

The use of an e-Delphi method to identify core maternity outcome measures.

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Devane D, Begley CM, Clarke M, Horey D, OBoyle C, (2007) Evaluating Maternity Care: A Core set of Outcome Measures, *Birth*, 34, (2), p 164 – 172

Background

Variation in maternity care outcome measures, both in the variety of outcomes reported and disparity in the definition of terms, makes comparison between studies and meta-analyses highly problematic. The aim of this Delphi study was to identify a minimum data set of core outcome measures that could be used to evaluate models of maternity care and provide the basis for comparison between models.

Methodology

A three round, electronic Delphi study design was used to reach consensus among key maternity care stakeholders internationally. The use of electronic, on-line resources allowed the participation of a wide variety of stakeholders and greatly facilitated international collaboration. Maternity service users, midwives, obstetricians, general practitioners, policy makers, and maternity care researchers from 28 countries (n=320) expressed willingness to take part. Of these, 218 (68%) completed round 1, of whom 173 (79%) completed round 2 and 152 (88%) of these completed round 3. For breakdown of participants see below.

Development of the instrument for Round 1

Systematic review of randomised trials comparing models of maternity care identified **263** outcome measures. These were grouped under five broad headings (Antenatal, Intrapartum, Postnatal, Fetal/Neonatal and Additional). A draft instrument was circulated to the research team before being piloted with a group of experienced clinicians and childbearing women, whose comments led to minor changes.

Data collection-Round 1

320 participants were asked to rate the importance of each of the identified outcomes for inclusion in a minimum dataset using a **five-point Likert scale**. Participants also asked to report up to two 'new' outcomes under each heading. A short, online demographic questionnaire included rating of **self-assessment of level of expertise** in evaluation of maternity care models.

Data collection-Round 2

The instrument for round 2 was developed from analysis of responses to round 1 and was re-sent to all participants who had responded to round 1. Outcomes were included in round 2 if the group mean was **greater than the mean** score for all the outcomes combined, **OR** if participants who self-assessed their level of expertise in the evaluation of maternity care models as 6 or 7 (in a 7 point Likert scale) had a mean for that outcome greater than the mean score for all the outcomes combined. **ALSO**, all newly identified outcomes suggested by two or more participants in Round 1 (**73 items**) were included in Round 2. Participants were asked to rate / re-rate the importance of each outcome in the Round 2 instrument.

Data collection-Round 3

The instrument for Round 3 was developed in a similar fashion to Round 2 except that outcomes were also included if 70% or more gave an importance rating of '4' or '5' on the 5-point Likert scale in Round 2. Again the overall group's mean rating and standard deviation for each included outcome were presented, with the participant's individual rating. Participants asked to re-rate the importance of each outcome in the Round 3 instrument.

Results - Round 3 (presented in next column)

Outcomes were retained from Round 3 when the mean score given by the group was greater than the overall average score for all outcomes combined (**black**), **OR** when 70% or more of the participants gave an **importance rating** of '4' or '5' on the 5-point Likert scale in Round 3 (**red**).

Conclusion

E-delphi as a technique to elicit and condense opinions towards consensus has the benefits of anonymity and low cost; but ambiguities regarding defining consensus and 'expertise' remain problematic. In this study, self-identified expertise as a marker for retaining items in round one, and a combination of means and 70% or more agreement, were attempts to ameliorate those ambiguities. The admittedly rather long data set presented could be shortened by further iterations or tighter selection criteria, but whatever the number of items, no set should be presented as prescriptive or restrictive. People involved in the planning and conduct of research remain free, of course, to supplement this core set with other outcomes that they deem important to their evaluation. If adopted however, this core set could be useful to identify primary outcome measures for multicentre trials and would allow more fruitful comparisons of models of maternity care both nationally and internationally.

| Twenty seven countries represented in Round 1 | | | Primary interest in maternity care | | |
|---|-------|---------|------------------------------------|------------|--------------|
| | Freq. | Percent | | Freq. | Percent |
| United Kingdom | 31.8% | n.= 69 | | | |
| Canada | 17.4% | 38 | Midwife | 98 | 45.0 |
| Australia | 12.9% | 28 | Obstetrician | 24 | 11.0 |
| Ireland | 10.6% | 23 | Women's Organisation Rep. | 15 | 6.9 |
| US | 9.7% | 21 | Manager | 14 | 6.4 |
| The Netherlands | 2.3% | 5 | Nurse | 14 | 6.4 |
| Peru | 1.5% | 4 | Woman who has or plans to birth | 9 | 4.1 |
| Sweden | 1.5% | 4 | Epidemiologist | 9 | 4.1 |
| Germany | 1.4% | 3 | Neonatologist | 8 | 3.7 |
| Northern Ireland | 1.4% | 3 | Family Physician / GP | 3 | 1.4 |
| Singapore | 0.9% | 2 | Other | 24 | 11.0 |
| Switzerland | 0.9% | 2 | | | |
| Other * | 7.0% | 15 | Total | 218 | 100.0 |

Round 3 data analysis (all outcomes)

Overall mean 4.19

Black = Included on basis of being greater than overall mean of all outcome means of 4.18 (rounded down to two decimal places) and where $\geq 70\%$ of participants rated outcome a 4 or 5 (where 5 is max rating).

