

Development and Psychometric Testing of the Wilmoth Sexual Behaviors Questionnaire–Female

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L'objectif de cette étude était de développer et d'évaluer le questionnaire Wilmoth portant sur les comportements sexuels chez les femmes (WSBQ-F). Tel que conçu au départ, le WSBQ-F comportait 54 points organisés en huit sous-catégories. Les points étaient évalués selon une échelle du type Likert, le pointage élevé reflétant la présence plus soutenue d'un comportement sexuel. Un échantillon de commodité de 310 femmes atteintes de cancer du sein ($n = 165$) et de femmes bien portantes ($n = 145$) a été utilisé dans le cadre de cette étude. Un index de validité de contenu de 1,00 a été établi. La validité conceptuelle a été évaluée à l'aide de l'analyse factorielle et de la méthode des groupes connus. La fiabilité de la consistance interne était de 0,94 en ce qui a trait à l'échelle totale, avec des coefficients variant de 0,52 à 0,94 quant aux sous-catégories. La corrélation de test-retest était de 0,81 en ce qui a trait à l'échelle totale; les coefficients des sous-catégories se situaient entre 0,58 et 0,88. Les tests initiaux de la mesure suggéraient que le WSBQ-F est un outil de mesure de comportements sexuels féminins fiable et valable.

The purpose of this study was to develop and test the Wilmoth Sexual Behaviors Questionnaire–Female. As initially developed, the WSBQ–F consisted of 54 items arranged in 8 subscales. Items were rated on a Likert-type scale, with high scores reflecting more consistent use of a sexual behaviour. A convenience sample of 310 women with breast cancer ($n = 165$) and healthy women ($n = 145$) participated in the study. An Index of Content Validity of 1.00 was obtained. Construct validity was estimated using exploratory factor analysis and the known groups method. Internal consistency reliability was .94 for the total scale, with coefficients ranging between 0.52 and 0.94 for the subscales. The test-retest correlation coefficient was .81 for the total scale; coefficients were between .58 and .88 for the subscales. Initial testing of the measure suggests that the WSBQ–F is a reliable and valid measure of female sexual behaviours.

Sexuality is a quality-of-life issue that nurses can no longer ignore. Our patients expect and deserve high-quality, holistic health care. Nursing care that ignores this aspect of life is substandard. Furthermore, there are standards of practice related to sexuality (American Nurses Association & Oncology Nursing Society, 1996) that nurses are held to,

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and these may be considered legal standards as well (Andrews, Goldberg, & Kaplan, 1996).

Nurses cannot meet these standards of practice without adequate information. The literature on the sexual effects of medical conditions or developmental changes is sparse. There are various reasons for this situation, including the limited number of reliable and valid measurement tools. Sexuality is a broad, complex construct and therefore is difficult to measure. A related problem is the lack of tools specific to female sexuality. Male and female sexuality differ (Masters & Johnson, 1966; Taylor, Rosen, & Leiblum, 1994), and it is important that measurement tools reflect the differences. The purpose of this study was to develop a measure specific to female sexuality based on a nursing model. What follows is a report on the development and initial testing of the measure.

Literature Review

Sexuality research generally focuses on a limited component of the construct, and this leads to a lack of comprehensive information on the sexual limitations of medical conditions and treatments. The literature was reviewed to determine whether a lack of measurement tools has contributed to this lack of knowledge. Female sexuality is broadly defined in the literature as physiologic, psychologic, and cognitive aspects of defining the self as female, including giving and receiving sensual pleasure, a desire for closeness and intimacy, and the release of sexual tensions. The criteria used in reviewing sexuality measurement tools included: (1) use of an identified theory, (2) comprehensive assessment of female sexuality, (3) clinical utility, (4) utility not limited to a specific medical condition, and (5) psychometric properties. None of the sexuality measures that were reviewed met all of these criteria.

