Title: Validation of the WHOQOL-BREF among women following childbirth

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(i) Title: Validation of the WHOQOL-BREF among women following

childbirth

(ii) Running head: Validation of the WHOQOL-BREF

(iii) Word cound: Abstract 226

Main text 1,946 (excluding acknowledgements, references)

2,512 (with acknowledgements and references)

PRÉCIS

The WHOQOL-BREF has been validated for clinical or research use following childbirth.

ABSTRACT

Background: There is an increasing interest in measuring quality of life (QOL) in clinical settings and in clinical trials. None of the commonly used QOL instrument have been validated for use postnatally.

Aim: To assess the psychometric properties of the 26-item WHOQOL-BREF among women following childbirth.

Methods: Using a prospective cohort design we recruited 320 women within the first few days of childbirth. At six weeks postpartum, participants were asked to complete the WHOQOL-BREF, the Edinburgh Postnatal Depression Index and the Australian Unity Wellbeing Index. Validation of the WHOQOL-BREF included an analysis of internal consistency, discriminate validity, convergent validity and an examination of the domain structure.

Results: 221 (69.1%) women returned their six-week questionnaire. All domains of the WHOQOL-BREF met reliability standards (alpha coefficient exceeding 0.70). The questionnaire discriminated well between known groups (depressed and non-depressed women. $P = <0.000$) and demonstrated satisfactory correlations with the Australian Unity Wellbeing index ($r = >0.45$). The domain structure of the WHOQOL-BREF was also valid in this population of new mothers, with moderate to high correlation between individual items and the domain structure to which the items were originally assigned.

Conclusion: The WHOQOL-BRF is well-accepted and valid instrument in this population and may be used in postnatal clinical settings or for assessing intervention effects in research studies.

Key words: Quality of life; Validation studies; Childbirth; Postpartum period; Depression, postpartum

BACKGROUND

In recent years there has been an increasing interest in health related quality of life (HRQoL) assessment in clinical research; particularly to gauge the success of intervention programs. A number of different approaches have been used to measure quality of life but many of these are condition-specific (1, 2). An alternative to using a condition-specific instrument is to use a generic quality of life (QOL) assessment instead (3, 4). However, when a generic QOL questionnaire is selected for use in a particular population, the tool should first be validated in that group. To our knowledge, none of the instruments commonly used to assess HRQoL, has been validated for use among women who have recently given birth. Consequently, normative ranges are unknown in this group, making comparisons between study populations and cross-culturally very difficult. A validated instrument would also be useful when investigating the quality of life among women who have experienced an adverse pregnancy outcome.

HRQoL instruments may be costly and complex to use, making them unsuitable if the intention is to use them in general health care settings or in large epidemiological studies. At least one generic quality of life measure does not have these problems; the short version of the World Health Organization Quality of Life assessment (WHOQOL-BREF) (5). However, the instrument is generic, rather than disease specific and, although it has been used to assess quality of life in a variety of cohorts (6-8), the WHOQOL-BREF has not been independently validated for use by new mothers, a group with health care and life issues which may be different from other population groups. Thus, the purpose of this study was to investigate the validity and reliability of the instrument for use following childbirth.

METHODS

Design

We used a prospective cohort design to determine the reliability and validity of the WHOQOL-BREF assessment in women who had recently given birth.

Participants

Participants were consenting women who gave birth to a live infant or infants ≥ 36 weeks gestation, who was not admitted to a neonatal intensive nursery. The study was approved by the hospital's Human Research Ethics Committee.

Instruments

WHOQOL-BREF

The WHOQOL-BREF was developed by the World Health Organization Quality of Life Group, in 15 international field centres (5). It is a self-report questionnaire that contains 26 items, and each item represents one facet. The facets are defined as those aspects of life that are considered to have contributed to a person's quality of life (5). Among the 26 items, 24 of them make up the 4 domains of physical health (7 items), psychological health (6 items), social relationships (3 items), and environment (8 items). The other 2 items measure overall quality of life and general health (5).

The Australian Unity Wellbeing Index

This cost-free instrument was developed by the Australian Centre on Quality of Life and has been used annually to measure the well-being of Australians since 2001, so societal norms are available (9). Several items contained in the 'Personal Wellbeing Index' of the instrument are similar to those in the WHOQOL-BREF; so we will use it to test the construct validity of the WHOQOL-BREF in a postnatal setting.

Edinburgh Postnatal Depression Scale (EPDS)

The EPDS is a simple, well-validated self-report questionnaire with 10 items designed to screen for depression (10). Women are asked to underline one of four possible responses to each question in terms of how they have felt in the previous week. A cut off score of >12 is generally accepted as the demarcation between depressed and non-depressed women. The EPDS will be used for known group comparisons.

