Review Article

Freestanding Midwife-Led Units: A Narrative Review

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Abstract

Background: Strengthening of midwives' position and support for freestanding birth centers, frequently referred to as Freestanding Midwife-led Units (FMUs), raise hopes for a return to humanized labor. Our study aimed to review published evidence regarding FMUs to systematize the knowledge of their functioning and to identify potential gaps in this matter. **Materials and Methods:** A structured integrative review of theoretical papers and empirical studies was conducted. The literature search included MEDLINE, Cochrane, Scopus, and Embase databases. The analysis included papers published in 1977–2017. Relevant documents were identified using various combinations of search terms and standard Boolean operators. The search included titles, abstracts, and keywords. Additional records were found through a manual search of reference lists from extracted papers. **Results:** Overall, 56 out of 107 originally found articles were identified as eligible for the review. Based on the critical analysis of published data, six groups of research problems were identified and discussed, namely, 1) specifics of FMUs, 2) costs of perinatal care at FMUs, 3) FMUs as a place for midwife education, 4) FMUs from midwives' perspective, 5) perinatal, maternal, and neonatal outcomes, and 6) FMUs from the perspective of a pregnant woman. **Conclusions:** FMUs offers a home-like environment and complex midwifery support for women with uncomplicated pregnancies. Although emergency equipment is available as needed, FMU birth is considered a natural spontaneous process. Midwives' supervision over low-risk labors may provide many benefits, primarily related to lower medicalization and fewer medical interventions than in a hospital setting.

Keywords: *Birth setting, birthing centers, midwifery, perinatal care, review*

Introduction

Progressive medicalization of perinatal care resulted in a decrease in physiological vaginal delivery rates. A growing number of cesarean sections and medical interventions have already been raising concerns since the 1980s. The proportion of surgical deliveries in low-risk pregnancies still increases nowadays,[1] and not infrequently, pregnant women need to struggle for their right to choose vaginal delivery as a preferred birth mode.[2] Strengthening of midwives' position and support for freestanding birth centers, frequently referred to as Freestanding Midwife-led Units (FMUs), raising hopes for a return to humanized labor. FMUs differ from their founding organization in terms of size and philosophy, and function as independent entities.[3] In the United States, an increase in the number of such facilities began in the early 1980s.[4] Nowadays, the number of FMUs licensed in the United States is relatively stable: 217 in 2011 and 295 in 2015. In Europe, a total of 58 FMUs were registered in the United Kingdom in 2010, and none in Poland.[5,6]

The first Polish hospital-affiliated birth center was founded in 2012 and still exists nowadays. Although the center functions within the organizational structure of an obstetrical hospital, it is managed by midwives who provide complex continuous care for women in labor from admission until discharged home after birth. Despite considerable progress in this matter, FMUs still represent only an alternative solution and are not available for all women with low-risk pregnancies. A midwife's salary is more economically profitable but also midwife care promoting natural delivery minimizes the costs of perinatal care, e.g., by promoting non-pharmacological methods of alleviating delivery pain, giving birth to water, and home birth. Hence, birth centers led by midwives should be particularly promoted. Midwives can have a very positive influence on an effective mother-to-child relationship, as well as

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giving birth the natural way, and giving mothers more time to go through the process. We designed this structured integrative review to analyze changes in the attitude to FMUs that took place over the last 20 years. The study aimed to review published evidence regarding FMUs to systematize the knowledge of their functioning and to identify potential gaps in this matter.

Materials and Methods

The structured integrative review of theoretical papers and empirical studies was conducted in line with the Whittemore's and Knafl's methodology.[7] Relevant publications were extracted and evaluated using a validated questionnaire for data collection developed by Caldwell *et al*.[8] Literature search included MEDLINE, Cochrane, Scopus, and Embase databases. The analysis was conducted in 2018 and included papers published in 1977–2017. Relevant documents were identified using various combinations of search terms and standard Boolean operators: Birth AND Centre AND Out-of-hospital/ Stand-alone/Freestanding OR Midwifery AND led AND unit AND Out-of-hospital/Stand-alone/Freestand. The search included titles, abstracts, and keywords. Additional records were found through a manual search of reference lists from the extracted papers. The inclusion criteria of the study are: published between January 1997 and January 2017; published in English, theoretical, and empirical studies. The exclusion criteria of the study are the inability to distinguish between the outcomes for FMUs and other settings, e.g., home births or Alongside Midwife-led Unit AMUs, "birth center" referring to usual care, conference reports, and proceedings.

