------------------------------------------------|----------|---------|--------|--------|---------|----------|
| 1.Care makes AIDS patients psychologically dependent             |          |         |        |        |         |          |
| 2.It is morally acceptable to provide care for AIDS patients (R) |          |         |        |        |         |          |
| 3.Regardless of care, People with AIDS will die                  |          |         |        |        |         |          |
| 4.Care for people with AIDS prolongs their sufferings            |          |         |        |        |         |          |
| 5.People discriminate care providers of AIDS patients            |          |         |        |        |         |          |
| 6.Care providers contract HIV from AIDS patients                 |          |         |        |        |         |          |
| 7.Care gives AIDS patients more time to transmit HIV             |          |         |        |        |         |          |
| 8.Care for AIDS patients is attractive (R)                       |          |         |        |        |         |          |
| 10.One can provide care for AIDS patients till they die (R)      |          |         |        |        |         |          |

|                                                               |  |  |  |  |  |  |
|---------------------------------------------------------------|--|--|--|--|--|--|
| 11.Care for AIDS patients is the duty of family members only  |  |  |  |  |  |  |
| 12.AIDS patients intentionally transmit HIV to care providers |  |  |  |  |  |  |
| <b>14.Care for AIDS patients is supported (R)</b>             |  |  |  |  |  |  |

Thank you!

## ANNEX V-IMPOTRANT TABLES

**Table V1: Ccommunality ( $H^2$ ), Item-component correlation (ICC), and item-higher component correlation (IHC) of PBBC items**

| <b>Component 1</b>                                    | <b><math>H^2</math></b> | <b>ICC</b> | <b>IHC</b> |
|-------------------------------------------------------|-------------------------|------------|------------|
| Sex should be exercised before marriage               | .701                    | .756       | .518       |
| Abstinence is against the rule of nature              | .335                    | .608       | .432       |
| Abstinence decreases intimacy in unmarried couples    | .283                    | .559       | .397       |
| Abstinence makes one unable to find sexual partners   | .473                    | .681       | .472       |
| Abstinence decreases trust between unmarried couples  | .431                    | .643       | .466       |
| Abstinence makes one sexually immature                | .430                    | .642       | .375       |
| <b>Component 2</b>                                    |                         |            |            |
| Faithfulness decreases one's interaction with people  | .568                    | .738       | .561       |
| It is wrong to have many sexual partners (R)          | .990                    | .983       | .657       |
| Faithfulness is a sign of being uncivilized           | .894                    | .925       | .616       |
| Faithfulness is a sign of being not much-loved        | .946                    | .978       | .624       |
| Faithfulness is only for religious guys               | .946                    | .978       | .624       |
| <b>Component 3</b>                                    |                         |            |            |
| Condom bursts during sexual intercourse               | .805                    | .894       | .353       |
| Using Condom doesn't affect sexual satisfaction (R)   | .850                    | .918       | .404       |
| Using Condom decreases trust between partners         | .817                    | .924       | .455       |
| Condom makes sexual intercourse unclean               | .771                    | .883       | .391       |
| Using Condom is a sign of having many sexual partners | .598                    | .731       | .259       |
| <b>Component 4</b>                                    |                         |            |            |
| HIV test is needed for everybody (R)                  | .788                    | .852       | .480       |
| Asking for HIV test decreases trust between partners  | .697                    | .824       | .491       |
| Being positive for HIV makes one to be outcasted      | .779                    | .837       | .506       |
| Being positive for HIV makes one to be hopeless       | .883                    | .914       | .543       |
| Being positive for HIV makes one die quickly          | .394                    | .699       | .479       |

**Component 5**

|                                                                |      |      |      |
|----------------------------------------------------------------|------|------|------|
| It is morally acceptable to provide care for AIDS patients (R) | .474 | .637 | .387 |
| Care gives AIDS patients more time to transmit HIV             | .488 | .667 | .366 |
| One can provide care for AIDS patients till they die (R)       | .331 | .591 | .359 |
| Care for AIDS patients is the duty of family members only      | .432 | .626 | .450 |
| AIDS patients intentionally transmit HIV to care providers     | .284 | .565 | .433 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. A Rotation converged in 6 iterations

