DANISH MEDICAL JOURNAL

Original Article

Creation of stakeholder value at a tertiary foetal medicine centre

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Dan Med J 2025;72(5):A11240830. doi: 10.61409/A11240830

ABSTRACT

INTRODUCTION. Little is known about how a tertiary foetal medicine unit creates value for its stakeholders. This study explored stakeholder perspectives to uncover nuances in value creation within a highly specialised unit.

METHODS. A cross-sectional exploratory survey was conducted at the Foetal Medicine Unit at Copenhagen University Hospital (Rigshospitalet), Denmark. Participants included patients, clinicians, referring hospitals, international partners and administrators. Questionnaires were designed by specialists, and data analysed using logistic regression and descriptive statistics.

RESULTS. The study surveyed patients (104, 64.2% response rate) and healthcare providers: internal (13/19, 63.2%), national (27/29, 93.1%), international (20/27, 74.1%) and administrators (5/11, 45.4%). Stakeholders emphasised the importance of specialised training. While patients accepted trainee involvement, most preferred certified specialists. Patients referred for pregnancy complications had significantly higher expectations of physician expertise than routine screenings (odds ratio = 2.58 (95% confidence interval: 1.13-5.88), p = 0.02). Key success metrics were patient outcomes, staff satisfaction and patient satisfaction.

CONCLUSIONS. Discrepancies were found between patients' acceptance of trainee involvement and their preference for certified specialists. Patients referred for complications had even higher expectations of physician expertise. Patient outcomes, patient satisfaction and staff satisfaction were consistently identified as the most important success indicators.

FUNDING. None.

TRIAL REGISTRATION. Not relevant.

Foetal medicine units vary significantly in size, case mix and organisation, from single-consultant clinics to extensive specialist teams. Small clinics often refer complex cases to larger hospitals, which may further refer to tertiary units for specialised procedures requiring a high volume to maintain competency. Tertiary referral units are crucial for training foetal medicine trainees by providing exposure to diverse foetal anomalies and invasive techniques [1, 2].

Despite their importance, little research has explored stakeholder needs and values [3, 4]. While patient care remains the primary focus, questions persist regarding how these units meet stakeholder expectations for training, specialised tasks and collaboration with referral hospitals. Additionally, as tertiary units often support the obstetric departments of their own hospital, defining expected services is essential.

Understanding the perspectives of various stakeholders is crucial for developing and implementing strategies to improve the quality of care, particularly when needs are changing [5]. Stakeholder theory posits that value perception varies among groups, such as patients and internal or external healthcare professionals [3, 4].

This study explores how a tertiary foetal medicine unit creates value for its stakeholders, including patients, clinicians referring patients to the unit from within and outside the hospital, international partners and administrators.

METHODS

This cross-sectional exploratory study used questionnaires to investigate how a tertiary foetal medicine unit created value for its stakeholders. The study was conducted at the Foetal Medicine Department of Rigshospitalet, Copenhagen, Denmark, between 6 May and 31 May 2024. All data were collected anonymously, with participants providing informed consent on the first page of the questionnaire.

Study setting

The Foetal Medicine Unit at Rigshospitalet, which forms part of the Department of Obstetrics, supports approximately 5,000 births annually [6], performs 17,500 ultrasound scans, conducts 100 invasive procedures and manages 100 complex cases requiring specialised examinations and interdisciplinary collaboration. As a referral centre, it handles cases from hospitals across Zealand, national cases such as foetal congenital heart disease or interventional procedures and complex monochorionic pregnancies, including twin-twin transfusion syndrome or selective intrauterine growth restriction from Norway. Additionally, the unit provides care for patients from the Faroe Islands, Greenland and Sweden.

Questionnaire development

A stepwise approach was adopted to develop the questionnaire to evaluate stakeholders' perceptions of value. First, relevant stakeholder groups were identified: patients, internal obstetricians, external stakeholders referring patients to the tertiary unit and hospital administration. Next, a panel of internal foetal medicine specialists, including experts in invasive procedures, congenital heart and brain anomalies and medical education, brainstormed themes and formulated questions. These were then piloted with midwives and obstetricians before the final questionnaire was created [7].