Procedure

Women were consented during their early postnatal hospital stay. Baseline demographic and obstetric data was collected at this time and the EPDS administered. Participants were contacted, by mail, six weeks after discharge and asked to complete a questionnaire, which included the WHOQOL-BREF, the Australian Unity Wellbeing Index and the EPDS. If questionnaires were not returned within two weeks, phone contact was attempted and, if requested, a second questionnaire sent. If the EPDS score was > 12 in the immediate postpartum period or at the 6-week follow-up, a nurse with counselling skills made immediate contact with the woman. At this time, the EPDS score was discussed and options for management explored.

Analysis

The WHOQOL-BREF was first summarised to a 4-domain construct (physical health, psychological health, social relationships & environment) and questions 3, 4 and 26 were reversed according to the guidelines for the WHOQOL-BREF (11). We calculated each of the domain scores by taking the mean score of all items included in each domain and multiplying by a factor of four. Missing values were replaced by the appropriate mean score for the domain to which the item belonged, following the

WHOQOL-BREF guidelines (11). SPSS version 17.0 (SPSS Inc., Australasia, Chatswood, NSW 2008) was used for all analyses.

Response patterns

We assessed the useability and acceptability of the WHOQOL-BREF by calculating the proportion of unanswered questions. We also estimated the floor and ceiling effects (proportion of participants scoring at the lowest and highest level) to gain a clearer understanding of items which have more or less impact on quality of life following childbirth.

Internal consistency

Internal consistency, for each domain was calculated using Cronbach's alpha, with an acceptable value set at > 0.70 (12).

Discriminant validity

For discriminate validity we used *t* tests to examine the ability of the WHOQOL-BREF to detect differences between groups. The groups were those scoring >12 on the EPDS (the postnatal depression (PND) group) at six weeks post partum and those scoring ≤ 12 on the same instrument (the non-PND Group).

Convergent validity

To test convergent validity, Pearson correlations were calculated between the four domains of the WHOQOL-BREF and the Personal Wellbeing component of the Australian Unity Wellbeing Index; in line with other studies, we accepted a moderate correlation (between $\geq r\ 0.45$ to $< r\ 0.70$) (13, 14).

Correlation matrix of the WHOQOL –BREF

Correlation between the individual items of the WHOQOL-BREF and the four domains was assessed using a 2-tailed Pearson correlation coefficient. A correlation of >0.45 was anticipated.

RESULTS

Between 28 August 2008 and 12 December 2008, we recruited 320 women to the study. Of these, 221 (69.1%) returned their 6 week questionnaire. Characteristics of the follow-up sample are shown in Table 1; these did not differ significantly from characteristics of the total number of women who were originally recruited. Women with EPDS scores >12 at six weeks post partum were less likely than others to have tertiary education and more likely to be living as single and to report having a current health problem. Mean item scores and response patterns for the WHOQOL-BREF are shown in Table 2.

Internal consistency

The homogeneity between items on each of the sub-scales was satisfactory with the alpha coefficient for each domain of the WHOQOL-BREF exceeding 0.70 (Table 3). The only exception was in the psychological domain for the PND group where the alpha coefficient was 0.62. This suggests internal consistency across domains of the WHOQOL-BREF for childbearing women, whether or not they are currently depressed.

Discriminant validity

Table 4 shows the ability of the WHOQOL-BREF to clearly discriminate between known groups. As expected, women scoring ≤ 12 on the EPDS at six weeks scored higher than those scoring above 12 in all domains and these differences were statistically significant. Discriminant validity was strongest in the psychological domain and weakest in the environmental domain.

Convergent validity

As predicted, moderate correlations in the expected direction were found between the domains of the WHOQOL-BREF and similar items on the Personal Wellbeing Index (Table 5). Mean scores from this sample were similar to those drawn the 2008 national survey (15). Exceptions were in the items 'personal relationships' and 'feeling safe' (postnatal women rated higher than the national average) and in the item 'community connection' where women in this sample scored lower than the national average.

Correlation matrix

We found the domain structure of the WHOQOL-BREF to be valid in this population of new mothers (Table 6). There was moderate to high correlation between individual items and the domain structure to which the items were originally assigned.

DISCUSSION

This study has examined the psychometric properties of the WHOQOL-BREF among women who have recently given birth. The proportion of unanswered questions was low, and the response rate was within the range of our previous investigations among similar populations (16, 17). This demonstrates that the instrument was both understandable and acceptable to the women surveyed.