**Table V2: Pattern Matrix of the components of PBBC instrument**

| Items                                                 | Component |      |      |      |   |
|-------------------------------------------------------|-----------|------|------|------|---|
|                                                       | 1         | 2    | 3    | 4    | 5 |
| It is wrong to have many sexual partners (R)          | .995      |      |      |      |   |
| Faithfulness is a sign of being not much-loved        | .980      |      |      |      |   |
| Faithfulness is only for religious guys               | .980      |      |      |      |   |
| Faithfulness is a sign of being uncivilized           | .949      |      |      |      |   |
| Faithfulness decreases one's interaction with people  | .713      |      |      |      |   |
| Using Condom doesn't affect sexual satisfaction (R)   |           | .915 |      |      |   |
| Condom bursts during sexual intercourse               |           | .902 |      |      |   |
| Using Condom decreases trust between partners         |           | .888 |      |      |   |
| Condom makes sexual intercourse unclean               |           | .870 |      |      |   |
| Using Condom is a sign of having many sexual partners |           | .782 |      |      |   |
| Being positive for HIV makes one to be hopeless       |           |      | .934 |      |   |
| HIV test is needed for everybody (R)                  |           |      | .901 |      |   |
| Being positive for HIV makes one to be outcasted      |           |      | .877 |      |   |
| Asking for HIV test decreases trust between partners  |           |      | .830 |      |   |
| Being positive for HIV makes one die quickly          |           |      | .501 |      |   |
| Sex should be exercised before marriage               |           |      |      | .838 |   |
| Abstinence makes one sexually immature                |           |      |      | .668 |   |
| Abstinence makes one unable to find sexual partners   |           |      |      | .653 |   |
| Abstinence decreases trust between unmarried couples  |           |      |      | .636 |   |
| Abstinence is against the rule of nature              |           |      |      | .524 |   |
| Abstinence decreases intimacy in unmarried couples    |           |      |      | .496 |   |



|                                                                |      |
|----------------------------------------------------------------|------|
| Care gives AIDS patients more time to transmit HIV             | .713 |
| It is morally acceptable to provide care for AIDS patients (R) | .686 |
| Care for AIDS patients is the duty of family members only      | .587 |
| One can provide care for AIDS patients till they die (R)       | .538 |
| AIDS patients intentionally transmit HIV to care providers     | .409 |

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.  
A Rotation converged in 6 iterations.

**Table V3: Structure Matrix of the PBBC instrument**

| Items                                                 | Components |      |      |      |   |
|-------------------------------------------------------|------------|------|------|------|---|
|                                                       | 1          | 2    | 3    | 4    | 5 |
| It is wrong to have many sexual partners (R)          | .995       |      |      |      |   |
| Faithfulness is a sign of being not much-loved        | .972       |      |      |      |   |
| Faithfulness is only for religious guys               | .972       |      |      |      |   |
| Faithfulness is a sign of being uncivilized           | .945       |      |      |      |   |
| Faithfulness decreases one's interaction with people  | .745       |      |      |      |   |
| Using Condom doesn't affect sexual satisfaction (R)   |            | .919 |      |      |   |
| Condom bursts during sexual intercourse               |            | .900 |      |      |   |
| Using Condom decreases trust between partners         |            | .895 |      |      |   |
| Condom makes sexual intercourse unclean               |            | .876 |      |      |   |
| Using Condom is a sign of having many sexual partners |            | .769 |      |      |   |
| Being positive for HIV makes one to be hopeless       |            |      | .938 |      |   |
| HIV test is needed for everybody (R)                  |            |      | .886 |      |   |
| Being positive for HIV makes one to be outcasted      |            |      | .882 |      |   |
| Asking for HIV test decreases trust between partners  |            |      | .831 |      |   |
| Being positive for HIV makes one die quickly          |            |      | .575 |      |   |
| Sex should be exercised before marriage               |            |      |      | .837 |   |
| Abstinence makes one sexually immature                |            |      |      | .681 |   |
| Abstinence makes one unable to find sexual partners   |            |      |      | .646 |   |
| Abstinence decreases trust between unmarried couples  |            |      |      | .637 |   |
| Abstinence is against the rule of nature              |            |      |      | .560 |   |
| Abstinence decreases intimacy in unmarried couples    |            |      |      | .519 |   |

