A mixed methods review to develop and confirm a framework for assessing midwifery practice in perinatal mental health

Running head: Midwifery practice and perinatal mental health

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Abstract

Aim: To ascertain whether a new framework examining midwifery practice in perinatal mental health is supported by the research literature.

Background: The identification and care of women with perinatal mental health problems is increasingly considered part of midwifery practice. Research suggests that many midwives lack knowledge, skills and confidence. It would be useful to be able to determine barriers and facilitators to effective clinical practice. The authors propose a framework comprising five potentially measurable domains which impact on midwives' ability to identify, assess and care for women with perinatal mental health problems.

Design: This mixed-methods review uses an innovative qualitative convergent design based on framework synthesis.

Data sources: Relevant electronic databases were searched for the period from January 2007 to December 2016; 33 studies from nine countries met the inclusion criteria.

Review methods: Study quality was assessed using critical appraisal tools. Study findings were mapped onto the five domains of the framework: knowledge, confidence, attitudes, illness perception and infrastructure. Findings were then synthesized for each domain.

Results: All five domains are substantially represented in the literature, thus supporting the proposed framework. A number of sub-domains and relationships between domains were identified. Varying levels of knowledge, confidence, attitudes and illness perceptions were found; evidence suggests that midwives benefit from further training within these domains. Features of organisational infrastructure act as barriers or facilitators to effective care; these need to be addressed at organisational level.

Conclusion: The proposed framework was confirmed and can be used to inform practice, policy and research.

Keywords

midwifery; midwives; perinatal mental health; postnatal depression; antenatal depression; midwifery education; mixed-methods review; framework synthesis

SUMMARY STATEMENT

Why is this review needed?

- Perinatal mental health problems can have serious consequences for women, their babies and their families.
- Midwives are increasingly involved in the assessment and care of women with perinatal mental health problems, but research shows that they may lack relevant knowledge, skills and confidence and that problems are often not identified or treated adequately.
- The review aims to confirm a framework which can be used to identify barriers and facilitators to the effective assessment and care of women with perinatal mental health problems.

What are the key findings?

- The review confirms the proposed framework and provides further details of the content of each of the five domains and how they are linked.
- Midwives' knowledge, confidence, attitudes and illness perceptions vary considerably and may hinder the provision of effective care for women with perinatal mental health problems.
- Appropriate organisational infrastructure, including referral pathways, the organisation of care and adequate training, is crucial in supporting effective midwifery practice.

How should the findings be used to influence policy/practice/research/education?

- The framework can be used to enhance clinical practice by identifying facilitators and barriers to effective care.
- The framework can be used to support further research and the development of measures of the five domains.
- The framework can potentially be applied to other conditions and/or groups of health professionals and is suitable for use in different countries and health service structures.

INTRODUCTION

There is significant and continually accruing evidence of the deleterious consequences of perinatal mental health (PMH) problems for pregnancy outcomes (Dunkel Schetter & Tanner, 2012) and the well-being of mothers, fathers and babies (Stein *et al.*, 2014). Identification and assessment of mental health issues can be critical in facilitating timely and appropriate liaison with relevant professionals, discussion regarding treatment and support options, and the development of management plans for the perinatal period. In the ten years since the publication of the UK National Institute for Health and Care Excellence (NICE) guidelines (NICE, 2007) for antenatal and postnatal mental health, which made recommendations and provided guidelines for the assessment and care of women with PMH problems, it would seem reasonable to expect significant changes. However, national reports (Knight *et al.*, 2015; RCOG, 2017) continue to emphasize gaps in service provision and failures to appropriately identify and care for women with PMH problems. It seems timely, specifically in the light of significant investment in new service development in the UK and increasing political mobilisation in other countries, to seek greater understanding of the challenges midwives face, and to provide an explanatory framework which can identify why to date numerous policy drivers and guidelines have failed to translate into practice and how that could be better supported.

Background

Whilst midwives are increasingly involved in the assessment and care of women with PMH problems, evidence suggests that many express concern regarding their knowledge and skills and hence lack confidence (Noonan, Doody, Jomeen, & Galvin, 2017; Ross-Davie, Elliott, Sarkar, & Green, 2006). Research exploring women's experiences has highlighted that a lack of knowledge of PMH among health professionals can act as a barrier to women's access to care (Byatt *et al.*, 2013; Higgins, Tuohy, Murphy, & Begley, 2016b). Low levels of confidence can have a negative impact on midwives' behaviour during assessment and care (Davis, Foureur, Clements, Brodie, & Herbison,

2012; McGookin, Furber, & Smith, 2017). Research with health visitors suggests that confidence in identifying and managing women with PMH problems is closely linked to knowledge (Jones *et al.*, 2015).

Negative attitudes and stigmatisation associated with mental illness are an important issue and result in labelling people as 'different', stereotyping, and discrimination (Mårtensson, Jacobsson, & Engström, 2014). When this is linked to the literature which attributes knowledge deficits and low levels of clinical confidence to a greater likelihood of negative attitudes toward individuals with mental health issues (Schafer, Wood, & Williams, 2011), an interesting context begins to emerge, where a complexity of factors interact to influence practitioner behaviours. Whilst this has not to date been explored in the perinatal context, evidence does seem to indicate that lack of knowledge, experience and familiarity are factors related to more negative attitudes in healthcare staff. It is feasible then to suggest that a similar context could exist for student midwives or midwives who are not specifically trained in mental health. The impact of negative attitudes can be substantial and affects understanding of PMH problems (McGookin *et al.*, 2017) and professional behaviour (Noonan *et al.*, 2017), which may reduce the likelihood of women disclosing problems. Furthermore, women themselves often perceive their mental health problems as a stigma, which can be instrumental in preventing them from seeking help (Bilszta, Ericksen, Buist, & Milgrom, 2010; Byatt *et al.*, 2013; Dennis & Chung-Lee, 2006).

Health professionals' perceptions of an illness, i.e. their understanding of symptomology, causes and consequences of conditions, as well as perceptions of how much 'personal control' patients can exercise over their symptoms and behaviour, can influence patient-practitioner encounters (Worsely, Whitehead, Kandler, & Reuber, 2011). Practitioners actively form mental representations of an illness, which determine how they respond in terms of clinical decision-making. The fascinating aspect of illness perceptions is how practitioners can have widely different perceptions of a condition and these perceptions can lead the same patients down very different illness trajectories (Petrie & Weinman, 2006).

Further complicating the issue of effective care of PMH problems is a general acknowledgement that unless it forms an integral part of a resourced infrastructure, with clear pathways that can offer diagnostic assessment, effective and available treatment options and support, then practitioners are less likely to actively engage in the identification and assessment process (Jomeen & Martin, 2014; Noonan *et al.*, 2017). Research into women's experiences echoes the importance of clear referral processes and integrated services (Darwin, McGowan, & Edozien, 2015; Higgins *et al.*, 2016b; Phillips & Thomas, 2015; Rollans, Schmied, Kemp, & Meade, 2013b). Access to a specialist PMH service promotes more positive experiences (Higgins *et al.*, 2016b; Myors, Schmied, Johnson, & Cleary, 2014).

From this narrative snapshot of the literature, it appears that five domains – knowledge, confidence, attitudes, illness perception and organisational infrastructure – are likely to impact on midwives' ability to identify, assess and care for women with PMH problems. The last two decades have seen a growing body of research in relation to the identification and care of women with PMH problems by midwives. A recent review (Noonan *et al.*, 2017) exploring midwives' perceptions and experiences of caring for women with PMH problems concludes that midwives' knowledge, skills and attitudes were of great importance in the care for these women. Midwives need to be supported not just by further training opportunities, but also by appropriate referral pathways and a supportive infrastructure. This paper reviews a similar body of literature, but has a different focus with a different approach. The aim of this review is to systematically identify whether the international research literature supports the proposed five-domain framework in terms of midwives' clinical practice.

THE REVIEW

Aims

The overall aim of this mixed methods review using a framework approach was to identify whether research into midwives' clinical practice within the identification and care of women with PMH problems confirms the proposed five-domain framework or whether it needs to be modified.

Design

This review synthesizes findings from qualitative, quantitative and mixed methods studies using a framework approach. While the review includes quantitative and qualitative evidence, the methodological and philosophical differences between the qualitative and quantitative studies (including within mixed methods studies) were not very large. The qualitative studies tended to be descriptive rather than interpretative. The quantitative studies used mostly simple surveys, with some employing a pre-/post-test design, and were also more descriptive in nature; they were not suitable for inclusion in a meta-analysis. Therefore findings were integrated by transforming quantitative into qualitative findings (Sandelowski, Voils, & Barroso, 2006). Following Pluye and Hong (2014), the approach taken can be described as a qualitative convergent design.

Framework synthesis employs a framework as a 'scaffold' against which findings from qualitative studies are mapped (Carroll, Booth, & Cooper, 2011; Carroll, Booth, Leaviss, & Rick, 2013). While Carroll et al (2013) include the systematic identification of frameworks in the literature and the subsequent generation of the a priori framework, for this review a suitable framework had already been identified. The a priori framework used in this review is based on existing research evidence and the authors' expert knowledge, as discussed above.

