Hindi Adaptation and validation of Body Image Concern Inventory

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The present study aimed to adapt the Body Image Concern Inventory (BICI) into Hindi and assess the psychometric properties of the scale in a Hindi-speaking population. This scale was originally developed by Littleton, Axson, and Pure in 2005. A World Health Organization guideline for the translation and adaptation of this scale has been followed to translate it into Hindi. The Hindi version of the BICI, Body Dissatisfaction Scale, Rosenberg's Self-esteem Scale, and General Mental Health Questionnaire-28 was administered to the sample after the translation process was completed. The age range of participants was 15–25 years (76 males and 81 females). In the end, the factor structure and psychometric properties of the scale were evaluated. The exploratory factor analysis identified two factors. The first factor consists of 12 items that are labelled "symptom interference," and the second factor consists of 7 items labelled "dysmorphic symptoms." The reliability of the subscales as well as the full scale was found satisfactory (for symptom interference, r =.828; for dysmorphic symptoms, r =.789; for the full scale, r =.871). The scale's concurrent validity ranged from.38 to.42. Comprehensively, the findings suggest that the Hindi version of BICI is a reliable and valid tool and might be useful for research purposes as well as for assessing appearance concerns in Hindi-speaking zones.

Keywords: Body image concern inventory, Hindi adaptation, Psychometric properties, Factor Structure

Introduction

Body image concern is defined as preoccupation with various aspects of appearance as well as engaging in a number of associated behaviors. These behaviours include weighing and measuring themselves and examining their bodies; excessive checking or camouflaging of the perceived defect; frequent comparisons of their appearance to others; seeking reassurance from others about their appearance; and avoiding social activities due to fear that others will notice their perceived defects (Littleton & Breitkoph 2008). Body image concern is a broader concept than body dissatisfaction. It is not only restricted to concern about weight and shape; indeed, individuals may have several areas of concern, including skin, teeth, face

shape, nose size or shape, lips, and hair (Altamura et al., 2001; Bartsch, 2007; Cansever et al., 2003).

Littleton et al. (2005) developed the Body Image Concern Inventory (BICI) in English. This scale is free and widely available, and it is a brief self-reported measure scale that assesses multiple facets of dysmorphic appearance concerns, including appearance dissatisfaction and its influence on behaviour. This scale has been translated and validated in Japan (Tanaka et al., 2011), China (Wang et al., 2022), Italy (Luca et al., 2011), and among Spanish-speaking Mexican and Mexican American women in the United States (Littleton &Breitkoph, 2008). The BICI factor structure has been found to be inconsistent across cultures. Littleton et al. (2005) suggested a one-factor structure for the BICI measuring "general body image concern." In the Italian and Spanish versions, two factor structures have been reported: one primary factor with 12 items ("dysmorphic symptoms") and a smaller factor with 7 items ("symptom interference"; Littleton & Breitkoph, 2008; Luca et al., 2011). Later, a three-factor structure consisting of "safety behaviour

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against perceived flaws (SB)," "avoidant behaviours (AB)," and "negative evaluation of appearance" was described in the Japanese version of the BICI (Tanaka et al. 2011). In the Chinese version of BICI, a three-factor structure, i.e., "safety behavior," "avoidant behavior," and "negative evaluation," has been reported as a result of confirmatory factor analysis. Variation in the BICI factor structure across languages should not be viewed as a limitation of the tool; rather, it may represent the measure's cultural sensitivity, as body dissatisfaction varies across ethnic groups and cultures (Jung and Lee, 2006).The nature of body image concerns is also influenced by cultural factors such as collectivism and individualism (Cardero, 2011).

Body image concerns exist on a continuum (Callagham et al., 2011). In previous studies, a high level of body image concern has been associated with eating disorders and body dysmorphic disorder (American Psychiatric Association, 2013). Body image disturbance has also been associated with a lower level of well-being, depression, low self-esteem, a low level of psychological well-being, and a low level of life satisfaction (Jackson et al., 2014; Becker et al., 2017; Rusell et al., 2012; Javaid & Ajaml, 2019). In the Indian population, studies reported that 68% and 26% of adolescents were dissatisfied with their bodies, respectively, in Tamil Nadu and Lucknow (Raj & Ploriya, 2018; Dixit, Agarwal, Kant, & Singh, 2011). Indian studies reported that self-esteem and body image satisfaction are correlated with each other among sportspersons, medical students, housewives, clerical staff, and teachers (Margerette & Manoj, 2016). The association between body image and depression as well as weight control behaviour has also been reported in previous literature (Ganeshan, Ramshankar, & Ramalingam, 2018). Kumar (2020) reported a positive correlation between body image concern, a low level of life satisfaction, and poor mental health. As per the literature review, there is a dearth of studies that have studied the subclinical level of behaviour. The unavailability of a valid and reliable tool in Hindi to measure dysmorphic symptoms and the influence of body concerns on behaviour may be one of the reasons behind the scarcity of research in this area. Therefore, this study aimed to translate and validate BICI and further analyse its factor structure.

