

Behaviour Related Stigma Scale (BRSS): A tool to measure behaviour related stigma among key population groups

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Abstract- Key populations are identified as the groups having the highest risk of acquiring and transmitting HIV due to their behaviour. They face high level of stigma and discrimination as a result of belonging to a key population group.

The groups identified as key populations in this study are drug users, men who have sex with men, female sex workers and transgender community. Reducing stigma and discrimination is identified as one of the four critical enablers which help to overcome major barriers to service uptake, including social exclusion and marginalization, criminalization, stigma and inequity among KP.

Since there was not tool to assess the level of behaviour related stigma among key populations, the objective of the study was to develop and scientifically validate a tool to assess the behaviour related stigma among key population groups.

Methods:

Development of the tools consisted of six steps. 1. Operationalizing the definition of stigma 2. Item generation, 3. Analysis of the content within each item and item reduction of the tool, 4. Formulating the draft instrument, 5. Finalizing the draft instrument to measure behaviour related stigma among key populations as BRSS. This was done through exploratory factor analysis and confirmatory factor analysis. The sample size was 183 and 180 respectively for the two components using respondent driven sampling method. The study was conducted in Galle district in Sri Lanka. The participant who were included for the exploratory factor analysis were excluded from the confirmatory factor analysis.

Results:

A seventeen item tool with a three factor structure was developed and the Sinhalese version of it was validated to Sri Lankan context. It was named as behaviour related stigma scale.

Conclusion:

Behavior related stigma scale can be used to assess the level of behaviour related stigma in any of the key population groups.

I. INTRODUCTION

Key Populations (KP) are the groups who have a high burden of acquiring Human immunodeficiency virus (HIV) in many

settings. Internationally the four KP groups considered are sex workers (SW), men who have sex with men (MSM), people who inject drugs (PWID) and transgender (TG) population (United Nations Programme on HIV/AIDS (UNAIDS, 2017).

Key populations are considered as a hidden population in both international and Sri Lankan setting. They possess the highest risk of contracting HIV, mainly due to their key behaviour.

Globally, KP are adversely affected by stigma and discrimination due to the fact that they belong to a key KP group. This leads to higher risk of acquiring HIV and limit access to HIV services (World Health Organization (WHO), 2014).

Stigma and discrimination adversely affect the social, psychological and medical aspects of the affected one's life. Since they get deserted from the families and get rejected from school, they become school drop outs without completing education. These factors lead them to a more vulnerable life. Additionally, multiple health complications also occur. They are anxiety, depression, self-harm, suicidal attempts, poor self-image, low self-esteem and addiction. Stigma and discrimination is identified as a key obstacle on universal access to HIV prevention, treatment and care. It lowers their access to health care services, and lowers HIV testing among these groups and necessary treatment. Finally, this will result in a hidden epidemic of HIV in the community.

Therefore, it is evident that it is essential to identify the key populations with high level of stigma due to their key behaviour. Since there is no comprehensive tool to assess behaviour related stigma among all KP groups, it was identified as important to develop a common tool to assess behaviour related stigma among KP.

The objective of the study was to develop and validate a tool to assess the behaviour related stigma among KPs.

II. METHODS:

Development of the Behaviour related stigma scale was conducted in six steps.

Step 1: Operationalizing the definition of stigma

A thorough literature review was carried out on medical sciences such as Psychiatry/Psychology, Behavioural Science and Sociology to identify different definitions of "stigma". A Delphi process was conducted to arrive at a new definition for stigma, to modify it to behavior related stigma and to identify its main

domains. A scale from zero (total disagreement) to four (total agreement) was used to rate the definitions for their appropriateness in the Sri Lankan context. This process was repeated in three rounds, selecting the definitions according to the score and finally arrived at one new definition. A definition for stigma was developed as “an attribute or behaviour which is discrediting”. As this study is on behaviour related self-stigma the definition was further modified as “an attribute possessed by an individual which is discrediting due to his or her identity or behaviour” (identity was taken into consideration among TG people and behaviour among FSW, MSM and DU).