Search methods

Inclusion criteria

Studies were eligible for inclusion if they were empirical research, written in English, published between January 2007 and December 2016, and related to midwifery practice in PMH from midwives' perspectives, i.e. with midwives as participants.

Search strategy

The search terms are shown in Table 1. Searches were conducted on PubMed, PsycINFO and CINAHL. Reference lists of identified papers were searched for further papers. After eliminating duplicates, search results were further screened by title, abstract and full text. The search was carried out in March 2017 by one of the authors (FW).

Search outcome

Study selection

The flow diagram in Figure 1 shows the number of studies retrieved and retained at each stage of the screening process. A total of 33 studies were included in the review. The selection of studies was carried out by one of the authors (FW) and agreed by the other authors.

Study characteristics

The eligible studies included 12 qualitative, five mixed methods and 16 quantitative studies originating from nine countries, with the majority conducted in Australia and the UK. The studies' aims, sample characteristics, methodological approaches, and findings are shown in Table 2. Aims, study design and methodological approaches varied considerably.

Six studies evaluated the impact of pre- and post-qualification training (Elliott, Ross-Davie, Sarkar, & Green, 2007; Higgins, Carroll, & Sharek, 2012; Higgins, Carroll, & Sharek, 2016a; Jardri *et al.*, 2010; Lau, McCauley, Moss, Miles, & Cross, 2015; McLachlan, Forster, Collins, Gunn, & Hegarty, 2011). Two looked at specific groups of women: black and ethnic minority women (Edge, 2010) and those with a

refugee background (Nithianandan *et al.*, 2016). Midwives' involvement in, and views of, PMH screening and assessment were examined in five studies (Rollans, Schmied, Kemp, & Meade, 2013a; Rompala, Cirino, Rosenberg, Fu, & Lambert, 2016; Williams, Turner, Burns, Evans, & Bennert, 2016; Yamashita *et al.*, 2007; Yelland, McLachlan, Forster, Rayner, & Lumley, 2007). One study explicitly explored the impact of PMH assessments on midwives (Mollart, Newing, & Foureur, 2009).

Eight studies explored midwives' views, knowledge and experiences of specific PMH problems: maternal distress (Fontein-Kuipers, Budé, Ausems, de Vries, & Nieuwenhuijze, 2014), antenatal depression (Jomeen, Glover, & Davies, 2009), schizophrenia (McCann & Clark, 2010; Wan, Moulton, & Abel, 2008), posttraumatic stress symptoms (Nyberg, Lindberg, & Öhrling, 2010), traumatic birth (Reed, Fenwick, Hauck, Gamble, & Creedy, 2014), and fear of childbirth (Salomonsson, Alehagen, & Wijma, 2011). The remaining 12 studies explored midwives' knowledge of, and attitudes to, PMH issues generally (Gibb & Hundley, 2007; Hauck *et al.*, 2015; Jarrett, 2014, 2015; Jones, Creedy, & Gamble, 2011, 2012a, 2012b; Lees, 2009; McCauley, Elsom, Muir-Cochrane, & Lyneham, 2011; Mivšek, Hundley, & Kiger, 2008; Phillips, 2015; Rothera & Oates, 2011).

Quality appraisal

The quality of studies was assessed using the Critical Appraisal Skills Programme (CASP) (Critical Appraisal Skills Programme, 2017) tool for qualitative studies; the tool for cohort studies was adapted for the quantitative studies. CASP ratings and comments for individual studies are included in supplementary information table 1. No studies were excluded on grounds of quality, but ratings were taken into account during the synthesis. Quality assessments were done by one author (FW), with a sub-sample checked by another author (PJ); comparison of assessments showed good inter-rater agreement.

Data abstraction

Data from qualitative and quantitative studies were mapped against the framework. For mixed methods studies, qualitative and quantitative data were mapped separately. Mapping followed these steps:

1. In each paper, evidence of the domains was highlighted, using different colours for the five domains. These concepts represent distinct 'units of meaning'.
2. Quantitative findings were transformed into qualitative findings.
3. Each concept was represented by a brief quote or description. These were entered into a table, with one column for each domain and an additional column for concepts which did not appear to fit into any of the domains. Each row contained the concepts for one paper.

Synthesis

Synthesis of evidence for each domain

After mapping the data against the domains, findings were drawn together and integrated for each of the five domains. Quantitative findings were transformed into qualitative findings (examples are given in supplementary information table 2). Qualitative and quantitative data were compared for areas of convergence, complementarity or discrepancy (O'Cathain, Murphy, & Nicholl, 2010). Findings were written up for each domain and sub-domain. The process of mapping concepts and writing up findings for each domain was iterative; referring back to the original papers as necessary helped to ensure that the concepts remained rooted in the original studies.

Comparison of mapped evidence and the a prior framework

The distribution and quality of evidence from qualitative and quantitative studies across all domains was then examined. Rich, in-depth evidence from a range of qualitative and quantitative sources for each domain indicates good evidence for confirmation of the framework (Carroll *et al.*, 2013). The identification of concepts outside the five domains would suggest that the framework needs to be modified (Carroll *et al.*, 2013).

RESULTS

Detailed findings are available in supplementary information table 3.

Knowledge

This domain relates to knowledge of PMH issues, knowledge of assessment, treatment and referrals, and interpersonal skills in interactions with women. There is a clear overlap with other domains, particularly confidence and illness perception. There was considerable variation in midwives' levels of PMH knowledge. Overall, knowledge was good for most conditions, particularly PND, but there were notable gaps, particularly for more severe conditions and for risk factors and consequences of PMH problems (Elliott, 2007; Hauck, 2015; Higgins *et al*., 2016a; Jarrett, 2015; Jomeen *et al.*, 2009; Jones *et al.*, 2011; Phillips, 2015). Many studies examined self-rated knowledge, which tended to be more positive than assessed knowledge but is likely to be less reliable. Training increased levels of knowledge (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Lau *et al.*, 2015; McLachlan *et al.*, 2011). Midwives used a range of assessment approaches (Gibb & Hundley, 2007; Yelland *et al.*, 2007), including informal and adapted techniques (Jarrett, 2014; Rollans *et al.*, 2013a; Salomonsson *et al.*, 2011; Williams *et al.*, 2016). Assessment of depression was more accurate than for other conditions (Hauck *et al.*, 2015; Jones *et al.*, 2012a). Assessment skills were improved by training (Higgins *et al*., 2012; Jardri *et al*., 2010; Yamashita *et al*., 2007). Knowledge of treatment and referrals varied, but was found to be poor in some midwives (Hauck *et al.*, 2015; McCauley *et al*., 2011; Rothera & Oates, 2011; Wan *et al*., 2008; Williams *et al*., 2016). Interpersonal skills, particularly good communication skills and building rapport, were considered very important in facilitating disclosure and care (McCauley *et al*., 2011; McLachlan *et al.*, 2011; Mivšek *et al*., 2008; Rollans *et al.*, 2013a; Williams et

al., 2016), but there was limited information in the included studies on the adequacy of interpersonal skills.

Confidence

Not many of the papers discussed confidence explicitly; it is, however, implicit in other domains and there is an overlap with knowledge and to a lesser extent with attitude. Although there were some exceptions, there was a general lack of confidence among midwives in the identification, care and referral of women with PMH problems (Edge, 2010; Gibb & Hundley, 2007; Hauck *et al*., 2015; Jomeen *et al*., 2009; Lees, 2009; McCauley *et al*., 2011; Phillips, 2015; Reed *et al.*, 2014; Yelland *et al*., 2007), particularly with respect to women with serious mental health problems (Jarrett, 2015; McCauley *et al*., 2011; Rothera & Oates, 2011). Confidence appeared to be higher in the assessment of women than in caring for women (Jarrett, 2015; Jones *et al.*, 2012b). Lack of confidence can lead to increases in referrals to other services (Rothera & Oates, 2011). Training increased levels of confidence (Elliott *et al.*, 2007; Higgins *et al*., 2012; Lau *et al*., 2015; McLachlan *et al*., 2011; Reed *et al*., 2014; Williams *et al*., 2016), as did previous experience (Hauck *et al*., 2015), although Jomeen and colleagues (2009) suggest that taught, rather than accrued, conceptualisations of PMH problems are more likely to be effective in increasing confidence.

Attitude

This domain has two sub-domains: (1) midwives' attitude to their role within PMH and (2) their attitude towards women with PMH problems. Midwives' attitudes to their role varied, with some studies revealing partially conflicting views, particularly in the case of more severe PMH problems. Midwives were more likely to consider assessments as part of their role, but felt that care and treatment, particularly of women with severe problems, was the responsibility of other professionals (Hauck *et al*., 2015; Jones *et al*., 2012b). Attitudes to women with PMH problems were mixed.

Attitudes are hard to measure accurately due to subjective perceptions and the impact of social desirability bias. Negative attitudes are often not expressed overtly but tend to be hidden or subconscious (Hauck *et al.*, 2015). Many midwives had positive attitudes towards women with PMH problems, but stereotyping and stigma were also evident (Hauck *et al.*, 2015; Higgins *et al.*, 2016a; Jarrett, 2014; McCauley *et al.*, 2011; Phillips, 2015). In two of the qualitative papers, midwives talked about the reluctance of midwifery generally to adopt a more psychological perspective, rather than a focus purely on physical health (Phillips, 2015), and suggest that mental health is still regarded as a taboo subject (Lees, 2009). Several studies showed that training can help to reduce stigma and increase understanding (Elliott *et al.*, 2007; Higgins *et al*., 2012; Higgins *et al*., 2016a; McLachlan *et al.*, 2011; Reed *et al.*, 2014).

