Development of a multidimensional labour satisfaction questionnaire: dimensions, validity, and internal reliability

L F P Smith

Abstract

Background—No published quantitative instrument exists to measure maternal satisfaction with the quality of different models of labour care in the UK.

Methods—A quantitative psychometric multidimensional maternal satisfaction questionnaire, the Women’s Views of Birth Labour Satisfaction Questionnaire (WOMBSLQ), was developed using principal components analysis with varimax rotation of successive versions. Internal reliability and content and construct validity were assessed.

Results—Of 300 women sent the first version (WOMBSLQ1), 120 (40%) replied; of 300 sent WOMBSLQ2, 188 (62.7%) replied; of 500 women sent WOMBSLQ3, 319 (63.8%) replied; and of 2400 women sent WOMBSLQ4, 1683 (70.1%) replied. The latter two versions consisted of 10 dimensions in addition to general satisfaction. These were (Cronbach’s alpha): professional support in labour (0.91), expectations of labour (0.90), home assessment in early labour (0.90), holding the baby (0.87), support from husband/partner (0.83), pain relief in labour (0.83), pain relief immediately after labour (0.65), knowing labour carers (0.82), labour environment (0.80), and control in labour (0.62). There were moderate correlations (range 0.16–0.73) between individual dimensions and the general satisfaction scale (0.75). Scores on individual dimensions were significantly related to a range of clinical and demographic variables.

Conclusion—This multidimensional labour satisfaction instrument has good validity and internal reliability. It could be used to assess care in labour across different models of maternity care, or as a prelude to in depth exploration of specific areas of concern. Its external reliability and transferability to care outside the South West region needs further evaluation, particularly in terms of ethnicity and social class.

Keywords: Women’s Views of Birth Labour Satisfaction Questionnaire (WOMBSLQ); labour; questionnaire

Maternal and perinatal mortality are the traditional national and international measures of the quality of labour care. Fortunately, maternal deaths have become extremely rare and perinatal mortality and morbidity such as cerebral palsy are insensitive indicators of various components of pregnancy care.1 For a full picture of the quality of labour care one needs a patient centred measure such as women’s satisfaction.

Measurement of patient satisfaction is not easy.2–5 To compare between women, institutions, or aspects of labour care, a quantitative measure is needed.4 Medical and nursing psychometric satisfaction measures exist,3 but only one has been published for (antenatal) maternity care.12 When designing a satisfaction questionnaire (instrument) one must consider a range of potential dimensions,6–15 including continuity of care, availability of carers, access, interpersonal skills, and technical competence.2 7 8 10–22 “Home made” satisfaction questionnaires tend to overestimate satisfaction, as do those which ask questions about satisfaction in general terms.13 21

Care in childbirth continues to evolve—for example, following publication of the “changing childbirth” report2 3—and there are still many organisational models for labour.25 26 Because these models emphasise various aspects of care—such as greater continuity, greater accessibility, and greater shared care—or provide care at different sites and/or from different professional groups, there is a need to have a valid reliable multidimensional questionnaire to assess the quality of labour care.
care from a woman’s perspective. Such assessment could allow future models of care to be more focused on women’s specific needs, not just on the needs of the professionals or the “maternity care system”. This paper describes the development of such a questionnaire, the Women’s Views of Birth Labour Satisfaction Questionnaire (WOMBLSQ).

Method

FACE AND CONTENT RELIABILITY

There were three development versions of the WOMBLSQ proper, resulting in a fourth or final version (WOMBLSQ4). Questions were selected from five sources to ensure content and face validity. These were fieldwork, a published survey manual, the North American PSQ-III satisfaction questionnaire, specially written questionnaires from an initial literature review, and further new questions were added after version 2 was tested (see below). The original fieldwork (reported elsewhere) enabled us to discard or to rewrite questions which were frequently skewed or not answered. WOMBLSQ2 contained open questions which were analysed to ensure that no important areas were being excluded from the questionnaire. If this was so, the missing content areas were added to WOMBLSQ3.

Many questions were deliberately very positively or negatively worded to enhance the respondents’ ability to express minimal dissatisfaction. All “questions” were statements which required respondents to mark a seven point Likert scale from “totally disagree” to “totally agree” to enhance the sensitivity of subsequent dimensions.