The questionnaires addressed themes related to training, expectations, treatment satisfaction, performance metrics, cooperation and diagnostic accessibility (SI, Tables S1, S2, S3). The questionnaire included multiple-choice answer options, a five-point Likert scale (construct-aligned response anchors), an importance rating scale (most important to least important, allowing multiple items to be marked as equally important), binary formats, and qualitative open-ended response items to gather detailed feedback.

Data collection

The aim was to include a broad range of patients and healthcare providers to ensure a representative sample. All pregnant women attending the clinic were invited to participate, and the principal investigator (JLP) distributed questionnaires in the waiting area. We included all maternal-foetal units in the Capital Region and Region Zealand that refer patients directly to the Copenhagen University Hospital (Rigshospitalet). Moreover, we included the tertiary referral hospitals in the Southern, Central and Northern Regions of Denmark. For international collaborators, we included all the international referring tertiary departments, including Norway (Trondheim, Tromsø, Bergen and Oslo), Sweden (Malmo), the Faroe Islands (Torshavn) and Greenland (Nuuk) (**Figure 1**). These were then contacted by email and invited to complete the questionnaires. Two reminders were

sent at one-week intervals. In total, the questionnaire was distributed to 162 pregnant women, 19 internal healthcare providers, 30 external national healthcare providers, 27 external international healthcare providers and 11 hospital administrators.

FIGURE 1 Map illustration of the distribution of healthcare providers included in the study: Copenhagen University Hospital (Rigshospitalet), Copenhagen (n = 13), Aarhus University Hospital (n = 8), Aalborg University Hospital (n = 3) Hvidovre Hospital (n = 2), North Zealand Hospital (n = 3), Herlev Hospital (n = 3), Odense University Hospital (n = 3), Zealand University Hospital, Roskilde (n = 2), Bornholm Hospital (1), Slagelse Hospital (1), and the National Hospital in the Faroe Island (n = 1) in Denmark. Oslo University Hospital (n = 10), St. Olavs Hospital, Trondheim (n = 5), Haukeland University Hospital, Bergen (n = 2), Skåne University Hospital, Lund (n = 1), and University Hospital of North Norway, Tromsø (n = 2) in Norway and Sweden.

Statistical analyses

A binary logistic regression was employed to analyse the relationship between patient expectations of physician and sonographer competencies (binary outcome) and patient-specific variables (binary predictor) without stepwise selection. Two-sided $p < 0.05$ were considered statistically significant. Stakeholder success parameters were compared by averaging the scores.

Open-ended qualitative responses were translated into English and coded using thematic analysis [8]. This method involved examining the responses to identify common themes and patterns, which were then analysed to draw conclusions.

Trial registration: not relevant.

RESULTS

A total of 104 patients responded to the survey, yielding a response rate of 64.2%, with 44.2% being nulliparous and 55.8% having given birth. Participants were evenly split between routine screenings (52.0%) and consultations with foetal medicine specialists (48.0%) (SI, Table S4).

Response rates for healthcare providers and administrators were 63.2% (internal, n = 12), 90.0% (national, n = 27), 74.1% (international, n = 20) and 45.5% (administrators, n = 5). Most internal providers were obstetricians (91.7%), while external providers were primarily foetal medicine specialists (92.6-95.0%) (SI, Table S5).

Patient and provider perspectives on trainee involvement

Trainee involvement was broadly supported by patients, with over 99% accepting the presence of trainees during scans and 90.8% approving of trainees performing scans under supervision. Despite this acceptance, 77.7% of patients expected sonographers to have completed formal training, such as the Fetal Medicine Foundation Program, and 52.7% preferred physicians to be experts in foetal medicine and specialists in the referred condition. Expectations were significantly higher among patients referred for complications such as anomalies or growth issues than for patients referred for routine screenings (odds ratio (OR) = 2.58 (95% confidence interval (CI): 1.13-5.88)), p = 0.02, **Table 1**). Patients emphasised both self-assessed competence and interprofessional consultation in their expectations for the competencies of the sonographer performing their scans. A total of 34.0% of patients stated that it was sufficient if the sonographer felt confident in their own skills, while 39.4% indicated that they did not need to be fully qualified as long as they consulted a colleague when uncertain.