Illness perception

In the included studies, illness perceptions related to contributing factors and prevalence, symptoms and consequences, and treatment and recovery. The accuracy of illness perceptions varied between studies. Illness perceptions appeared to be more accurate for more historically acknowledged conditions such as postnatal depression, which have received more emphasis in training and clinical practice. Perceptions of antenatal depression were less accurate, which may reflect less emphasis in training on depression in pregnancy (Jomeen *et al.*, 2009; Jones *et al.*, 2011). Perceptions were also less accurate for more severe conditions, especially in terms of contributing factors and consequences (Jarrett, 2015; McCann & Clark, 2010). There was evidence of lay or 'common sense' perceptions, particularly in terms of factors contribution to PMH problems (Hauck *et al.*, 2015; McCann & Clark, 2010). This underlines the importance of adequate training in PMH issues, including severe conditions. One of the included studies illustrates the importance of illness perceptions in the context of antenatal depression: midwives demonstrated varied levels of understanding of the condition, which impacted on identification and led to failure to make referral decisions, despite the majority of midwives believing that antenatal depression was treatable (Jomeen *et al.*, 2009).

Infrastructure

Sub-themes in this domain were time pressures, referral pathways and further services, the organisation of maternity care, training and support for midwives. Many midwives said that time pressures made assessment and care more challenging and could be a barrier to effective assessment (Edge, 2010; Lees, 2009; Nithianandan *et al.*, 2016; Phillips, 2015; Rompala *et al.*, 2016). Some felt that caring for women with PMH problems required additional time (McCauley *et al.*, 2011; Mivšek *et al.*, 2008). Time pressures were particularly acute in the initial appointment (Lees, 2009; Nithianandan *et al.*, 2016). Many of the studies underlined the inadequacy of referral pathways and a lack of appropriate services for referral. Several studies highlighted the importance of good communication between health professionals and appropriate integration of services for effective care (McCauley *et al*., 2011; Mivšek *et al*., 2008; Phillips, 2015). Continuity of care was identified as being important for the provision of effective care as it enabled midwives and women to build up a relationship and makes it easier for midwives to identify problems (Gibb & Hundley, 2007; Jones *et al.*, 2012b; Mivšek *et al*., 2008; Reed *et al.*, 2014; Wan *et al.*, 2008; Williams *et al.*, 2016; Yelland e*t al.*, 2007).

Lack of adequate training and the need for further training were common themes in many studies (Hauck *et al.*, 2015; Jomeen *et al.*, 2009; Jones *et al.*, 2011; Lees, 2009; McCann & Clark, 2010; McCauley *et al.*, 2011; Phillips, 2015; Rothera & Oates, 2011; Wan *et al.*, 2008). As one of the studies (McCann & Clark, 2010) showed, students who have just started a midwifery course are likely to use lay conceptualisations of mental disorders, highlighting the need for comprehensive PMH training within the curriculum. Several studies included in this review found that training improved confidence, knowledge and skills and reduced stigma among midwives (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; Jardri *et al.*, 2010; Lau *et al.*, 2015; McLachlan *et al.*, 2011; Reed *et al.*, 2014; Williams *et al.*, 2016). This needs to be treated with some caution as in many studies knowledge and skills were self-rated and any increase in knowledge and training was

assessed soon after training and may not necessarily be sustained over a longer time period. It is promising that overall the later studies in this review suggest higher levels of knowledge compared to the earlier studies, indicating a general improvement in training and knowledge. A few papers emphasized the emotional impact of caring for women with PMH problems on midwives and the need for both formal and informal support in order to enable midwives to provide good quality care (Mollart *et al.*, 2009; Nyberg *et al.*, 2010; Rothera & Oates, 2011; Salomonsson *et al.*, 2011).

DISCUSSION

Support for the framework

There was rich evidence for all five domains of the a priori framework (Figure 2) in qualitative and quantitative studies, ranging from 19 studies (illness perception) to 29 studies (knowledge) (Table 3). There was some overlap between several of the domains and consequently the allocation of some concepts to domains has been ambiguous. In particular, there was considerable overlap between the domains of knowledge and illness perception; in many cases it was difficult to decide to which domain concepts should be assigned. In terms of the knowledge domain, this was the case for knowledge of PMH conditions and treatment options, rather than interpersonal skills. However, overall the domains are distinct enough to represent separate components of the framework.

Additional domains

Originally, several concepts were identified as potentially being outside the five domains. One of these was midwives' interpersonal skills in the interaction with women. The decision was made to include this in the knowledge domain, but it is important to note that it constitutes a separate sub-domain to 'knowledge about PMH issues and 'knowledge of assessment, treatment and referrals'.

This raises some questions about the content of the knowledge domain. The emotional impact on midwives of caring for women with PMH problems and midwives' need for support were also originally considered outside the five domains. However, as the provision of support largely falls under organisational infrastructure, these concepts were included within the infrastructure domain.

Sub-domains

Sub-domains were identified for four of the five domains, further elaborating the structure of the framework. Knowledge can be split into knowledge about PMH issues, knowledge of assessment, treatment and referrals, and knowledge of interpersonal skills. To some extent knowledge can be divided into knowing *what* and knowing *how.* Knowing *what* relates to knowledge of facts about PMH issues (including prevalence rates, predisposing factors, illness characteristics, consequences) and knowledge of assessment, treatment and referral options. Knowing *how* is more closely related to skills in assessment and treatment, as well as interpersonal skills. The attitude domain contains two distinct subdomains: attitudes towards midwives' role in assessment and treatment of PMH and attitudes towards women with PMH problems. Illness perception can be divided into perception of contributing factors and prevalence, symptoms and consequences, and treatment and recovery. Within infrastructure the subdomains are quite distinct: lack of time, referral pathways and further services, the organisation of maternity care, training and support for midwives, though lack of time could be included with the organisational subdomain.

Relationship of domains to each other

Knowledge is a critical component of the framework and to some extent underpins confidence, attitude and illness perception. The link with confidence is relatively direct: higher levels of knowledge and skills generally increase confidence (Jones *et al.*, 2015). Benner's 'from novice to expert' stages of clinical competence (Benner, 1982) can be used to explore the link between

knowledge and confidence. Knowledge is a critical component which develops over time, is reinforced by experience and underpins performance through the five levels of proficiency. The 'novice' has little or no knowledge or experience in the situation in which they are expected to perform and as a consequence lacks confidence (i.e. student midwife). As the practitioner moves through the stages of clinical competence, gaining knowledge and experience, confidence is enhanced and facilitates conscious, analytical contemplation of the problem. A proficient practitioner has a perspective on the whole problem and hence is able to take into account the holistic picture which improves clinical decision-making and efficiency. The 'expert' ultimately is able through knowledge, confidence, experience and deep insight to ensure accurate identification of the problem, even in situations where she has no experience of that particular problem (i.e. experienced midwife with specialist knowledge of PMH problems).

Knowledge is also linked to attitude, as improved knowledge of PMH conditions, treatments and referral options may make it more likely that midwives recognise that assessment and care of women with PMH problems are part of their role (Jardri *et al.*, 2010; Noonan *et al.*, 2017). Higher levels of confidence are likely to result in midwives having a more positive attitude towards their own role in the assessment and care of women with PMH problem. However, attitudes to midwives' role in PMH also go beyond individual levels of knowledge and confidence, as evidenced by the two papers in which midwives talked about a reluctance in midwifery generally to take a more psychological perspective (Lees, 2009; Phillips, 2015). While this is likely to be partly due to a lack of confidence and knowledge, it may also be related to the dominance of the biomedical approach in maternity care which prevails despite challenges from the alternative humanistic normality paradigm (Brubaker & Dillaway, 2009). Better knowledge, and more accurate illness perceptions, can improve attitudes towards women with PMH problems by counteracting negative stereotypes and stigma and reducing fear. This is supported by a number of studies included in this review which suggest that training, and therefore increased knowledge, helps to reduce stigma and increases

understanding (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; McLachlan *et al.*, 2011; Reed *et al.*, 2014).

There are number of links between knowledge and organisational infrastructure. Clear, readily available referral pathways and information about further services are likely to increase knowledge of referral and treatment options (Jomeen & Martin, 2014; Noonan *et al.*, 2017). There is good evidence that effective training, both as part of midwifery education and through ongoing professional development, increases knowledge of all types (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; Jardri *et al.*, 2010; Lau *et al.*, 2015; McLachlan *et al.*, 2011; Reed *et al.*, 2014; Williams *et al.*, 2016). Training also increases confidence through increased knowledge and the presence of clear referral pathways is likely to increase midwives' confidence in referring women for further treatment (Hogg, 2013). All infrastructure subdomains are likely to have an impact on midwives' attitudes towards their own role in PMH. Lack of time and support and the absence of effective referral pathways and further services may lead to midwives feeling that the identification care of women with PMH problems is beyond the scope of their role (Byatt, Simas, Lundquist, Johnson, & Ziedonis, 2012; Hogg, 2013).