The questionnaire was developed over 4 years in several NHS trusts and general practices in the old South West region of England. WOMBLSQ1 was tested in three trusts, WOMBLSQ2 and 3 in nine trusts, and WOMBLSQ4 in three different trusts. Midwives were asked to give questionnaires to consecutive women postnatally within 10 days of birth. This included women who had delivered at home, in community units, or large hospitals. Except for WOMBLSQ4 which was posted 6–12 weeks postnatally to consecutive women on a list of births, no reminders were used. WOMBLSQ3 and 4 had additional sections on demography and pregnancy details to judge the generalisability of results and to allow testing of construct validity.

INTERNAL RELIABILITY

Questionnaires were analysed using the SPSS-PC statistical package. Repeated stepwise principal components analysis (PCA) with varimax rotation was used to produce factors (dimensions), each of which consisted of one or more questions which were then re-read as a group intuitively to label the dimensions. The aim was to evolve groups of questions which each addressed a specific dimension. This procedure has been used in a similar situation to produce an antenatal satisfaction questionnaire and other patient satisfaction questionnaires. The remaining questions were then checked to ensure content validity. New questions were added where either important topic areas were missing following the statistical analysis (reduced content validity) or where the internal reliability of a dimension was low and the next version evolved.

SCALE GENERATION

Scale scores were generated to allow easily comprehensible comparisons between individual dimensions. This is important if the questionnaire is to be used to assess the relative

Table 1 Parameters of the final and three development versions of the labour satisfaction questionnaires

<table>
<thead>
<tr>
<th>Year tested</th>
<th>Pre-test</th>
<th>Post-analysis</th>
<th>Pre-test</th>
<th>Post-analysis</th>
<th>Pre-test</th>
<th>Post-analysis</th>
<th>Pre-test</th>
<th>Post-analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td>300</td>
<td>120</td>
<td>500</td>
<td>200</td>
<td>300</td>
<td>188</td>
<td>500</td>
<td>319</td>
</tr>
<tr>
<td>Factors (dimensions)*</td>
<td>11</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>KMO statistic</td>
<td>0.626</td>
<td>0.779</td>
<td>0.860</td>
<td>0.892</td>
<td>0.761</td>
<td>0.794</td>
<td>0.821</td>
<td>0.865</td>
</tr>
<tr>
<td>Bartlett, p value</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>82.9</td>
<td>72.7</td>
<td>75.9</td>
<td>77.4</td>
</tr>
<tr>
<td>% variance explained</td>
<td>82.9</td>
<td>72.7</td>
<td>75.9</td>
<td>77.4</td>
<td>50 32</td>
<td>64 32</td>
<td>50 32</td>
<td>50 32</td>
</tr>
</tbody>
</table>

Excluding “a general satisfaction” dimension at all stages.

“Pre-test” refers to the state of the questionnaire as it was sent out to respondents; “post-analysis” refers to the reduced questionnaire after analysis.
strengths and weaknesses of various aspects of labour care. To produce a scale score for each of the dimensions identified, constituent scale questions were added (with negatively worded questions being reversed). This total was then transformed so that the minimum possible score was always 0 (total dissatisfaction with that dimension) and the maximum possible score 100% (total satisfaction with that dimension).

CONSTRUCT VALIDITY
Construct validity should be assessed by examining the compatibility of dimensions with primary research evidence about how different groups of women should score. In addition, individual dimensions were tested against the transformed general satisfaction dimension. There should be moderate correlation between dimensions which are related to, but distinct from, “satisfaction” as a global concept.

The transformed individual dimensions were tested against (1) depression (on the Edinburgh Postnatal Depression scale of 0–20 with a higher score indicating more severe depression) and age (years) (Pearson correlation coefficients calculated); (2) duration of breastfeeding (recorded on an ordinal scale of: never attempted, tried only a few times, breast fed but now discontinued, still breast feeding but mixed; solely breast feeding), educational level (primary or secondary school, sixth form/college, professional or technical qualification, diploma, degree course) and social class (unskilled manual, partly skilled manual, skilled manual, skilled non-manual, professional/managerial) (Spearman correlation coefficients calculated); and (3) place of delivery (home, small community unit, large hospital), parity (multiparous or primiparous), induction of labour (yes/no), mode of delivery (vaginal delivery, forceps/Ventouse delivery, caesarean section), and labour complications (yes/no) (one way analysis of variance followed by Student-Newmann-Keuls (SNK) post hoc tests if appropriate). Because of the large number of comparisons being analysed the p value was set at 1%.