Tools have generally lacked an identified theoretical framework or a theoretical definition of the construct being measured (Bentler, 1967; Hanson & Brouse, 1983; Hoon, Hoon, & Wincze, 1976; Taylor et al., 1994). The tool developed by Waterhouse and Metcalfe (1986) was loosely based on the Roy Adaptation Model (Metcalfe, 1990). Some authors report on psychometric testing of heterosexual samples but do not identify the presence or absence of medical conditions in the subjects, which inhibits use of the tools among samples with a diagnosed condition (Bentler; Derogatis & Melisaratos, 1979; Hoon et al.; Taylor et al.). Other tools have been designed for use among subjects with a specific medical condition (Bransfield, Horiot, & Nabid, 1984; Hanson & Brouse; Waterhouse & Metcalfe), which hinders comparison to healthy

samples and to those with other health problems. Some tools address a limited aspect of sexuality such as sexual intercourse (Bransfield et al.), arousal (Hoon et al.), or intimacy (Hetherington, 1988), or are specifically directed at heterosexual women (Bentler). Two measures are quite lengthy and thus of limited clinical utility (Derogatis & Melisaratos; Waterhouse & Metcalfe). Finally, while adequate reliability is reported for all measures, satisfactory validity is reported for only three (Hetherington; Hoon et al.; Taylor et al.).

In summary, there is a lack of psychometrically sound measures that are clinically useful and that address a broad range of female sexual behaviours in multiple populations using an identified theory base. This deficit prompted the development of a measure of female sexuality guided by a nursing conceptual framework.

Tool Development Process

Conceptual Framework

Johnson's Behavioral Systems Model (JBSM) (Johnson, 1980) guided development of the tool. The JBSM views the individual as an open behavioural system with integrated and interdependent parts. The parts, called subsystems, encompass physiologic as well as psychologic behavioural functioning.

The "sexual subsystem" encompasses a wide range of sexual behaviours related to biologic sex, with the dual functions of procreation and gratification (Johnson, 1980). Johnson does not identify the specific sexual behaviours in which an individual can engage, but does indicate that desire is the drive or motivation necessary for attainment of the goal of sexual gratification. She does not define gratification or indicate how to determine when it has been achieved, but she does imply that behaviours indicate the drive that has been stimulated or the goal that is being sought.

Johnson (1980) explains that the behaviours typically chosen by an individual make up that person's "set" of behaviours, and that behaviours may vary slightly according to the individual's current emotions, relationship status, and health status. The model indicates that sexual behaviour is a trait attribute that is relatively stable until a crisis occurs, such as diagnosis and treatment of a medical condition. Consistent with this, frequency of a given behaviour is one way to measure and identify an individual's set of behaviours. This is congruent with Cronbach's (Waltz, Strickland, & Lenz, 1991) and Johnson's assumptions that trait conceptualizations have behavioural regularity.

Tool Construction

The Wilmoth Sexual Behaviors Questionnaire–Female (WSBQ–F) was developed from a comprehensive review of the literature, a review of measures of sexuality, and focus-group input. Sexual behaviour is defined as the range of behaviours in which an individual can engage, alone or with another person, to reduce sexual tensions and achieve satisfaction (Wilmoth, 1993). Respondents are asked to refer to their current sexual behaviour when completing the questionnaire.

The JBSM guided identification of behavioural components from the literature. These were: communication, appearance, arousal, activity level, techniques, and orgasm. Communication was defined as verbal talk between partners. Appearance was conceptualized as physical appearance both when clothed and when unclothed. Desire was defined as interest in sexual activity both with and without a partner. Arousal was conceptualized as the physical manifestation of desire, such as vaginal lubrication. Activity level was defined as both initiation of and frequency of sexual activity. Techniques was defined as self-touch of various body parts as well as positions used when engaging in sexual activity. Orgasm was defined as the ability to achieve orgasm as well as the intensity of orgasm. Finally, satisfaction was conceptualized as being content after sexual activity and feeling close to one's partner after engaging in sexual behaviours.

An item pool of 86 behaviours was developed. Items represented identified components of sexual behaviour and the subsystem drive and goal (desire and gratification). Items were worded to elicit typical sexual behaviour, which is consistent with measurement of trait attributes (Waltz et al., 1991). Items were worded as statements rather than questions, to make them seem less intrusive and as neutral as possible regarding sexual orientation.

