**The exploration of midwives’ emotional wellbeing: the use of cognitive interviews to evaluate a new survey instrument**

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**Abstract:**

**Background:** Surveys are a popular method of collecting data to explore factors associated with midwives’ emotional wellbeing, yet existing survey instruments lack consideration of how working practices may influence outcomes.

**Aim:** To test the face and content validity of a new instrument by assessing midwives’ comprehension of bespoke survey items.

**Methods:** Twenty-four cognitive interviews were conducted with midwives working across the United Kingdom. A framework matrix method facilitated descriptive and explanatory analysis of the interpretation of survey items. The interviews were followed by a discussion group with midwifery academics to help identify the optimal wording of one problematic survey question.

**Findings:** A range of potential comprehension and response problems were identified, resulting in modifications and addition of new survey items.

**Conclusions:** Cognitive interviews can be an effective method to confirm the relevance and usability of bespoke survey items and offer opportunities to improve wording to reduce potential sources of error, thus enhancing the face and content validity of surveys.

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**Conflicts of interest:** None

**Key words:** Cognitive interviews, survey, questionnaire design, midwifery, emotional wellbeing

**Key points:**

* Surveys are regularly used within midwifery research to explore factors that may be associated with midwives’ emotional wellbeing, yet there is a lack of standardised questionnaires that are specifically designed to explore the effect of working practices on outcomes.
* This research sought to test the face and content validity of a new survey instrument by assessing midwives’ comprehension of bespoke survey items related to working practices.
* The findings identified and validated previously unexplored measures that may influence emotional wellbeing outcomes in midwives.
* Inclusion of these measures may enhance understanding of factors that influence emotional wellbeing outcomes in midwives.

**Introduction**

There is an increasing body of evidence from surveys to suggest that burnout is not uncommon within the midwifery workforce (Hildingsson et al. 2013; Henriksen and Lukasse 2016; Fenwick et al. 2018a; Hunter et al. 2019; Stoll and Gallagher 2019), with potentially better outcomes for midwives working in a caseload model (Newton et al. 2014; Dixon et al. 2017; Dawson et al. 2018; Fenwick et al. 2018b). However, there are conflicting findings on whether age, length of experience or weekly hours influence outcomes, which might be explained by differences within the samples or methods of analysis. The influence of working practices on job satisfaction are commonly captured through the analysis of open-ended survey responses. The ability for midwives to form relationships with women and have time to provide advice and high-quality care has been linked to job satisfaction, whereas working conditions, such as high or unreasonable workloads, working long shifts/hours with no breaks, staff shortages, or a lack of recognition or role support have contributed to job dissatisfaction (Sandall 1998; Cull et al. 2019; Harvie et al. 2019). However, there was a gap in the evidence on how shift length and other working practices, such as the ability to take rest breaks, finish on time or intershift recovery may influence outcomes, and no existing survey instrument that incorporated these aspects.

Bespoke survey items can be developed to answer specific research questions, yet this approach is not without its challenges. The design of a new survey instrument requires careful planning as response errors can arise when participants attempt to answer questions, increasing the risk of invalid or incomplete data (Collins 2015; Hofmeyer et al. 2015). Drawing on a model arising from the fields of cognitive psychology and survey evaluation, there are four distinct stages that must be completed for a participant to be able to answer a survey question: comprehension, retrieval of information, judgement and reporting an answer (Groves et al. 2011). If participants do not interpret a question in a way that was intended by the researcher, then conclusions will be flawed, or if different participants interpret the question in different ways, systematic bias could be introduced (Willis 2005; Collins 2015). The retrieval process may depend on whether factual or attitudinal information is required, timescales and frequency of an event (Ryan et al. 2012; Collins 2015). When participants answer survey questions, they make a judgement based on their understanding of the question, whether they have the information to answer it and whether they are motivated enough to answer accurately (Willis 2005; Collins 2015). Response options can affect the way a participant reports an answer (Collins 2015).