TABLE 1 A binary logistic regression was used to assess the association between patient expectations of physician and sonographer competencies and patient-specific variables.

Patient expectations of healthcare professionals in foetal medicine	Patients	OR (95% CI)	p value
Booked for foetal medicine consultation			
"The physician should be an expert in foetal medicine and a specialist in the condition I was referred for"	Suspicion of disease	2.58 (1.13-5.88)	0.02
	Routine screening	Ref.	
	Nulliparous	0.74 (0.34-1.64)	0.46
	Multiparous	Ref.	
"It is okay if the physician is in training as long as a specialist is supervising them"	Suspicion of disease	0.88 (0.40-1.95)	0.76
	Routine screening	Ref.	
	Nulliparous	0.92 (0.42-2.03)	0.84
	Multiparous	Ref.	
Booked for screening with sonographer			
"The individual has completed the training programme required in Denmark"	Suspicion of disease	0.72 (0.30-1.73)	0.47
	Routine screening	Ref.	
	Nulliparous	1.72 (0.72-4.11)	0.22
	Multiparous	Ref.	
"They don't need to be fully qualified as long as they consult a colleague when in doubt"	Suspicion of disease	0.87 (0.38-1.97)	0.73
	Routine screening	Ref.	
	Nulliparous	1.18 (0.52-2.68)	0.69
	Multiparous	Ref.	
The individual feels competent to perform the task	Suspicion of disease	2.01 (0.84-4.77)	0.12
	Routine screening	Ref.	
	Nulliparous	0.48 (0.20-1.16)	0.10
	Multiparous	Ref.	

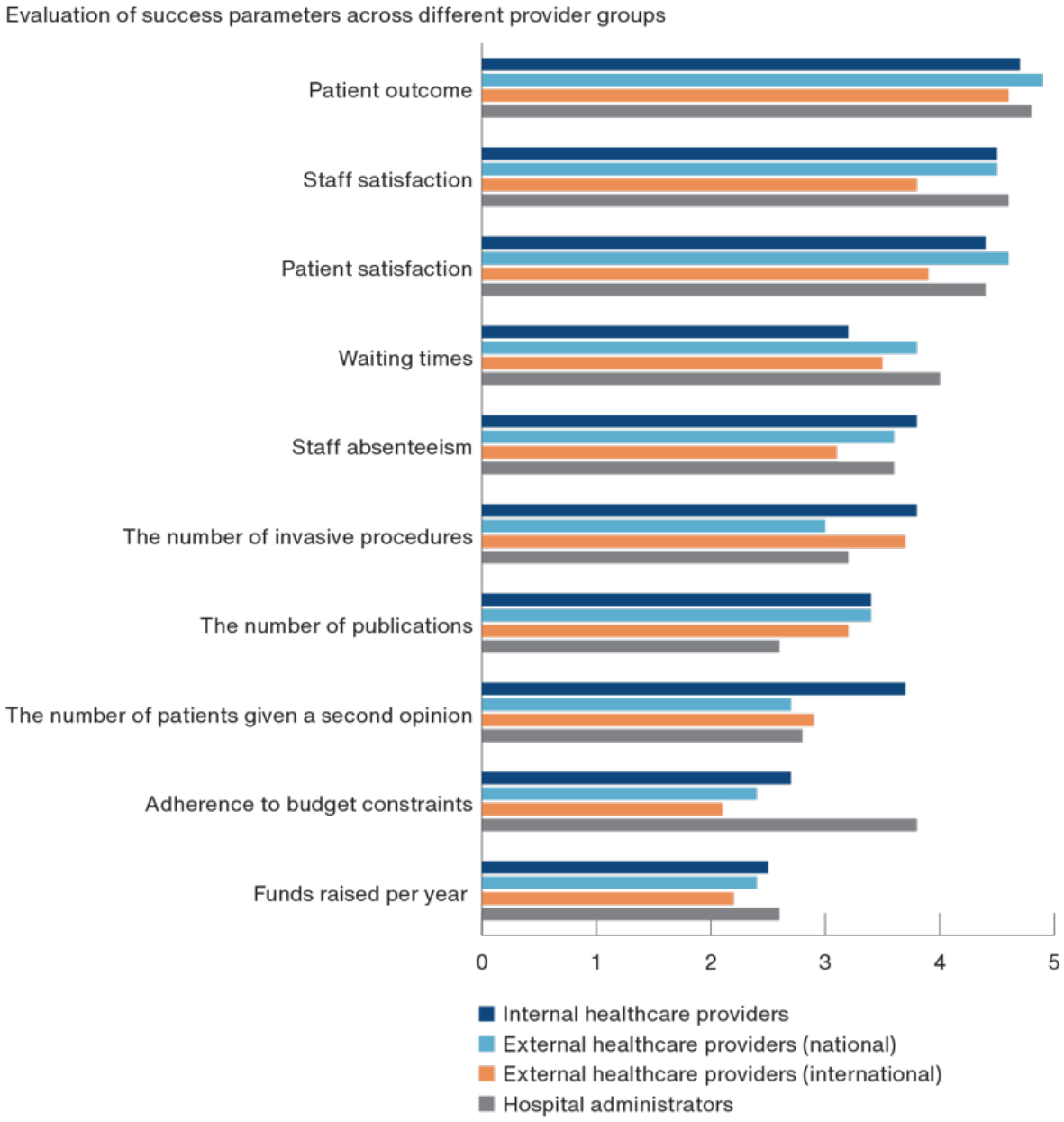
CI = confidence interval; OR = odds ratio.