A focus group of 20 healthy women plus a group of breast cancer survivors from a university community and breast cancer support groups volunteered to review the items. Focus groups recommended that items on anal intercourse be eliminated to reduce embarrassment and to enhance the willingness of participants to complete the questionnaire.

A revised draft of the WSBQ–F was reviewed by the focus group a second time for content, wording, and format. The focus group recommended that of 54 of the original 86 items be tested. The instrument was pilot tested by six women with breast cancer and four healthy women. The women were asked to review the items on the WSBQ–F

and to make suggestions for additions, deletions, and rewording. Their suggestions resulted in increased clarity but no change in the number of items.

Description of the WSBQ-F

The WSBQ-F measures consistency in use of a sexual behaviour in terms of frequency. Higher scores reflect greater consistency in specific sexual behaviours. If the WSBQ-F is administered to the same individual at different times, score differentials would quantify changes in use of one or more sexual behaviours, indicating a change in the individual's set of behaviours and perhaps a need for further assessment and referral.

The version of the WSBQ-F that was submitted for psychometric testing consisted of 54 statements scored on a 7-point Likert scale of 0 to 6 (0 = not applicable, 1 = never, 6 = always). The *not applicable* choice was included to distinguish between items that were not part of a subject's set of sexual behaviours and items that were part of their set of behaviours but were not currently being used, which would receive a *never* response. For example, items on touching of surgical scars would be *not applicable* if the subject had not had surgery, whereas items on heterosexual intercourse would receive a *never* response if they were part of one's set of behaviours but were not being used currently.

The measure requires 20 minutes to complete. Items reflective of each component of sexual behaviour were grouped together for initial testing of the tool. The range of scores is 0-324; higher scores reflect greater regularity in use of sexual behaviours.

Method

Sample

Women from two distinct populations, healthy women and women with breast cancer, were selected to test the WSBQ-F for its ability to distinguish between groups. The study sample consisted of a convenience sample of healthy women ("healthy subjects") and women with breast cancer treated with either a modified radical mastectomy or breast conservation surgery (lumpectomy) ("breast cancer subjects"). A minimum of 270 subjects were needed to adequately perform factor analysis (54 items x 5 subjects per item) (Ferketich, 1991). Oversampling of both groups was planned, to account for potentially high non-response rates due to the sensitivity of the material.

A convenience sample of healthy subjects was drawn from among 400 nurses selected from the membership of a professional organization. Inclusion criteria were: over 25 but not more than 75 years old, no history of breast cancer, and ability to read and write English. A total of 145 nurses (36%) returned the completed questionnaire. The 50 subjects who returned it within 4 weeks were mailed the WSBQ-F a second time for test-retest purposes; 25 (50%) of this group returned the completed questionnaire.

A convenience sample of breast cancer subjects was drawn from among 330 women with a history of breast cancer from physician practices, national and regional breast cancer support groups, on-line support groups, and individual networking. Inclusion criteria were: over 25 but not more than 75 years old, at least 6 months post-diagnosis of cancer, and ability to read and write English. A total of 165 women with breast cancer (50%) returned the completed questionnaire.

The demographic characteristics of both groups of subjects are described in Table 1.

The majority of healthy subjects were Caucasian, married, between the ages of 25 and 45, with a university degree. The majority of these women had not yet experienced menopause (85%) and described themselves as "healthy," although 68% had had surgery at some point in their lives, the most common type being Caesarean section.

The majority of breast cancer subjects were Caucasian, married, between the ages of 36 and 55, with some university education. One half (51%) of these women were within 3 years of their cancer diagnosis. Most ($n = 119$, 72%) had had a modified radical mastectomy as their primary surgical treatment, 45 (27%) had had a lumpectomy, and one subject did not know what type of surgery she had had. Forty-eight subjects had chosen to have breast reconstruction. A majority of this group had received one or more forms of adjuvant therapy. It was not possible to compare subjects and non-respondents, since no data were available for the non-respondents.