A new survey was created in December 2018; the objectives were to analyse the association between individual characteristics, work-related factors and working practices and their effect on emotional wellbeing outcomes of midwives working in the National Health Service (NHS) across the United Kingdom (UK). Items for inclusion were informed by the survey’s objectives, a review of the literature, national guidance on staff reported measures related to midwifery safe staffing indicators (National Institute for Health and Care Excellence 2015) and measures of key items from a preliminary survey of Heads of Midwifery that explored the working practices of midwives in NHS hospital settings (Dent 2020). Single-item measures assessed the outcomes of work-related stress (WRS), job satisfaction, being pleased with their standard of care, and thoughts about leaving midwifery. Burnout was measured with the Copenhagen Burnout Inventory (Kristensen et al. 2005), which has previously been validated among midwives, so these items were not tested, and neither were individual characteristics. The rationale for including working practices items are shown in Table 1.

This paper presents the process of survey development and the two pre-testing methods that preceded a conventional pilot: cognitive interviews and a discussion group. Cognitive interviews are specifically designed in-depth qualitative methods, structured around a four stage answer model, to understand how participants might have interpreted a question and how they came to formulate an answer, and these processes are then analysed to assess whether the questions were measuring what they were intended to and to what level of accuracy (Presser et al. 2004; Groves et al. 2011). The aim of the interviews was to test question wording and proposed content to support the face and content validity of the new instrument. The discussion group was incorporated as an additional form of review, with the aim to specifically consider the optimal wording of one survey item.

**Methods**

Participants

To be eligible for inclusion, participants needed to be registered with the Nursing and Midwifery Council and currently working as a midwife in an NHS Trust, thus reflecting the target population of the finalised survey. Student midwives or midwives who did not work in a clinical role were excluded. The cognitive interviews were based on a purposive theoretically driven non-probability sample. Country/region of the UK in which the midwife worked was prioritised in the sampling criteria (due to likely differences in working practices). A minimum of two interviews needed to be conducted with midwives working in each of the following areas: Northern Ireland, Scotland, Wales and London. Due to the large geographical area, and to allow flexibility in recruitment, a minimum of four interviews were set for those working in the North, South and East of England. To ensure a balance of opinions, secondary sampling criteria included at least four interviews with midwives with less than two years’ experience, four with 10 or more years’ experience; four in those aged under 35 years, and four in those aged 45 years or older.

Participants were recruited via advertisements on two midwifery network social media sites on Facebook. All sampling criteria were achieved (Table 2), with 24 interviews conducted over three consecutive rounds of testing between July and November 2019. Midwives responding to the call for participation were asked if they would consent to being a ‘survey champion’, which would involve them promoting participation in the finalised online survey by sharing the survey link with other midwives, for example, through their social media groups. A total of 44 midwives were recruited as survey champions from various regions of the UK (23 took part in the interviews). For practical reasons, a convenience sample of five midwifery academics were recruited for the discussion group from a University in the East of England, via internal email invites, which took place in February 2020. The researcher had a working relationship with these five participants.

Measures and procedures

All midwives taking part in the interviews completed the survey online, administered through the secure online platform ‘Online Surveys’, either face-to-face or whilst on the telephone. Interviews were audio recorded and assigned an identification number. Interviews ranged in length from 26 to 93 minutes, with a mean duration of 47 minutes. Two main techniques that can be used in cognitive interviews are think-aloud and verbal probing (Willis 2005; Campanelli 2008; d’Ardenne 2015); both techniques were used. With think-aloud, the participant talks out loud when reading the question and verbalises thoughts about their answer whilst the interviewer makes notes that may indicate any problems with a question (d’Ardenne 2015). Verbal probing involves asking specific questions related to a question to target specific aspects, such as recall or comprehension (Ryan et al. 2012). An interview protocol had been developed to structure each individual interview and serve as a data collection instrument (field notes and observations). Midwives were asked to answer a series of survey questions whilst thinking-aloud and advised in advance where to pause to facilitate standardised probes (included in the protocol), such as “How easy or difficult was it to answer this question?” Spontaneous probes were used as necessary, for example, if a participant changed their original answer: “I saw you changed your answer for question X, can you say what you were thinking at the time?”

Cognitive testing methods can also include card sorts (Collins 2015), which are useful visual methods that permit exploration of an individual’s unique interpretation of complex concepts (Willis 2005). Card sorts were used as a systematic means to inform the content of two new multi-response items that would complement the single item outcome measures of WRS and job satisfaction. The card sort for WRS (Fig. 1) was developed as part of the interview process based on responses to spontaneous probes in the first 12 interviews. In subsequent interviews, only those who selected a positive response to WRS were asked to complete the card sort. Items for the job satisfaction card sort were prepared in advance, derived from key aspects arising from the review of the literature and were used at the end of all interviews (Fig. 2). The card sorting process required midwives to decide on the importance of items by placing cards in a ranked order or, if items were not considered important, they could be left out.

