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Developing and testing an instrument for identifying culture-specific barriers to breast cancer screening in Israeli Arab women

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Abstract

Aims. To develop and assess an instrument for studying culture-specific barriers to performing examinations for early detection of breast cancer. *Methods.* A three-step design: (a) content analysis of five focus groups (N = 51); (b) constructing and initial testing of the Arab culture-specific barriers (ACSB) instrument in a pilot study (N = 79); (c) testing for validity and reliability of the revised ACSB instrument (N = 300, of these 200 Muslim and 100 Christian, mean age 48). Construct validity was examined using factor analysis. Performance of screenings (mammography and clinical and self breast examination) was used to test criterion validity by logistic regression and receiver operating characteristic (ROC) curve; convergent validity was tested by the barriers subscale of the health beliefs questionnaire. Internal consistency reliability was tested by Cronbach's alpha coefficients. *Results.* Factor analysis revealed five subscales: social barriers, exposure barriers, environmental barriers, uneasiness with own body, and traditional beliefs concerning cancer. The factors accounted for 54.6% of cumulative variance. Twelve items not meeting item-scale criteria were removed, resulting in a 21-item instrument. Convergent validity was confirmed for all subscales except traditional beliefs. ACSB mean score explained between 0.79 (95% CI .72–.86) and 0.85 (95% CI .79–.94) of the area under the ROC curve of the screening procedures. Internal consistency of the subscales ranged from 0.76 to 0.90. *Conclusions.* The study showed initial satisfactory reliability of the ACSB. Validity was approved for social barriers, exposure barriers, environmental barriers and uneasiness with own body subscales, and only partially for traditional beliefs. Further examination of the instrument with different populations of Arab women is needed.

Screening for early detection of breast cancer is the most efficient way to increase survival from this illness [1]. Almost all studies assessing cancer screening in ethnic minority groups found lower participation rates than in the general population [2–4]. The lower participation rates were found related to provision of fewer services, difficulties in accessibility [3,4], poorer socioeconomic situation [5], and lower level of health literacy [6]. Other studies reported unique and culture-specific barriers to screening in different ethnic groups, such as Chinese-Australian [7], African American [8], Korean [9] and Arab [10] women.

The Arab population in Israel constitutes 19.6% of the general population. Most are Muslims (82.4%) or Christians (8.9%) [11]. They speak Arabic language, and share some likeness in cultural norms and values. The Arabs are mostly conservative and religious [12]. In the US population, people of Arab ancestry constitute 0.42% (approximately 1 189 000 people). Nearly half of the foreign-born Arabs arrived in the USA during the 1990's [13]. Accordingly, studying the relationships between culture and screening behavior, in order to promote screening attendance, is highly relevant for the Arab-American population and their health providers [14].

In Israel, age-adjusted rates of ever having undergone mammography are 36% in Arab women compared to 51% in Jewish women [15]. A telephone population-based survey of 929 randomly selected women showed that 74.1% of Jewish women aged 50+ and 45% of Arab women had ever undergone mammography. These lower rates among Arab women are partially responsible for diagnosis at a more advanced stage of the disease [16,17].

Culture-based beliefs of Arab women regarding screening for breast and cervical cancer were addressed in three studies with focus groups

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[14,18,19]. In Baron-Epel and colleagues' qualitative study, a major theme expressed by the women was fear of losing their role in society (as wife and mother) [18]. They perceived screening as an act that could possibly lead to a diagnosis of cancer, hence to their inability to fulfill the female role and to loss of status in society [18]. In Azaiza and Cohen's [19] study, the women evinced a combination of traditional beliefs and modern biomedical knowledge concerning risk and preventive factors related to cancer. Positive attitudes to screening were often integrated with traditional and religious beliefs. In another qualitative study with a small and not representative sample, Muslim-American women reported resisting screening for cervical cancer as it threatened their cultural and religious values [14]. Another study found that out of 98 female primary care physicians in the United Arab Emirates, only 40% reported ever having performed a Pap smear [20]. Presumably rates of attendance for early detection of breast and cervical cancer are increasing among Arab women with the growing number of educational interventions; we were unable to find more accurate studies.