The literature search procedure was designed as a five-stage process. The first stage included the removal of duplicate publications, followed by a screening of titles, a review of abstracts, extraction and analysis of full-text articles, and manual search of reference lists. As a result, 56 out of 107 originally found articles were identified as eligible for the review [Figure 1]. Later, each paper was assigned to a specific research problem based on the principal question addressed. Eventually, six groups of research problems were identified, among them two with additional subcategories [Figure 2].

Ethical considerations

The study has received the approval of the ethical committees at the Medical University of Warsaw - AKBE/232/2017.

Results

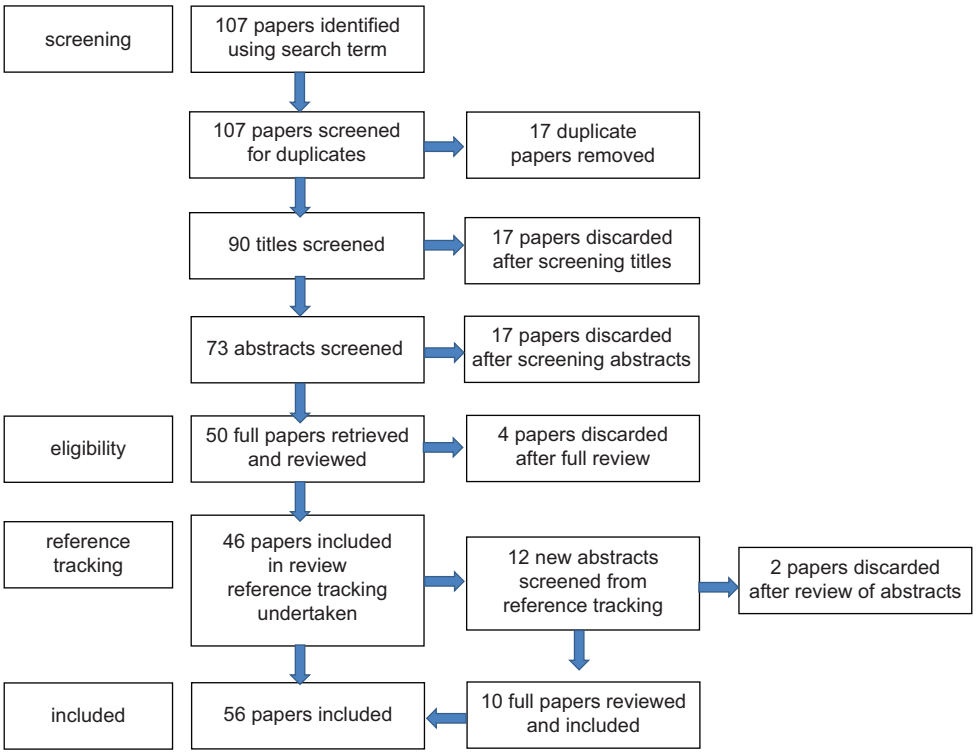
Problem 1: Specifics of FMUs

The nomenclature used to describe non-hospital labor facilities run by midwives is by no means unified. Although they are most often referred to as FMUs, also a more generic term "birth center" has been used by many authors.[3,9,10] The definition of FMU varies and may include several elements such as the description of site, personnel, and philosophy. However, a key component, common for all FMUs, is the woman-centered attitude, continuity of care during pregnancy and after birth, lower medicalization level, and informed involvement of the customer in all decisions regarding perinatal care. FMUs offer services for women with uncomplicated pregnancies, who do not need to be supervised by an obstetrician. As emphasized in the reviewed papers, FMUs do not routinely employ gynecologists and neonatologists, and stand-alone from centers that offer purely medical services, such as cesarean section and epidural anesthesia. This implies that whenever any complications occur, pregnant women are taken to hospital.[10-16] The Birthplace in England National Prospective Cohort Study demonstrated that in 2007, two out of three trusts offered women a choice between home birth and delivery at an obstetrical department, but no option to use an FMU.[17] Another more recent study showed that the number of FMUs in the United Kingdom (about 60) has virtually not changed over time, and these centers provide their services to a relatively small group of women, primarily in rural areas.[6] Another published study analyzed medical documentation used at various FMUs and confirmed its consistency with the Unified Diagnostic Services protocol. The authors emphasized that periodical analysis of documentation in the form of audits may help to identify potential errors, assess data quality, and personnel training.[18] The authors of an older study published in 1999 addressed the issue of triage in women in pregnancy and labor. The authors emphasized that the use of evidence-based protocols at FMUs may result in greater customer safety and fewer interventions in common triage problems.[15]