Red = Outcomes for which $\geq 70\%$ of participants rated outcome a 4 or 5 (where 5 is max rating) but where mean for specific outcome is < 4.18

| Outcome | N. | Mean | S.D. |
|---|-----|------|------|
| 1 Maternal Death | 151 | 4.91 | 0.33 |
| 2 Mode of delivery | 151 | 4.89 | 0.40 |
| 3 Neonatal Death | 150 | 4.86 | 0.43 |
| 4 Stillbirth | 151 | 4.83 | 0.47 |
| 5 Type of labour onset | 151 | 4.68 | 0.66 |
| 6 Admission to Special Care | 150 | 4.62 | 0.59 |
| 7 Birth injury | 151 | 4.58 | 0.68 |
| 8 Ruptured uterus | 151 | 4.56 | 0.75 |
| 9 Postpartum haemorrhage | 151 | 4.56 | 0.66 |
| 10 Mother admission to ICU | 149 | 4.55 | 0.63 |
| 11 Readmission to hospital | 150 | 4.50 | 0.67 |
| 12 Method of feeding | 150 | 4.49 | 0.78 |
| 13 Gestation at delivery | 151 | 4.47 | 0.72 |
| 14 VBAC (Vaginal birth after caesarean section) | 150 | 4.47 | 0.70 |
| 15 Postnatal Depression | 150 | 4.46 | 0.75 |
| 16 Place of birth | 150 | 4.45 | 0.80 |
| 17 Neonatal resuscitation required | 151 | 4.44 | 0.72 |
| 18 Gestational age at birth | 150 | 4.42 | 0.79 |
| 19 Normal, i.e. physiological birth | 149 | 4.41 | 0.77 |
| 20 Oxytocin augmentation | 151 | 4.39 | 0.76 |
| 21 Anal sphincter damage | 151 | 4.37 | 0.74 |
| 22 HIE (Hypoxic ischaemic encephalopathy) | 151 | 4.35 | 0.84 |
| 23 Hypertensive dis. of preg. (Intranatal) | 146 | 4.34 | 0.89 |
| 24 Hypertensive disorders of pregnancy | 152 | 4.33 | 0.91 |
| 25 Puerperal psychosis | 149 | 4.32 | 0.94 |
| 26 Faecal incontinence | 149 | 4.32 | 0.80 |
| 27 Birth asphyxia | 151 | 4.32 | 0.88 |
| 28 Breastfeeding at discharge | 150 | 4.31 | 0.93 |
| 29 Neonatal readmission to hospital | 150 | 4.31 | 0.75 |
| 30 Apgar score at 5min | 151 | 4.31 | 0.86 |
| 31 Trial of labour | 150 | 4.31 | 0.79 |
| 32 Breastfeeding at 3months | 149 | 4.30 | 0.84 |
| 33 Maternal satisfaction (Postnatal) | 150 | 4.30 | 0.94 |
| 34 Birth weight | 151 | 4.30 | 0.83 |
| 35 Fitting / Seizures | 150 | 4.29 | 0.89 |
| 36 Infant requiring intubation | 151 | 4.27 | 0.77 |
| 37 Fetal abnormality | 150 | 4.27 | 0.88 |
| 38 Use of pharmacological analgesia | 150 | 4.25 | 0.80 |
| 39 Maternal satisfaction | 152 | 4.25 | 0.92 |
| 40 Hypertensive dis. of preg. (Postnatal) | 149 | 4.24 | 0.98 |
| 41 Maternal satisfaction Intra | 150 | 4.24 | 0.95 |
| 42 Caesarean section wound infection | 150 | 4.24 | 0.83 |
| 43 Preterm birth | 151 | 4.23 | 0.91 |
| 44 Pulmonary embolism | 148 | 4.22 | 0.90 |
| 45 Intra Uterine Growth Restriction | 149 | 4.22 | 0.76 |
| 46 Preterm labour | 150 | 4.20 | 0.87 |
| 47 Meconium aspiration | 151 | 4.19 | 0.89 |
| 48 Intrapartum haemorrhage | 149 | 4.19 | 0.76 |
| 49 Neonatal infection | 150 | 4.19 | 0.88 |
| 50 Shoulder dystocia | 151 | 4.19 | 0.81 |
| 51 Maternal cerebral infarction | 149 | 4.17 | 0.96 |
| 52 DVT (Deep venous thrombosis) | 149 | 4.17 | 0.77 |
| 53 Overall obstetric intervention score | 149 | 4.17 | 0.97 |