Several validated questionnaires exist for the assessment of health beliefs regarding screening for breast cancer [21,22]. Although the existence of culture-specific barriers has been widely acknowledged [2,7–10] only two studies to our knowledge report using culture-based questionnaires [23,24]. Marks et al. [23] studied the role of cultural assimilation in breast cancer screening among Hispanic women, using an assimilation questionnaire. Tang et al. [24] constructed a questionnaire assessing cultural barriers to screening for Asian women, which revealed four factors: communication with mother, openness regarding sexuality, prevention orientation, and utilization of Western medicine. No attempt has been made so far to construct a cultural-based barriers questionnaire adapted for Arab women.

Identifying cultural health beliefs is a prerequisite for initiating change in health behaviors. This paper describes the development of a questionnaire on culture-based barriers to breast cancer screening constructed for Arab women, and tests of its validity and reliability.

Methods

The questionnaire on Arab Culture-Specific Barriers (ACSB) to breast cancer screening was developed in three consecutive phases, as previously suggested [25,26]: (1) content analysis of five focus groups, one of main methods for devising items for new scales. The groups serve to elicit the relevant themes as perceived by patients; (2) constructing the preliminary ACSB with a sample of 79 women; (3) testing the revised questionnaire with a sample of 300 women and constructing the final instrument.

Phase 1: Focus groups

Fifty-one women participated in five focus groups held in representative Arab communities: two large Arab villages in northern and central Israel, an Arab city, a city with a mixed Arab and Jewish population, and a Bedouin village in southern Israel. The women were recruited by the snowball method. All groups were held in Arabic and sessions lasted for two hours. The facilitators were social workers, and were trained to conduct the specific interviews. An interview guide was developed to ensure consistency of the groups.

The women's ages ranged from 20 to 58 years (M 37.0, SD 9.4), and they had between 0 and 19 years of education (M 10.7, SD 4.4). Most were married with 0 to 11 children (M 4.2, SD 2.5). About half of the women in four of the five groups worked outside the home. Most rated themselves religious or very religious.

Content analysis yielded four domains of cultural barriers: (1) social barriers to screening, including loss of the traditional roles and status of Arab women once diagnosed with breast cancer, and reactions of people to women attending screenings; (2) barriers to clinical examination and mammography due to embarrassment and uneasiness at exposing the body, religious instructions on modesty, or their situation as women in a conservative Arab society (e.g., may not travel alone) or as a minority group (language problems, alienation, accessibility); (3) barriers to breast self-examination due to feelings of uneasiness with their own body; (4) traditional beliefs regarding cancer, such as perceptions of cancer as punishment, atonement or a trial, and the healing power of religious writings.

Phase 2: Constructing and testing the initial ACSB
Methods

The initial ACSB instrument contained 33 items based on the four content categories: social barriers (8 items), barriers to clinical examinations and mammography (14 items), barriers to breast self-examination (4 items) and traditional beliefs about cancer (7 items). Answers ranged from 1 = not at all, to 5 = very much. Four professionals reviewed the instrument, several changes were made based on their comments, and content validity was confirmed.

A pre-test was conducted with a convenience sample of 79 women in representative Arab communities throughout Israel. Participants' mean age was 48.5 years (SD 5.7, range 40–68), 89.9% of them were married and had on average 4.8 children (SD 2.3, range 1–14). Fifty-four (67.1%) women were Muslim, 22 (27.8%) were Christian, and three (3.8%) were Druze. Mean years of education were 11.6 (SD 5.3, range 0–27).

Results

Four items were eliminated because of low percentage of answers, and three more because of correlation coefficients with other items above 0.80. Several items were rephrased. Cronbach's alpha was satisfactory, ranging from 0.69 to 0.93 for the different subscales.

Phase 3: Study phase methods

Participants. A random sample of 300 women participated in the study, 200 (66.7%) of them Muslim and 100 (33.3%) Christian. Demographic characteristics are shown in Table I: mean age was 48 years and the majority of the women were married. Level of education varied widely, about 37% worked outside home. More than 90% classified themselves as religious or very religious. Approximately 88% reported a good or fair economic situation. Four percent of the women had a first-degree female relative who had breast cancer.

Table I. Participants' demographic characteristics and breast examination rate (N = 300).