McCourt *et al*. presented a concept of FMUs as centers focused on women's well-being. However, they also highlighted the difficulties and challenges faced by FMUs in providing a social context of birth at a facility other than a woman's home.[16] The authors of one paper presented FMUs as a midwife-led innovation. In their opinion, the example of FMUs shows how expensive and complex services can be transformed into simpler and less costly solutions.[9]

Problem 2: Costs of perinatal care at FMUs

Medicalization of perinatal care, especially a growing proportion of deliveries by cesarean section, contributed to a considerable increase in economic burden. However, a direct comparison of costs of perinatal care in a hospital setting and at FMUs may be challenging. This results from the fact that women who give birth at FMUs are by default at a lower risk of perinatal complications and thus, their treatment does not generate extra costs.[19] One study demonstrated that the costs of healthcare services offered at



*Preferred Reporting Items of Systematic Reviews Meta Analyses

Figure 1: PRISMA* flow diagram

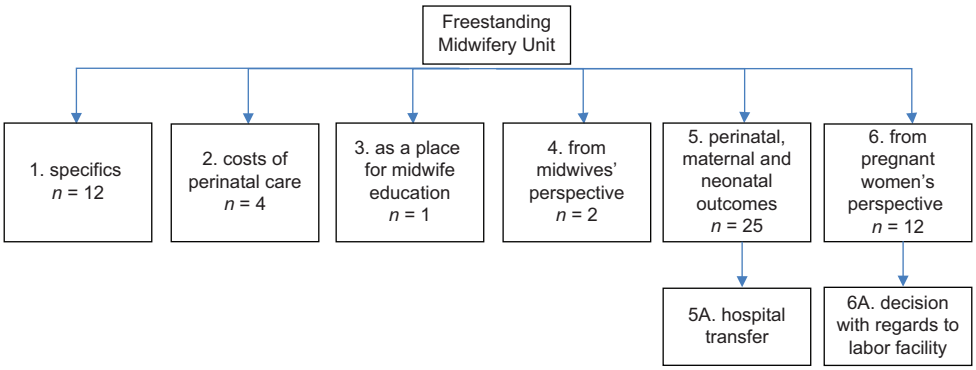


Figure 2: Freestanding midwifery-led midwife in literature - groups of research problems

FMUs are lower than in the case of traditional obstetrical units. The economic burden of labor at an FMU is also lower than at an Alongside Midwifery Unit (AMU) but still higher than in the case of home birth.[20] The costs of midwifery care per single client of the Barkantine Birth Center, a London-based FMU, were low compared to a traditional delivery in a hospital setting.[21] Howell *et al*. analyzed the structure of costs at the Family Health and Birth Center and concluded that such a model of care could provide a 16% reduction of costs for every pregnancy and thus, may have a substantial impact on healthcare expenditures during the perinatal period.[19] Finally, Stone *et al*. demonstrated that costs of care at an FMU and hospital are essentially the same. However, the costs of care at FMUs could be further reduced with a growing number of clients.[22]

Problem 3: FMUs as a place for midwife education

The educational role of FMUs has virtually not been studied so far. The only published paper addressing the problem of midwife education presented experiences of its author, whose attitude to midwifery changed considerably after a stay at an FMU.[23] As a result, the author became more focused on physiological labor, rather than on potential complications or failures. The stay at the FMU was an empowering experience that influenced her decisions regarding future career and place of work.[23]

Problem 4: FMUs from midwives' perspective

Published studies centered around the effect of the facility on midwives' decisions regarding the course of labor; the authors assumed that FMU deliveries may follow different

standard operating procedures in this matter than those used at traditional hospital units. One study analyzed the determinants of midwives' decisions regarding the management of labor and birth at FMUs. Midwives' ability to make independent decisions is vital for the outcome of perinatal care. Furthermore, the hospital approach to labor is much more time-oriented than at an FMU, and not infrequently, there is a pressure on midwives to accelerate the process by carrying out an unnecessary medical intervention.[24] Despite differences in the professional status of the respondents (supervisors of midwives, midwives, student midwives), all of them declared that working at the FMU could promote physiological labor as an option that should be available for all women.[25]

Problem 5: Perinatal, maternal, and neonatal outcomes

Detailed data about the outcomes of FMU deliveries are presented in Table 1. Several evidence gathered over the last three decades demonstrates that FMU deliveries are associated with a lower number of medical interventions; this contributed to greater acceptance of perinatal care in this setting among pregnant women.[26] The analysis of labor outcomes at FMUs is easier than in the case of AMUs, as stated by Leslie and Romano.[27] Research showed that immersion in water, a technique used commonly at FMUs, is associated with a lesser risk of a maternal transfer before birth and intrapartum, and lower cesarean section rates, increasing the likelihood of non-surgical vaginal delivery.[28] Hollowell *et al*. did not find statistically significant differences in the frequency of adverse perinatal outcomes of elective AMU and FMU births.[29] Burns *et al*. compared the outcomes of home births, FMU, and AMU deliveries.[30] Tilden *et al*. observed increased neonatal morbidity after vaginal deliveries in a community setting in women with a history of cesarean section in previous pregnancies.[31]