Step 2: Item generation

Items to be included within the multi-dimensional constructs of behavior related stigma were generated using a detailed literature review, key informants and in-depth interviews. Literature on instruments used in medical (Psychiatry, Psychology) and Sociology were searched. The selected items were adopted according to the cultural acceptability in generating items.

Key informant interviews were conducted among the main stakeholders from different categories who are directly and indirectly involved in decision making and service provision to KP such as Mental Health, Psychiatry, Psychology and human behaviour.

In-depth interviews were conducted to get an insight into different aspects that people of KP regard as important for behaviour related stigma. They were carried out among KP in the community in different settings; urban, semi urban and rural.

Step 3: Analysis of the content within each item and item reduction of the tool

The items that were in duplicate were removed and a draft list of 32 items was prepared. The items were rated using a five point likert scale ranging from least important -1 to most important -5. There were 25 items with a mean score of three or more and mean score of seven items were less than three. Those seven items were excluded during the review. The list of 25 items was sent for the second round to the expert panel for clarifications, suggestions and rating. The results were reviewed as in the first round with special emphasis placed on the definition for behavior related stigma. Finally, a total of 18 items were retained after the non-statistical item reduction procedure.

Step 4: Formulating the draft instrument

The selected items were developed into an instrument by writing them as statements that were to be used as interviewer administered questions as it was considered the most appropriate method for obtaining data which could be applied to the KP with varying education levels. A Likert scale was used as response choices.

Simple scoring of items was adopted in the absence of any research evidence for any benefit in weighting the items as opposed to weighted scoring, especially when there are many items in the pool (Chang, Brown, & Nitzke, 2008). Scores ranged from 1 to 5 for all 18 items. In 17 stems of the scale excluding item 8, the lowest value was one which indicated least likelihood of behavior related stigma and highest score of five indicated the most likelihood of behavior related stigma. In the stem no. 08, the

scoring was reverse; a score of 1 indicated a most likelihood of behavior related stigma and a score of 5 indicated least likelihood of behavior related stigma.

Step 5: Translation of the draft instrument

The BRSS was translated into Sinhala from the original English version. The forward – backward translation methodology was employed in the translation of draft instrument.

Step 6: Finalizing the draft instrument to measure behaviour related stigma among key populations as BRSS

The draft instrument was finalized as BRSS by carrying out the following procedures.

a. Exploration of the underlying latent factors in the draft instrument

An exploratory factor analysis using Principal Component Analysis (PCA) was carried out to assess how the selected 18 items were related to each other, and to see if there was any need for further reduction of items (Brown, 2006). The factorability of the 18 items was assessed.

A cross-sectional community-based study was carried out among 183 KP in Galle district in January 2018. As there were 18 items in the BRSS the ratio of participants per item was 1: 10.1.

Study population:

Four four KPs (female sex workers, men who have sex with men, drug users and transgender) were defined as below.

- Female sex worker is defined as any female who has sold sex in exchange of money or goods for the past six months. (NSACP, 2015).

- Men who have had sex with other men in the past six months as a matter of reference or practice, regardless of their sexual identity or sexual orientation and irrespective of whether they have sex with women or not are defined as MSM (NSACP, 2013).

- Drug users are defined as people who take psycho active (psychotropic) substances for non-medical purposes during the past six months excluding those who take only alcohol and tobacco (NSACP, 2013).

- Transgender people are defined as people who belong to the umbrella term as those who describe people whose gender identity and expression doesn't conform to the norms and expectations traditionally associated with their sex assigned at birth for the past six months (UNAIDS, 2015).

All FSW, MSM, DU and TG group who have completed 18 years and resided in Galle district for the past six months from the time of the study were included while any participant who belonged to the four KP, with a diagnosis of a mental disorder at the time of the study was excluded.

As this is a study on hard to reach populations, respondent driven sampling method was used.

Data was collected using an interviewer-administered-questionnaire (IAQ) including socio-demographic characteristics and the draft instrument translated to Sinhala Language.

Data collection was done by trained field investigators who were graduates in Sociology.