Strengths and limitations

This review used an innovative approach to conduct a mixed methods systematic review using framework synthesis. It was strengthened by the inclusion of a wide range of qualitative and quantitative research studies conducted in a number of countries using different perspectives and research conditions. However, the different contexts and methodologies of studies included in the review made comparison of the studies difficult. Some studies were of methodological quality, with relatively low sample sizes and often high drop-out rates. The frequent use of midwives' self-report assessment of knowledge and confidence and of non-validated questionnaires was also problematic and could undermine the accuracy of the findings from these particular studies.

CONCLUSION

This mixed methods review used a framework synthesis approach to confirm five domains of midwifery practice in the care and identification of women with PMH problems. It identified a number of subdomains and how domains are related to each other. The review identified variations in midwives' knowledge, confidence, attitudes and illness perceptions. Knowledge was confirmed as a critical component of practice which underpins other domains, and emphasizes the need for high quality, effective training in PMH issues. Other factors also constrain effective identification and care of women with PMH problems, including organisational processes. It is essential for service providers to identify and modify those barriers to midwives becoming 'experts' in the care of women with PMH problems.

This framework can be used to systematically identify gaps in knowledge, confidence, attitudes, illness perceptions, and training. It can also aid in the identification of barriers to effective care in terms of factors related to organisational infrastructure. In research, the framework can facilitate a conceptual exploration of facilitators and barriers to the identification and care of women with PMH problems. Furthermore, the framework has already aided the development of validated measures assessing mental health awareness in midwives and student midwives (Martin, Jomeen, & Jarrett, 2017) and professional issues in maternal mental health (Jomeen, Jarrett, & Martin, 2018). The framework has international relevance and can potentially be applied to other conditions and groups of health professionals. Further research is required into the use of these measures and potential ways of assessing other domains. Research which explicitly explores how domains are linked and support each other would strengthen the framework and could be used to enhance effective care and service delivery.

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Impact statement

This review adds to the body of knowledge around midwives' practice in the identification and care of women with perinatal mental health problems. The authors propose a framework comprising five domains: knowledge, confidence, attitudes, illness perception, and organizational infrastructure. Relevant research is reviewed to further develop the framework and confirm its domains. The proposed framework, which is supported by the evidence synthesized in the review, can be used to support clinical practice by identifying gaps in effective care, training needs and elements of organisational infrastructure required to support midwives in their role. The framework can also be used in research and the development of relevant measures and can be applied to other conditions and groups of health professionals.

Table 1 Search terms (limited to 2007-2016)

midwife OR midwives OR midwifery
AND
perinatal OR antenatal OR prenatal OR antepartum OR postnatal OR postpartum OR pregnancy OR maternal
AND
“mental health” OR anxiety OR depression OR stress OR distress
AND
identification OR diagnosis OR disclosure OR assessment OR management OR care

Table 2 Study characteristics

	Aims	Sample and Methods	Findings
Edge, 2010 (UK)	Investigate health professionals' views about PMH care for Black & ethnic minority women	42 health professionals (including 27 midwives) Interviews and focus groups (framework analysis)	Time, staff and resource shortages; lack of psychiatric knowledge and training; lack of clear referral process; some assumptions made about BME women
Elliott *et al.*, 2007 (UK)	Evaluate a programme to encourage midwives to detect and refer women with MH problems (2 studies)	First study: 187 midwives (both questionnaires returned for 73); second study: maternity notes after discharge First study: pre-/post questionnaires (experience, MH training, attitudes, confidence, knowledge); second study: examination of notes before and after training	First study: significant improvement in knowledge questions and self-reported confidence and attitudes Second study: significantly more notes showed mental health problems entered and more explanatory information besides diagnosis
Fontein-Kuipers *et al.*, 2014 (Netherlands)	Explore midwives' behavioural intentions and their determinants regarding management of care of women with maternal distress	112 midwives Questionnaire (work-related details; screening, support and collaboration) (multiple linear regression analysis)	Intention to support women and to collaborate with other HPs stronger than intention to screen for distress; predicting intention: finding maternal distress interesting topic, experience, attitude to screening and support, self-efficacy
Gibb & Hundley, 2007 (UK)	Explore midwives' views of psychosocial well-being in the postnatal period	13 community midwives and 8 student midwives Focus groups (thematic analysis)	Importance of coping and unmet expectations, assessed through range of skills; assessment easier if midwives know women; use of stereotypical categories to describe women; identification of 'worrying behaviour'
Hauck *et al.*, 2015 (Australia)	Explore midwives' knowledge of, and attitudes towards, mental health disorders in childbearing women vis-à-vis their perceived mental health learning needs	238 midwives in public tertiary maternity hospitals Survey (employment data; professional development needs; mental health knowledge; attitudes) and vignettes (anxiety disorder, depression, manic episode, schizophrenia)	Lack of knowledge and access to information, need for further training; correct identification from vignettes highest for PND, lowest for schizophrenia; mostly positive attitudes to midwives' role in PMH; cluster analysis showed negative stereotyping of PMH disorders
Higgins *et al.*, 2012 (Ireland)	Report on student midwives' views of a PMH module	79 student midwives Questionnaire: satisfaction with the module (descriptive statistics) Textual data (thematic analysis)	Quantitative: high levels of satisfaction with module; qualitative: enhanced understanding and confidence; insights into the lived experience

	Aims	Sample and Methods	Findings
Higgins *et al.*, 2016a (Ireland)	Examine the impact of a PMH module on student midwives' knowledge, skills, and attitudes	28 student midwives attending PMH module Repeated measures survey before and after PMH training (knowledge, skill, attitudes); three open-ended questions (analysed thematically)	Quantitative: significant increase in knowledge and skills; positive attitudes towards women with PMH problems; qualitative: increased understanding and confidence
Jardri *et al.*, 2010 (France)	Evaluate the impact of training on early PND screening by midwives and the effectiveness of specific clinical recommendations	Women giving birth during pre-training period (n=472) and post-training period (n=343); midwives at the unit EPDS scores after birth pre-/post-training; midwives: clinical assessment questionnaire	Significant improvements in screening by midwives after training; improved midwives' perception of poor emotional well-being; significant improvement in early detection of PND
Jarrett, 2015 (UK)	Explore the knowledge and experience of student midwives	33 student midwives Questionnaire (training, confidence, knowledge, attitudes)	Students often underestimated risk of existing mental health problems developing into more serious problem; felt ill-prepared and lacked confidence
Jarrett, 2014 (UK)	Explore the attitudes of student midwives to the care of women with MH problems	7 student midwives (near completion) Small group interviews (thematic analysis)	Use of informal knowledge in assessments; dislike of standardised questionnaires; use of stereotypes; anxiety and lack of confidence when caring for women
Jomeen *et al.*, 2009 (UK)	Ascertain midwives' level of knowledge of AND	52 midwives Questionnaire (training information, experience of working with women, illness perception)	Generally poor levels of training and confidence, good levels of knowledge and appropriate illness perceptions
Jones *et al.*, 2011 (Australia)	Assess Australian midwives' levels of knowledge and learning needs regarding antenatal and postnatal depression	815 midwives Postal survey (employment data; education; knowledge of antenatal and postnatal depression)	Correctly answered 62.9% of items on antenatal depression and 70.7% of items on PND; lack of knowledge highest on risk factors, onset period and risk of suicide with antenatal depression
Jones *et al.*, 2012a (Australia)	Explore midwives' care for women with perinatal depression, assessment ability and knowledge of therapeutic interventions	815 midwives Postal survey (questions about screening and hypothetical case study)	Almost 70% of midwives reported screening for perinatal depression; time constraints major barrier; almost two-thirds correctly recognised depression in case study; anti-depressants recommended more frequently postnatally than antenatally
Jones *et al.*, 2012b (Australia)	Assess attitudes towards caring for women with emotional distress and opinions on role of policies	815 midwives Postal survey (attitude towards role in management of women with perinatal MH disorders)	Midwives willing to help, acknowledged importance of providing emotional care; impeded in practice by perceived lack of competency rather than lack of interest