Problem 5a: Hospital transfers

The proportion of intrapartum transfers from FMUs to hospitals is estimated at 8.2–19.6%.[32-36] According to literature, transfers are required markedly more often in the case of nulliparas than in multiparas (36.7% vs. 7.2%).[26] The main risk factors for an intrapartum transfer are listed in Table 2. The study conducted by Monk *et al*. demonstrated that the proportion of women who have been transferred from FMUs and delivered by cesarean was lower than in the case of those giving birth at a tertiary obstetrical center.[37] According to Rowe *et al*., median transfer time, defined as the time elapsed between the decision to transfer and initial evaluation at an obstetrical department was shorter in the case of women delivering at home than in those giving birth at an FMU.[38]

Problem 6: FMUs from the perspective of a pregnant woman

Women who gave birth at an FMU had more positive experiences and were more satisfied with the care they were offered than those who delivered in a hospital setting. FMUs were scored higher in terms of the support offered, women's right to participate in the decision-making process, openness for psychological needs, satisfying their delivery-related requests, providing information, and empathy.[39] Women who gave birth at an FMU declared that contrary to delivery in a hospital setting, their pregnancy and labor were considered as physiological phenomena, they were treated individually, recognized as a partner in the decision-making process, motivated to rely on their body and spirit, and ascertained about their ability to deliver vaginally.[40] Many previous studies demonstrated that women who used FMU services were highly satisfied with their labor and reported positive experiences in this matter.[41,42] They declared that midwives assisted them in the process of "becoming a mother" which is conceptualized as "matrescent" care.[43] In contrast, the experience of being transferred from an FMU to an obstetrical department was generally described as a disappointment; however, the respondents emphasized that the individual and emphatic care offered by midwives during the transfer, and appropriate preparation for this event helped them to adapt.[44]

Problem 6a: Labor facility-related decisions

The experiences of women who gave birth at an FMU were also described in the context of their decision to choose a non-hospital labor facility.[45,46] The decision to give birth at an FMU was determined by maternal beliefs and a system of values, and the list of considered obstacles was essentially the same as in the case of home birth.[46] Women who decided to give birth to an FMU declared their trust in midwives and their own bodies.[47] Another important factor considered during the decision-making process was the space and interior design of an FMU, and previously established relationship with a midwife or doula from a given center.[48-50]

Discussion

Nowadays, community births constitute an alternative to labor in a hospital setting in most countries.[51] FMU births represent an intermediate option for women who equally value the sense of safety associated with professional support and a home-like environment during labor. FMUs became a particularly attractive solution for women who do not have appropriate conditions for a home birth but still do not want to deliver at a hospital. A growing number of FMUs and the resultant increase in the number of women who do not give birth in a traditional setting justifies the evaluation of the quality and safety of these alternative solutions. Our review demonstrated that most published studies focused primarily on obstetrical and neonatal outcomes of labors at FMUs, and less attention was paid to other aspects of their functioning. Apart from hospitals, also FMUs, promoting a natural attitude to labor, it should be a place where future midwives could be educated. However,

Table 1: Outcomes of labor for freestanding midwife-led units (FMUs)