|                                                                                                      |      |
|------------------------------------------------------------------------------------------------------|------|
| Care gives AIDS patients more time to transmit HIV                                                   | .690 |
| It is morally acceptable to provide care for AIDS patients                                           | .674 |
| (R                                                                                                   |      |
| Care for AIDS patients is the duty of family members only                                            | .630 |
| One can provide care for AIDS patients till they die (R)                                             | .556 |
| AIDS patients intentionally transmit HIV to care providers                                           | .488 |
| Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. |      |

**Table V4: Descriptive statistics for items in five subscales**

| <b>Enjoyment component</b>                            | <b>Sum</b> | <b>Mean</b> | <b>SD</b> |
|-------------------------------------------------------|------------|-------------|-----------|
| Sex should be exercised before marriage               | 1192       | 2.87        | .74       |
| Abstinence is against the rule of nature              | 1137       | 2.74        | 1.66      |
| Abstinence decreases intimacy in unmarried couples    | 1237       | 2.98        | 1.37      |
| Abstinence makes one unable to find sexual partners   | 1204       | 2.90        | 1.46      |
| Abstinence decreases trust between unmarried couples  | 1184       | 2.85        | 1.43      |
| Abstinence makes one sexually immature                | 1238       | 2.98        | 1.60      |
| <b>Benefit component</b>                              |            |             |           |
| Faithfulness decreases one's interaction with people  | 986        | 2.38        | 1.47      |
| It is wrong to have many sexual partners (R)          | 905        | 2.18        | 1.21      |
| Faithfulness is a sign of being uncivilized           | 825        | 1.99        | 1.30      |
| Faithfulness is a sign of being not much-loved        | 911        | 2.20        | 1.30      |
| Faithfulness is only for religious guys               | 911        | 2.20        | 1.30      |
| <b>Risk component</b>                                 |            |             |           |
| Condom bursts during sexual intercourse               | 1543       | 3.72        | .96       |
| Using Condom doesn't affect sexual satisfaction (R)   | 1555       | 3.75        | 1.00      |
| Using Condom decreases trust between partners         | 1400       | 3.37        | 1.29      |
| Condom makes sexual intercourse unclean               | 1472       | 3.55        | .95       |
| Using Condom is a sign of having many sexual partners | 1410       | 3.40        | .63       |
| <b>Commitment component</b>                           |            |             |           |
| HIV test is needed for everybody (R)                  | 1270       | 3.06        | .86       |
| Asking for HIV test decreases trust between partners  | 1215       | 2.93        | 1.14      |
| Being positive for HIV makes one to be outcasted      | 1235       | 2.98        | .68       |
| Being positive for HIV makes one to be hopeless       | 1321       | 3.18        | .86       |

|                                                                |      |      |      |
|----------------------------------------------------------------|------|------|------|
| Being positive for HIV makes one die quickly                   | 1064 | 2.56 | 1.29 |
| <b>Fear component</b>                                          |      |      |      |
| It is morally acceptable to provide care for AIDS patients (R) | 1008 | 2.43 | 1.28 |
| Care gives AIDS patients more time to transmit HIV             | 1131 | 2.73 | 1.46 |
| One can provide care for AIDS patients till they die (R)       | 1271 | 3.06 | 1.44 |
| Care for AIDS patients is the duty of family members only      | 915  | 2.20 | 1.21 |
| AIDS patients intentionally transmit HIV to care providers     | 1193 | 2.87 | 1.34 |