	Aims	Sample and Methods	Findings
Lau *et al.*, 2015 (Australia)	Assess the impact of a PMH education programme	78 midwives Questionnaire (self-efficacy, optimism, knowledge)	Post-training: increased optimism and self-efficacy; significant increase in perceived knowledge in PMH conditions
Lees *et al.*, 2009 (UK)	Evaluate practitioners' knowledge of women's needs and available services	Midwives (34 for questionnaires, 50 for focus groups), 18 student midwives (focus groups), 14 obstetricians and 13 health visitors Data from referral documentation; questionnaire: referral patterns and systems; focus groups	Referral documentation: lack of care pathways; Questionnaires: lack of knowledge, need for further training; qualitative: booking appointment too short, no set referral process; students: PMH issues still regarded as taboo subject, need to be better prepared
McCann & Clark, 2010 (Australia)	Examine midwifery students' mental health literacy about postnatal women with schizophrenia	38 first year midwifery students Attitudes and Beliefs about Mental Health Problems: Professional and Public Views questionnaire (vignette on schizophrenia, knowledge, attitudes)	Mainly lay person-informed conceptualizations of postnatal mental health interventions; limited understanding of potential negative consequences
McCauley *et al.*, 2011 (Australia)	Examine what midwives thought about their MH skills and knowledge when working with postnatal women	161 midwives from 19 hospitals Questionnaire (skills, knowledge, attitudes, experiences); open-ended question about experiences (qualitative thematic process, limited information)	Quantitative: lack of confidence, skills and knowledge, need for further training; qualitative: feeling out of their depths (lack of knowledge, skills, understanding), also positive experiences
McLachlan *et al.*, 2011 (Australia)	Evaluate communication skills education for midwives	25 midwives (21 completed pre- and post- survey) Pre-/post survey (communication skills, willingness to change, learning style, knowledge, attitudes)	Post-training: increased confidence and knowledge
Mivšek *et al.*, 2008 (Slovenia)	To explore midwives' & nurses' knowledge of and attitudes to PN mood disorders	10 midwives and nurses (unclear how many midwives; only responses which were clearly from midwives were included in the review) Focus groups (analysis unclear)	Lack of knowledge on postnatal mental health; did not consider management of PMH problems as their role; lack of continuity of care considered main obstacle; need for further training
Mollart *et al.*, 2009 (Australia)	Investigate the impact of antenatal psychosocial assessments on midwives' emotional well-being	18 midwives with experience of conducting the psychosocial assessment at booking visits Focus group interviews (thematic analysis)	Themes: cumulative complex disclosures; frustration and stress; lack of support for midwives; unhealthy coping strategies
Nithianandan *et al.*, 2016 (Australia)	Investigate barriers and enablers to implementing PMH screening for women with a refugee background	28 health professionals (including 5 midwives) Interviews (thematic analysis, using Theoretical Domains Framework and Cultural Competency Framework)	Importance of PMH screening, including for PTSD; barriers and enablers with respect to knowledge, skills, professional roles, beliefs about capabilities and

	Aims	Sample and Methods	Findings
			consequences, environmental context, social influences, behavioural regulation
Nyberg *et al.*, 2010 (Sweden)	Describe midwives' experiences with women with PTSD symptoms	8 midwives Interviews (thematic content analysis)	Need to reflect on own attitude; need for sensitivity and training
Phillips, 2015 (UK)	Assess student midwives' awareness of perinatal mental illness	9 student midwives Focus group (thematic analysis)	Good knowledge; wanting to make a difference; cultural sensitivity; importance of communication; lack of time
Reed *et al.*, 2014 (Australia)	Describe midwives' experiences of counselling women who had a traumatic birth	18 midwives Semi-structured interviews (4 time points), diary entries, web-based postings (thematic analysis)	Challenging but rewarding; improvements in skills; using counselling skills in other areas
Rollans *et al.*, 2013a (Australia)	Describe the content and process of psychosocial assessment by midwives	34 pregnant women, 18 midwives Ethnographic study: observation (structured tool, field notes); brief interviews with midwives (analysis unclear)	Midwives varied in approach to assessment, some were more approachable and flexible; need for further training
Rompala *et al.*, 2016 (USA)	Understand the antenatal screening practices of midwives in Oregon	60 midwives Survey (practice characteristics, screening, perceived barriers to screening)	Almost all screened for antenatal depression, most used standardised screening tool; barriers to screening: lack of mental health services, lack of time and insurance constraints
Rothera & Oates, 2011 (UK)	Explore health professionals' views on identification, treatment and management of PMH disorders	768 health professionals, including 468 midwives 4 vignettes with pre-defined response categories; survey (attitudes to management of PMH disorders)	Participants lacked knowledge and skills to identify and manage PMH disorders effectively, limited training; need for specialised services
Salomonsson *et al.*, 2011 (Sweden)	Describe the views of midwives on severe fear of childbirth	726 midwives Questionnaire (views of severe fear of childbirth)	Views: fear of childbirth had increased; education needed; identification intuitive, varied depending on work place
Wan *et al.*, 2008 (UK)	Understand health professionals' perspectives of needs of mothers with schizophrenia	28 perinatal psychiatry and antenatal service workers (including 15 midwives) Interviews; thematic analysis	Need for more support for women; importance of continuity of care and communication; need for further training
Williams *et al.*, 2016 (UK)	Explore midwives' and women's views of using the depression case finding questions	15 midwives, 20 pregnant women Interviews (thematic analysis, constant comparison approach)	Questions useful for introducing PMH discussion; flexibility in how questions are used; lack of knowledge of treatments and referral options

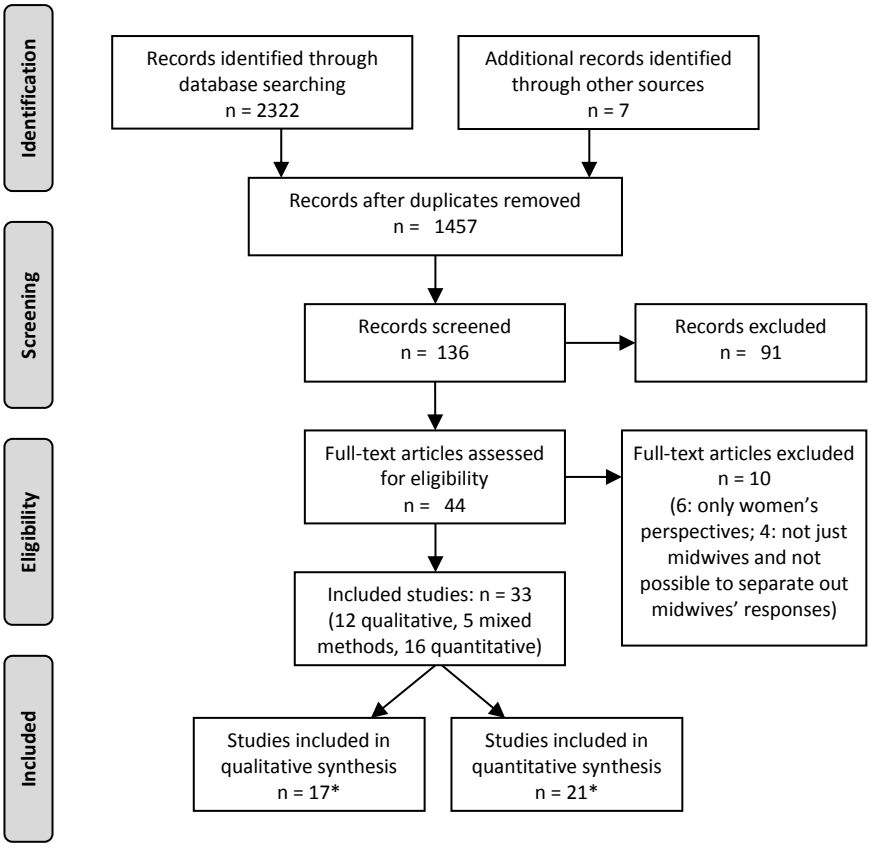
	Aims	Sample and Methods	Findings
Yamashita *et al.*, 2007 (Japan)	Examine to what extent midwives agree with a psychiatrist on diagnoses of psychiatric disorders	12 midwives Vignettes of 29 cases (mood and anxiety disorders)	Overall good agreement with psychiatrist's diagnosis; appropriately trained midwives can use diagnostic criteria reliably
Yelland *et al.*, 2007 (Australia)	Describe how women's MH is assessed and promoted during the postnatal hospital stay	66 hospital respondents (survey); 11 midwifery or nurse unit managers, 14 associate unit managers, 8 clinical midwives, 5 medical practitioners (interviews) Survey: assessment practices; interviews	Quantitative: lack of consistency between hospitals in assessment of PMH; qualitative: mixed levels of knowledge and skills

Table 3 Number of studies in which evidence was found for each domain

	Knowledge	Confidence	Attitude	Illness perception	Infrastructure
Qualitative	10	6	9	7	10
Mixed methods	5 (4/5)*	5 (5/2)	5 (4/3)	3 (2/2)	3 (3/3)
Quantitative	14	11	9	9	12
Total	29	22	23	19	25