Statistical analysis:

All items in the draft instrument were subjected to PCA using the Statistical package for Social sciences (SPSS) version 22. Initially inter-correlation matrices of the 18 items were calculated and anti-image correlation matrix was carried out to measure the factorability for all the variables. Sampling adequacy of data was assessed. The factors were selected as relevant when the Eigen values were more than one. Scree plots were examined and factors were rotated to optimize the interpretability of the scale. After conducting the PCA, three factorable latent factors were identified. Promax rotation method was used. Seventeen items loaded well with a factor loading of more than 0.3 into three factors. Since item No 17 “**I feel that people think that I spread HIV merely because I belong to a key population**” was cross loading, it was dropped and re rotated. The three factors identified were negative self-image, disclosure concerns and public attitudes. Then item no 18 was renumbered as item no 17. Pre-testing of the draft instrument was carried out among 20 adults in the district of Kandy and modifications were done as appropriate. The scale developed was named Behaviour Related Stigma Scale (BRSS).

Assessment of validity and reliability of the BRSS This was conducted in two stages.

Stage 1: Assessment of judgmental validity

Face, content and consensual validity were assessed in relation to judgmental validity. Each item in the instrument was assessed for its relevance, appropriateness and acceptability in the local context by the experts in different fields, by agreeing whether the conceptual definition of behaviour related stigma has been translated appropriately within the BRSS.

Stage 2: Validation study to ensure construct validity and reliability of BRSS (Sinhala version)

A cross sectional study was conducted among 180 eligible study participants in Galle district, who were not included in PCA. Data was collected using the draft tool (BRSS) with 17 items which was developed in this study by the same field investigators. Considering the non-normal distribution of the items in the BRSS and according to the recommendations offered in LISREL 9.2, Robust Maximum Likelihood (RML) estimation method was used in the CFA. The CFA was performed on the covariance matrix of the items of BRSS. Assessment of the appropriateness of the model was based on several fit indices such as Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative fit index (CFI) and Non Normal Fit Index (NNFI). Judgements on how well the model fits data were made on the basis of RMSEA < 0.05, SRMR 0.9 and NNFI > 0.9 (Chang et al, 2008).

Internal consistency was assessed in the study using the Chronbach's Alpha, where it is estimated that values higher than 0.7 are satisfactory (Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011). Test-retest reliability was assessed by administering the BRSS to a randomly selected sub-sample of 20 participants, following a time interval of two weeks. Value of 0.7 or above for the Spearman's r correlation coefficient was considered as having at least a moderate correlation between the scores (Mukaka, 2012).

III. RESULTS:

The construct for behaviour related stigma was defined as “an attribute, behaviour or reputation which is socially discrediting on an individual and results in a feeling of shame and expectation of discrimination due to one's key behaviour or identity.”

A total of 32 items were generated for the construct on behaviour related stigma using three methods following thorough literature review and key informant interviews among eight individuals working with KP groups and in-depth interviews in 12 individuals. The majority of the key informants belonged to 30 – 39 age group (n= 07). Most of them (n= 08) had an educational qualification of G.C.E. (Advance level) or higher.

Analysis of the contents and item reduction

Thirty-two items were generated at the initial stage. They were further reviewed by a panel of experts on the importance of measuring each item measuring behaviour related stigma. During this process, the number of items was reduced to 25 by deleting irrelevant and duplicate items. Finally, the number of items was reduced to 18 according to the expert rating and importance. These 18 items were retained in the draft instrument.

Latent Factors identified using PCA

An exploratory factor analysis using PCA was carried out to identify the unknown latent factors in the draft instrument representing behaviour related stigma among KPs. The sample size for this component was 183 adults who belonged to the four KPs.

The majority of the study participants were between 18 – 39 years of age (74.3%). Nearly 75% of them had a personal monthly income below LKR 40,000. The majority of them were Sinhala Buddhists.

Factorability of the data set for PCA

This was confirmed by the following results.

- The sample size (n=183) was acceptable as the number of items were 18, which gave a ratio of 1:10 between factors to items (Streiner, 1994).
- To perform PCA, the items should be correlated with each other but not too much. The anti-image correlation matrix which is the negatives of the partial correlation coefficients, the coefficients were well above the accepted level of 0.5 for the 18 items.