Following completion of the interviews, the survey item on shift length continued to create comprehension difficulties. Rather than rely solely on the judgement of the interviewer, a one-hour, semi-structured discussion group was conducted to specifically consider the optimal wording of this question. The format drew on cognitive interviewing techniques (Willis 2005; Collins 2015). Vignettes were used to present hypothetical scenarios that demonstrated the types of comprehension problems found for the question on shift length. No audio recording was made but verbal feedback was documented, with the aim to reach a consensus on the wording.

Analysis

The primary unit of analysis in the interviews was the respondent’s interpretation of the individual survey items, and not their survey answer. The full transcription of cognitive interviews is often unnecessary as it is the interviewer notes which provide the main unit of analysis but, as a novice cognitive interviewer, JD transcribed all interviews verbatim to check the accuracy of interview notes. Interview data were then reduced and organised through two framework matrix methods (d’Ardenne and Collins 2015) which facilitated descriptive and explanatory analysis on an item-by-item basis to guide decisions on whether survey items should be removed, modified or retained. Results were analysed after interviews 12, 18 and 24 (final interview). The interview protocol was updated after each review to reflect any changes in question or answer format.

Ethics

Ethical approval was granted by The University of Hertfordshire Health, Science, Engineering and Technology Ethics Committee with Delegated Authority for the cognitive interviews [HSK/PGR/UH/03668] and the discussion group [HSK/PGR/UH/04063]. Written informed consent was obtained for each method prior to any data collection.

**Results**

The pre-testing process resulted in several modifications to the original survey items (Table 3 provides examples). Only one of the work-related items (travel to work time) required modification. Of all the working practices items, the question on shift length appeared to be the most problematic. The potential for response error was noted due to midwives working a range of shift lengths to make up weekly hours, working on-calls, differences in day and night shift lengths, working beyond the end of their shift or confusion with the question. Participants in the discussion group agreed that the optimal format of this question would be to split it into separate questions for day and night shifts, remove the reference to rest breaks and to provide an explanatory statement regarding any time spent working beyond the end of the shift. New questions were created to explore mixed shift lengths and issues related to on-call working.

The terms ‘unpaid’ and ‘scheduled’ appeared to cause confusion in the question on rest breaks, so they were removed, with no further problems observed. During the first 12 interviews, midwives provided reasons for missed breaks or not being able to finish on time. In subsequent interviews, two new survey items were added to explore this. Retrieval probes explored how easy or difficult it was to remember finishing on time or the inability to take rest breaks in the past month and past 3-months. All thought it was easy to remember this for the past month, but only half felt confident for a 3-month period, so both questions retained a one-month recall period. There were no problems identified for the remaining working practices items.

No problems were observed for any of the single-item outcome measures. A general probe explored how easy or difficult it was to answer the questions on job satisfaction and standard of care. Some verbalised difficulty in answering, often reflecting on very satisfying aspects of their jobs alongside frustrations, whilst answers on their standard of care appeared to be based on the type of care they wanted to give. However, all were able to decide on answers that they felt were appropriate.

The reasons given for WRS and job satisfaction, collated from the card sorts (Fig. 1 and 2), were retained for inclusion in new survey items, with minor amendments to some of the wording. Based on the feedback, nine further answer options were included for job satisfaction, which included separating opinions on the continuity of care model into two statements to reflect positive and negative views of working in this model. General probes in the first 12 interviews explored options for expanding the questions on standard of care and thoughts about leaving. All midwives thought this would be useful. Reasons influencing their standard of care were focused on factors that had a perceived detrimental impact. A new multi-response item was created and tested in the final 12 interviews, resulting in a list of 13 reasons. A total of 21 reasons were collated from those that indicated thoughts of leaving, which conditionally appeared in a new question if a positive answer was given.

