Midwifery Led Care: a single mixed-methods synthesis

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Abstract

Background Although Midwifery Led Care (MLC) has shown to be beneficial for women and their children and for midwives, the implementation of MLC remains challenging. The midwife is the central care provider in MLC. An exploration of the potential factors that might attribute to midwives' utility of MLC will offer relevant information to support MLC implementation, scale up and MLC sustainability.

Objective To explore the utility of MLC and midwives' MLC behavioural determinants.

Methods A systematic mixed-methods review was conducted, integrating data derived from methodologically different studies into a single mixed-methods synthesis. Quality was assessed using The Joanna Briggs Institute Critical Appraisal tools. Data was organised using the Feasibility-Appropriateness-Meaningfulness-Effectiveness (FAME) scale. Behavioural MLC determinants were grouped in an extended Attitude-Social influence-self Efficacy (ASE) model. After a synthesis and summary of the data and a descriptive thematic analysis, all FAME/ASE variables were quantified for a Bayesian Pearson correlation analysis of the FAME and ASE-themes. The Bayes Factor (BF) indicated the strength between the correlations.

Results 26 papers of good quality were included. The relationships between the FAME scales and ASE themes showed very strong evidence (BF 31.1-41.6), strong (BF 11.2-28.5) and to a lesser degree moderate (BF 3.1-9.7) and anecdotal evidence (BF 1.5-2.9). MLC utility was predominantly explained by the appropriateness and effectiveness of MLC and their correlations with the midwife's attitude, the perceived social influence of the public, supportive factors, regulation, professional and personal norm, and intention. Anecdotal to very strong evidence for correlations between the ASE themes (BF 1.5-41.6) was observed.

Conclusion To implement, scale up and maintain MLC a multipronged approach is needed, with attention for the strong and very strong behavioural aspects of midwives related to the utility of MLC. To fully embed MLC as a first choice for women, midwives need to stand up for their professional identity in the wider culture and climate of maternity services to push the change for MLC.

Key words behavior; care management; continuity of care; midwifery organization; organizational culture; review; midwife-led care; caseload midwifery

Introduction

Midwife-Led Care (MLC) is a care model where the midwife is the lead professional in planning, organising, and providing care to a woman from booking to the postnatal period within a multi-disciplinary network of consultation and referral with other care providers [1]. MLC is widely recommended as a measure of quality-of-care since it has shown to improve outcomes such as the reduction of intra-partum medical interventions, lower rates of preterm birth, intrapartum pain relief, amniotomy and episiotomy, and higher rates of spontaneous vaginal birth and breastfeeding, as well as higher rates of care satisfaction among women and job satisfaction among midwives [1-10]. The philosophy behind MLC is normality of childbirth, continuity of care and being cared for by a known, trusted midwife during labour, aiming to optimise bio-psychosocial processes, strengthening the opportunities for women to achieve a physiological birth and a positive birth experience [1,11-13]

There is great diversity in how MLC is organised across the different healthcare settings such as community practices, hospitals, freestanding or alongside birth units applying various care strategies [14]. Examples of MLC strategies are continuity of care from a known midwife, caseload midwifery, continuity of care management, and team/group-midwifery [1,2,12,13,15-18]. Despite good quality evidence, MLC is still not utilised as a worldwide standard model of care [19-22]. This, despite the International Confederation of Midwives (ICM) [23] states that MLC should be the first choice for all childbearing women.

Midwives are the essential caregivers and primary executors at the heart of MLC. Given the midwifery scope and the pivotal role of midwives within MLC, an understanding of midwives' behaviour is of extreme importance to shape the development of MLC [9,11,22,24] - that is, 'what makes midwives tick' to provide MLC, what helps and hinders them, how do they (inter)act as MLC midwives, how do they respond to and view MLC. To create awareness about how to increase the (transformational) utility of MLC, an exploration of midwives' behavioural factors possibly playing a role in implementation, transition, capacity building and evaluation processes of MLC is essential [25-29]. A systematic approach to explore midwives' behaviour can contribute to a synthesis of what is known and what needs to be elaborated on regarding the context or environment, organizational culture, (recurring) patterns, beliefs, and values of midwives about MLC and how and with whom the midwife (inter)acts [26]. So far, there is no framework that systematically focuses on the relation between the behaviour of midwives and MLC utility to identify strengths or potential weaknesses of MLC, to inform practice and/or to evaluate the MLC model. Midwives, those who already work within an MLC model of care or who execute MLC strategies, those who are scoping or anticipating MLC practices, as well

as midwifery managers and educators, would benefit from evidence on possible implementation strategies for MLC. Information is needed as to whether MLC is a model that is feasible, appropriate, adequate, and meaningful in maternity services.

The present study aims to explore the utility and behavioural determinants of performing MLC reported by midwives and to examine the relationship between the behaviour of midwives and MLC utility. It was hypothesized that midwives' behaviour is correlated with the utility of MLC. A framework of MLC was proposed, integrating and building upon previous research by integrating multilevel variables of multilevel research, with varying sample sizes, allowing the operationalisation of theoretical thinking and creation of theory [30,31].

Methods

Design

A systematic mixed-methods review was performed, integrating data derived from methodologically different studies into a single mixed-methods synthesis [32]. A synthesis of the data, derived from the review, was conducted, data entries were summarised, the patterns and commonalities emerging from the data were described and the relationships between the findings were analysed [33].

Search Strategy

The literature search was conducted (JD,VB) between November 2020 and May 2021 in the following electronic databases: PubMed, ScienceDirect, Web of Science, Scopus, PsychINFO and Biomed Central. The following key terms and database specific advanced search options were used: (midwife) AND (model of care OR continuity of care OR models, organizational) AND (midwives experience OR midwives' perception OR midwives' satisfaction OR attitude of health personnel OR barriers). A 10-year limit was placed on publication dates. Both original qualitative and quantitative literature published in the English language were included.