Sampling adequacy for PCA

Kaiser–Meyer –Olkin measure and Bartlett's test of sphericity were performed to assess sampling adequacy. Kaiser–Meyer –Olkin measure was 0.847 and it was well above the required value of 0.6. Bartlett's test of sphericity was significant as required ($\chi^2 = 1092.986$, $df = 153$; $p < 0.01$). Thus, all the 18 items in the draft instrument were considered adequate for PCA.

Selection of latent factors (Items grouped together in the PCA)

Principal components were selected as the extraction method. The number of factors was decided depending on the Eigen value. A factor was considered relevant if the given Eigen value exceeded 1.0. In the current study, the Eigen values ranged from 5.238 to 1.079. Extraction was done depending on the eigen value of > 1. Initially five factors where the Eigen values were >1 were extracted. The initial eigen values are given in Table 1.

Table 1: Total Variance Explained in PCA

Initial Eigenvalues			
Component	Total	% of Variance	Cumulative %
1	5.238	29.097	29.097
2	2.393	13.293	42.391
3	1.264	7.025	49.415
4	1.192	6.625	56.040
5	1.079	5.993	62.033
6	.820	4.554	66.587
7	.787	4.371	70.959
8	.732	4.066	75.024
9	.660	3.665	78.689
10	.635	3.529	82.218
11	.558	3.099	85.317
12	.489	2.719	88.036
13	.455	2.529	90.565
14	.414	2.302	92.866
15	.404	2.243	95.109
16	.394	2.187	97.296
17	.253	1.403	98.700
18	.234	1.300	100.000

The scree plot suggests a three factor solution which seemed to be more appropriate. Therefore, a three factor solution was adopted for the current study. It is shown in figure 1.