Sample

This study was conducted on students from various schools and colleges in Varanasi, India. Schools and colleges have been contacted for permission to collect data from students. A purposeful sampling technique was used to collect the data. First, the participants were given a thorough explanation, ensuring that they understood the study's purpose and requirements. The participants who gave their written consent were included in the sample. The consent form clearly states that the participants' information will be kept confidential, and their identities will not be revealed in any report. All the participants who could understand Hindi and were willing to participate have been included in the study. Participants who had undergone cosmetic surgery or any other surgery that resulted in a permanent change in the body, as well as students, who had any physical disability, psychological or neurological disorder, or severe medical problem, were excluded from the study. All the scales have been administered to 160 participants. Incomplete data have been excluded. So, the final sample of the study consists of 157 participants (76 males and 81 females).

Table 1
Sociodemographic Profile of the Participants

	Sociodemographic Variables	Mean(±SD) / Frequency%
Age	(Years)	20.46 (3.05)
Sex	Male	76 (48.4%)
	Female	81(51.6%)
Education	Matriculation	27 (17.2%)
	Intermediate	24 (15.3%)
	Graduate	53 (33.8%)
	Post Graduate	53 (33.8%)

Tools
Body Image Concern Inventory (Littleton et al, 2005)

This inventory was originally developed by Littleton, Axson, and Pure in 2005. This inventory consists of a total of 19 items that measure two aspects of body image (i.e., dysmorphic symptoms and symptom interference). For each item, the participants must respond on a Likert scale ranging from 1 (never) to 5 (always). The total score ranges from 19 to 95, where higher scores represent a high level of dysmorphic concern. The reliability of the scales is 0.92 and 0.76 for dysmorphic concern and symptom interference, respectively. The concurrent validity of the scale was 0.94.

Body Dissatisfaction Scale (Tariq and Ijaz,2015)

The Hindi version of the Body Dissatisfaction Scale, originally developed by Tariq and Ijaz (2015), assesses the level of body dissatisfaction. It consists of a total of 26 items; all the items on the scale are rated on a 5-point Likert scale ranging from 0 to 4. where 0 indicates "not at all" and 4 indicates "always." The reliability coefficient of the scale ranges from.89 to.94, and the concurrent validity ranges from.72 to.78. A high score on this scale denotes high dissatisfaction with the body.

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

A Hindi version of Rosenberg's self-esteem scale (Prashant & Arora, 1988) was used to assess self-esteem. It is a widely used, trustworthy, and reliable tool, with a high score indicating high self-esteem. This scale consists of a total of 10 items. Each item on the scale is rated on a 4-point Likert scale, and the available responses are 1 (strongly agree), 2 (agree), 3 (disagree), and 4 (strongly disagree). The reliability of the Indian version of Rosenberg's self-esteem is high (alpha = 0.80) in all age groups and diverse populations.

General Health questionnaire Scale (Goldberg, 1979)

The Hindi version of GHQ-28 (Shukla, Saxena, Dubey, & Pandey) was used to assess general mental health. It comprises 28 items, which are divided into four subscales. These are somatic symptoms, anxiety or insomnia, social dysfunction, and severe depression. All 28 items are rated on a 4-point Likert scale ranging from 0 to 3. A high score on this scale denotes high psychological distress. The internal consistency and reliability of the Hindi version of GHQ-28 were reported. 89. It also demonstrated good construct validity and concurrent validity.