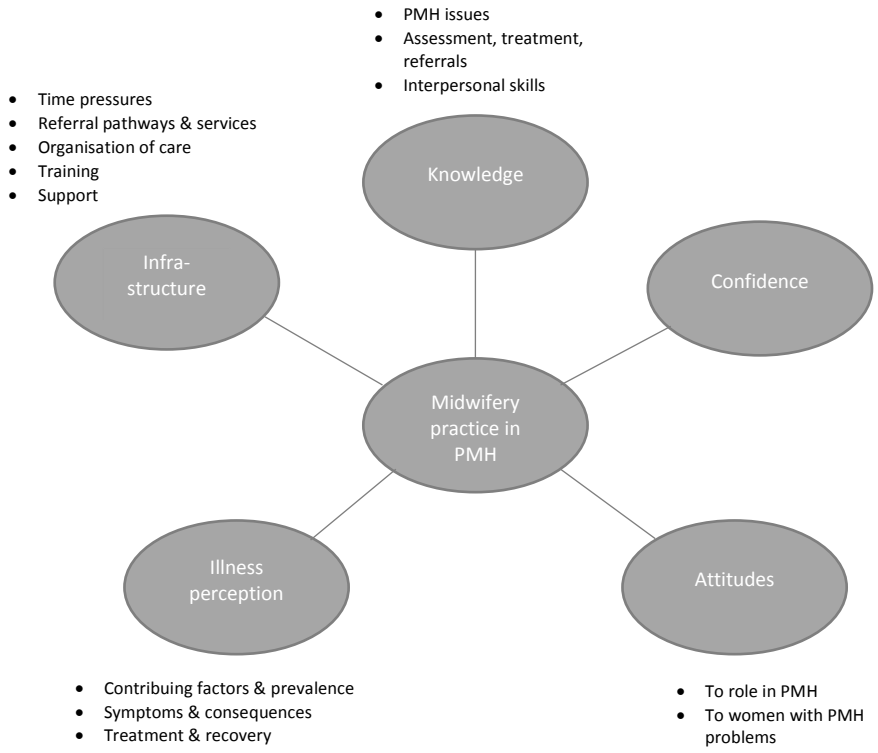
* numbers in brackets relate to qualitative and quantitative elements of mixed methods studies

Figure 1 PRISMA flow diagram



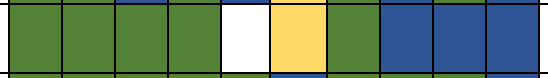
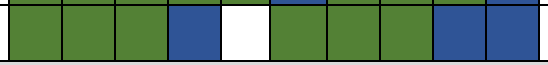
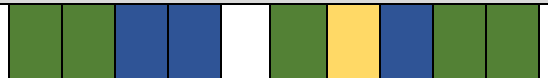
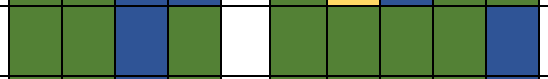
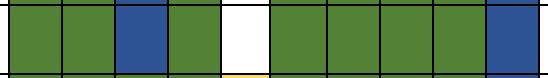
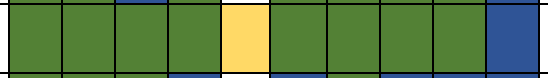
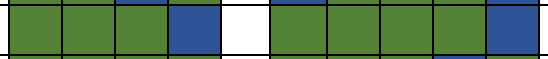
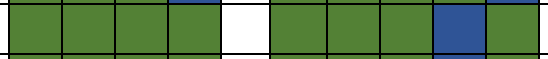
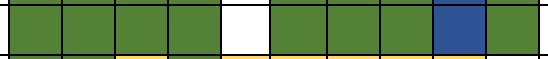
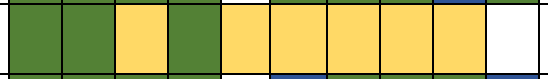
* this adds up to more than 33 as mixed methods studies were included in the qualitative and quantitative synthesis

Figure 2 The five-domain framework



Supplementary information file 1: Quality ratings table

	1	2	3	4	5	6	7	8	9	10	Comments
Qualitative											
Edge, 2010											Limited detail regarding data analysis
Gibb & Hundley, 2007											
Jarrett, 2014											Small sample; low response rate therefore possible bias
Mivšek *et al*., 2008											Suitability of methodology and research design for exploring knowledge; relatively small sample; too little detail of data analysis; limited generalizability
Mollart *et al*., 2009											
Nithianandan *et al*., 2016											
Nyberg *et al*., 2010											Small sample
Phillips 2015											Effectiveness of study in assessing knowledge; limited generalizability due to small sample
Reed *et al*., 2014											Limited generalizability, specific to intervention only
Rollans *et al*., 2013a											Limited information about data analysis
Wan *et al*., 2008											
Williams *et al*., 2016											
Mixed methods											
Higgins *et al*., 2012 – qual											Limited information about open-ended questions
Higgins *et al*., 2012 – quant											No validated questionnaire, self-rated; not clear if all the results were reported
Higgins *et al*., 2016a – qual											No information on analysis of qualitative open-ended questions; limited generalizability
Higgins *et al*., 2016a – quant											No validated questionnaire, self-rated assessments; small sample size; no effect sizes; limited generalizability
Lees *et al*., 2009 – qual											Limited information provided on data collection; no information on data analysis; very brief findings, quotes not provided

Lees *et al*., 2009 – quant		Limited information on recruitment; no information about questionnaire; small sample size was small; 47% response rate, no exploration of differences between responders and non-responders; no information on ethical issues; limited information regarding the analysis; limited results presented; limited generalizability
McCauley *et al*., 2011 – qual		Limited scope in research design; one open ended question, therefore limited depth; limited information regarding ethical issues
McCauley *et al*., 2011 – quant		30% response rate, no information on differences between responders and non-responders; no details about ethical issues; not all results represented; limited generalizability
Yelland *et al*., 2007 qual		Limited generalizability
Yelland *et al.,* 2007 quant		Questionnaire not validated, but piloted; not all findings appear to have been presented; limited generalizability
Quantitative		
Elliott *et al*., 2007		Post-training survey completed by 39%; no information on whether returners/non-returners were different, assumption that non-respondents didn't change; questionnaire not validated, self-rated; not always clear which statistical tests were used, no effect sizes reported
Fontein-Kuipers *et al*., 2014		Possible bias due to who responded; questionnaire based on guidelines and quality standards, not validated, but assessed using internal consistency and pretesting
Hauck *et al*., 2015		Possible bias in who responded; no comparison of responders and non-responders); 50% response rate; non-validated questionnaire, but piloted
Jardri *et al.*, 2010		Not clear if there were any potential confounding differences between the two study periods; no demographic information on participant
Jarrett, 2015		No discussion regarding difference between those who took part and those who declined; mix of self-rated and actual knowledge; 15% did not answer all questions; small sample therefore analysis limited to descriptive statistics only; no information on demographics of participants; not all data was presented (e.g. in tables); small sample so hard to generalise but findings supported by other studies
Jomeen *et al*., 2009		Unclear if there were differences between participants and those who didn't take part. 9.6% of sample completed survey only partially; relatively small sample, low response rate; some limited generalizability
Jones *et al*., 2011		Self-rated knowledge; potentially limited generalizability
Jones *et al*., 2012a		Self-rated confidence; not clear if all data presented ; potentially limited generalizability
Jones *et al.,* 2012b		Results not presented in detail; potentially limited generalizability
Lau *et al*., 2015		Brief research report presented only; insufficient detail provided for recruitment, intervention control, data collection, ethics, analysis and results; limited generalizability
McCann & Clark 2010		Small sample; limited generalizability

McLachlan *et al*., 2011											No information was on those who did not take part in the study; non-validated questionnaire, self-rated; small sample
Rompala *et al.,* 2016											Questionnaire not validated, but piloted; low response rate of 37%; no discussion of differences between responders and non-responders; relatively small sample; limited generalizability
Rothera & Oates 2011											Questionnaire not validated; low response rate (26.7%); differences between responders and non-responders not discussed; effect sizes not given; some limits to generalizability
Salomonsson *et al.,* 2011											Questionnaire not validated, but based on experience and previous study, piloted; effect sizes not discussed
Yamashita *et al*., 2007											Vignettes of psychiatric disorders, not PMH-specific therefore possible differences; no comparison pre-training; not much detail of training; limited generalizability

Key	
Yes	
Partial	
No	
Unclear	
n/a	

Qualitative

1. Rationale and aims
    - Goal of the research?
    - Why was it thought important?
    - Relevance?

2. Is a qualitative methodology appropriate?

- Does the research seek to interpret or illuminate the actions and/or subjective experiences of participants?
- Is qualitative research the right methodology for addressing the research goal?

3. Was the research design appropriate to address the aims of the research?
    - Has the researcher justified the research design?

4. Was the recruitment strategy appropriate to the aims of the research?
    - Do the authors explain how participants were selected?
    - Are the participants appropriate (do they provide access to the type of knowledge sought by the study)?
    - Are there any discussions around recruitment (e.g. why did some not take part)?

5. Was the data collected in a way that addressed the research issue?
    - Was the setting for data collection justified?
    - Is it clear how data were collected?
    - Was this appropriate?
    - Was data saturation discussed (if appropriate)?

6. Has the relationship between researcher and participants been adequately considered?
    - Did the researchers critically examine their own role, biases and influences?
    - How did researchers respond to events during the study?
    - Did they consider implications of changes to the research design?

7. Have ethical issues been taken into consideration?
    - Is there sufficient detail about how the research was explained to participants?
    - Did the researchers discuss issues raised by the study (e.g. about informed consent or confidentiality)?
    - Has ethical approval been granted?

8. Was the data analysis sufficiently rigorous?
    - Is the analysis process described in depth?
    - Is it clear how categories/themes were derived from the data (if applicable)?
    - Did the researchers explain how data presented (e.g. quotes) were chosen from the original sample to demonstrate the analysis process?
    - Are sufficient data presented to supported findings?
    - Are contradictory data taken into account?
    - Have the researchers critically examined their own role and biases during analysis?