Selection

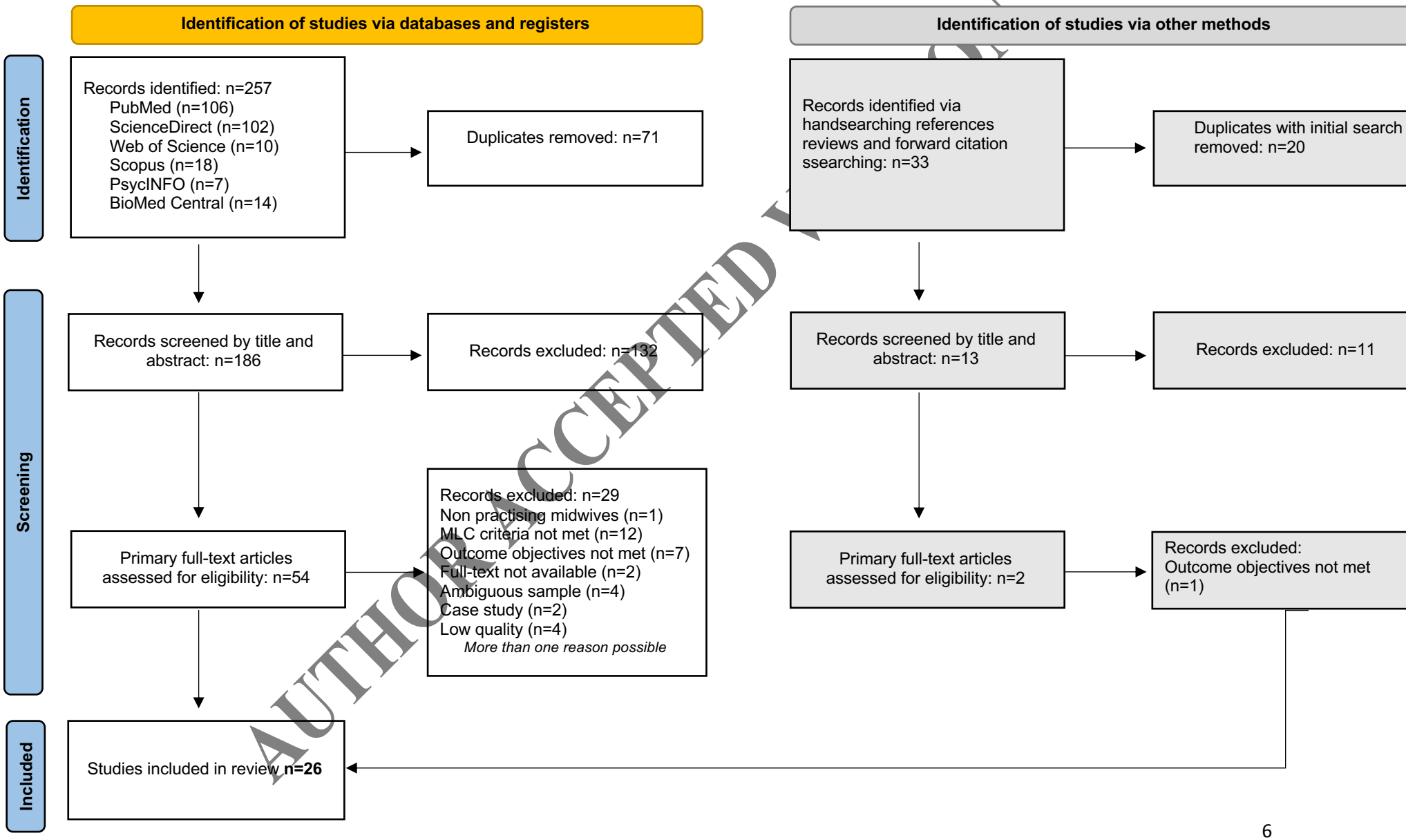
The purpose was to select literature exploring either midwives' reports working in the MLC model or midwives' perceptions of the hypothetical or potential (future) utility of the model. Primary peer-reviewed studies with samples of practising midwives in countries enlisted by the ICM [34] were included. Studies with healthcare professionals other than midwives, studies unclear if or what data were obtained from midwives and studies showing ambiguity whether the midwife enacted as primary care giver were excluded. From this search, additional publications were identified via the references

of systematic reviews and forward citation. Of the 290 records identified, 199 remained after removing the duplicates and papers that did not pertain to the focus of this review (JD,VB). Following this, 56 publications remained and were screened for its eligibility against the inclusion and exclusion criteria, leaving 30 records prior to quality appraisal (Fig. 1).

Quality Appraisal

The 30 studies were appraised using The Joanna Briggs Institute (JBI) Critical Appraisal tools for use in systematic reviews (YK,JD,VB). A scoring system was added to this process to assist in summarizing quality level. Each item was rated: 'Yes', 'No', 'Unclear' or 'Not/Applicable'. Based on the overall appraisal of items, the paper was included or excluded or further explored and discussed [35,36]. The components of studies with a mixed-methods design were separately appraised. The papers with two or more absent and/or unclear JBI-criteria were discussed. After reaching consensus (YK,JD,VB) four papers were excluded, leaving a final 26 good quality papers for further synthesis and analysis (Fig. 1; *From:* Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71).

Figure 1. PRISMA 2020 flow diagram



Organising the Data

To organise the data and to analyse the relevant literature about MLC utility, the Feasibility-Appropriateness-Meaningfulness-Effectiveness (FAME) scale was used [33]. In this study, feasibility is about whether MLC is socio-politically and financially possible, regulated and managed within the climate of maternity services and the work-life balance from an employee/employer viewpoint. Appropriateness is how MLC relates to the midwife's professional and personal domain, culture, and context. Meaningfulness is about how midwives make sense of MLC, the purposefulness and worth of MLC, relying on personal experiences, opinions, values, beliefs, and thoughts. Effectiveness is about the relationship between MLC and (clinical or health) outcomes, including satisfaction of women and of midwives [33]. To organise the behavioural determinants of MLC, the Attitude-Social influence-self Efficacy (ASE) model was chosen. According to this model, a person's specific behaviour is a result of several influencing cognitive factors. The intention to perform a certain behaviour predicts the actual behaviour - in this case MLC. The three central psychosocial determinants attitude, social influence and self-efficacy are assumed to primarily predict and determine the midwife's intention to provide MLC. Intention can also be influenced by external variables such as supportive factors, barriers and/or knowledge [37]. Earlier studies have used the (extended) ASE model to explain midwifery practice and midwives' behaviour [38-40].

Data Extraction & Synthesis

The aim of the synthesis was to summarize and synthesize the reports of midwives' reality as represented by the primary authors. First, all 26 articles were (re)read, focusing on the content of the data sources (YK,JD,VB). Because the research question focused on midwives' reports, the data was extracted from the studies' results sections. After immersing in the data, per paper, line by line, relevant ASE variables (quantitative studies) and ASE text segments (qualitative studies) were identified, assigning a code fitting an ASE category [41]. Data-driven additional behavioural aspects such as professional, personal, and social norm, regulation, enablers, supportive factors, barriers, knowledge, and skills were added to the original ASE model to provide a full scope of midwives' behaviour [32,42,43]. These additional behavioural concepts were integrated to increase the predictiveness of MLC [31,32]. A matrix (Microsoft Excel©) was created to group the ASE codes and categories. Similar categories were grouped together (e.g. supportive and enabling factors, knowledge and skills), resulting in 12 final ASE themes [41]. The ASE themes were then ordered in the four FAME scales; each column of the ASE themes corresponded with the rows of the FAME scale. Findings were compared and refined by all authors, until consensus was reached about the relevant place in the matrix. Second, patterns in the FAME and the ASE themes were identified across the text

segments and the variables within and between the entries. This was an iterative and recursive process of constant comparison and contrasting between all authors to establish a level of focus regarding the FAME and ASE themes [44]. The viewpoints were presented as themes [41]. The number of FAME and ASE entries were counted to summarise the number of entries per scale and theme.