Procedure

To develop a Hindi version of the Body Image Concern Inventory (BICI), three professors proficient in Hindi and English were selected for the translation. The forward translation was presented to the panel of subject experts, who were aware of the concept and purpose of the questionnaire. Forward translation work was given to another two professors for backward translation. Lastly, the original version of BICI and the translated version were reviewed together for inconsistencies. There is no culture-sensitive item in the scale; therefore, no culture-specific modification was required. This revised translation has been administered to a small group of students to identify any difficulty in understanding the items. A review of the response suggested no ambiguity or difficulty in understanding the items. Lastly, the Hindi version of the BICI was administered to the final sample to examine the factor structure, reliability, and validity of the translated scale.

Statistical Analyses

The IBM Statistics Package for Social Science, version 20, was used to analyse the obtained data. Exploratory factor analysis has been conducted to determine the factor structure of BICI using the principal component analysis method. Initially, Bartlett's test for sphericity was conducted to test the overall significance of all the correlations within the correlation matrix. To estimate the strength of the association among variables, the Kaiser-Meyer-Olkin measure of sampling adequacy was tested. After that, a scatter plot was used to determine the possible number of factors suitable to be retained. Using varimax rotation, the unrotated factor component matrix was rotated with a criterion of factor loading > 0.40 as recommended by Hair et al. (2014), and finally, the Cronbach's alpha coefficient was calculated to assess the reliability of the scale. The concurrent validity of the scale was computed using Pearson correlation coefficients.

Exploratory Factor Analysis: The result of the KMO sample adequacy test was found to be high (.798), which indicates the appropriateness of the sample for factor analysis. The value of Bartlett's test of sphericity was found to be significant (2 (171) = 1015.97), which indicates that the items are adequately correlated. The values of both tests were significant, which indicated the suitability and adequacy of the sample for computing factor analysis. As a result of principal component analysis, a total of 19 unrotated factors have been extracted. Eigenvalues greater than one were used to identify theoretically significant factors. Five factors had eigenvalues greater than one, accounting for 60.4 percent of the total variance. However, the examination of factor loading indicated some redundant factors. Therefore, the scree plot was used to identify a number of significant factors (Hair et al., 2014). In the scree plot, the eigenvalue is plotted graphically for each factor (Figure 1). It is evident from the scree plot that only two factors are significantly departed from the scree; therefore, these factors have been retained for the subsequent rotation. These two variables accounted for 42.45% of the variance.

Figure1: Scree Plot, Depicting Factors with Their Eigen Value
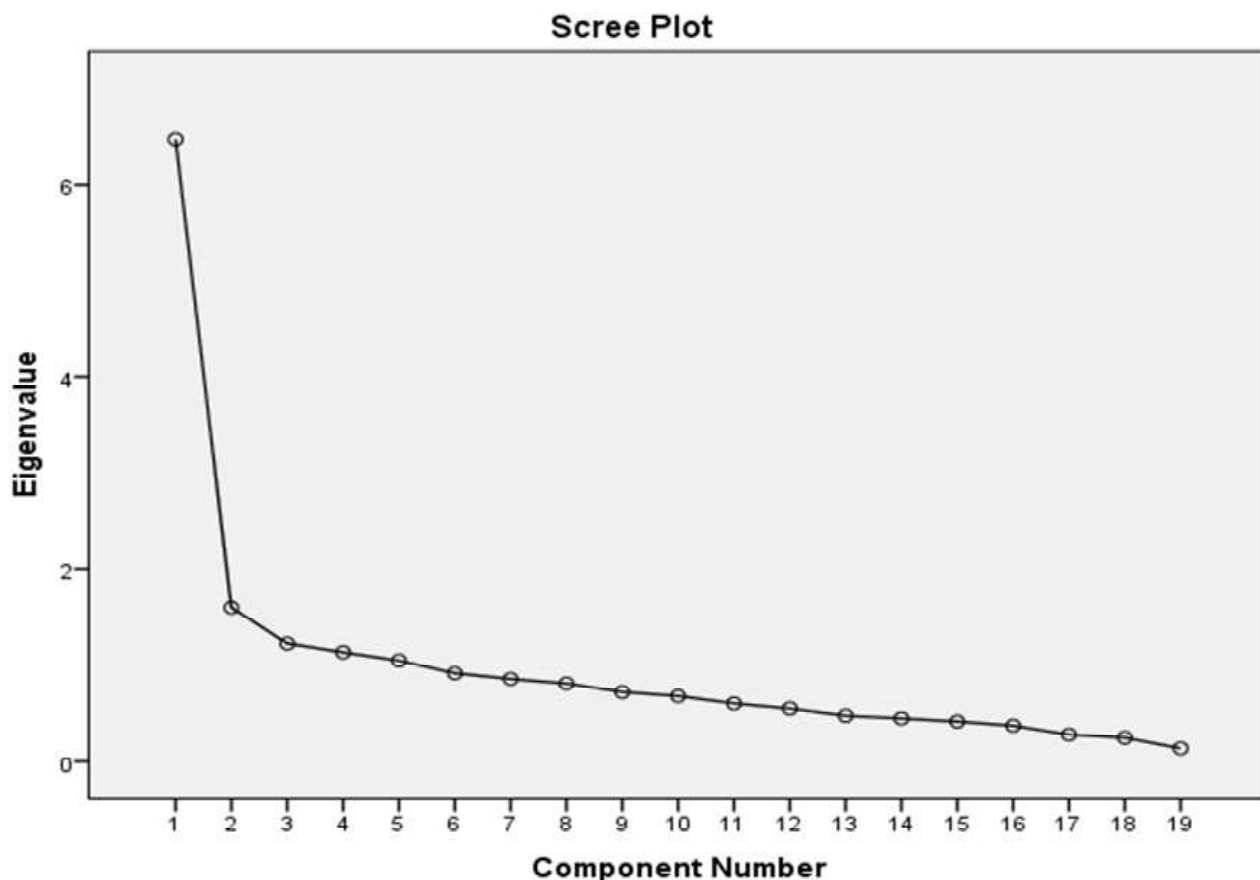
Varimax rotation, with the criteria of factor loading > 0.40 recommended by Hair et al. (2014) and Field (2009), has been performed. Two different factors were identified for the items in the Hindi version of BICI. The factor analysis revealed that, with the exception of item 19, each item was significantly loaded on two factors. Only 18 items have factor loadings greater than.40.Item 19 has a factor loading of.355.In the original paper of the BICI, item number 19 was found to be statistically weak but was still included in the scale due to expert ratings and the adequacy of this item among different samples (Littleton et al., 2005). Therefore, this item is retained in the Hindi version of the scale despite the low factor loading of the item. The factor loading of every item has been specified in Table 2. For each item, only the strongest loading has been presented in the table.