9. Is there a clear statement of findings?

- Are findings explicit?
- Is there adequate discussion of evidence for and against the researchers' arguments?
- Have the researchers discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)?
- Are the findings discussed in relation to the original research question?

10. How valuable is the research?
    - Have the researchers discussed the contribution to existing knowledge or understanding (with respect to current practice, policy or existing literature)?
    - Have the researchers identified new areas of research?
    - Have the researchers discussed whether and how findings can be transferred to other populations or how research may be used?

Quantitative

1. Rationale and aims
    - Did the study address a clearly focused issue?
    - Is this issue relevant?
    - Are aims / research questions clearly state?
2. Research design
    - Was the research design clearly described?
    - Was it appropriate for the aims and research questions?
3. Recruitment
    - Was the sample representative of a defined population?
    - Were inclusion/exclusion criteria clear?
    - Was recruitment appropriate?
    - What was the response rate? Did the researchers look at differences between responders and non-responders?
4. Outcome measures
    - Were the measures appropriate (validated, subjective/objective)?
    - Timings?
5. Intervention / control group
    - If an intervention was used (e.g. training), has it been described adequately?
    - If a control group has been used, is it appropriate?
6. Data collection
    - Was the sample size large enough?
    - Is the data collection procedure clear?
    - What was the drop-out / non-completion rate? Did the researchers consider differences between completers and non-completers?

7. Ethics
    - Are ethical issues discussed?
    - Was ethical approval given (if applicable)?
8. Analysis
    - Is the analysis appropriate?
    - Has sufficient statistical information been provided (e.g. effect size)?
9. Results
    - Is suitable information on demographics provided?
    - Are the results presented clearly and comprehensively?
    - Is the interpretation of results appropriate?
    - Have alternative explanations been considered?
10. Value
    - Does the study make a contribution to knowledge/understanding?
    - Is it relevant to clinical practice and/or policy?
    - Are the findings generalizable?

Additional File 2: Examples of transformations of quantitative findings into qualitative findings

Quantitative findings	Transformation to qualitative
Higgins *et al.*, 2012: post-module questionnaire on satisfaction with a PMH module; 79 midwifery students	
Module was very valuable: 91% agree/strongly agree; 9% neutral (p. 289)	The majority of students found the module very valuable.
Module helped develop confidence to practise: 85% agree/strongly agree; 13% neutral; 3% disagree/strongly disagree (p. 289)	The majority of students said that the module helped them to develop confidence to practice; a very small minority disagreed.
Higgins *et al.*, 2016a: pre-/post-module questionnaire on impact of PMH module on knowledge, skills and attitudes; 28 midwifery students	
Pre-/post-survey: statistically significant increase in self-rated knowledge: mean score increased from 1.59 (SD = .24) to 2.60 (SD = .24); paired sample t-test was statistically significant (t (24)= −18.29, p < .001) (p. 366)	Students' self-rated knowledge was improved significantly by the module.
PND: 36% reported very good/excellent knowledge (p. 366)	Just over a third of student midwives felt that they had very good knowledge of PND.
Response to 'One of the main reasons women experience mental illness is a lack of self-discipline and will power': 93% negative pre-survey (7% neutral), 100% negative post-survey (p. 367)	Participants' perceptions of the amount of control women have over PMH problems was fairly accurate before the module, but improved even more afterwards.
Lees *et al.*, 2009: questionnaires to evaluate knowledge of women's needs and available services; 34 midwives	
91%: 'stated that their knowledge of perinatal mental health issues was inadequate and they recognised that they would benefit from further training' (p. 26)	A majority of practitioners said that their knowledge of PMH issues was inadequate and that they would benefit from further training.
Hauck *et al.*, 2015: survey of midwives; 238 midwives	
37.6% felt 'well equipped to support women with perinatal mental health disorders' (p. 250)	Just over a third of midwives felt they were well equipped in supporting women with PMH problems.
Jones *et al.*, 2011: survey of midwives' knowledge; 815 midwives	
86.9% aware of comorbidity of depression and anxiety (p. 355)	Most midwives were aware of the comorbidity of depression and anxiety.
55.8%: too little emphasis on assessment and management of women with PMH problems in midwifery education (18.1%: no emphasis; 24.3% adequate emphasis) (p. 356)	Most midwives said that there had been too little or no emphasis on assessment and management of women with perinatal problems in midwifery education.
Rothera & Oates, 2011: survey of views on identification and management of PMH problems; 468 midwives	
Need guidelines/protocols for referral procedure to manage PMH disorders: 53% mild, 66.9% serious (p. 309)	Most midwives expressed a need for guidelines and protocols for referral procedures to manage PMH disorders.
Need more training for PMH problems: 90.4% agree (p. 310)	A large majority of midwives said they needed more training for PMH problems.

Additional File 3: Findings

Knowledge	
PMH issues	Good knowledge of PMH issues, with some exceptions (Hauck *et al.*, 2015; Phillips, 2015)
	Lack of sufficient knowledge in general (Edge, 2010; Mivšek *et al.*, 2008)
	Good knowledge of onset, symptoms and treatment for psychosis; knowledge of risk factors weaker (Elliott *et al.*, 2007)
	Self-rated knowledge generally good for postnatal depression (Elliott *et al.*, 2007; Higgins *et al.*, 2016a; Jarrett, 2015)
	Generally good knowledge of antenatal depression; less so for consequences (knowledge of postnatal depression applied to this) (Jomeen *et al.*, 2009)
	Better knowledge of postnatal than antenatal depression, particularly for risk factors (Jones *et al.*, 2011)
	Lack of knowledge about traumatic birth experience (Reed *et al.*, 2014)
	Training increased knowledge (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Lau *et al.*, 2015; McLachlan *et al.*, 2011)
Assessment, treatment and referrals	Range of techniques (Gibb & Hundley, 2007; Yelland *et al.*, 2007)
	Use of informal, 'common sense' knowledge (Jarrett, 2014; Salomonsson *et al.*, 2011)
	Adapting use of assessment tools (Rollans *et al.*, 2013a; Williams *et al.*, 2016)
	Two-thirds correctly diagnosed depression from case study (Jones *et al.*, 2012a)
	Almost all identified depression from vignettes; most correctly identified manic episode, bipolar disorder and schizophrenia (Hauck *et al.*, 2015)
	Knowledge of EPDS poor for some (Hauck *et al.*, 2015)
	Some lacked knowledge about treatment and referrals (Hauck *et al.*, 2015; McCauley *et al.*, 2011; Rothera & Oates, 2011; Wan *et al.*, 2008; Williams *et al.*, 2016)
	Training improved assessment skills (Higgins *et al.*, 2012; Jardri *et al.*, 2010; Yamashita *et al.*, 2007)
Interpersonal skills	Good interpersonal skills important (McCauley *et al.*, 2011; Mivšek *et al.*, 2008; Williams *et al.*, 2016)
	Important for encouraging disclosure of PMH problems (Rollans *et al.*, 2013a)
	Different styles in interaction with women, some midwives using a more engaging and friendly approach (Rollans *et al.*, 2013a)
	Training in counselling skills effective not just in improving midwives' care for women, but also in their own lives (Reed *et al.*, 2014)
	Poor skills in responding to women with psychotic symptoms, obsessive thinking or eating disorders, or when assessing suicide (Higgins *et al.*, 2016a)
	Communication skills, teamwork, rapport building and grief counselling listed as the four most important skills (McCauley *et al.*, 2011)

	Midwives satisfied with their communication skills (McLachlan *et al.*, 2011)
Confidence	
	Lack of confidence with PMH generally (Lees, 2009; McCauley *et al.*, 2011; Phillips, 2015), in identifying women with PMH problems (Edge, 2010; Gibb & Hundley, 2007; Yelland *et al.*, 2007), caring for women (Hauck *et al.*, 2015; Jomeen *et al.*, 2009; McCauley *et al.*, 2011; Reed *et al.*, 2014; Yelland *et al.*, 2007) and referrals (Phillips, 2015)
	Lacking confidence particularly for more severe problems (Jarrett, 2015; McCauley *et al.*, 2011; Rothera & Oates, 2011)
	Lack of confidence results in increased referrals to other services (Rothera & Oates, 2011)
	Midwives' self-efficacy for supporting women with distress relatively high (Fontein-Kuipers *et al.*, 2014); most midwives felt adequately prepared when meeting a woman with severe fear of childbirth (Salomonsson *et al.*, 2011)
	Confidence may be higher with regards to assessment (Jarrett, 2015; Jones *et al.*, 2012b) compared to caring for women
	Training increased confidence (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Lau *et al.*, 2015; McLachlan *et al.*, 2011; Reed *et al.*, 2014; Williams *et al.*, 2016), as did previous experience (Hauck *et al.*, 2015)
	Some midwives had 'false' confidence in their knowledge of PMH problems, reported feeling confident but lacked important knowledge (Mivšek *et al.*, 2008)
Attitudes	
Midwives' role	Identification of problems and referrals part of their role (Hauck *et al.*, 2015; Jarrett, 2015; Jones *et al.*, 2012b; Mivšek *et al.*, 2008; Nithianandan *et al.*, 2016; Salomonsson *et al.*, 2011; Williams *et al.*, 2016)
	Not part of their role: takes too much time or too difficult and women with PMH problems should be cared for elsewhere (McCauley *et al.*, 2011); lack training (Phillips, 2015); treating postnatal depression is doctor's responsibility and educating expectant parents in PMH issues not their role either (Mivšek *et al.*, 2008)
	Assessment more likely to be considered part of role (Hauck *et al.*, 2015; Jones *et al.*, 2012b) than caring for women
	More likely to consider assessment part of their role after training (Jardri *et al.*, 2010)
	Midwifery reluctant to take a non-medical, more psychological perspective (Phillips, 2015); PMH issues still regarded a taboo subject (Lees, 2009)
Women with PMH problems	Feeling frightened of women with serious PMH problems, some considered them difficult to manage (Jarrett, 2014; McCauley *et al.*, 2011)
	Generally positive attitudes, but cluster analysis of warmth/friendliness and competence/capability ratings revealed attitudes to women with PMH problems more negative than towards other women (Hauck *et al.*, 2015)
	Positive attitudes to women with PMH problems (Higgins *et al.*, 2016a)
	Fewer than half rated experience of working with women with PMH problems as positive (McCauley *et al.*, 2011)
	Some stigma towards women with PMH problems (Phillips, 2015); some sometimes did not refer women to specialist services because they were trying to protect them