From the provider perspective, trainee programmes at the Foetal Medicine Unit were highly valued, with 91.6% of internal, 84.6% of national and 68.4% of international providers emphasising their importance. However, barriers such as resource constraints and limited awareness of available trainee opportunities were also noted (SI, Table S6).

Performance metrics in foetal medicine

In assessing key success parameters, stakeholder groups consistently identified "patient outcomes", "staff satisfaction" and "patient satisfaction" as the most important, with average scores of 4.8 (95% CI: 4.55-4.91), 4.4 (95% CI: 4.06-4.44) and 4.3 (95% CI: 4.03-4.38), respectively, on a 1-5 scale (5 = most important, 1 = least important). In contrast, "funds raised per year" (2.7 (95% CI: 2.11-2.59)) and "adherence to budget constraints" (2.4 (95% CI: 2.17-2.71)) were deemed least important. Importantly, there was a consensus among all stakeholders regarding the importance and prioritisation of the listed parameters, as evidenced by the minimal variation in the average scores across the provider groups (**Figure 2**, SI, Table S7).

Figure 2 Histogram comparing mean scores of success parameters across stakeholders at the Foetal Medicine Unit (internal, external national and international healthcare providers, and hospital administrators). Scores range from 1 (lowest importance) to 5 (highest importance) (SI, Table S9).



Healthcare providers identified four key priorities for a tertiary foetal medicine unit: 1) Complicated invasive procedures, 2) Research at a high national and international level, 3) Highly specialised diagnostics and 4) Second opinion on complex cases. Internal providers highlighted the need for assistance with acute scans, while national external providers especially emphasised the training and education of foetal medicine specialists and sonographers (**Table 2**).

TABLE 2 Overview of tasks that stakeholders believe should be performed by the Foetal Medicine Unit. Tasks are presented in descending order based on their importance scores. The values are n[a] (%).

		External	
	Internal	national	international
Complicated invasive procedures	12 (100)	25 (96.2)	17 (100)
Research at a high national and international level	11 (91.7)	25 (96.2)	14 (82.4)
Highly specialised diagnostics	12 (100)	20 (76.9)	14 (82.4)
Second opinion on complex patients	12 (100)	20 (76.9)	12 (70.6)
Training and education of foetal medicine specialists and sonographers	9 (75.0)	22 (84.6)	11 (64.7)
Assistance with acute scans for the Obstetrics Department at Copenhagen University Hospital (Rigshospitalet)	10 (83.3)	9 (34.6)	6 (35.3)

a) The number of responses favouring the performance of each task within the Foetal Medicine Department.