The first factor, which accounted for 22.29% of the total variance, included 12 items related to avoidance behavior, camouflaging of a perceived defect, and interference with functioning due to appearance concerns. This factor is labelled "symptom interference." The second factor contains items that indicate thoughts about appearance concerns, such as "I am ashamed of some of my body parts." This factor explains 20.15 percent of the total variance. This factor is labelled as a "dysmorphic concern."

Table 2: Item Factor loadings for Exploratory Factor Analysis Using Varimax Rotation method (N= 157)

items	Descriptions	Factor Loadings 1	2	Eigen Value	Variance Explained
Q 16	I have missed social activities because of my appearance. मैंने अपने शारीरिक बनावट / रंग रूप के कारण सामाजिक गतिविधियों को छोड़ा है।	.732			
Q 10	I compare my appearance to that of fashion models or others मैं मेरे दिखावे (रूप रंग) की तुलना फैशन मॉडल या अन्य से करती / करता हूं।	.661			
Q 7	I seek reassurance from others about my appearance. मैं दूसरों से अपने दिखावे (रूप रंग) के बारे में आश्वासन चाहता / चाहती हूं।	.660			
Q 6	I buy cosmetic products to try to improve my appearance. मैं अपने रंग रूप को बेहतर करने के लिए सौंदर्यवर्द्धक (कॉस्मेटिक) खरीदता / खरीदती हूं।	.590			
Q 15	I have considered consulting/consulted some sort of medical expert regarding flaws in my appearance. मैंने अपने शारीरिक बनावट (रूप रंग) के बारे में चिकित्सीय सलाह लेने के लिए विचार किया है।	.578		6.46	22.29%
Q 2	I spend a significant amount of time checking my appearance in the mirror. मैं एक सार्थक समय अपने (रूप रंग) को आईने में जांचने में बिताती / बिताता हूं।	.540			
Q 18	I fear that others will discover my flaws in appearance. मुझे डर है कि दूसरे मेरे शरीर (रूप रंग) की खामिया खोज लेंगे।	.536			
Q 11	I try to camouflage certain flaws in my appearance. मैं अपने दिखावे (रूप रंग) में कुछ खामियां को छुपाने की कोशिश करता / करती हूं।	.507			
Q 13	I have bought clothing to hide a certain aspect of my appearance. मैंने अपने शरीर (रूप रंग) के कुछ पक्षों को छिपाने के लिए विशेष कपड़े खरीदे हैं।	.489			
Q 17	I have been embarrassed to leave the house because of my appearance. मुझे अपने शारीरिक बनावट (रूप रंग) के कारण घर से बाहर निकलने में शर्मींदगी महसूस होती है।	.476			
Q 4	I am reluctant to engage in social activities when my appearance does not meet my satisfaction. जब मैं अपने बाहरी दिखावे (रूप रंग) से संतुष्ट नहीं होता / होती तो सामाजिक कार्यों को करने में रुचि नहीं लेता / लेती हूं।	440 .355			
Q 19	I have avoided looking at my appearance in the mirror. मैंने आईने में अपने रंग–रूप को देखने से परहेज किया है।				
Q 1	I am dissatisfied with some aspect of my appearance. मैं अपने बाहरी दिखावे (रूप रंग) के कुछ पक्षों से असन्तुष्ट हूं।		.778		
Q 8	I feel there are certain aspects of my appearance I would like to change. मुझे लगता है कि मेरे दिखावे (रूप रंग) के कुछ पहलू है जिन्हें मैं बदलना चाहूंगा / चाहूंगी।		.777		
Q 3	I feel others are speaking negatively of my appearance. मुझे महसूस होता है कि दूसरे मेरे दिखावे (रूप रंग) के बारे में नकारात्मक तरीके से बात करते हैं।		.591	1.59	20.15%
Q 12	I examine flaws in my appearance. मैं अपने दिखावे (रूप रंग) में कमियों की जांच करती / करता हूं।		.569		
Q 5	I feel there are certain aspects of my appearance that are extremely unattractive. मुझे लगता है कि मेरे दिखावे (रूप रंग) में कुछ पक्ष बहुत अधिक अनाकर्षक है।		.567		
Q 14	I feel others are more physically attractive than me. मुझे महसूस होता है कि दूसरे शारीरिक रूप से मुझसे ज्यादा आकर्षक है।		.557		
Q 9	I am ashamed of some part of my body. मुझे अपने शरीर के कुछ हिस्सों से शर्म आती है।		.530		

Sample Characteristics