Procedure

All potential subjects were mailed a study packet consisting of a letter describing the purpose of the study, a Demographic Data form, the WSBQ-F, and a self-addressed, stamped return envelope. A university human subjects committee approved the study. Consent to participate was indicated by return of the confidential survey.

Table 1 *Demographic Characteristics of Subjects*

	Healthy	Breast Cancer
Age		
25–35	56 (39%)	12 (7%)
36–45	55 (37%)	48 (29%)
46–55	26 (18%)	62 (38%)
56–65	7 (5%)	28 (17%)
66–75	1 (1%)	15 (9%)
Education		
< High school	0	3 (2%)
High school	1 (1%)	18 (11%)
Technical	3 (2%)	10 (6%)
Some university	16 (11%)	52 (31%)
University	82 (56%)	34 (21%)
Postgraduate	43 (30%)	48 (29%)
Race		
Caucasian	136 (94%)	158 (96%)
Black	4 (3%)	4 (2%)
Hispanic	3 (2%)	2 (1%)
Asian	2 (1%)	0
Marital Status		
Married	101 (70%)	137 (83%)
Divorced	18 (12%)	10 (6%)
Widowed	0	4 (2%)
Single	26 (18%)	9 (5%)
Living with partner	0	5 (3%)
N = 310 (healthy = 145; breast cancer = 165)		

Several types of validity and reliability estimates were calculated on the WSBQ-F. These included an Index of Content Validity, two levels of exploratory factor analysis, and both rest-retest and internal consistency reliability. It was hypothesized that the healthy women would have higher scores on the WSBQ-F, indicating greater consistency than the women with breast cancer in the set of behaviours and a greater level of sexual gratification.

Table 2 <i>Factor Loadings of the WSBQ-F</i>								
	Factors							
Item	1	2	3	4	5	6	7	8
Communication								
$\alpha = .94, r = .78$								
1. hugging	.84							
2. hold and touch	.84							
3. partner important	.83							
4. talk	.80							
5. talk about sex	.75							
6. appear nude	.70							
7. satisfied	.67							
8. kiss face	.66							
9. feel closer	.58							
10. partner touch	.58							
11. I initiate	.58							
12. I start talks	.57							
13. partner touch	.57							
14. lights on	.54							
15. undress	.52							
16. partner touch	.50							
17. shower together	.49							
18. satisfied	.48							
19. lingerie	.44							
Sexual Technique								
$\alpha = .87, r = .58$								
20. oral sex		.70						
21. side to side		.66						
22. oral sex		.66						
23. rear entry		.66						
24. woman on top		.65						
25. woman on bottom		.59						
26. manual stimulation		.52						
27. clitoral touch		.50						
Sexual Response								
$\alpha = .88, r = .74$								
28. turned on			.81					
29. interested			.81					
30. sexual touching			.72					
31. wet vagina			.64					
32. sexual interest			.60					
33. orgasm			.55					
34. orgasm important			.50					
35. orgasm intense			.50					

(continued on page 143)

Table 2 (cont'd)								
Factors								
Item	1	2	3	4	5	6	7	8
Body Scar^a								
$\alpha = .73, r = .84$								
36. touch scar				.87				
37. partner look				.86				
38. look at scar				.86				
39. partner touch				.85				
Self-Touch								
$\alpha = .87, r = .73$								
40. touch stomach					.91			
41. touch breasts					.91			
42. touch clitoris					.77			
43. touch face					.67			
Relationship Quality^b								
$\alpha = .57, r = .80$								
44. relationship good						.93		
45. brought closer						.91		
46. less feminine						.91		
Masturbation								
$\alpha = .52, r = .88$								
47. masturbation							.54	
48. sex toy							.53	
49. look naked							.42	
Removed Factor								
44. tense after sex								.58
22. frequency								.47
Total Scale								
$\alpha = .94, r = .81$								
E-Value	15.6	3.7	3.6	2.8	2.2	2.2	1.7	1.4
Proportion	30.5	7.3	7.2	5.5	4.4	4.3	3.3	2.8
Cumulative %	30.5	37.8	44.9	50.4	54.8	59.1	62.4	65.3
N = 310 (^a N = 226; ^b N = 135)								