Demographics	
Age	
Mean (SD)	48.21 (5.81)
Range	40–65
Marital status N (%)	
Married	245 (81.7)
Not married	55 (18.3)
Years of education	
Mean (SD)	10.33 (4.42)
Range	0–25
Employment status N (%)	
Employed	110 (36.7)
Not employed	190 (63.3)
Economic background N (%)	
Good	102 (34.0)
Average	161 (53.7)
Poor	37 (12.3)
Religiosity N (%)	
Secular	26 (8.7)
Mildly religious	143 (47.7)
Very religious	131 (43.6)
Mammography test[1] N (%)	
Done in previous two years	52 (41.3)
Never done	74 (58.7)
Clinical examination N (%)	
Done in previous two years	96 (32.0)
Never done	204 (68.0)
Breast self-examination N (%)	
Done once in two months or more	161 (53.7)
Never done	139 (46.3)
Has a first-degree relative with breast cancer N (%)	12 (4.0)

[1]Women over 50 (n = 105).

Procedure. Participants were recruited from the north and center of Israel, with the proportion set at 200 women from the north and 100 women from the center (based on the proportion of Arab inhabitants in each area). The sample was controlled for proportion of Christian (n = 100) and Muslim (n = 200) women. To obtain a large enough sample of Christian women, their proportion in the study relative to their proportion in the general population was enlarged.

The northern sample was 100 Christian and 100 Muslim women from a major Arab city, two large towns, five small villages, and two cities with mixed Arab and Jewish population. The center sample was Muslim women only, as most of the Arab population in the central part of Israel is Muslim. Interviewers went from house to house in the different neighborhoods of each community. One woman in each household, aged 40–65, took part in the study. When no eligible woman was at home, that house was bypassed. The women were interviewed in Arabic. Twenty-one households refused to participate. Response rate was 93.5%. The interviewers were trained for the study, which was approved by the university ethics committee.

Questionnaires. Demographic data included age, family status, education, employment, perceived economic status, level of religiosity, and having a first-degree relative suffering from breast cancer.

Breast examinations. Frequency of mammography, clinical and self breast examinations. Mammography attendance was analyzed only for women aged 50 and over (as recommended by the Israel Cancer Association [27]). Attending mammography and clinical examination was coded 1 = had attended in previous year or two years and 0 = had never attended. Breast self-examination performance was

coded 1 = had performed at least once in previous two months and 0 = had never performed.

The Arab Culture-Specific Barriers (ACSB) consisted of 26 items, tapping into four domains: barriers to clinical examinations and mammography (10 items), social barriers (6 items), traditional beliefs about cancer, (6 items), and barriers to breast self-examination (4 items). Answers ranged from 1 = not at all, to 5 = very much. Internal consistency (α) was 0.68 to 0.94.

Barriers to breast examinations is a subscale of the health beliefs questionnaire [20,21]. The Arabic version of the questionnaire was used in two previous studies, [2,10] in which internal consistency of the subscale was 0.92 and 0.89. The barriers scale consisted of seven items each for barriers to mammography and clinical examination: time, availability, costs, being painful, being embarrassing, causing anxiety, and possible harm to health. Barriers to breast self-examination were measured by three items: lack of knowledge and lack of skill to perform the examination, and disbelief as to its benefits. Answers ranged from 1 = strongly agree, to 5 = strongly disagree. Internal consistency (α) of the scales ranged from 0.86 to 0.93.

Statistical methods. New instruments are usually tested for validity (i.e., degree of being accurate measures of variables such as attitudes, characteristics or symptoms). Three types of validity were examined in this phase, as previously suggested: construct validity, convergent validity and criterion validity [28,29].

1. Construct validity is concerned with the theoretical relationship of a variable to other groups of variables. Factor analysis is usually used to validate a new scale, demonstrating that its constituent items load on the same factor, and to omit proposed scale items that cross-load on more than one factor [28]. Factor analysis was performed using principal components as the extraction method for obtaining the initial factor solution.

Laiser-Meyer-Olkin's test [29] and Bartlett's test of sphericity [30] were both performed for suitability of the data for factor analysis. The former [29] measures suitability, based on the principle that if variables share common factors, partial correlations between pairs of variables should be small when the other variables are controlled. Larger numbers indicate better adequacy. The latter assesses whether the correlation matrix is suitable for factor analysis, with lower p-value indicative of better suitability [30]. As correlated factors could be expected, the oblique rotation with Promax was used. Excluded were items with loadings lower than 0.5 or items cross-loading on two factors, with difference lower than 0.2.