The age group of the participants was 15–25 years (mean age = 20.49, SD = 2.81). The participants' educational levels ranged from 10th grade to post-graduate. The mean score of the Body Image Concern Inventory was 31.28. Furthermore, the mean scores for dysmorphic symptoms and symptom interference were 12.19 and 14.49, respectively.

Reliability

Cronbach's alpha coefficient was performed to assess the internal consistency of the scale as well as its subscale. Good Cronbach's alpha values were obtained for the full scale (.871) as well as subscales, i.e., dysmorphic symptoms (.789) and symptom interference (.828). These values indicate that the Hindi version of BICI has adequate internal consistency.

Between Subscale Correlation coefficient

The correlation coefficient among two subscales of the Hindi version was calculated to estimate the homogeneity of the present scale. Scores of the dysmorphic symptom subscale were significantly and positively correlated with scores of the symptom interference subscale (r =.571, p 0.001). The score of the full scale was significantly and positively correlated with the score of dysmorphic symptoms (r =.841 p 0.001) and the score of symptom interference (r =.344 p 0.001). This indicates that the scale is homogeneous in nature.

Validity

Concurrent Validity: Concurrent validity has been assessed by computing the correlation coefficient among the obtained responses from the body image concern inventory, body image dissatisfaction, Rosenberg's self-esteem scale, and General Health Questionnaire-28 (Table 3). The obtained correlation coefficient values indicated a substantial amount of concurrent validity for the scale. The BICI scores were found to be significantly positively correlated with the Body Dissatisfaction Scale (.385 p 0.001) and the General Health Questionnaire (.429 p 0.001), as well as significantly negatively correlated with Rosenberg's Self-Esteem Scale (-.392 p 0.001). According to the findings, higher levels of appearance concern are associated with higher levels of body image dissatisfaction, as high scores on the body image concern inventory indicate more concern about appearance and high scores on the body image dissatisfaction inventory reflect more dissatisfaction with the body. Similarly, scores of the BICI are positively correlated with the GHQ-28, which means a higher level of appearance concern is associated with poor mental health. Moreover, scores of the BICI are significantly negatively correlated with RSE (among the obtained responses from the body image concern inventory, body image dissatisfaction, Rosenberg's self-esteem scale, and General Health Questionnaire-28 (Table 3). The obtained correlation coefficient values indicated a substantial amount of concurrent validity for the scale. Scores of the BICI were found to be significantly positively correlated with the Body Dissatisfaction Scale (.385 p 0.001) and the General Health Questionnaire (.429 p 0.001), and significantly and negatively correlated with Rosenberg's Self-Esteem Scale (-.392 p 0.001). Results imply that higher levels of appearance concern are associated with high levels of body image dissatisfaction, as high scores on the body image concern inventory indicate more concern toward appearance and high scores on body image dissatisfaction reflect more dissatisfaction with the body. Similarly, scores of the BICI are positively correlated with the GHQ-28, which means a higher level of appearance concern is associated with poor mental health. Moreover, scores of the BICI are significantly negatively correlated with RSE (-.392, p 0.001), which indicates that individuals who have a high level of self-esteem have less concern about their appearance.