	from being stigmatised, more than 60% said other midwives responded negatively to women with PMH problems (McCauley *et al.*, 2011)
	43 % worried about the safety of other women and babies when caring for a woman with severe PMH problems, 12% anxious about own safety (Jarrett, 2015)
	Training helped to reduce stigma and increase understanding (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; McLachlan *et al.*, 2011; Reed *et al.*, 2014)
Illness perception	
Contributing factors and prevalence	Contributing factors generally: mismatch between expectations and reality, difficulties in coming to terms with the reality of life with a new baby, exhaustion, being older, a lack of support and labour experiences (Gibb & Hundley, 2007); cultural pressures (Jarrett, 2014; Phillips, 2015); social and economic factors, relationship problems, age, isolation and certain personality traits (Mivšek *et al.*, 2008); low socio-economic and refugee status (Phillips, 2015); history of abuse or trauma and a personal or family history of mental illness (Hauck *et al.*, 2015)
	Contributing factors for antenatal depression: relationship problems, psychiatric history, low social support, unintended pregnancy, hormonal imbalances, previous pregnancy loss, and stress or worry (Jomeen *et al.*, 2009)
	Some inaccurate perceptions around contributing factors (Hauck *et al.*, 2015; Jomeen *et al.*, 2009; Mivšek *et al.*, 2008)
	Almost half underestimated prevalence of antenatal depression (Jones *et al.*, 2011)
	A fifth of student midwives underestimated risk of developing puerperal psychosis; only a quarter aware that a woman was more likely to develop puerperal psychosis if she had it previously (Jarrett, 2015)
	More than two-thirds thought that the incidence of severe fear of childbirth had increased over the last 10 years; two-thirds believed fear of childbirth is different from other phobias (Salomonsson *et al.*, 2011)
Symptoms and consequences	Some believed women often displayed extreme or obsessive behaviours with respect to themselves, their baby or the house (Gibb & Hundley, 2007)
	Student midwives considered women's environment, attitude, appearance and behaviour to be indicators of psychological well-being (Jarrett, 2014)
	Midwives believed some sadness, caused by hormonal changes, is experienced by almost all women after birth, but 'real' depression is not very common; postnatal depression was believed not to start until after the third month postnatally (Mivšek *et al.*, 2008)
	Midwives said it was sometimes difficult to distinguish between symptoms of early pregnancy and symptoms of depression (Williams *et al.*, 2016)
	Generally appropriate illness perceptions of antenatal depression; mostly good awareness of symptoms, but perceived large overlap with symptoms experienced frequently by non-depressed pregnant women (Jomeen *et al.*, 2009)
	A third of student midwives believed puerperal psychosis had gradual onset in first six months after giving birth (Jarrett, 2015)
	Not coping with requirements of daily life and the new baby seen as central (Gibb & Hundley, 2007)
	More than half were aware that PMH problems could lead to attachment problems; most believed women were likely to recover eventually (Hauck *et al.*, 2015)

	Most aware that antenatal depression could have major consequences for women, but knowledge of specific consequences less accurate and tended to be based on knowledge of postnatal depression (Jomeen *et al.*, 2009)
	Almost all underestimated proportion of women with antenatal depression who attempted suicide after birth (Jones *et al.*, 2011)
Treatment and recovery	Recommended mostly support, advice and self-help groups for mild problems; considered referral to other services more appropriate for severe problems (Rothera & Oates, 2011)
	Less likely to suggest antidepressants for antenatal than postnatal depression; more likely to suggest self-help techniques and additional support for antenatal depression, recommended seeking help from specialists for postnatal depression (Jones *et al.*, 2012a)
	Third of student midwives not aware that effective treatment for psychosis requires medication and hospital admission (Jarrett, 2015)
	Student midwives aware that outcome for women with schizophrenia favourable if treated, but lacked some understanding of consequences of not obtaining professional help; understanding largely based on lay perceptions of treatment (McCann & Clark, 2010)
	Third of midwives felt a visit to the labour ward decreases fear of childbirth, over two-thirds believed specialist fear of childbirth team helped to reduce incidence, almost 80% thought that making a birth plan was beneficial (Salomonsson *et al.*, 2011)
Infrastructure	
Lack of time	Time pressure makes it more difficult to identify PMH problems (Edge, 2010; Lees, 2009; Nithianandan *et al.*, 2016; Phillips, 2015)
	Looking after women with PMH problems requires additional time (McCauley *et al.*, 2011; Mivšek *et al.*, 2008)
	If problems are identified, more time needed to discuss options and referrals (Phillips, 2015)
	Time pressure most acute in initial appointment as already very busy (Lees, 2009; Nithianandan *et al.*, 2016)
	Time pressures mean that focus is on women with serious mental illness, leaving women with less severe problems without help they need (Edge, 2010)
	Almost half said lack of time can be barrier to screening for antenatal depression (Rompala *et al.*, 2016)
	More than half said that of time sometimes makes it difficult to provide quality care for women with depression; 60% reported having enough time to assess emotional health (Jones *et al.*, 2012b)
Referral pathways and further services	Lack of clear and effective referral pathways (Edge, 2010; Lees, 2009; McCauley *et al.*, 2011; Mollart, Newing, & Foureur, 2009; Nyberg *et al.*, 2010; Phillips, 2015; Rompala *et al.*, 2016)
	Lack of appropriate services for referral (Nyberg *et al.*, 2010; Rothera & Oates, 2011; Wan *et al.*, 2008); can be barrier to screening and referring women (Jones *et al.*, 2012a; Lees, 2009)

Organisation of care	Importance of continuity of care (makes it easier to identify problems and build good relationship) (Gibb & Hundley, 2007; Jones *et al.*, 2012b; Mivšek *et al.*, 2008; Reed *et al.*, 2014; Wan *et al.*, 2008; Williams *et al.*, 2016; Yelland *et al.*, 2007)
	Importance of good communication and co-operation between health professionals and better integration of midwifery and mental health services (McCauley *et al.*, 2011; Mivšek *et al.*, 2008; Phillips, 2015)
	Presence of interpreters and family members (Nithianandan *et al.*, 2016) and partners and medical students (Williams *et al.*, 2016) during assessments identified as potential barrier to disclosure
	Inclusion of mental health assessments in booking appointment not ideal: no time to build relationship, due to timing early symptoms of pregnancy can be misinterpreted as symptoms of depression (Williams *et al.*, 2016)
	Organisational priorities encourage focus only on problems directly presented by women, not underlying issues (Jones *et al.*, 2012b)
	Insurance constraints as barrier to screening (Rompala *et al.*, 2016)
Training	Midwives identified need for further training in PMH (Hauck *et al.*, 2015; Jomeen *et al.*, 2009; Jones *et al.*, 2011; Lees, 2009; McCann & Clark, 2010; McCauley *et al.*, 2011; Phillips, 2015; Rothera & Oates, 2011; Wan *et al.*, 2008)
	Found training helpful and relevant to clinical practice (Higgins *et al.*, 2012; Reed *et al.*, 2014)
	Overall, PMH training increased knowledge, skills and confidence (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; Jardri *et al.*, 2010; Lau *et al.*, 2015; McLachlan *et al.*, 2011; Reed *et al.*, 2014; Williams *et al.*, 2016) and helped to reduce stigma and increase understanding (Elliott *et al.*, 2007; Higgins *et al.*, 2012; Higgins *et al.*, 2016a; McLachlan *et al.*, 2011; Reed *et al.*, 2014)
	Lack of training affected how midwives viewed their role within PMH (Phillips, 2015)
Support for midwives	Cumulative emotional impact of doing psychosocial assessments, particular disclosure of trauma; can lead to unhelpful coping strategies (Mollart *et al.*, 2009)
	Difficult to keep professional distance and deal with emotions professionally (Nyberg *et al.*, 2010)
	Need for support (informal support, formal supervision, mentoring) (McCauley *et al.*, 2011; Nyberg *et al.*, 2010; Rothera & Oates, 2011; Salomonsson *et al.*, 2011)