Results

Validity

An Index of Content Analysis was determined for the WSBQ-F. Two experts from the field of sexuality and two experts from oncology nursing were asked to link each item with the appropriate sexual subsystem and to assess the relevancy of the item to the subsystem. Two experts in nursing theory critiqued the tool for congruency with the JBSM. All experts agreed that the items adequately reflected the domain of sexual behaviours and an Index of Content Validity (Lynn, 1986) of 1.00 was obtained.

Exploratory factor analysis was performed to determine the factor structure of the WSBQ-F. Initially all 54 items were entered into a principal components analysis with a varimax rotation. Varimax rotation is an orthogonal rotation in which variables tend to load high on one factor and low on others (Kaiser, 1960), facilitating interpretation of factors. Eight factors were forced in the initial factor analysis, since the WSBQ-F was designed on the basis of eight types of sexual behaviours (Tabachnick & Fidell, 1989). A liberal item loading criterion of .30 was used for the first factor analysis, resulting in the elimination of three items.

A second factor analysis was performed with a more conservative item loading criterion of .40 on 51 items. The number of factors retained was determined by using the Kaiser rule of eigenvalues greater than or equal to 1 (Kaiser, 1960). Two items that created a weak factor and that were not conceptually related to each other were eliminated. This resulted in a tool with seven factors and 49 items. The total variance accounted for by the factors was 65%.

Factor 1 consisted of 19 items on verbal and non-verbal communication techniques and was named the Communication Scale. Factor 2, the Techniques Scale, contained eight items referring to sexual techniques, including various positions used during heterosexual intercourse, manual stimulation by the partner, and touching of the clitoris by the partner. Factor 3, termed the Sexual Response Scale, included eight physiologic items. Factor 4, labelled Body Scar, included four items related to looking at and touching a scar. Factor 5, Self-Touch, included four items on non-sexual touching of various parts of one's own body. Factor 6, Relationship Quality, contained three items on the impact of a health problem on the respondent's sexual relationship and sense of femininity. Factor 7, the Masturbation Scale, included three items on masturbation. Factors, item loading, and samples of items are shown in Table 2.

A two-group Multivariate Analysis of Variance (MANOVA) was performed to test the hypothesis that healthy women would have higher scores than women with breast cancer on the WSBQ-F. MANOVA was the appropriate statistical test because the variables have a common conceptual meaning; use of fragmented Univariate tests would greatly inflate the type I error rate (Stevens, 1996). Two factors composed of items that did not apply to every participant were omitted from the analysis: since a participant with no body scars or with no health problems would not have a score for Body Scar or Relationship Quality, factors 4 and 6 were eliminated.

With an alpha level set at $p = .05$, the omnibus test revealed a statistically significant difference between the sexual behaviours of healthy subjects and those of breast cancer subjects ($F = 3.785, df = 4,261$). Univariate tests revealed significant differences between the healthy women and those with breast cancer on factors 2 (Techniques Scale) and 3 (Sexual Response Scale), with the healthy sample scoring higher on both factors (Table 3). These analyses were repeated controlling for differences between the two groups in age, education, and marital status; significant differences were found between the two groups on the Techniques and Sexual Response scales.

Table 3 *Two-Group MANOVA on Differences Between Healthy Women and Women with Breast Cancer, as Measured Using WSBQ-F Subscales*

Subscale	df	Mean Square		F
		Between	Error	
Communication	1	2227.8	620.2	3.6
Techniques	1	536.7	88.9	6.0*
Sexual Response	1	1171.4	90.7	12.9*
Self-Touch	1	35.2	26.9	1.3
Masturbation	1	.31	7.4	.04

N = 262 (healthy sample = 131; breast cancer sample = 131)
 * $p \leq .01$

Reliability

Internal consistency of the WSBQ-F was determined using Cronbach’s alpha (Waltz et al., 1991). The alpha coefficient for the total scale was .94 and subscale alphas ranged between .52 and .94. (Table 2).