Table 3

Correlation of Hindi version of BICI with measure of Body Image Dissatisfaction, Self-esteem, and General Mental Health

Variables	Tools	N	Body image oncern	P value
Body Image Dissatisfaction	BDS	157	0.385	<0.001
Self-esteem	RSE	157	-0.392	<0.001
General Mental Health	GHQ-28	157	0.429	<0.001

BDS: Body Dissatisfaction Scale, RSE: Rosenberg Self-esteem Scale, GHQ-28: General Mental Health Questionnaire-28

Discussion

This study aimed to adapt and validate the body image concern scale as well as explore the factor structure of the scale. The scale was translated and presented to a panel of experts for suggestions on how to improve the content of the items. The scale has no culturally sensitive items; therefore, no cultural-specific modification was required.

As a result of factor analysis, a two-factor solution has been provided for the Hindi version of BICI. These factors are labelled as "symptom interference" and "dysmorphic concern." The factor loading of the items is different from the English version of BICI. Factor 1, which is labelled "symptom interference," has 12 items, and factor 2, which is labelled "dysmorphic concern," has 7 items. The factor structure of BICI was found to be inconsistent across cultures and languages. Spanish and Italian versions of BICI reported a two-factor structure, i.e., dysmorphic symptoms and symptom interference (Littleton &Breitkoph, 2008; Luca et al., 2011). Japanese and Chinese versions of BICI documented a three-factor structure consisting of "safety behavior," "avoidant behavior," and "negative evaluation of appearance."

The Hindi version of BICI had good internal consistency (both overall and subscale internal consistency values). Cronbach's alpha value was good for both factors and the full scale. It shows that items on the scale are correlated with each other and are thus homogenous in nature. To assess the validity of the scale correlation coefficient between scores of the BICI and scores of the body dissatisfaction scale, self-esteem, and general mental health questionnaire, a study has been conducted. These measures have been selected based on the previous association between body image and these variables. Previous research has shown that body dissatisfaction is a key indicator of body image concern and that body dissatisfaction leads to low self-esteem, negative emotions, depression, and poor psychological well-being (Jackson et al., 2014; Becker et al., 2017; Javaid &Ajaml, 2019). Thus, measures of body image dissatisfaction, self-esteem, and a general mental health questionnaire were considered to assess the concurrent validity of the scale.

In table 3, it is evident that scores of BICI have been significantly and negatively correlated with scores of self-esteem. On the other hand, a positive correlation can be observed between scores on the BICI and scores on the body dissatisfaction scale and general mental health (28). The association between these variables explains why individuals with a higher level of body image concern experience dissatisfaction with their bodies, a low level of self-esteem, and poor mental health. A similar association has been observed in the studies of Audrey, Satyadarma, and Subroto (2020) regarding self-esteem. Kumar (2020) reported a significant association between body image and psychological well-being. These studies provide evidence for the concurrent validity of the scale.

This tool can be very useful for measuring body image dissatisfaction and subclinical levels of appearance concern. The study does, however, have some limitations. The sample size was relatively small. Also, although the scale has been validated only in non-clinical populations, it can be validated in the clinical population.

Conclusion

The Hindi version of BICI is a reliable and valid tool to measure appearance concerns. It measures appearance concern under two factors: 1) dysmorphic symptoms, and 2) symptom interference. This scale would be useful for assessment and research purposes in the area of body image, particularly in the Hindi-speaking population.

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