Satisfaction with treatment and cooperation

Patient satisfaction was notably high, with 64.6% being very satisfied and 28.3% satisfied. They valued professionalism, a welcoming approach and feeling safe and well-informed. Additionally, 91.9% felt their concerns were thoroughly addressed, though extended waiting times were frequently mentioned as a recurring issue (SI, Table S8). Healthcare providers also expressed strong satisfaction, with 91.7% (internal), 92.3% (national external) and 100.0% (international) finding that the unit met expectations and resolved tasks effectively. Key strengths included communication, collaboration and service quality (SI, Table S9).

Accessibility of diagnostics and treatment

Most healthcare providers found diagnostics and interventional treatments at the foetal medicine unit very accessible (75.0-90.0%) or accessible (10.0-22.2%), with limited appointments, busy schedules and staff shortages noted as barriers (SI, Table S10).

DISCUSSION

This study examined the nuances of creating value at a specialised foetal medicine unit by gathering input from multiple stakeholders. The Foetal Medicine Unit is highly specialised, providing trainees with exposure to various foetal anomalies and invasive techniques. This exposure is crucial for trainees, allowing them to observe, diagnose and treat rare and complex conditions under the guidance of experienced professionals [2].

However, patients' acceptance of trainees performing scans under supervision remained inconsistent with their expectations regarding healthcare provider competencies. While patients support trainee involvement, they still expect certified specialists to perform examinations, creating a challenge for hands-on and supervised training in healthcare education [9-11]. Improving transparency about who performs scans and ensuring that a supervising specialist is present can balance patient expectations with trainee education, fostering trust and an effective learning environment.

Surprisingly, the patients emphasised clinicians' self-assessment of competence, which is known to have little or no correlation with actual competence from multiple previous studies [12, 13]. Cognitive biases cause individuals

to overestimate their abilities and believe that they have accurate self-insight, resulting in inaccurate self-assessments. In terms of quality of care, failure to appreciate the limits of one's abilities is considered a threat [12-14].

Healthcare providers highlighted the importance of trainee programmes, aligning with previous studies [15]. However, access is limited by scheduling, resources and institutional constraints. Assessing value in a tertiary foetal medicine unit requires defining its essential functions and success criteria. Stakeholders identified four key tasks: complex invasive procedures, high-level research, specialised diagnostics and second opinions on complex cases, aligning with prior studies [16, 17]. Additionally, they prioritised patient outcomes, patient satisfaction and staff satisfaction as key success parameters. These findings highlight the importance of patient- and staff-centered metrics in assessing success.

This study highlights an effective method for prioritising tasks aligned with patient and provider values, especially in tertiary units with diverse stakeholders. A consensus favoured patient and staff satisfaction over economic goals, signalling a focus on quality care. However, "adherence to budget constraints" revealed disagreement, with administrators prioritising it significantly higher than others, posing challenges in balancing budgets with stakeholder expectations.

This study has some limitations to consider when interpreting the findings. First, the small sample size, especially among hospital administrators, limits the ability to generalise results. Additionally, a lower response rate was observed among hospital administrators, which reduces the generalisability of their feedback. Second, despite good overall response rates, non-response bias remains a concern, as non-responders may have different perspectives that could influence findings on patient acceptance of trainee involvement, expectations and satisfaction. Third, while efforts were made to ensure a broad and representative sample, selection bias remains a potential limitation, particularly regarding external healthcare personnel. Finally, the survey design, created by internal specialists, may have excluded external perspectives, and the lack of pilot testing with patients may potentially have impacted the clarity and precision of questions for this group.

CONCLUSIONS

The value of a tertiary foetal medicine unit is influenced by various factors. Patients generally accept trainee involvement but prefer certified specialists, particularly in complex pregnancies. Balancing training needs against meeting patient expectations is therefore essential to maintaining high-quality care. Stakeholders consistently prioritised patient outcomes and staff- and patient satisfaction as the most important parameters, reflecting a shared focus on fundamental services that enhance the unit's overall value.