Data Analysis

To allow the same treatment of both quantitative and qualitative data, verbal counts from qualitative studies were translated into numerical results in the matrix. For example, adjectives deriving from the qualitative data such as 'never', 'sometimes' or 'always' or little', 'moderate', 'most', were transformed into categories with the numerical values '0', '0.5' or '1' [45-47]. Quantitative data were coded into the same numerical values according to the p-value and frequencies: p>.10 and 0–33.3% (value 0); p>.05 into p.10 and 33.4 – 66.6% (value 0.5); p.001 into p.05 and 67.7-100% (value 1). Numerical scoring entries were made when the feasibility, appropriateness, meaningfulness, and effectiveness of the ASE theme promoted the utility of MLC (value 1), had no effect on utility (value 0.5), or did not promote the utility of MLC (value 0). If a report did not address a certain theme, the cell was left blank. Assigning the level of utility was a process among four researchers (YK,JD,VB,ET).

For analysis, the matrix was exported into SPSS© version 28. To analyse a complete data set, multiple imputation was used for the missing values with the Markov Chain Monte Carlo (MCMC) method [48]. Two-sided Bayesian Pearson correlations were calculated to establish the strength of the relationship(s) between the FAME categories and the ASE themes, and between the ASE themes [49,50]. It was hypothesized that the ASE themes correlate with the FAME themes (H_1). A Bayes Factor (BF) of >100 was considered as extreme evidence for H_1, 30-100 as very strong evidence, 10-30 as strong evidence, 3-10 as moderate evidence, 1-3 as anecdotal evidence, 1 as no evidence, and a BF <1 was considered in favour of H_0 [50]. The criteria were set at 10.000 MC samples, a tolerance of 0.0001 and a maximum of 2000 iterations. This study is considered as a first attempt in MLC behaviour framework building, lacking full-domain specific numerical information to facilitate good predictions and therefore we did not set priors for the analysis [31,51].

Results

Sample Characteristics

The included 26 articles were published between 2010 and 2021. Most of the studies (n=17) had a qualitative design. The five quantitative studies all had a cross-sectional design, and four studies a mixed method approach. Self-reported data from 4.785 midwives (MLC midwives n=1.676/non-MLC midwives n=3.109) were retrieved. All but one study, were conducted in the Oceanic countries (n = 16) and in Europe (n = 9) (in total 12 different countries). Midwives in the samples were either employed or self-employed and worked in different maternity care settings (e.g., hospital, community). The studies reported on various MLC strategies (e.g., caseload, team midwifery). Caseload midwifery was most often reported (n=10). The midwives in the studies cared for low-risk women (n=10), high risk women (n= 1), or for mixed groups of high and low-risk women (n=14). From one study the risk status of women was unclear. Details of the studies are presented in Table 1.

Table 1. ***Papers included in review***

Author(s), year of publication	Design study	Country	Aim of study	Population/midwives in the sample	FAME/ASE entries (n)
Clemons et al [62]	Qualitative survey with open-ended questions	New Zealand	To explore job autonomy amongst midwives and to identify what supports/ enables and what hinders/ disables midwives' ability to practice autonomously within their role	253 midwives: 117 self-employed midwives, 88 employed and 48 'other'; 0-42 years of work experience; caring for low and high-risk women	2
Kashani et al [64]	Qualitative, descriptive (interviews)	Australia, North-East Victoria	To describe midwives' experiences of and views on working in a CL midwifery model in a rural setting	11 qualified midwives; 24-61 years of age; 3-39 years of work experience; 5 presently and 6 midwives formerly practising in a CL model with low-risk women	18
Newton et al [63]	Quantitative, cross-sectional (survey)	Australia	To compare views of CL midwifery: those working in CL models and those in SC models in hospitals with and without CL	542 midwives, working in public hospitals providing care to low-risk women: 20% CL midwives, 39% non-CL midwives, 41% were working in a hospital without a CoC model; 56% >10 years of work experience, 13% in first year of practice	17
McInnes et al [60]	Realist evaluation, participatory research, survey including open text answers, interviews, observations, audits, field notes	Scotland, UK	To explore how CoMC works, for whom, in what context and to what extent, to inform sustainable on-going implementation and up scaling the CoMC model	Midwives working in one Scottish Health Board: baseline survey (321 midwives); interviews (113/77 CoMC/36 non-CoMC midwives); caring for low and high-risk women	14
Hollins Martin et al [59]	Realist evaluation, online survey with free text comments	Scotland, UK	To collect baseline data prior to implementing a CoMC model collecting data about midwives' personal and professional wellbeing prior to service reorganisation, with a longitudinal study intended to measure change in midwives' reports across time *This paper reports the baseline data-collection*	321 midwives working in a Scottish Health Board, including urban and rural settings with approx. 9500 births per year. The Health Board comprised of three settings: 2 hospitals and community midwifery services caring for low and high-risk women	12
Styles et al [61]	Qualitative, implementation research (interviews)	Australia, Queensland	To explore the perceptions and experiences of midwifery and obstetric staff during the implementation and upscaling of midwifery CoC. Data collection within the first 2-3 months and 2 years after CoC implementation	15 midwives, core midwives and midwives providing CoC to low and high-risk women *obstetric staff experiences excluded from analysis*	11
Bradfield et al [68]	Qualitative, descriptive phenomenological design, purposive sample (interviews)	West Australia	To explore the experiences of being 'with woman' during labour and birth from the perspectives of midwives working in a model where care is provided by a known midwife	10 midwives working in a 'known' midwife scheme; 35-57 years of age; 4–34 years of work experience; low and high-risk women. All midwives previously worked in public hospital with fragmented care where the woman was unknown to them	12