The JBSM suggests that sexual behaviour is a relatively stable attribute in healthy individuals not experiencing severe life crises (Johnson, 1980). This assumption directed the decision to use a sample of healthy subjects for test-retest reliability. As can be seen in Table 2, the Pearson correlation coefficients ranged between $r^2 = .58$ and $.88$. The correlation for the total scale was $r^2 = .81$, which is an adequate value obtained from initial testing of a measure (Waltz et al., 1991).

Discussion

The WSBQ-F was designed to assess women's sexual behaviours from a broad perspective using the JBSM (Johnson, 1980) as a guide. Initial psychometric testing utilized healthy women as one sample to validate the model's assertion that sexual behaviours are a relatively stable trait in the absence of a crisis situation. Breast cancer patients were chosen to test the ability of the tool to differentiate between two diverse samples. Initial testing of the WSBQ-F provided support for the validity and reliability of the measure. The final version of the WSBQ-F consisted of 49 items scored on a 7-point Likert scale with the possible range of scores from 0 to 294.

The subscales identified through factor analysis were Communication, Techniques, Sexual Response, Body Scar, Self-Touch, Relationship Quality, and Masturbation. These factors differed slightly from those identified a priori, yet conceptually they supported the assertion by the JBSM (Johnson, 1980) that the sexual subsystem comprises a broad range of behaviours. These factors will be discussed in more detail below. Test-retest reliability in the group of healthy women supported the assertion that sexual behaviour is a trait attribute. The assumption that greater regularity of use of a set of behaviours reflects attainment of the subsystem goal of gratification remains to be tested.

Construct Validity

Analysis indicated that communication consists of a wide variety of verbal and non-verbal behaviours — for example, hugging, talking, and physical appearance. Items on satisfaction, which infer the subsystem goal of gratification, also loaded on this factor, suggesting that sexual gratification is at least partially dependent on communication. The Communication subscale produced the largest factor, accounting for 30.5% of the variance, which indicates the importance of multiple modes of communication of sexual behaviours by and towards women.

Factor analysis indicated that techniques used in achieving sexual gratification were viewed more narrowly than found in the literature. Items factoring onto the Techniques subscale were positions used during intercourse, not behaviours such as hugging and touching of partner. Two items reflecting masturbation also had initially been hypothesized to be forms of techniques. These items factored separately and may be reflective of either being used alone or resulting from the high number of non-responses to these two items. Further testing of these items is warranted.

Desire, the drive for the Sexual Subsystem, factored into the scale that included other components of the sexual response cycle (desire, arousal, and orgasm). This suggests that desire is intricately related to the other components of sexual response, that desire cannot be measured by itself, or that the items were not sensitive enough to distinguish desire from other components of the sexual response cycle.

The Body Scar subscale, which refers to looking at and touching a surgical scar, may not immediately appear to be related to sexual behaviours. However, the literature on body image and female sexuality suggests that scarring and a partner's reaction to it affect a woman's level of comfort with her sexuality and her sexual behaviour (Derogatis, 1980a; Schover, 1994). These items need revision and further testing to determine their relevance.

Construct validity using contrasted groups indicated that the WSBQ-F was sensitive to differences in sexual behaviours between healthy women and women with breast cancer. There is literature supporting the higher Technique scores on the WSBQ-F by healthy women. Andersen and Jochimsen (1985) found that healthy women reported higher levels of sexual behaviours and sexual arousal than either breast or gynecological cancer patients. They found that healthy subjects reported significantly higher levels of arousal than either group of cancer subjects, but no significant difference in the desire or orgasm phases of the sexual response cycle. This finding supports the model's assertion that individuals exhibit behavioural regularity and routinely practise a set of sexual behaviours.