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Accepted 18 March 2025

Published 9 April 2025

Conflicts of interest OBP reports financial support from or interest in the Novo Nordisk Foundation. LNN reports financial support from or interest in the Danish Health Authority, Danish Society Fetal Medicine and Patienterstatningen. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. These are available together with the article at ugeskriftet.dk/dmj

References can be found with the article at ugeskriftet.dk/dmj

Cite this as Dan Med J 2025;72(5):A11240830

doi 10.61409/A11240830

Supplementary material: https://content.ugeskriftet.dk/sites/default/files/2025-03/a11240830-supplementary.pdf

REFERENCES

1. Fetal Medicine Foundation. FMF fellowships. Fetal Medicine Foundation, 2024
2. ISUOG Education Committee recommendations for basic training in obstetric and gynecological ultrasound. Ultrasound Obstet Gynecol. 2014;43(1):113-6. https://doi.org/10.1002/uog.13208
3. Friedman AL, Miles S. Developing stakeholder theory. J Man Stud. 2002;39(1)1-21. https://doi.org/10.1111/1467-6486.00280
4. Miller S, Liao LM, Warner D et al. Service users and care providers' experiences of tertiary combined fetal medicine clinics. Prenat Diagn. 2012;32(9):864-8. https://doi.org/10.1002/pd.3922
5. Rana A, Sharma KA, Dadhwal V. Restructuring fetal medicine services in a low-resource setting during the COVID-19 pandemic: experience from a tertiary care fetal medicine center. Int J Gynaecol Obstet. 2020;151(2):291-3. https://doi.org/10.1002/ijgo.13337
6. Rigshospitalet. Nøgletal. Rigshospitalet, 2023. www.rigshospitalet.dk/om-hospitalet/organisation/Sider/noegletal.aspx (Mar 2025)
7. Artino AR Jr, La Rochelle JS, Dezeee KJ et al. Developing questionnaires for educational research: AMEE Guide No. 87. Med Teach. 2014;36(6):463-74. https://doi.org/10.3109/0142159X.2014.889814.
8. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77-101.
9. Nizard J, Duyme M, Ville Y. Teaching ultrasound-guided invasive procedures in fetal medicine: learning curves with and without an electronic guidance system. Ultrasound Obstet Gynecol. 2002;19(3):274-7. https://doi.org/10.1046/j.1469-0705.2002.00647.x
10. Evans MI. Teaching new procedures. Ultrasound Obstet Gynecol. 2002;19(5):436-7. https://doi.org/10.1046/j.1469-0705.2002.00715.x
11. Pittini R, Oepkes D, Macrury K et al. Teaching invasive perinatal procedures: assessment of a high fidelity simulator-based curriculum. Ultrasound Obstet Gynecol. 2002;19(5):478-83. https://doi.org/10.1046/j.1469-0705.2002.00701.x
12. Hodges B. The question of competence: reconsidering medical education in the twenty-first century. Medicine, Education, 2014. https://doi.org/10.7591/9780801465802
13. Eva KW. Quality improvement as a statement of values. Med Educ. 2023;57(1):2-3. https://doi.org/10.1111/medu.14972.
14. Eva KW, Regehr G. Effective feedback for maintenance of competence: from data delivery to trusting dialogues. CMAJ. 2013;185(6):463-4. https://doi.org/10.1503/cmaj.121772
15. Goncalves LF. Re: Which factors are associated with trainees' confidence in performing obstetric and gynecological ultrasound examinations? M. G. Tolsgaard, M. B. Rasmussen, C. Tappert, M. Sundler, J. L. Sorensen, B. Ottesen, C. Ringsted and A. Tabor. Ultrasound Obstet Gynecol 2014; 43: 444-51. Ultrasound Obstet Gynecol. 2014;43(4):363-4. https://doi.org/10.1002/uog.13342.
16. Ayawine A, Asaarik MJA, Atinga RA. Stakeholder opinions on perceived sub-standard emergency obstetric and newborn care in Ghana. BMC Health Serv Res. 2024;24(1):461. https://doi.org/10.1186/s12913-024-10936-x
17. Tuncalp &;, Were WM, MacLennan C et al. Quality of care for pregnant women and newborns - the WHO vision. BJOG. 2015;122(8):1045-9. https://doi.org/10.1111/1471-0528.13451