Bradfield et al [54]	Qualitative, descriptive phenomenological design (interviews)	West Australia	To explore midwives' perceptions of being with women during labour and birth in the context of various models of maternity care	31 midwives: 10 CoC midwives, 11 worked in private obstetric-led model, 10 in standard public model; providing care to low and high-risk women; 35-62 years of age; 3-35 years of midwifery experience	8
Cronie et al [69]	Quantitative, cross-sectional, online questionnaire	Netherlands	To measure and compare job satisfaction among hospital and primary-care midwives	508 midwives, 103 hospital and 405 primary care midwives; mean age 40 years; providing care to low-risk women	8
Taylor et al [70]	Quantitative, cross-sectional (33 quantitative/16 qualitative questions)	United Kingdom	To examine the working patterns that midwives are willing and able to adopt, and to ascertain what barriers exist and what would help midwives to work in CoC models	798 midwives in 7 geographical areas (27 hospitals; providing care to low and high-risk women in community (36%) and obstetric units (34%); 57% had been qualified >10 years	7
Dawson et al [75]	Quantitative, cross-sectional (survey)	Australia	Comparing the experiences of CL and non-CL midwives in relation to burnout and attitudes to their professional role	542 midwives: 107 working in CL, 212 in other areas of midwifery in a hospital with a CL model, 220 worked in a hospital without a CL model; 56% had been practising as a midwife >10 years. Risk status of women was unclear	5
Hunter et al [76]	Qualitative, hermeneutic phenomenology (interviews)	New Zealand	To reveal what enables, safeguards, and sustains midwives to provide intrapartum care in freestanding midwifery-led units from midwives' and obstetricians' perspectives	4 CL community midwives, 7 employed midwives caring for low-risk women *non-midwives' responses excluded from analysis*	1
Coddington et al [53]	Qualitative, descriptive exploratory study (interviews)	Australia	To examine midwives' experiences of transitioning from providing hospital-based midwifery to homebirth midwifery care	9 midwives and 4 midwifery managers (also practising) providing care to low-risk women in a MGP or community within the 5 past years	16
Dixon et al [73]	Quantitative, cross-sectional (survey)	New Zealand	To describe and compare the demographic and work-related factors of midwives and to explore factors associated with burnout in groups of employed and self-employed midwives	473 self-employed midwives, 452 employed midwives, 148 both self-employed and employed midwives caring for low and high-risk women	7
Jepsen et al [72]	Qualitative, phenomenology, (field observations, interviews)	North Denmark	To explore what constitutes CL midwifery from the perspectives of the midwives and how midwives experience working in CL midwifery	13 CL midwives; 2 different hospitals; 29-59 years of age; 4–25 years of work experience; 23% CL; 77% combination of CL and SC; caring for a mixed group of low and high-risk women	15
Newton et al [58]	Mixed method (surveys and in-depth interviews)	Australia, Melbourne	To explore CL and SC midwives' views and experiences of midwifery work in two new CL models (survey at baseline and two years later; interviews at 6-months and after 2 years or at resignation)	Full- and part time working CL (survey and interviews) and SC midwives (survey); 50% >10 years of work experience; 21 CL and 130 SC midwives at baseline; 22 CL and 133 SC midwives at 2-years; 28 interviews with CL midwives; providing care to low-risk women	35

Burau & Overgaard [55]	Qualitative multi-case design (interviews and focus groups)	Denmark	To explore: 1) The interplay between midwives and management in their negotiations on the introduction and development of CL midwifery 2) The professional and organisational interests pursued by midwives and management in the process 3) The professional and organisational resources activated by midwives and management in the process	(Deputy) Chief-, CL-, and ward midwives working in three hospitals (university, mid-level, community; low and high-risk women) in which CL midwifery had been introduced less than a year ago: 10 individual interviews (3 chief midwives, 3 deputy chief midwives, 3 CL midwives, 1 obstetrician); 14 group interviews (14 CL midwives, 10 ward midwives, 9 health visitors, 6 obstetricians) *non-midwives' responses excluded from analysis*	13
Cummins et al [56]	Qualitative, descriptive (interviews)	Australia	To explore the experiences of the new graduate midwives who have worked in CoMC and to examine the support they received and, to establish the facilitators and barriers to the expansion of new graduate positions in midwifery CoMC	13 newly graduate midwives; 21-46 years of age; working within their first or second year of practice; caring for low and high-risk women	11
Maillefer et al [67]	Qualitative, descriptive (interviews and focus groups)	Switzerland (Canton of Vaud)	To explore the perceptions of women and healthcare providers related to the future development of an MLC at a university hospital	10 midwives working at a university (tertiary) hospital caring for low and high-risk women *non-midwives' responses excluded from analysis*	4
Sjöblom et al [52]	Qualitative, phenomenology (Interview)	Denmark, Iceland, Norway, Finland, Sweden	To describe the lived experience of being a homebirth midwife in the Nordic countries	21 homebirth midwives: 8 from Sweden, 5 from Denmark, 4 from Norway, 2 from Finland and 2 from Iceland; 2-38 years of work experience; providing care to low-risk women	8
Warmelink et al [57]	Qualitative, constructivist/ interpretative design	Netherlands	To gain an understanding of how primary care midwives feel about their work and investigate factors associated with job satisfaction of primary care midwives	99 midwives; 22-61 years of age; 40 years of work experience; providing care to low-risk women	13
Edmondson & Walker [66]	Qualitative, grounded theory (interviews)	Australia, North Queensland	To uncover how birth centre midwives, working within midwifery CL, constructed their midwifery role to maintain a positive work-life balance	7 midwives; 0-3 years of work experience; 40-60 years of age without having young children; working at the birth centre with low-risk women;	10
Menke et al [74]	Qualitative, descriptive (focus groups)	Australia, Queensland	To examine midwives' perceptions of the organisational structures and processes of care and their impact on a CL model for socially disadvantaged women and vulnerable childbearing women	17 midwives working in MGP; 26-61 years of age; on average 8 years of work experience and 21 months of MGP experience; providing care to high-risk women	16
Newton et al [20]	Quantitative, cross-sectional (survey)	Australia, Victoria	To compare midwives' attitudes to their professional role and measures of burnout between CL midwives and those working in SC models in these two newly introduced CL models	22 CL midwives and 133 SC midwives; CL midwives providing care to low-risk women; SC midwives providing care to a mixed group of low and high-risk women	4
Gu et al [65]	Qualitative, phenomenology (interviews)	China, Shanghai	To explore and describe midwives' experiences of providing continuity of care to labouring women in a hospital setting	12 midwives; 3-8 years of work experience; providing care to a mixed group of low and high-risk women	10

Fereday & Oster [77]	Qualitative, interpretive study (Interviews)	Australia, Adelaide	To gain insight into the management of flexible work hours to achieve a work–life balance for a group of midwives working in a CL model	17 midwives, 3 months-2 years' experience in an MGP providing care to low-risk women	15

Continuity of Care (CoC)/Continuity of Midwifery Care (CoMC): a nominated primary care midwife who migrates with the woman in case of complications and/or referral of care
Caseload (CL): one midwife providing all care, including being on-call for own caseload births with the backup of another midwife
Midwifery Group Practice (MGP): a team of midwives sharing a caseload of women with backup from one or more midwives in the group, providing antenatal, intrapartum, and postnatal care in a scheduled system
Standard Care (SC): care as practised in the place where the study was conducted (other than CoC/CoMC, CL or MGP) such as shared care (hospital)midwife/obstetrician, (hospital)midwife/General Practitioner, care from a variety of midwives and obstetric staff, hospital care, care delivered by midwives who work shifts of 8–10 hours

Quality

The JBI-criteria 'locating the researcher culturally or theoretically' (n=11) and 'is the influence of the researcher on the research, and vice-versa, addressed' (n=10) were recurrently unclear or absent in the qualitative methodological designs. Only one quantitative paper 'identified or stated confounding factors'. The papers showed overall good quality.