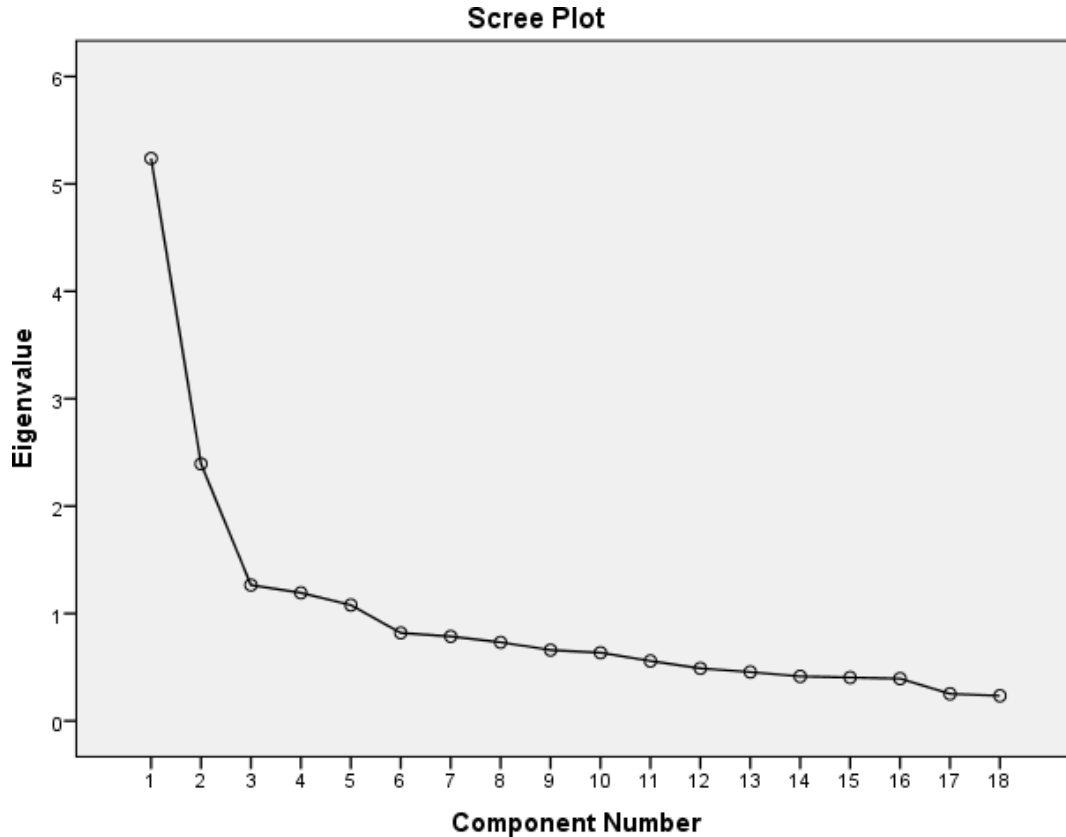


Figure 2: Scree plot of factor analysis of Behaviour Related Stigma Scale

Since there could be some degree of correlation between factors, promax rotation method was used initially. Item number 17 was cross loading. Therefore, it was dropped and re-rotated. The final factor solution is shown as table 2.

Table 2: Pattern Matrix of Items of the Behaviour Related Stigma Scale After Item no 17 was dropped – Sinhala Version

		Component		
		1	2	3
ST1	I think that my behbehaviour is a punishment for me	.824		
ST2	I feel that my life is worthless because of my behaviour	.822		
ST5	I do not feel socializing like others do because I belong to a key population	.782		
ST4	I feel that I am not as good as the others	.702		
ST18	I feel that society thinks that I’m an unsuccessful person due to my key behaviour	.682		
ST3	I wish I did not belong to a key population group	.669		
ST9	I feel like I’m getting rejected when I am with people who don’t belong to a key population	.537		
ST16	I feel that the society thinks that key populations destroy our culture	.485		

ST14	I feel worried that people who know about my behaviour will tell it to others	.830
ST11	I feel that I should be very careful to whom I disclose about my behaviour	.817
ST15	I feel that I need to tell people close to me to keep the fact that I belong to a key population as a secret	.778
ST13	I feel that telling someone about my behaviour is risky	.638
ST10	I feel that I need to work hard to keep my key behaviour status a secret	.609
ST12	I feel worried that people may judge me negatively when they learn about my behaviour	.795
ST7	I feel that people are afraid of me once they get to know that I belong to a key population	.576
ST6	I feel that people tend to ignore my good points when they get to know about my behaviour	.567
ST8	I feel that I am able to live the life I want, although I belong to a key population	.393

Extraction method: Principal component analysis Promax rotation

Factor naming

The three factors were named by analyzing the items in each factor. The three factors were named as below.

F1: Negative Self Image: ST1, ST2, ST3, ST4, ST5, ST9, ST16, ST18

F2: Disclosure concerns: ST10, ST11, ST13, ST14, ST15

F3: Public attitudes: ST6, ST7, ST8, ST12

Validity and Reliability of the instrument (BRSS)

Assessment of data set for comparability for confirmatory factor analysis

The sample size was 180 for 18 items. The ratio of participants to variables was 10:1 which was satisfactory. Normality of data was assessed by Kolmogorov – Smirnov and Shapiro – Wilk test of normality which were statistically significant confirming non normality of data. Histograms drawn for each item showed a non-normal distribution of data. The standardized skewness and kurtosis were calculated. These ratios

were greater than 1.96 had a p value of less than 0.05, indicating a significant skew or kurtosis.

Data was checked for outliers. Although there were few univariate outliers, they were included in the dataset as it was decided that they were important to be included following the opinion of a panel of experts. Bivariate correlations between items were examined. The highest correlation observed between the two items was 0.64, indicating that none of the two items were highly or perfectly correlated.

Assessment of construct validity through CFA

Confirmatory factor analysis was carried out to assess the comparability of the factor structure obtained following PCA in a different sample using the finalized BRSS. Since the distribution of responses obtained for each item did not confirm to a normal distribution, Robust Maximum Likelihood (RML) method was carried out. Several models of factor structures were evaluated using RML estimation method. The summary of model fit statistics of the three models described above is given in table 3.