Compared with other healthy populations, the mean scores for items on the WHOQOL-BREF were one to two points higher in this cohort (5, 14, 18). On the one hand this was surprising, postpartum physical and emotional heath problems are not uncommon in the months following childbirth with sleep disturbances, pain and

physical exhaustion frequently reported (19-21). On the other hand, childbirth is usually a positive experience for women and a time when women may minimise their health problems. For example, a recent review of postpartum health reported that, in general, women reported their health status as good during this period (22).

Internal consistency for the four domains and the total scale were satisfactory with one exception. The Cronbach's alpha for the psychological domain in the PND group was marginally below the acceptable minimum standard of 0.70 however, it is not unusual for subscales in some instruments to fall below this level (13). In terms of discriminant validity the WHOQOL-BREF performed particularly well. On average, in each of the domains, women in the non-PND group scored approximately three points more than those with EPDS scores over 12. Although no previous studies have evaluated discriminant validity in new mothers using this instrument, the ability of the WHOQOL-BREF to discriminate between known groups has been well demonstrated in other cohorts (5, 7, 18). It was also interesting to note the sensitivity of the instrument in terms of the strength of difference between the PND group and the non-PND group for each of the domains. The WHOQOL Group suggest that discriminant validity is best demonstrated in the physical domain (5) however, in this cohort, not unexpectedly, the psychological domain showed the greatest difference between groups.

Convergent validity was confirmed using the Personal well-being sub-scale of the Australian Unity Wellbeing Index. The highest correlations were found between the social domain and personal relationships and the psychological domain and life as a whole but, overall, correlations in all domains were satisfactory. The SF-36 is

generally used to assess convergent validity (7, 13, 14). However, we used the Personal well-being sub-scale of the Australian Unity Wellbeing Index because it was free and because we were able to compare our results with an Australian population (15). Using this index provided further support for the notion that childbirth is a positive time for women. They rated their life as a whole, their personal relationships and their feelings of safety highly, although they felt less connected with the community in the early postnatal period than does the wider population. The domain structure of the WHOQOL-BREF was also well supported in this population with mean correlations > 0.60 for all of the domains.

LIMITATIONS

The response rate of 70% is not ideal and may indicate some selection bias. However, women who did respond were demographically similar to non-responders and, although slightly more from the non-PND group returned their questionnaire (62% to 68%) the discriminant validity outcomes indicate that this is unlikely to have affected results. In other words, even though the response rate from those with a positive postnatal depression screen was lower that those who did not have a positive screen, there were sufficient responses to identify significant differences between groups scores, in each of the domains measured. Moreover, the overall response rate was very similar to large, population based surveys of postpartum women; between 68% - 72% (23,24), and higher than an Australian study of postnatal women (52%) who were questioned about their responses to being screened for postnatal depression (25). Consequently, we believe results remain robust.

CONCLUSION

This study is the first to test the psychometric properties of the WHOQOL-BRF in a population of postnatal women. Results indicate that the instrument is well-accepted and valid for this group and may be used in clinical settings or for assessing intervention effects in research studies.

ACKNOWLEDGEMENT

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Table 1. Demographic, obstetric and EPDS score characteristics of study participants.
Results are means and standard deviation [SD] or number and (%).

	Non-PND group	PND group†
Mean age in years [SD]	30.8 [5.7]	29.40 [6.1]
Mean satisfaction with birth experience [SD]	4.0 [1.2]	3.5 [1.2]
Primipara	80 (43.2)	15 (50.0)
Spontaneous vaginal delivery	82 (44.3)	13 (43.3)
Tertiary education	117 (61.6)	15 (51.7)
Living as single	13 (7.0)	5 (16.7)
Current health problem	14 (7.6)	4 (13.3)

† As measured by a score > 12 on the Edinburgh postnatal depression scale

Table 2. Response pattern and mean scores for WHOQOL-BREF items

	Missing %	Mean score	Standard deviation	Floor (%)	Ceiling (%)
Overall quality of life (1)	0.0	4.3	0.65	0.9	41.6
Overall health (2)	0.5	3.8	0.87	10.0	20.5
Pain (3)	0.0	4.5	0.74	59.7	0.5
Dependence of medical aids (4)	0.5	4.7	0.64	80.1	2.3
Positive feeling (5)	0.0	4.0	0.72	0.5	21.7
Personal belief (6)	0.0	4.0	0.81	1.4	27.1
Concentration (7)	0.0	3.5	0.74	0.9	4.5
Security (8)	1.0	4.3	0.74	0.5	45.0
Physical environment (9)	0.0	4.1	0.70	0.5	28.5
Energy (10)	0.0	3.7	0.81	0.5	10.4
Bodily image (11)	0.0	3.6	1.02	5.0	15.8
Financial Support (12)	0.5	3.8	0.92	2.3	20.8
Accessibility of information (13)	0.0	4.2	0.74	2.3	39.4
Leisure activity (14)	1.0	2.9	1.01	8.6	4.5
Mobility (15)	0.0	4.4	0.79	0.9	51.6
Sleep and rest (16)	0.0	3.1	0.97	5.0	4.5
Activities of daily living (17)	0.0	3.5	0.88	1.4	8.6
Work capacity (18)	1.0	3.5	0.87	2.7	7.2
Self-esteem (19)	0.5	3.7	0.81	0.9	10.4
Personal relationships (20)	0.0	4.1	0.92	1.8	35.3
Sexual activity (21)	0.0	3.3	1.08	7.2	12.7
Social support (22)	0.5	4.0	0.89	2.3	25.8
Home Environment (23)	0.0	3.9	0.95	1.4	27.1
Health care (24)	1.4	4.1	0.83	1.4	34.5