FAME & ASE Entries

In total, 292 entries were extracted from the data, with a minimum of one entry to a maximum of 35 entries per study (Table 1). 'Appropriateness' was the most often reported FAME theme and 'supportive factors' was the most often reported ASE theme (Table 2).

Table 2. Data matrix of entries per study

		ASE THEMES											
FAME CATEGORIES	**STUDY**	**Attitude**	**Social influence**	**Social influence (maternity**	**Self-efficacy**	**Regulation**	**Supportive factors**	**Barriers**	**Social norm**	**Professional norm**	**Personal norm**	**Knowledge**	**Intention**
FEASIBILITY N = 56	Clemons et al [62]			1				1					
	Newton et al [63]					1	2	3					
	McInnes et al [61]					1	2	2					
	Hollins Martin et al [59]				1		1						
	Styles et al [61]						1	1		1			
	Bradfield et al [68]					1				1			
	Coddington et al [53]	1	1	1									
	Burau & Overgaard [55]	2				1	2	1		1			1
	Maillefer et al [67]	1								1			
	Sjöblom et al [52]	1	1							1			
	Warmelink et al [57]					1	3	1	1	1	1	1	
	Edmondson & Walker [66]					1	3			1	1	1	
	Menke et al [74]									1	1		
	Newton et al [20]					1							
	Gu et al [65]									1			
	Fereday & Oster [77]										1		
	N entries per study	**5**	**2**	**2**	**1**	**7**	**14**	**9**	**1**	**9**	**4**	**2**	**1**
APPROPRIATENESS N = 184	Kashani et al [64]	3					8	1	1	2			1
	Newton et al [63]	4	1	2			8	2	1	4	3	1	
	McInnes et al [60]			1	1								
	Hollins Martin et al [59]	4	1							1	2	1	
	Styles et al [61]						1		2	2	2		
	Bradfield et al [68]	1					2			1			
	Bradfield et al [54]			1			4			3			1
	Cronie et al [69]	1		1		3	3						
	Taylor et al [70]						3	2		1		1	
	Hunter et al [76]				1								
	Coddington et al [53]	2	2			1	4			1	1	2	

	Dixon et al [73]	1		1		3	1		1				
	Jespen et al [72]	2					2			3	1		1
	Burau & Overgaard [55]						1		2				
	Cummins et al [56]	2					6	1		1			
	Maillefer et al [67]	1											
	Sjöblom et al [52]						1	1					
	Warmelink et al [57]								1				
	Edmondson & Walker [66]						1			1			
	Menke et al [74]		1					4	4	1	1		2
	Newton et al [20]	3				1	2	3			7		
	Gu et al [65]						1	2		1	1		
	Fereday & Oster [77]						5	5		3			
	N entries per study	**24**	**5**	**6**	**2**	**8**	**53**	**21**	**12**	**25**	**18**	**5**	**5**
MEANINGFULNESS N = 18	Kashani et al [64]	1											
	Newton et al [63]									1			
	McInnes et al [60]											1	
	Hollins Martin et al [59]									1			
	Styles et al [61]												1
	Bradfield et al [68]		1		1					1			
	Jespen et al [72]	1							1				
	Maillefer et al [67]	1											
	Sjöblom et al [52]	1					1						1
	Warmelink et al [57]									1			
	Edmondson & Walker [66]							1					
	Menke et al [74]						1						
	Fereday & Oster [77]						1						
	N entries per study	**4**	**1**	**-**	**1**	**-**	**3**	**1**	**1**	**4**	**-**	**1**	**2**
EFFECTIVENESS N = 33	Kashani et al [64]										1		
	Newton et al [63]									3	1		
	McInnes et al [60]								2		1	1	2
	Bradfield et al [68]							1		1			
	Dawson et al [75]	1								1	1		1
	Jespen et al [72]	1		1				1					1
	Newton et al [58]	1									1		1
	Burau & Overgaard [55]	1											1
	Cummins et al [56]						1						
	Warmelink et al [57]	1									1		
	Gu et al [65]				1			2				1	
	N entries per study	**5**	**-**	**1**	**1**	**-**	**1**	**4**	**2**	**5**	**6**	**2**	**6**
TOTAL N entries per ASE theme		**38**	**8**	**9**	**5**	**15**	**71**	**35**	**16**	**43**	**28**	**10**	**14**

FAME Themes

Feasibility of MLC was determined by childbearing women [52-54] and by leadership, staff, hours, equipment, rota, quality assurance in the midwife's work environment and the extent this environment advocated MLC values [52-60]. *Feasibility* was shaped by midwives with MLC expertise in the culture of maternity services [20,53,55,58,60-64]. MLC was *feasible* when midwives were seen as knowledgeable and autonomous practitioners whilst collaborating on multidisciplinary level [52,55,57,62,65,66-68]. MLC was *feasible* on an individual midwife level when a supportive network at home was available [56-59,69,70] and when midwives were intrinsically motivated, interested and committed to provide MLC [52,55,65,67,71].

The woman-midwife relationship/partnership, working in a homely environment, continuity of care and carer, advocacy, autonomy, and empowerment were strategies of clinical *appropriateness* of MLC [53,54,59,67,68,72]. MLC was *appropriate* as it fitted the midwife's autonomous professional identity, centred around the strong midwife-woman relationship while providing continuous and individualised care [58,59,64,69,72]. MLC was *appropriate* in the context of informed and shared decision-making in maternity services [53,71,73].

MLC was determined to be *meaningful* when midwives believed in women and when women believed in themselves – in the ability to give birth [52,64,74]. *Meaningfulness* was shown by women trusting midwives and midwives being true to midwifery values and beliefs [52,58-60,64,66]. It was *meaningful* for midwives to know the women in their care, to engage with them and their families, and with women's individual circumstances and needs [57,60,72]. Continuity was *meaningful* in the relationship between the midwife and the woman [55,56,59,64,67]. Midwives agreed that the benefits of MLC were worth the efforts and therefore *meaningful* [61].

The *effectiveness* of MLC was recognised by increased satisfaction of women with care [60], by job satisfaction of midwives and lower levels of burnout compared to non-MLC midwives [55,60,75]. Midwives reported MLC as *effective* because of observed and experienced improved medical and psychosocial standards of care and improved clinical outcomes for birthing women and their babies [55,58,60].

ASE Themes

MLC midwives showed a positive *attitude* towards the model of care [58,60,72,75] and regarded MLC as important for (skills) development, expertise, and professional autonomy [53,55,57-59,64,67,73] and to be 'a good midwife' [58,60,64]. Midwives believed that MLC could be the opportunity to introduce change in the medical model of maternity services [67]. The midwives had a fundamental belief that MLC improved the woman's ability to give birth and to improve birth outcomes [52,58].