| 54 Fetal and/or neonatal haemorrhage | 151 | 4.17 | 0.89 |
| 55 Breastfeeding at 6 weeks | 150 | 4.17 | 1.01 |
| 56 Episiotomy | 150 | 4.17 | 0.81 |
| 57 Multiple pregnancy | 150 | 4.15 | 1.02 |
| 58 RDS (respiratory distress syndrome) | 151 | 4.15 | 0.91 |
| 59 Inverted uterus | 151 | 4.15 | 0.96 |
| 60 Lead professional at birth | 149 | 4.14 | 0.89 |
| 61 Transfer / referral to medical led care (Intranatal) | 151 | 4.13 | 0.81 |
| 62 Urinary incontinence | 148 | 4.12 | 0.76 |
| 63 Cord prolapse | 149 | 4.12 | 0.91 |
| 64 Maternal preferences for future care | 150 | 4.09 | 0.93 |
| 65 Fetal acidosis | 151 | 4.09 | 0.88 |
| 66 Prolonged rupture of membranes | 152 | 4.09 | 0.85 |
| 67 Transfer/referral to medical led care | 152 | 4.08 | 0.94 |
| 68 Blood transfusion | 149 | 4.07 | 0.90 |
| 69 Retained products of conception | 150 | 4.07 | 0.90 |
| 70 Rhesus isoimmunisation | 149 | 4.06 | 0.99 |
| 71 Manual Removal of Placenta | 149 | 4.05 | 0.84 |
| 72 Amniotomy | 150 | 4.05 | 0.80 |
| 73 Intact perineum | 151 | 4.05 | 0.90 |
| 74 Maternal attitudes toward routines and practices | 150 | 4.04 | 0.94 |
| 75 Time from decision to birth by emergency C/S | 151 | 4.03 | 0.85 |
| 76 Postmaturity | 152 | 4.03 | 0.91 |
| 77 Breast feeding at 6 months | 150 | 4.03 | 1.00 |
| 78 Malpresentation | 151 | 4.02 | 0.86 |
| 79 Retained placenta | 150 | 4.01 | 0.88 |
| 80 Length of infant hospital stay | 150 | 4.01 | 0.84 |
| 81 Total cost per birth | 149 | 4.00 | 0.89 |
| 82 Long term infant child neuro dev. probs. | 149 | 4.00 | 0.87 |
| 83 Intrauterine hypoxia | 151 | 4.00 | 0.97 |
| 84 Perineal and vaginal tears | 149 | 3.99 | 0.92 |
| 85 Continuity of care during labour | 150 | 3.97 | 1.02 |
| 86 Fetal distress | 150 | 3.97 | 0.93 |
| 87 Infant feeding problems | 150 | 3.97 | 0.87 |
| 88 Method of fetal heart rate monitoring | 151 | 3.95 | 0.93 |
| 89 Maternal perception of midwifery support (Labour) | 150 | 3.94 | 0.99 |
| 90 Separation of mother and infant | 151 | 3.93 | 1.02 |
| 91 Maternal perception of control during labour | 151 | 3.92 | 1.00 |
| 92 Use of non-pharmacological methods | 151 | 3.90 | 0.96 |
| 93 Diabetes - insulin required | 151 | 3.90 | 0.96 |
| 94 Women's preferences for labour and birth | 150 | 3.89 | 1.04 |
| 95 Length of 2 nd stage of labour | 151 | 3.88 | 0.96 |
| 96 Length of postnatal hospital stay | 149 | 3.87 | 0.89 |
| 97 Breast feeding problems | 149 | 3.87 | 0.94 |
| 98 Premature rupture of the membranes | 150 | 3.86 | 0.88 |
| 99 Women's perception of availability of choice | 149 | 3.85 | 1.02 |
| 100 Jaundice requiring phototherapy | 149 | 3.85 | 0.91 |
| 101 Neonatal pneumothorax | 150 | 3.83 | 0.95 |
| 102 Continuity of carer during pregnancy | 151 | 3.78 | 1.00 |
| 103 Fetal loss before 24 weeks | 152 | 3.75 | 1.02 |
| 104 Cardiac problems | 150 | 3.70 | 0.95 |
| 105 Drug/alcohol use during pregnancy | 152 | 3.70 | 0.91 |