The study was approved by the relevant local research ethics committees.

Table 3  Matrix of correlation coefficients for WOMBLSQ4 between all scales

<table>
<thead>
<tr>
<th>Professional support</th>
<th>Expectations</th>
<th>Home assessment</th>
<th>Holding baby</th>
<th>Husband support</th>
<th>Pain in labour</th>
<th>Pain after labour</th>
<th>Knowing carer</th>
<th>Environment</th>
<th>Control</th>
<th>General satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>0.418</td>
<td>0.203</td>
<td>0.392</td>
<td>0.282</td>
<td>0.542</td>
<td>0.292</td>
<td>0.332</td>
<td>0.477</td>
<td>0.224</td>
<td>0.729</td>
</tr>
<tr>
<td>Expectations</td>
<td>—</td>
<td>0.173</td>
<td>0.344</td>
<td>0.148</td>
<td>0.378</td>
<td>0.273</td>
<td>0.236</td>
<td>0.417</td>
<td>0.095</td>
<td>0.484</td>
</tr>
<tr>
<td>Holding baby</td>
<td></td>
<td>0.144</td>
<td>0.077**</td>
<td>0.260</td>
<td></td>
<td>0.172</td>
<td>0.133</td>
<td>0.251</td>
<td>0.053**</td>
<td>0.269</td>
</tr>
<tr>
<td>Husband support</td>
<td></td>
<td></td>
<td>0.236</td>
<td>0.302</td>
<td></td>
<td>0.225</td>
<td>0.096</td>
<td>0.334</td>
<td>0.020**</td>
<td>0.325</td>
</tr>
<tr>
<td>Pain in labour</td>
<td></td>
<td></td>
<td></td>
<td>0.028</td>
<td></td>
<td>0.147</td>
<td>0.034**</td>
<td>0.175</td>
<td>0.065**</td>
<td>0.228</td>
</tr>
<tr>
<td>Pain after labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.286</td>
<td>0.187</td>
<td>0.306</td>
<td>0.027**</td>
<td>0.554</td>
</tr>
<tr>
<td>Knowing carer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.1</td>
<td>0.100</td>
<td>0.229</td>
<td>0.030**</td>
<td>0.273</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.284</td>
<td>0.104</td>
<td>0.314</td>
<td>0.130</td>
<td>0.482</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.130</td>
<td>0.146</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All are significant at p<0.001 except *p<0.01, **p<0.05, ***p=NS. Minimum n for all correlations in table = 1513.
32 (8.6%) had an instrumental delivery, 44 (11.8%) had caesarean section, 77 (20.7%; four not known) had their labour induced, 123 (33.1%) had labour complications, 251 (69.1%; 13 not known) planned to deliver in a large hospital, 90 (24.8%) in a community unit, and 22 (6.1%) at home; mean (SD) gestation at birth was 39.8 (1.55) weeks (range 33–43).

**WOMBLSQ4**

Of 1683 respondents, 1420 (86.4%) were screen negative on the Edinburgh Postnatal Depression scale with 40 women not answering the question; 317 (19%; 14 not known) never attempted breast feeding, 146 (8.7%) tried for a short period but quickly gave up, 534 (32.0%) breast fed for some weeks, 407 (24.4%) were still breast feeding in addition to other milk, 265 (15.9%) were still exclusively breast feeding when surveyed.

**DIMENSIONS AND INTERNAL RELIABILITY**

PCA of the WOMBLSQ3 respondents suggested 11 dimensions comprising 32 questions, including general satisfaction (two questions). These were (table 1): professional support, women’s expectations, knowing carers, pain in labour, labour environment, home assessment in early labour, pain immediately after labour, holding the baby, being in control, and support from husband/partner. PCA of the WOMBLSQ4 respondents confirmed these dimensions. Each of the 30 questions highly loaded onto only one dimension (see appendix). The overall reliability of the total scale excluding general satisfaction was good with Cronbach’s alpha of 0.860 and 0.892, respectively, and values for individual dimensions of 0.55–0.90 and 0.62–0.91, respectively, for WOMBLSQ3 and WOMBLSQ4.

**CONSTRUCT VALIDITY**

The individual dimensions of WOMBLSQ4 were tested against the general satisfaction scale and found to be moderately correlated (table 3). Intercorrelations between dimensions were mostly acceptable.