The ability of the WSBQ-F to differentiate between healthy women and women with a serious medical condition provides validation for the assertion that sexual behaviours differ between these two groups. These data suggest that the WSBQ-F is sensitive to sexual differences between groups and has the potential to be able to identify behavioural instability in the Sexual Subsystem. For further discussion of differences in sexual behaviours between women who have had a lumpectomy and

those who have had a mastectomy, with or without reconstruction, the reader is referred to Wilmoth and Townsend (1995). Testing of the measure in women with other medical conditions or in women who have had surgery for non-malignant reasons is indicated. Testing of the measure in women from other cultures and gender orientations, as well as women with a variety of chronic illnesses, is clearly indicated. Testing of the WSBQ-F in a sample across time is also required, to validate the ability of the WSBQ-F to detect subtle changes in behaviours and provide data for its applicability in a clinical population.

Reliability

The WSBQ-F underwent two types of reliability testing. Internal consistency reliability resulted in an alpha for the total scale of 0.94, indicating that the tool is internally consistent. The WSBQ-F was found to be a stable measure of sexual behaviours in healthy women. This supports the assumption that sexual behaviour is a trait attribute with behavioural regularity. The values of alpha and r^2 reported for the total measure and subscales are consistent with values reported for the Derogatis Sexual Functioning Inventory (Derogatis, 1980b; Derogatis & Melisaratos, 1979).

A goal of the WSBQ-F was to be inclusive of women of different gender orientations. This goal was not completely achieved. Further work is required to make the WSBQ-F applicable to women from various cultures and of other sexual orientations. Limitations of the data include use of a convenience sample comprising primarily Caucasian women. All subjects self-selected themselves for the study; thus it might be assumed that participants were more liberal in their sexual views than non-participants. However, there are reports suggesting that sexuality research features less liberal bias than is frequently assumed and that subjects who self-select for this type of research may simply be more aware of and more open about their sexuality (Catania, McDermott, & Pollack, 1986). Additional sampling limitations include differences in age and education between the two samples. These factors limit the generalizability of the data. Use of a convenience sample may not be optimal but is common early in tool development (Derogatis & Melisaratos, 1979; Taylor et al., 1994; Waterhouse & Metcalfe, 1986).

An additional limitation of this study was inclusion of heterogeneous respondents in the factor analysis. All subjects were included in the analysis ($n = 310$). Use of this heterogeneous sample may have altered the results of the factor analysis. Subsequent testing of the

measure should use homogeneous samples of adequate size for this type of validity assessment.

The model imposed constraints on development of the tool by limiting inquiry to observable behaviours. Items referring to the subsystem drive and goal, which were not behavioural items, did not factor onto their own scales. Items on desire and gratification require further investigation. Additional research is needed to validate the model's assumption that behavioural regularity and frequency of use of a set of sexual behaviours are reflective of gratification.

A strength of this study lies in its sample size. A sample size in the range of 200–300 is recommended when conducting a reliability study (Streiner & Norman, 1995). The sample sizes in other psychometric studies on sexuality measures range between 30 (Bransfield et al., 1984) and 380 (Derogatis & Melisaratos, 1979). Another strength is the response rate of 36% and 50% for the two groups of subjects. Such a response rate is adequate for a mailed questionnaire (Waltz et al., 1991) on a sensitive topic (Waterhouse & Metcalfe, 1986).

Initial testing of the WSBQ-F indicates that the measure achieved the five evaluative criteria set forth for a tool measuring female sexuality. The WSBQ-F is a theory-based measure that assesses multiple facets of female sexuality and may prove to be clinically useful. The measure differentiates between healthy women and women with breast cancer. Future testing will include the addition of descriptors at each scale point. The WSBQ-F requires testing among women with conditions other than cancer and among women of different ethnic groups and sexual orientations. While further work is indicated, the WSBQ-F provides researchers with a conceptually grounded gender-focused measure of sexuality.

Sexuality is an important aspect of quality of life and one that nurses have a legal and moral responsibility to address. They cannot meet this standard of practice without adequate knowledge about the effects of normal developmental changes in sexuality and the effects of medical conditions on sexuality. The Wilmoth Sexual Behaviors Questionnaire-Female is a tool that can help nurses add to their knowledge base in this area.

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