Social influence was observed within maternity services (colleagues) as well as in the public domain (women, media) [53,58,60,64,69,73]. Midwives reported that their role of being the woman's advocate was often met with resistance, disrespect and scrutiny or questions from obstetricians, midwives [53,54,58,60,62] and from colleagues - who believed MLC exposes mother and baby to potential health risks [52]. Midwives were affected by negative MLC media messages and hospital management's announcements [53], feeling unsupported and judged [62, 74].

Self-efficacy was a result of strong individual MLC values and beliefs, reliance on skills [76] and feeling empowered and confident [53,58,60,62]. Midwives indicated that through developing a close and trusting relationship with the woman, knowing the woman's health and her family situation, they believed in their abilities to provide optimal care for women [56,64,65,74].

Not being able to work within a woman centred care approach was perceived as a *barrier* to construct the MLC role [60]. Poor workforce engagement of colleague's, poor leadership, lack of regulation, poor management and/or miscommunications with the wider healthcare team [53,55,57,60,62,73,74], a lack of staff [56] and activities such as meetings and paperwork were *barriers* in adopting MLC [57,64]. Unclear/undefined working hours were *barriers* to achieve work-life balance [20,52,58,59,61,65,77]. For non-MLC midwives, being on-call was the primary reason not to work in the MLC model [20,58]. Additionally, some midwives regarded having young children and having to organise childcare as *barriers* for being an MLC midwife [58,70,77].

Accountability, responsibility, and autonomy [55-58,69] as well as a strong relationship and quality contacts with women and having enough time to provide care acted as *supportive factors* for working in the MLC model [52,54,55,57,59,63,64,65,72,77]. The woman-midwife relationship was regarded as MLC's 'key to success' [63]. Midwives working in the MLC model felt s*upported* by sharing the same midwifery philosophy with colleagues [56,58,60,61,64,66,77]. Feeling 'part of a team' and good collaboration with other healthcare professionals were regarded to *support* working in the MLC model [66,82,87]. A flexible work schedule enabled a good work-life balance, supporting the combination of work and family responsibilities through the flexibility offered by being on call [55,58,64,66]. Having a supportive network at home was therefore regarded as an essential *supportive factor* for being an MLC midwife [20,52,56,65,66,70]. Awareness, knowledge, and transparency about organisational factors, such as knowing the roster in advance, protected days off, development opportunities, alignment with woman-centred care, adequate resources, management quality, quality assurance, financial rewards, clear workplace protocols regarding agreements and referrals *support* working in the MLC model [20,57,69,72,73,77].

Midwives were aware of women's *(social) norm* of the MLC midwife: to be available and accessible in the local community [64]. Midwives regarded communication, collaboration, positive interaction, and positive partnerships with women as *professional norms* of MLC [20,53,54,64,71,72,74] as well as getting to know the woman and putting her at the centre of midwifery care [55,57,68]. In MLC one-

to-one care and homebirth were regarded as the *norm* [53,57,65,71,72]. Some midwives regarded it as a *professional norm* to offer MLC to vulnerable women or because of a previous traumatic birth [58, 59, 61]. Sometimes MLC midwives were subjected to the projection of *professional norms* of other healthcare professionals. For example, non-MLC midwives believe that MLC midwives have privileged working conditions and therefore are expected to demonstrate a high level of competency and to improve clinical outcomes and women's satisfaction levels [55,60,72,74]. MLC midwives were sometimes regarded as practising outside of the *social norm* of maternity services [74] and homebirth was regarded with scepticism [61]. To practice in an MLC model, midwives felt on a *personal* level the need to be available to women, to show a genuine interest in her and to acknowledge her feelings [72,77] but also to establish boundaries around their working life and personal time and commitments [58,61,65,66,77].

MLC enabled midwives to utilise, maintain and improve their *knowledge* and skills [53,58,59,65,66]. *Knowing* the woman and *knowing* and *learning about* her care needs and personal circumstances, enables to adequately adapt care, corresponding with the woman's individual needs [60,70]. Midwives indicated that MLC expands medical and psychosocial *knowledge* [55].

Midwives reported a strong *intention* to build relationships with pregnant women [72] and felt motivated by the opportunity for relational continuity [55]. *Intentions* were enhanced by the experience of being with women - an incentive to provide MLC [54,74]. Empowering and supporting women towards a positive birth experience was seen as a driving force behind MLC [52]. The fact that MLC was regarded as true midwifery, enhanced the *intention* to provide and commit to MLC [58,60,64,72,75].

Bayes Factors FAME and ASE-themes

The missing values showed a non-monotone pattern, justifying multiple imputation using the Markov Chain Monte Carlo (MCMC) method [48]. Of the Bayes Factors (BF), none of the correlations showed extreme evidence, 27 correlations showed very strong evidence (BF 31.1-41.6), 27 strong evidence (BF 11.2-28.5), 13 showed moderate evidence (BF 3.1-9.7), 10 anecdotal evidence (BF 1.5-2.9), 15 showed no evidence (BF 0.5-1.3) for H_1 and 22 correlations showed extreme evidence (BF 0.00-0.09) for H_0 (see Table 3). MLC utility was predominantly explained by the FAME categories: appropriateness and effectiveness and their (very) strong evidence for underlying relationships with the ASE themes: attitude, perceived social influence of the public, supportive factors, regulation, professional and personal norm, and intention of midwives. MLC utility was not so much explained by feasibility and meaningfulness, although these showed evidence of (very)