**Discussion**

The cognitive interviews enabled the systematic assessment of the content and quality of the new survey instrument (Collins 2015; Willis 2015). The results have shown the importance of pre-testing survey items from a respondent’s perspective as potential comprehension and response problems became evident during the process. If these issues had not been identified prior to survey administration it could have led to response errors, potentially misleading conclusions, threatening the validity of the results. The use of cognitive interviews to evaluate surveys in health care research has been well documented (e.g. Drennan 2003; Ryan et al. 2012). In recent years, cognitive interviews have also been used as part of the validation process for survey instruments in midwifery settings (Martin et al. 2014; Stahl et al. 2017; Kalu et al. 2020). Focus groups offer an alternative form of review, although they are more exploratory so are useful in the early stages of survey development (Blake 2015). As a pre-testing method, focus groups can produce different findings to cognitive interviews. For example, comprehension problems are more likely to go undetected as participants may be unwilling or feel uncomfortable in a group environment, they may not have the opportunity to voice their own interpretations of a question, and responses to probing in focus groups have resulted in more generic opinions and less clearly formulated answers (Blake 2015; Collins 2015; Sugovic et al. 2016). Therefore, cognitive interviews were deemed the optimal pre-testing method.

Midwives in this study had the skills and ability to understand the different interview techniques and were adept in verbalising their thought processes, minimising the chance of the interviewer missing any response problems. By focusing on the perception of the target population, the survey questions were refined to better suit the various ways in which midwives work across the UK and how they might interpret the questions. This is evident in the modifications and addition of items related to working practices. The feedback from the interviews also enabled the expansion of specific question and answer options to explore reasons associated with a range of working practices.

The construct of the single-item outcome measures were all measured as concepts-by-intuition, the operationalisation of which assumes that the meaning is immediately obvious to an individual and that they can express their views to a simple question (Saris & Gallhofer, 2014). The cognitive interviews confirmed midwives’ comprehension and judgement of these measures, and appeared to capture accurate accounts of how midwives perceived their ability to do their job to a standard they were pleased with, even when some found it a hard question to answer, and midwives appeared to base their answer for job satisfaction on an overall assessment of both positive and negative factors. Participants enjoyed the inclusion of card sorts, which built the concepts of WRS and job satisfaction, which may not have been identified through the literature review alone.

The limitations of the approach need to be acknowledged. The convenience sample of midwifery academics could be criticised for not being representative of the target population (Fain 2013), yet this group had knowledge about working practices as they were linked to different NHS hospital sites as part of their job; in addition, the revised format of the question on shift length was tested in the later pilot study. Cognitive interviews could be criticised for a lack of standardised practice for data analysis (Ryan et al. 2012). However, the systematic approach of the framework matrix method is specifically designed to be transparent and open to scrutiny as each matrix details the analytic process and interpretations (audit trail), which can help findings gain credibility (Collins 2015). Whilst the cognitive interviews were effective in assessing whether participants understood the questions, it is possible that a different sample may have identified other problems (Ryan et al. 2012), or proposed alternative reasons when building the multi-response options. However, the reasons listed were frequently similar among participants, so were thought to provide a good starting point to better understand factors that may contribute to midwives’ emotional wellbeing.

**Conclusion**

The findings have shown that designing a new questionnaire is a complex process. Cognitive interviews precede and complement a conventional pilot by revealing problems that may not have been anticipated by the researcher. Cognitive pre-testing can be an effective method to confirm the relevance and usability of bespoke survey items and offers opportunities to improve wording and content before administration in the field to reduce potential sources of error, supporting the face and content validity of the survey.

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Table 1. Rationale for inclusion of working practices items in first draft of survey

Items Rationale for inclusion

Shift length Inconsistent findings within nursing literature

Advance release of off-duty Possible impact on ability to plan personal/social life with any certainty

Frequency of finishing shift All items may be directly or indirectly related to staffing issues (NICE 2015)

on time\*

Inability to take a rest break \* Inconsistencies in NHS Trusts documenting these in the first survey

(Dent 2020)

Formal methods in place to

record missed rest breaks\*

Called away from a mandatory

training session in past year

Length of rest break Results from first survey (Dent 2020):

- short breaks not necessarily corresponding to shorter shifts

Maximum number of consecutive - differences in maximum number of consecutive shifts

shifts that can be scheduled - less than half of respondents reported a policy of at least

48 hours rest between night and day shifts

Scheduled to work a day shift within All with a possible impact on fatigue and wellbeing.