2. Convergent validity is determined when two scales purported to measure similar phenomena show a relatively high correlation, but not too high [26]. Pearson correlations were conducted to assess the associations between the ACSB subscales and the barriers scales [22].

For scale validation, high correlations between the scales are expected as this will indicate that the new scale measures the barriers constructs. But the correlations are not expected to be too high, as this might show that the new scale measures identically to the existing health beliefs barriers scale.

3. Criterion validity is the scale's ability to predict some criterion (e.g., a behavior or a diagnosis) [25,26]. It was examined by logistic regression analyses, which assessed the likelihood of breast examination performance from the ACSB subscales. The enter method was used. The ACSB mean score was also subjected to Receiver Operating Characteristic (ROC) analysis in order to further determine the discriminant properties of the instrument. The ROC analysis discriminates between true positive rate and false positive rate for different cut-off points of a parameter. Thus, the area under the ROC curve is a measure of how well the scale can distinguish between two groups (performed/never performed examinations) [26].

Cronbach's internal consistency was analyzed to determine reliability. Missing data were handled with casewise deletion. Data were analyzed using SPSS 14.

Results

Construct validity

To examine whether the ACSB items reflected underlying dimensions of cultural perceptions, principal component factor analysis was performed. Tests of the suitability of the data for factor analysis proved satisfactory: the Laiser-Meyer-Olkin test [29] value was 0.79, exceeding the recommended value of 0.60. Bartlett's sphericity test [30] reached statistical significance ($p = 0.0001$). Inspection of the end solution showed five factors, all with Eigen values higher than 1, cumulatively accounting for 54.61% of the total variance (Table II). Three items with

Table II. Factor loadings[a], Eigen values[b], means and reliability scores in the final factor-analysis model (N = 300).

	Factor 1 Exposure barriers	Factor 2 Social barriers	Factor 3 Traditional beliefs	Factor 4 Environment barriers	Factor 5 Uneasiness with own body
Exposure of body to male physician	0.82				
Exposure of body to female physician	0.73				
Body exposure forbidden by religion	0.70				
Fear of being seen at the clinic	0.68				
Fear of pity		0.77			
Fear of disrespect by family		0.65			
Fear of losing job		0.63			
Fear of losing friends		0.62			
Fear of husband's detachment, resentment		0.58			
Fear of neglecting the family		0.55			
Cancer is a way of punishment by God			0.74		
Cancer is a way of atonement for bad deeds by God			0.73		
Cancer is a trial by God			0.73		
Reading religious writings helps			0.63		
Communication barriers				0.65	
Accessibility barriers				0.57	
Cost barriers				0.51	
No privacy for examining breast					0.67
Uneasiness looking at own body					0.55
Uneasiness touching own body					0.55
Eigen value	4.81	2.55	1.95	1.73	1.47
Mean	3.03	2.86	3.08	3.21	1.64
(SD)	(0.36)	(0.90)	(0.93)	(0.79)	(0.97)
Range	1–5	1–5	1.29–5	1–5	1–4.60
Cronbach's alpha	0.87	0.78	0.76	0.86	0.85

[a]Factor loadings represent the degree of correlation between the initial raw score and the final factor score.
[b]Eigen values are indicators of variance accounted for each factor.

factor loading lower than 0.5 were eliminated; two items were excluded due to cross-loading, i.e., factor loading difference lower than 0.2.

The emerging factors were slightly different from the original dimensions. Factor 1 included barriers to exposure of body (4 items), factor 2 included social barriers (6 items), factor 3 included traditional beliefs about cancer (4 items), factor 4 included environmental barriers (3 items), and factor 5 included uneasiness with own body (4 items) (Appendix 1). Means, SD and ranges for the factors are presented in Table II. The means of factors ranged from 1.36 to 3.03.

Convergent validity

Convergent validity was measured by correlations between the ACSB scales and the subscales of barriers to breast self-examination, clinical examination and mammography [22]. Table III shows that the social barriers, exposure barriers, environmental barriers and uneasiness with own body were positively and significantly associated with the barriers subscales of the health belief questionnaire. The traditional beliefs subscale was positively associated with barriers to breast self-examination, but not with mammography and clinical examinations.