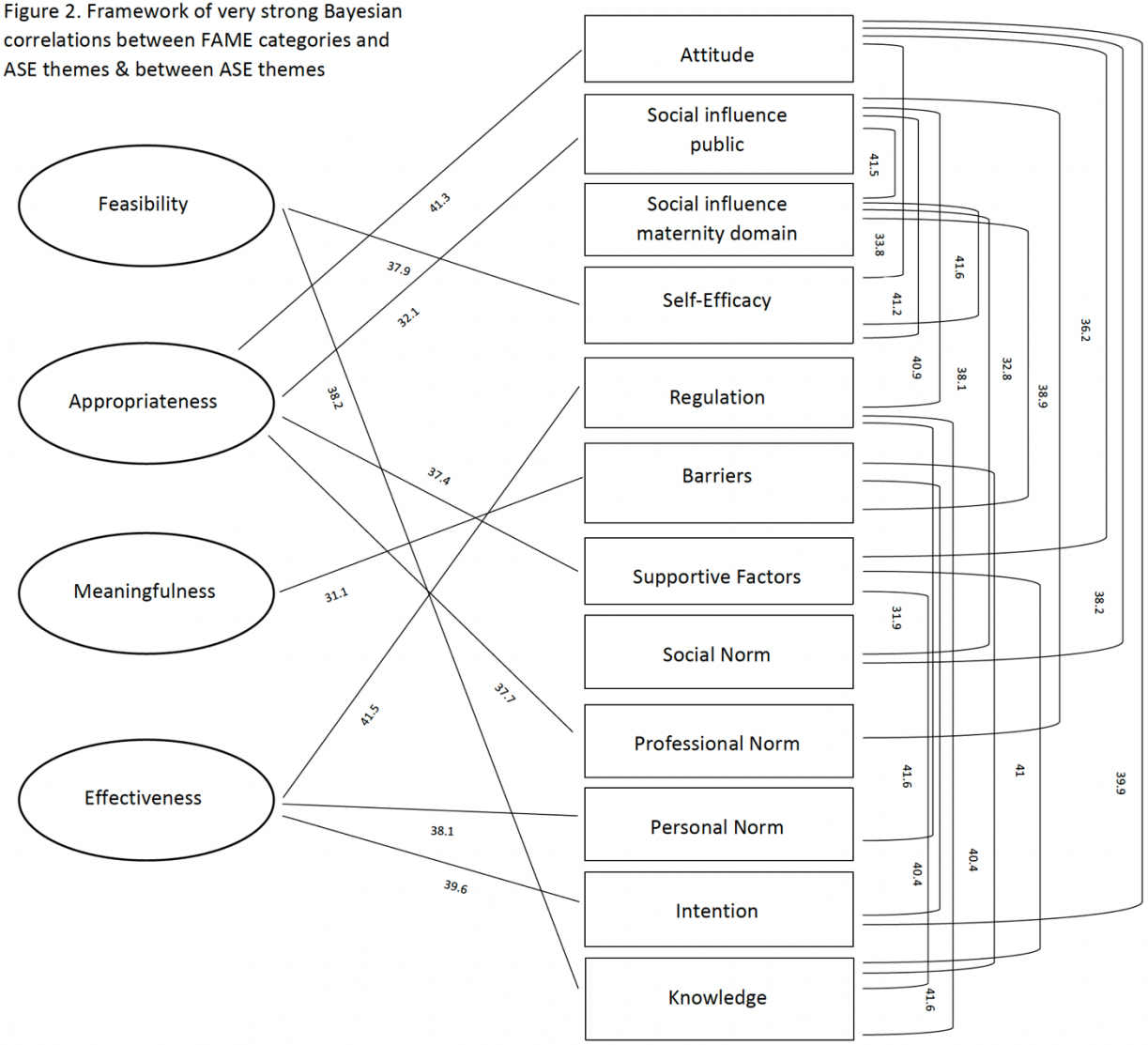
strong underlying relationships with the ASE themes: self-efficacy, regulation, professional norm, intention, knowledge, and barriers. The very strong BFs between FAME/ASE themes and between the ASE themes are reported in Fig. 2 and Table 3.

Table 3. Bayes Factors

	Attitude	Social Influence public	Social Influence maternity domain	Self-Efficacy	Regulation	Barriers	Supportive Factors	Social Norm	Professional Norm	Personal Norm	Intention	Knowledge
Feasibility (F)	1.11	0.00	0.75	**37.92**	*20.1*	0.05	1.50	0.00	*16.58*	9.68	*26.20*	**38.15**
Appropriateness (A)	**41.29**	**32.06**	0.09	*27.44*	0.00	*20.48*	**37.40**	0.93	**37.67**	5.22	2.72	*11.22*
Meaningfulness (M)	1.32	6.40	0.00	2.87	0.00	**31.10**	2.91	0.00	*20.65*	0.05	8.44	0.00
Effectiveness (E)	*23.66*	*20.41*	0.00	*17.56*	**41.48**	*11.95*	1.40	3.07	4.71	**38.13**	**39.59**	0.00
Attitude		*22.30*	0.58	**33.79**	0.00	*11.20*	**36.24**	**38.16**	2.17	0.76	**39.87**	0.86
Social Influence public			**41.48**	**41.18**	**40.88**	*27.84*	0.03	*24.09*	**38.93**	0.92	*19.85*	0.08
Social Influence maternity domain				**41.55**	0.00	**32.82**	*19.60*	**38.08**	5.61	1.63	0.00	0.00
Self-efficacy					1.19	8.43	5.24	0.72	*15.05*	2.08	4.37	0.50
Regulation						5.67	0.45	0.05	0.96	**41.59**	0.00	**41.58**
Barriers							*28.52*	*19.51*	*17.95*	3.36	**40.42**	**40.41**
Supportive factors								*27.24*	*12.16*	0.00	*25.62*	**40.85**
Social norm									0.02	*20.15*	0.00	1.12
Professional norm										*26.57*	2.64	**31.86**
Personal norm											3.78	*22.97*
Intention												1.55

Bayes Factor: BF >100 = extreme evidence for H_1; **BF 30-100 = very strong evidence H_1**; *BF 10-30 = strong evidence for H_1*; BF 3-10 = moderate evidence for H_1; BF 1-3 = anecdotal evidence for H_1; BF 1 = no evidence for H_1; BF <1 = extreme evidence for H_0

Figure 2. Framework of very strong Bayesian correlations between FAME categories and ASE themes & between ASE themes



Discussion

The framework of the FAME scales and the themes of the extended ASE model showed that the utility of MLC is explained and influenced by multiple and diverse midwives' behavioural factors. The various behavioural determinants of midwives related to the utility of MLC were entangled in a systematic way, which has not been done before. The predominantly strong and very strong levels of evidence and to a lesser degree the moderate and anecdotal evidence, support the hypothesis that ASE themes correlate with the FAME scales.

The data entries most often reported on MLC in the midwifery context and culture (appropriateness scale), the results strongly emphasize that MLC seems to be regarded as a core and true value of midwifery [23]. However, the thematic findings show that the MLC context and culture can be distinguished in prosocial intrinsic (attitude, professional norm) and extrinsic pragmatic forces (supportive factors, social influence of the public) [78] - suggesting an ambiguity in forces [79]: Some midwives value MLC because it fosters own happiness and wellbeing as well as of the women in their care. MLC also aligns with the core value of 'doing or being good' [80]. Other midwives value MLC because of having sufficient time to provide care, a reduced caseload, a fixed team structure and autonomous and flexible diary management [81]. Both prosocial and pragmatic factors are important for MLC midwives' self-determination and their resilience [78] as these factors contribute to midwives' competency, autonomy, and relatedness to working in the MLC model [79]. Based on the prosocial-pragmatic duality midwives should be supported to be unique in providing MLC and not utilise a one-size-fits-all MLC approach, accepting and recognising that midwives have different perceptions to provide MLC and interact differently with the women in their care [19,40,82]. There should be no preference for either the prosocial or the pragmatic aspects – although usually the prosocial aspects precede the pragmatic aspects and then co-exist [83]. Additionally, as different MLC strategies exists, it might be that some strategies (e.g. group practice) suit some midwives better in achieving a family-work balance [40,58,70,77]. In the woman-midwife relationship the midwife is as much an individual as the woman [83]. To avoid interdisciplinary polarisation or discohesion, reasons attributing to midwives' self-determination and their resilience need to considered, acknowledged and respected as well as it needs therefore to be accepted that MLC might not fit all midwives [24,39,40,81,83].