Transport (25)	0.5	4.2	0.94	1.8	46.4
Negative feeling (26)	1.0	3.8	0.77	0.9	12.7

Table 3. Internal consistency (coefficient alpha) of the WHOLQOL-BREF domains

Domain	Non-PND group n = 190	PND group† n = 29
Physical (7 items)	0.74	0.78
Psychological (6 items)	0.73	0.69
Social (3 items)	0.71	0.71
Environmental (8 items)	0.77	0.75

† As measured by a score > 12 on the Edinburgh postnatal depression scale

Table 4. Means and (standard deviations) of the domains of the WHOQOL-BREF for non-depressed and depressed groups

Domain	Non-PND group	PND group†	P - value
Physical	16.0 (1.85)	13.1 (2.57)	< 0.000
Psychological	15.5 (1.96)	12.0 (2.20)	< 0.000
Social	15.6 (2.82)	12.4 (3.69)	< 0.000
Environmental	16.2 (2.00)	13.7 (2.28)	< 0.000

† As measured by a score > 12 on the Edinburgh postnatal depression scale

Table 5: Pearson's correlations between the WHOQOL-BREF and the 'Personal well-being' sub-scale of the Australian Unity Wellbeing Index†.

	Physical health	Psychological Health	Social relationships	Environmental health
Life as a whole	0.54	0.70	0.61	0.62
Standard of living	0.50	0.58	0.39	0.63
Health	0.47	0.60	0.35	0.48
Achievement in life	0.49	0.63	0.54	0.54
Personal relationships	0.39	0.52	0.79	0.53
Feeling safe	0.41	0.47	0.52	0.63
Feeling part of community	0.58	0.56	0.47	0.57
Future security	0.50	0.59	0.53	0.65

† Weak correlation ($r \leq 0.45$); moderate correlation (r 0.45 to $r < 0.70$); strong correlation ($r \geq 70$

Table 6. Correlation matrix for the four domains of the WHOQOL-BREF†

	Physical health	Psychological health	Social relationships	Environmental health
Physical health (item number)				
Pain (3)	**0.52**	0.31	0.19	0.25
Dependence of medical aids (4)	**0.50**	0.30	0.19	0.17
Energy (10)	**0.73**	0.65	0.35	0.60
Mobility (15)	**0.62**	0.40	0.45	0.59
Sleep and rest (16)	**0.73**	0.49	0.41	0.46
Activities of daily living (17)	**0.80**	0.51	0.37	0.50
Work capacity (18)	**0.79**	0.55	0.45	0.49
Psychological health (item number)				
Positive feeling (5)	0.60	**0.81**	0.58	0.59
Personal belief (6)	0.40	**0.70**	0.47	0.48
Concentration (7)	0.45	**0.59**	0.23	0.35
Bodily image (11)	0.45	**0.72**	0.41	0.48
Self-esteem (19)	0.59	**0.82**	0.52	0.60
Negative feeling (26)	0.62	**0.75**	0.46	0.48
Social relationships (number of items)				
Personal relationships (20)	0.43	0.57	**0.84**	0.57
Sexual activity (21)	0.36	0.43	**0.84**	0.45
Social support (22)	0.45	0.51	**0.76**	0.48

Environmental Health (item

number)

Security (8)	0.39	0.53	0.44	**0.65**
Physical environment (9)	0.37	0.51	0.41	**0.61**
Financial Support (12)	0.39	0.40	0.39	**0.67**
Accessibility of information (13)	0.43	0.48	0.39	**0.65**
Leisure activity (14)	0.54	0.54	0.42	**0.70**
Home Environment (23)	0.45	0.37	0.34	**0.64**
Health care (24)	0.38	0.32	0.34	**0.58**
Transport (25)	0.44	0.40	0.42	**0.68**

† Correlation of r > 45 was considered satisfactory