Outcomes	FMU* vs. OU**	Source
Primary outcomes		
Perinatal mortality and intrapartum related neonatal morbidities	Similar	[35, 52-55]
Spontaneous vaginal birth	↑	[26,30,35,52-54, 56-58]
Cesarean section rates	↓	[5,26,35,52,54,56-58]
Vaginal instrumental deliveries	↓	[5,26,35,52,54,56-58]
Secondary outcomes maternal		
Labor interventions	↓	[5,26,35,52,55-56]
Inductions of labor	↓	[56,58]
Augmentation of labor	↓	[26,30,35,54,56,58]
Amniotomy in labor	↓	[58]
Intact perineum	Similar, ↓ M***	[26]
	↓	[35,59]
Episiotomies	↓	[26,30,53-54,58]
	Similar	[26]
3rd-4th degree tear	Similar	[34,35,56]
	↓	[54]
Continuous electronic fetal monitoring	↓	[58]
Nonpharmacological pain relief measures in labor	↑	[58]
Analgesia in labor	↓	[54,58]
Epidural anesthesia in labor	↓	[26,30,35,54,58]
Secondary outcomes perinatal		
Apgar score <9/5 min	Similar	[26,35]
NICU**** admission	Similar	[26,35]
	↓	[56,60]
Infant readmission	Similar	[26,35,58]
5-min Apgar score of 10	↑	[61]
5-min Apgar score of 0	↑	[62]
Neonatal seizures or serious neurologic dysfunction	↑	[62]
Infants requiring evaluation and treatment for infection	↓	[58]
Incidence of thick meconium in the amniotic fluid	Similar	[58]
Incidence of fetal heart rate abnormalities	↓	[52,58]
Birth weight <2500 g	↓	[60]
Low birth weight infants	Similar	[5,57-58]
Fetal intolerance of labor	↓	[60]
Meconium staining	↓	[60]
Assisted Ventilation	↓	[60]
Assisted ventilation >6 h,	Similar	[60]
Neonatal seizures	Similar	[60]
Birth injury rates	Similar	[60]
Other:		
Water birth	↑	[26,28,35]
Antepartum hospital admission rates	Similar	[58]
	↓	[35]
Use of intravenous fluids in labor	↓	[58]
Intake of food and drink in labor	↑	[58]
Breastfeeding rates	↑	[35,53]
Breastfeeding rate at 6 weeks	↑	[59]
Incidence of maternal infection or need for antibiotics after birth	Similar	[58]
Delivery on weekend	↑	[5]
Full-term delivery	↑	[5]
Upright position for birth	Similar, ↑ M	[26]
	↑	[35]
Prolonged and precipitous labors	↑	[60]

Contd...

Table 1: Contd...

Outcomes	FMU* vs. OU**	Source
Chorioamnionitis	↓	[60]
Active management of the third stage	↓	[53-54]
VBAC*****	↑	[5]

*Freestanding midwife-led units, **Obstetrical unit, ***Multipara, ****Neonatal intensive care unit, *****Vaginal birth after a cesarean; ↑: Higher incidence at FMU; ↓: Lower incidence at FMUs

Table 2: Risk factors for intrapartum transfer

Risk factor	Source
Nulliparity	[32,63]
Maternal age >35 years	[32,63]
Lack of partner	[32]
Cervical dilation <3 cm on admission to the birth center	[32]
Between 5 and 12 antenatal appointments at the birth center	[32]
The onset of labor care after 40 weeks of gestation	[63]
Complications at the onset of labor	[63]
Multiparous women with a previous cesarean	[34]
A history of previous hospital delivery without cesarean	[34]

to our knowledge, none of the published studies addressed the problem of midwifery education in this setting. Lack of time pressure without artificial acceleration of physiological labor would provide an opportunity for future midwives to familiarize themselves with intrinsic (endocrine) control of this process. However, it should be remembered that women who decided to give birth to an FMU expect privacy without the presence of too many healthcare professionals, not mentioning students.

Another important aspect that needs to be explored is to work at an FMU and human resource management from the perspective of a midwife. The results of previous studies in this matter are inconclusive. Midwives employed at FMUs have freedom and independence at work and when making decisions, which provides them with a sense of creativity and autonomy.[64,65] According to McCourt *et al*., FMU represents a 'protected space' that 'has a function for midwives as well as for birthing women'.[18] Hunter demonstrated that midwives working at an FMU considered their job as more emotionally-balanced.[52] Although many previous studies compared to stress, job burnout, and satisfaction of a caseload or midwife-led and traditional approach, to the best of our knowledge, none of the authors analyzed satisfaction scores in midwives from FMUs, AMUs, and obstetrical departments. Furthermore, FMUs should be considered from a perspective of decades of midwives' efforts to maintain their autonomy, recognition and professional identity during physiological labor, and in the context of women's ability to deliver babies without medical assistance.[18] Another important aspect is a cooperation between FMUs and hospitals, and its role in the facilitation of intrapartum transfers and strengthening the sense of professional safety and confidence in midwives working in a community setting. The strength of our work was a broad perspective, considering different perspectives. A constraint on the research was the failure to include studies in a language other than English. Our review was limited by practical and theoretical papers that were in English only.

Conclusion

FMUs differ from traditional obstetrical units in terms of the structure of employed personnel, procedures, use of medical interventions, instrumental, or surgical deliveries. FMUs offers a home-like environment and complex midwifery support for women with uncomplicated pregnancies. Although emergency equipment is available as needed, FMU birth is considered a natural spontaneous process. Midwives' supervision over low-risk labors may provide many benefits, primarily related to lower medicalization, and fewer medical interventions than in a hospital setting.

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Conflicts of interest

Nothing to declare.

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