24 hours of finishing a night shift

Table 2. Characteristics of cognitive interview participants

Region Years of Age Band Data collection

experience method

London 6 30 6 Face-to-face

7 34 6 Face-to-face

South of England:

South West 13 49 6 Face-to-face

11 59 6 Telephone

South East 9 33 7 Face-to-face

5 55 6 Face-to-face

East of England:

East 8 46 7 Face-to-face

18 months 38 6 Face-to-face

22 44 6 Telephone

Midlands 23 months 23 5 Face-to-face

35 60 6 Face-to-face

North of England:

Yorkshire & The Humber 3 54 6 Telephone

7 50 6 Telephone

North West 20 months 50 5 Face-to-face

13 46 6 Telephone

24 51 6 Telephone

North East 18 months 39 5 Face-to-face

18 49 6 Telephone

Scotland 6 39 6 Face-to-face

6 47 6 Face-to-face

Wales 8 37 6 Face-to-face

6 39 6 Face-to-face

Northern Ireland 4 26 6 Face-to-face

14 44 7 Face-to-face

*Note: To protect the identify of participants, the ID numbers assigned in Table 3 do not correspond to the order shown in Table 3.*

Table 3. Examples of response problems

Initial question wording/ Response problem Final wording

Revisions

(1) What is your estimated (1) Comprehension and ability to answer: What is your estimated time to

time to travel to work on One participant (CI007) queried whether travel to work (one-way) on a typical

a typical day? the question meant a return journey day? (For community midwives that

go straight to home visits, use travel

*Question modified after 1st review:* time from home to any base location)

(2) What is your estimated (2) One participant (CI016) did not feel she

time to travel to work could answer as she works in community

(one-way) on a typical day? and goes straight to visits which vary in

distance

(1) What is the total shift (1) Comprehension and ability to answer: How long are your DAY shifts? (Do not

length (including any rest Question does not account for mixed include any time spent working beyond

break) you are scheduled (shorter) shift lengths to make up the end of your shift – you will be asked

to work? weekly hours. Question does not account about this later). If you work different

for midwives who work a variety of shift shift lengths in the day, select the most

lengths. Potential for response error if common shift length worked.

answer includes time working beyond

end of shift. Response categories: no How long are your NIGHT shifts? (Do

option to acknowledge extended working not include any time spent working

hours due to on-call work. beyond the end of your shift).

*Question modified after 1st review:*

(2) What is the total shift length, (2) Ability to answer: question does not

including any rest break (even account for differences between day and

if not taken) that you are night shift length.

scheduled to work on a typical One participant (CI022) who worked

shift? (If you work different 12.5-hr shifts with 1-hour break was

shift lengths, select the most unsure whether to answer 11.5 or

common shift length worked) 12.5 hours for shift length.

*New question added after 1st review:*

Do you ever have to work mixed Comprehension: Two participants (CI022, Do you ever have to work mixed shift

shift lengths (e.g. shorter shifts of CI023) thought the answer was yes, but lengths (e.g. shorter shifts to make up

6 hours) to make up your weekly not for making up hours, instead reasons weekly hours or because of study

contracted hours? reasons were for study days/training or days/training or other reasons?

on a “when needed” basis.

*New question added after 1st review:*

Do you ever have to work on-calls? Ability to answer: Participants who Do you currently have to work on-calls?

[with positive answer triggering a worked on-calls advised on-call period [With positive answer triggering a

further question on the number was calculated over a 1-month period. Further question on the number of

of on-calls in a week] In one unit, midwives used to have to on-calls in a one-month/4-week period]

work on-calls due to staffing shortages

but this practice has been stopped as

staffing levels have increased.

*New conditional response*

*option added after 1st review:*

If you work on-calls, do you No response problems. Question format retained.

consider that your working

pattern allows you sufficient

recovery time before being back

on duty?

(1) How many unpaid rest breaks (1) Comprehension: The term ‘unpaid’ How many rest breaks are you

are usually scheduled into appeared to confuse some participants, supposed to have in the most common

your shift? (CI007, CI010, CI011), believing breaks/ shift length you usually work? (even if

missed breaks were paid they are cut short or not taken). Do not

*Question modified after 1st review:* include any ‘informal’ tea breaks.

(2) How many unpaid rest breaks (2) Comprehension: The term ‘scheduled’

are usually scheduled in your confused one participant (CI013), who

shift (even if they are cut short believed this to mean a specific timeframe

or not taken – how many are you for a break, but was also unsure how to

supposed to have?) answer when breaks varied according to

the shift length worked.

Shape

Description automatically generated with medium confidence

Shape

Description automatically generated with medium confidence