Planned place of delivery was significantly associated with satisfaction with professional support, expectations of labour, pain in labour, knowing carer, and control subscales (table 4). Those women whose labour was induced were less likely to be satisfied with their expectations of labour subscale (F=16.38, df=1, 360; p<0.001; 49.3% vs 63.2% for those not induced). Primiparous women were less likely to be satisfied with their expectations of labour (F=33.8, df=1, 353; p<0.0001; 52.7% vs 68.5%) and with knowing their carers in labour (F=6.81, df=1, 360; p<0.01; 38.5% vs 46.9%). Type of delivery was also related to satisfaction with expectations of labour (F=95.96, df=2, 360; p<0.0001) and with pain after delivery (F=7.15, df=2, 368; p<0.001). Women having a vaginal delivery were more satisfied with their expectations of labour (68.0%) than those having instrumental delivery (32.3%) and those having a caesarean section (24.1%). Women having a vaginal delivery (48.9%) were also more satisfied with their pain relief immediately after delivery than those having a caesarean section (40.4%), but not than those having an instrumental delivery (44.1%). Maternal age and gestation at delivery were unrelated to any of the satisfaction subscales.

Respondents to WOMBLSQ4 had a range of postnatal depression scores. These were significantly negatively correlated with the satisfaction scale (p<0.001) and all subscales (p<0.001) except knowing carer (p>0.05) and control (p>0.05; table 5). Duration of breast feedingb

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Home</th>
<th>Community unit (CU)</th>
<th>Large Hospital (LH)</th>
<th>F value</th>
<th>SD</th>
<th>df</th>
<th>p value</th>
<th>Significant differences on post-hoc testing (p&lt;0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td>84.3</td>
<td>68.6</td>
<td>54.8</td>
<td>19.6</td>
<td>25.8</td>
<td>2,350</td>
<td>0.0001</td>
<td>Home v CU; home v LH; CU v LH</td>
</tr>
<tr>
<td>Professional support</td>
<td>92.3</td>
<td>80.3</td>
<td>78.4</td>
<td>7.0</td>
<td>16.8</td>
<td>2,357</td>
<td>0.001</td>
<td>Home v CU; home v LH</td>
</tr>
<tr>
<td>Pain in labour</td>
<td>63.5</td>
<td>55.9</td>
<td>54.5</td>
<td>5.9</td>
<td>11.7</td>
<td>2,351</td>
<td>0.01</td>
<td>Home v CU; home v LH</td>
</tr>
<tr>
<td>Knowing carer</td>
<td>84.1</td>
<td>46.2</td>
<td>38.4</td>
<td>25.8</td>
<td>28.5</td>
<td>2,356</td>
<td>0.0001</td>
<td>Home v CU; home v LH; CU v LH</td>
</tr>
<tr>
<td>Control</td>
<td>64.8</td>
<td>44.8</td>
<td>49.2</td>
<td>6.3</td>
<td>23.7</td>
<td>2,350</td>
<td>0.002</td>
<td>Home v CU; home v LH</td>
</tr>
</tbody>
</table>

*Table 5 Testing of construct validity of dimensions against depression, breast feeding, best educational level attained, social class of head of household, place of delivery, parity, whether labour induced, mode of delivery, labour complications and age*
feeding was positively associated with increasing satisfaction for subscales of professional support, holding her baby, pain in labour, pain after labour, and being in control; it was significantly negatively associated with knowing her carer. Higher educational achievement was negatively correlated with satisfaction on the expectation subscale, knowing carer, and environment subscale; it was significantly positively correlated on the control subscale. Higher social class was significantly positively correlated with the husband/partner support subscale; it was significantly negatively correlated with satisfaction with expectation subscale, knowing carer, and labour environment subscale.

Discussion

This study has produced a new valid reliable instrument with which to assess women’s satisfaction with their labour care, and hence strengthen assessment of the quality of labour care. It is short and easily completed by women, strengthening assessment of the quality of labour satisfaction with their labour care, and hence providing feedback that can be used in evaluating service developments as one component of assessing the quality of labour care that women receive.

The instrument still has some weaknesses. Further work is needed to assess its test-retest reliability and its generalisability; the respondents were predominately of middle social class, in stable relationships, and of good educational achievement. However, it is sufficiently robust to be used in evaluating service developments as one component of assessing the quality of labour care that women receive.