Criterion validity

Criterion validity of the ACSB was assessed by the criterion of performing breast examinations (mammography, clinical examination, and self-examination) by means of logistic regression (Table IV). Table IV shows that the subscales of social barriers, exposure barriers, environmental barriers and uneasiness with own body significantly increased the odds of non-performance of breast examinations, between 1.27 (95% CI 1.64–2.91) and 20.22 (95% CI 5.06–37.86). The environmental barriers subscale was not significantly associated with self-examination, and the uneasiness with own body subscale was not significantly associated with mammography. Regarding traditional beliefs about cancer, these significantly increased odds for breast self-examination, but this subscale was not significantly associated with mammography or clinical examinations. At the next stage a mean score of ACSB (except for traditional beliefs about cancer) was calculated and was subjected to Receiver Operating

Table III. Pearson correlations between ACSB subscales and barriers and benefits subscales of the health belief questionnaire (N = 300).

	Mammography		Clinical examination		Breast self-examination	
	Barriers	Benefits	Barriers	Benefits	Barriers	Benefits
Exposure barriers	.47***	−.32***	.51***	−.32***	.25***	−.21*
Social barriers	.15*	.10	.19**	.02	.20**	−.14*
Traditional beliefs	−.01	.13*	−.06	.18*	.24***	.04
Environmental barriers	.22***	−.07	.22***	−.19**	.12*	−.10
Self-uneasiness	.18**	−.05	.21**	−.07	.34***	−.26***

Characteristic (ROC) analysis to assess its discriminating properties. For breast self-examination, the area under the ROC curve was 0.79 (95% CI .72–.86), for clinical examination it was 0.84 (95% CI .78–.92), and for mammography it was 0.85 (95% CI .79–.94). ROC analysis revealed that the mean ACSB score was associated with the breast examinations.

Reliability

The subscales based on the factor model proved to have internal consistency (Cronbach's alpha) coefficients of 0.76 to 0.90 (Table II).

Discussion

Based on the central role of culture-specific beliefs in screening behaviors, the study set out to develop and assess the ACSB instrument. It was constructed to facilitate further research, which will expand understanding of the effect of culture on perceptions and behaviors regarding screenings for early detection of breast cancer. Scholars have previously attested to the importance of learning about the specific effects of culture on health and health behavior and of ethnic populations, in order to enhance professionals' cultural competence and thus reduce health disparities [31]. Nevertheless, hardly any instruments have been developed for culture-based perceptions related to screening for breast cancer, and none at all for the Arab population anywhere in the world.

The paper outlines the process of validation of the ACSB. We found satisfactory validity and reliability for the ACSB, although, as in case of any new instrument, further examinations are needed.

Five factors emerged in the factor analysis, in contrast to the initial four dimensions developed out of the content analysis. The initial subscale of barriers to mammography and to clinical examination was divided into barriers to body exposure and environmental barriers, while the other three subscales remained intact and were confirmed by the factor analysis. Reconfiguration of factors through factor analysis is often possible in the process of establishing new scales. Steiner and Norman [26] explain that construct validation is "a process of learning more about the construct, making new predictions, and testing them" (p. 180). This is especially true for an entirely new construct such as cultural-based barriers. The new factors fine-tune our understanding of culture-based barriers still more: they no longer seem to apply to specific examinations, but to be rooted in deeper perceptions about the body, the meaning of exposure, and the environment as possible obstacles to all three examinations. The degree of explanation of the cumulative variance is satisfactorily founded [28].

Factor analysis is a vital step in the development of new instruments [25,26,28]. It helps in the arrangement of items into subgroups and in the decision process of dropping items. A disadvantage of this validation test is the lack of a cut-off score that determines construct validity.

Table IV. Logistic regression analysis with breast examination performance as dependent variable and ACSB scales as independent variables.