The findings enhance the predominant monodisciplinary midwifery perspective embedded in the midwifery culture. Midwives did not often report on MLC in the wider context of integral maternity care (feasibility) while MLC exists within a broad cultural, socio-political, and financial

climate and multi-disciplinary network of health and maternity services [1,84,85]. The analysis shows that feasibility is predominantly underpinned by self-efficacy, professional norm, intention, and knowledge. The thematic findings about these behavioural aspects do not include referral to the multi-disciplinary maternity service culture – instead these are reports on a midwife-woman level. Midwives' limited reports on MLC feasibility within the maternity services climate might be because of the feeling of the patriarchal and hierarchical medical hegemonic and medical dominant maternity care system with multidisciplinary debates about professional responsibilities and abilities [9,24,84-87]. Nevertheless, for increased feasibility of MLC, while reclaiming the midwifery role in a medicalised climate, midwives will need to collaborate effectively in the organisational climate of maternity services and to stand up for their professional identity in hierarchal relationships [88]. However, midwives are not able to achieve increased feasibility as an individual or separate monodisciplinary group. Therefore, while focusing on multidisciplinary collaboration, simultaneously greater insight, reflection on traditional power imbalances, and respect for each other's job (autonomy) should be established to adequately embed MLC in maternity services [89].

Evaluation of MLC consistently demonstrates quality of care, good outcomes for mothers and babies and overall satisfaction of maternity experiences for women. For MLC to be(come) regarded as a first choice for all childbearing women, it seems imperative that the worth and effectiveness of MLC should be shared, internalised, and formalised in the maternity climate to avoid the domination of obstetricians' regulation in the maternity care climate [89]. It is evident that practice transformation needs to be supported through theoretical understanding grounded in contextual significance to implement MLC as a sustainable model of care and handing a mandate to MLC midwives to assist organisational change and to prevent medical/obstetric care to have a head start in the feasibility of MLC [90]. MLC needs an emancipatory shift and prominent change agents and role models, transformational leaders who provide vision and resources and an active coordination of knowledge exchange on meso-level [85]. MLC needs academics, policymakers, and governors in midwifery organisations, putting MLC up in a debate with healthcare politicians and health services/insurances on macro level [24]. Effective and efficient educational programs to improve (student)midwives' knowledge during to shifting context of (re)orientation to MLC and to grow confidence would be of merit [83,91]. Additionally, midwives need to find a way to (re)claim their legal right to act autonomously and reflect on their midwifery abilities by using strategies primarily consisting of self-awareness and self-determination [65,68]. The qualitative findings show that the woman-midwife relationship is an important and recurring issue. Therefore, it

might be necessary to seek alliance with women as MLC key stakeholders towards pushing the change at social level to indicate for MLC to become politically and financially governed [80].

The analysis shows extreme evidence that building meaningful trusting relationships with women and the commitment to physiological approach of childbirth are not correlated with the influence of the maternity care domain, regulation, the midwife's social and personal norm and/or with the midwife's knowledge [52,54,57-60,64,66,72,74]. The thematic findings suggest that MLC midwives are not so much being put off by human and non-human barriers in the work setting or by issues in their personal lives. The meaningfulness of MLC and midwives' MLC actions are seemingly separate entities, emphasizing the epistemological status of MLC [40,83,92]. It therefore must be safeguarded for the barriers in the work setting to become conditions that affect the meaningfulness of MLC [93]. Constant and conscious reflection on the meaningfulness of MLC among (student)midwives is of merit.

Limitations

Although several behavioural determinants were identified, this does not assure the strength of the ASE model in explaining the utility of MLC. There was an inconsistency in the number of reported FAME and ASE attributes, causing over and underrepresentation of certain themes. Over and underrepresentation could have been a result of including studies performed in the same setting and same group of researchers, reporting on the same issues, likely to contribute to publication bias. Having included reports of both MLC and non-MLC midwives, limits potential positivity and/or negativity reporting bias [81]. The imputation of missing data could also have added to publication bias, however using the MCMC algorithm reduced the loss of precision [94]. The lack of evidence/limited number of entries in certain areas (e.g., meaningfulness, self-efficacy, social norm, intention) can be considered as topics for future research to complement the framework that was developed based on the current evidence. From all the Bayes Factors, there were no BFs showing extreme evidence, and the BFs showing very good evidence had a ceiling of 41.6. Multiple determinants showed no evidence to test the hypothesis. However, using a Bayesian approach for estimation of H_1 provides outcomes in a form that are less prone to misinterpretation, aiding to the trustworthiness of the final framework [50,95]. The included studies showed heterogeneity of sample setting characteristics. Most of the included studies were conducted in Australia and Europe with midwives - potentially overrepresenting and underrepresenting certain geographical areas, midwifery cultures, maternity settings, and health care systems, affecting the generalisability of the results. As MLC was first introduced in predominantly New Zealand, Australia, and the United Kingdom, it might not be surprising that most studies originated from these countries [83]. Not all

studies provided information about midwives' background such as years of experience, likely to cause confounding. Additionally, a variety of different strategies of MLC were reported. The study did not address the variations between the studied geographic distributions, midwives' characteristics or the different organisational settings or care strategies, possibly limiting the interpretation of the findings. Sub analyses can be recommended for future research. The fact that there was sometimes weak to no evidence of relations between FAME and ASE themes gives rise to the thought that other variables and/or unknown confounders not studied yet may affect midwives' behaviour. Hence, further research is recommended. Although the studies showed overall good quality, there were unclear or absent JBI-criteria, lowering the overall appraisal. JBI has no clear guidelines about exclusion [38,39] and the decision was based on discussion among the researchers, which could have led to selection bias based on the authors' beliefs about MLC [96].

Conclusion

The body of evidence regarding safety and efficacy of MLC is well established. The study provides a theoretical underpinning, offering a grass roots approach to practice grounded in contextual significance. The findings and framework are a first attempt to structure the midwives' behavioural determinants related to the utility of MLC, offering recommendations for the implementation, scale up and sustainability of this model of care. MLC is without a doubt a core and true value of midwifery, albeit not being fully embraced by all midwives. To implement and maintain MLC a multipronged approach is needed, with attention for the strong and very strong behavioural aspects of midwives related to the utility of MLC. It needs to be considered how these aspects are addressed in practice, multidisciplinary collaboration, education, management and/or polices and guidelines of antenatal, intrapartum, and postnatal care. The evidence indicates the need for an emancipatory transition for MLC to become fully embedded in the wider culture and climate of maternity services for MLC to be(come) the first choice for all childbearing women. This study offers opportunities for future research to update and/or complement the framework that was developed.

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