1 Bakheetegi LS. Only a minor part of cerebral palsy cases begin in labour. BMJ 1999;319:1016–17.
### Appendix

Scales derived by principal components analysis (PCA) of WOMBSQ4. Scales are intuitively named followed by their component questions. Scale means, standard deviations, percentage of variance explained by scale and Cronbach alpha coefficients are given. The final scale about general satisfaction was omitted from PCA with varimax rotation and Kaiser normalisation. Question numbers represent their order on the final questionnaire; negatively worded questions are shown with a minus sign.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Name (Cronbach’s alpha, mean scale score, sd, % variance explained)</th>
<th>Coefficient</th>
</tr>
</thead>
</table>
| 1     | Professional support (alpha = 0.91, mean scale score = 72.3, SD = 20.1, % variance = 27.0) | Q7: All my labour carers were very supportive 0.830  
Q13: Carers always listened very, very carefully to everything that I had to say 0.734  
Q19: During labour there was always a carer to explain things so that I could understand 0.696  
Q27: All my carers treated me in the most friendly and courteous manner possible 0.838  
Q32: My carers couldn’t have been more helpful 0.797 |
| 2     | Expectations (alpha = 0.90, mean scale score = 59.0, SD = 27.7, % variance = 7.9) | Q1: My labour went totally normally 0.842  
Q11: The labour went nearly exactly as I had hoped that it would 0.868  
Q17: The delivery went almost completely as I had hoped that it would 0.866  
Q22: My labour was just about the right length 0.749 |
| 3     | Home assessment (alpha = 0.90, mean scale score = 54.3, SD = 23.5, % variance = 7.7) | Q8: I should have had a home assessment in early labour (–) 0.838  
Q15: When I thought that my labour had started, I would have liked a carer to come and see me at home to confirm that I had (–) 0.918  
Q28: Early home assessment of me in labour would have been very helpful (–) 0.922 |
| 4     | Holding baby (alpha = 0.87, mean scale score = 74.2, SD = 20.5, % variance = 7.3) | Q3: I got to see my baby at exactly the right time after she/he was born 0.811  
Q10: After my baby was born, I was not given him/her quite as soon as I wanted (–) 0.872  
Q18: I needed to hold my baby a little earlier than I did (–) 0.864 |
| 5     | Support from husband (alpha = 0.83, mean scale score = 72.7, SD = 21.2, % variance = 5.8) | Q2: My birth partner/husband helped me to understand what was going on when I was in labour 0.778  
Q23: My birth partner/husband couldn’t have supported me any better 0.891  
Q29: I could have had a bit more help from my birth partner/husband (–) 0.889 |
| 6     | Pain in labour (alpha = 0.83, mean scale score = 64.0, SD = 21.8, % variance = 5.5) | Q9: I should have been offered something more to relieve my labour pains (–) 0.762  
Q20: I got excellent pain relief in labour 0.753  
Q26: More pain relief would have made my labour easier (–) 0.826 |
| 7     | Pain after delivery (alpha = 0.65, mean scale score = 57.6, SD = 21.0, % variance = 4.8) | Q6: I should have been offered something more to relieve the pains I had after my baby was born (–) 0.632  
Q16: I was in a fair bit of pain immediately after the birth (–) 0.791  
Q31: I didn’t need a lot of pain relief after the birth 0.779 |
| 8     | Continuity (alpha = 0.82, mean scale score = 38.8, SD = 28.2, % variance = 4.4) | Q5: At the start of my labour I knew my carers very well 0.892  
Q24: I knew the carer(s) present at the birth of my baby 0.885 |
| 9     | Environment (alpha = 0.80, mean scale score = 61.6, SD = 23.7, % variance = 3.7) | Q4: My birth room was a little impersonal and clinical (–) 0.888  
Q14: The area where I gave birth was very pleasant and relaxing 0.748 |
| 10    | Control (alpha = 0.62, mean scale score = 53.0, SD = 22.2, % variance = 3.3) | Q21: Control (alpha = 0.62, mean scale score = 53.0, SD = 22.2, % variance = 3.3)  
Q20: Labour was just a matter of doing what I was told by my carers (–) 0.842 |
| 11    | General satisfaction (alpha = 0.75, mean scale score = 53.1, SD = 12.5) | Q12: The way my labour care was provided could not have been improved N/A  
Q25: I am satisfied with just one or two things about the labour care that I received (–) N/A |
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