Table 3: Model Fit Statistics of the One Factor, Two Factor and Three Factor Models of BRSS

Model	Absolute fit indices			Comparative fit		Parsimony correlation	
	X2	GFI	SRMR	NNFI	CFI	RMSEA	NCP
One factor model	433.3 119 <0.000	df = p	0.741	0.115	0.622	0.669	0.121 314.305
Two factor model	230.13 118 <0.000	df = p	0.859	0.0935	0.864	0.882	0.073 112.132
Three factor model	172.7 116	df = p	0.895	0.0573	0.930	0.904	0.052 56.701

Assessment of reliability of the BRSS:

The Cronbach’s alpha value of the overall BRSS was 0.85. All the values exceeded Nunnally’s criterion of 0.7, which were satisfactory (Nunnally, 1978).

Test – retest method was employed to assess the reliability. The BRSS which was used in the validation study was re-administered to a randomly selected 20 participants by the PI independently following a two-week interval. The total scores obtained for each subscale at the two occasions were compared.

The intra class correlation coefficient was 0.97 which indicates that there is excellent inter rater reliability, and 95% confidence interval was 0.948 – 0.992.

IV. CONCLUSION:

A 17 item tool with a three factor structure was developed to measure behaviour related stigma among key populations. It was named as “Behaviour Related Stigma Scale” (BRSS).

V. DISCUSSION:

Behaviour related stigma scale (BRSS) is the first ever validated tool which measures all the component the behaviour related stigma among KP. This can be used in any key population group. This can be used by the service implementers to measure to assess behaviour related stigma among KP and direct them for necessary interventions to overcome them if necessary. The newly developed BRSS is a cost effective tool which can be administered by an interviewer who has completed secondary education or self-administered by KP with similar educational level. The average time spent to administer the instrument was 15 -18 minutes which was considered satisfactory for a community based study.

The validity and reliability of the scale, reliability of data of the study and meeting the presumed assumptions in respondent driven sampling has increased the quality of conclusions obtained from the study.

In the absence of specific guidelines to measure behaviour related stigma among KP, guidelines for the development of scales which measure psychometric properties were followed (McDowell & Newell 1996; Tay & Jebb, 2017). A similar method has been used in development of new instruments in the field of HIV related stigma by Berger, Ferrans & Lashley (2001).

According to the generated definition, operationalization of behaviour related stigma was done and items were generated. It was ensured that the construct was well explored by the selected items. Upon exploration of the items, it was identified that behaviour related stigma could be assessed by introducing common items to all the KP groups by generalizing the items to the whole target group. Expert opinion was obtained from the same panel of experts regarding the suitability of developing a common tool. The current study followed the item reduction which was done using a non-statistical method. This has been identified as an accepted method for reduction of items from a pool (Redding et al., 2006).

This tool included a five point likert scale which has been recommended that to adopt a minimum of five responses in scale development (Striener & Norman, 1995). Sixteen out of seventeen items of the BRSS were positively scored while one item was negatively scored. This was done purposefully to minimize acquiescence response bias (Latkin et al., 2010) as done in Berger’s HIV stigma scale as well (Berger et al., 2001).

Galle district was selected for the validation study because an adequate amount from all four KP groups with diverse socio economic and cultural background could be found (NSACP, 2013; NSACP 2018 a). It is not recommended to use the same data set to explore the factor structure as well as assess the validity of the instrument. Hence, for confirmatory factor analysis, data was

collected from a different set of participants from the same study setting where data was collected for the PCA.

Since EFA analysis provides the best option for identification of the constructs, especially when the constructs cannot be hypothesized (Stapleton, 1997), it was performed to explore the underlying latent factors in the draft instrument (BRSS). The sample size used was considered adequate as it was more than the minimum sample size required for factor analysis which was more than 1:5 ratio (Brown, 2006).

Although the behaviour related stigma among KP were described as self – stigma and perceived stigma, the latter consisted of disclosure concerns and public attitudes. This subdivision of disclosure concerns and public attitudes under the category of perceived stigma has been explained by Brakel (2006) and Gray (2002).

Since there was no gold standard to measure behaviour related stigma among KP, criterion validity of BRSS was not assessed. Yet, the BRSS has shown adequate validity and reliability statistics for it to be accepted as a suitable study instrument to measure behaviour related stigma among KP in community setting.

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Declaration of interest:

I declare that there is no conflict of interest.

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