	Mammography[1] (n = 126)		Clinical examination (n = 300)		Breast self-examination (n = 300)	
Variables	OR	CI 95%	OR	CI 95%	OR	CI 95%
Exposure barriers	20.22***	5.06–37.86	1.72**	1.24–3.15	1.33*	1.13–2.56
Social barriers	1.39*	0.76–2.06	2.74***	1.73–4.34	1.36*	1.10–2.12
Traditional beliefs	1.15	0.71–2.43	0.79	0.43–1.46	4.33***	.81–10.331
Environmental barriers	5.22**	1.58–17.22	3.40***	1.70–6.79	.850	.59–1.240
Self-uneasiness	1.27**	1.64–2.91	1.15	0.76–1.29	12.70***	5.82–21.70
χ^2 (5)	81.80***		96.29***		152.43***	

[1]Women aged 50 and over; OR = odds ratio, CI = confidence interval.
*p < 0.05, **p < 0.01, ***p < 0.001.

Convergent validity is based on the principle that the factors of the new instrument should correlate to some degree with existing scales measuring similar constructs [25,26]. The convergent validity of ACSB was assessed against the three barriers subscales (barriers to clinical examination, to mammography, and to self-examination) of the health beliefs questionnaire [21]. Convergent validity was confirmed for all ACSB subscales except traditional beliefs. In contrast to the four validated subscales, the traditional beliefs subscale associated with barriers to self-examination not with barriers to mammography and clinical examination. These mixed results may be explained by the duality that exists in Arab society regarding traditional beliefs about health and illness [19]. The belief that cancer is an immutable fate, ordained by God, is ubiquitous in Arab society [32]. However, religious texts also heavily stress personal responsibility and taking an active role in promoting and preserving one's health [33]. This view is also supported by modern processes encouraging women to assume an active role in protecting health [34]. Convergent validity of this subscale should perhaps be measured against other constructs, such as scales of faith or religiosity.

A mean score for the ACSB (except the traditional bekiefs subscale) was calculated. It showed satisfactory criterion validity, explaining between 0.79 (95% CI .72–.86) and 0.85 (95% CI .79–.94) of the area under the ROC curve. Accordingly, it provides good discrimination between women performing and not performing the screening tests, and is predictive of carrying out each breast examination procedure.

Changing health behaviors and improving screening attendance is a major aim of health professionals. Empirical intervention studies have demonstrated that barriers can be lowered or modified once they are identified, and can serve as a basis for an intervention plan [35,36]. The present instrument may further serve as a tool for planning and implementing interventions to increase screening attendance among Arab-Israeli women.

In addition to its strengths, the study has some limitations. One of these might be a selection bias caused by our not interviewing women who were not at home. Still, the large sample, covering women from different areas and types of residents, and a good representation of the religious groups, hopefully minimized this bias. Also, the high response rate strengthens the study's generalizibilty. Another limitation is not assessing divergent validity against a social desirability scale, which might have reinforced the results, but could not be applied due to the length of the interview. Yet another limitation is that the instrument was not tested in other cultural subgroups of Arab women or in other countries. Its applicability to Arab women in other countries, such as Arab states where modernization processes have not been as pervasive as in Israel, or to Arab women in the USA and Europe, is still in doubt.

Controlled studies with larger sample size are needed to further examine the instrument and its properties. A two time-point study could also give more information on its test-retest reliability.

Culture is a complex and multidimensional construct, especially in changing societies [37]. We do not pretend that our instrument plumbs cultural depth and complexity entirely. This is only a first step in an attempt to build a validated instrument to measure cultural aspects of health behaviors. Further research is needed to test and improve this instrument.

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Appendix 1. ACSB questionnaire, final version.

Factor 1: Exposure barriers	
A male physician examining my breast embarrasses me	1.
A female physician examining my breast embarrasses me	2.
Body exposure is forbidden by religion	3.
I fear being seen at the clinic	4.
Factor 2: Social barriers	
Fear pity by others	5.
Fear disrespect by my family	6.
Fear losing my job	7.
Fear my husband's detachment, resentment	8.
Fear neglecting my family	9.
Fear losing my friends	10.
Factor 3: Religious beliefs concerning cancer	
Cancer is a way of punishment by God	11.
Cancer is a way of atonement for bad deeds by God	12.
Cancer is a trial by God	13.
Reading religious writings assists healing	14.
Factor 4: Environmental barriers	
Language and communication	15.
Distance and accessibility of the clinic	16.
Cost of the examinations	17.
Factor 4: Uneasiness with own body	
I feel embarrassed looking at my body	18.
I feel embarrassed touching my body	19.
I have no privacy to examine my body	20.
I do not know my body sufficiently to recognize changes in it.	21.