

Utilisation of maternal healthcare services and influencing factors in public health facilities in Addis Ababa, Ethiopia



Authors:

Sintayehu A. Temesgen^{1,2,3}
Thinavhuyo R. Netangaheni¹

Affiliations:

¹Department of Health Studies, College of Human Sciences, University of South Africa, Pretoria, South Africa

²Ethiopian Public Health Institute, Addis Ababa, Ethiopia

³The African Center for Early Childhood Development, Addis Ababa, Ethiopia

Corresponding author:

Sintayehu Temesgen,
sintayehuabat@yahoo.com

Dates:

Received: 08 Apr. 2024
Accepted: 07 Aug. 2024
Published: 09 Oct. 2024

How to cite this article:

Temesgen, S.A. & Netangaheni, T.R., 2024, 'Utilisation of maternal healthcare services and influencing factors in public health facilities in Addis Ababa, Ethiopia', *Health SA Gesondheid* 29(0), a2694. <https://doi.org/10.4102/hsag.v29i0.2694>

Copyright:

© 2024. The Authors.
Licensee: AOSIS. This work is licensed under the Creative Commons Attribution License.

Read online:



Scan this QR code with your smart phone or mobile device to read online.

Background: Ethiopian maternal mortality remains high, despite the implementation of extensive health programmes. This indicates that the full potential of maternal health services is not being effectively utilised.

Aim: This study aimed to evaluate the utilisation and factors influencing maternal healthcare services in public health facilities in Addis Ababa.

Setting: This study was conducted in five public hospitals and 10 public health centres of Addis Ababa city administration from 31st August 2023 to 13th October 2023.

Methods: The study's design utilised a cross-sectional quantitative technique, which involved interviewing 354 women from each group who received visits throughout their pregnancy, delivery and postpartum period. The data were analysed using SPSS version 26.

Results: This study analysed maternal health service utilisation indicators, revealing a 70.8% overall utilisation of services, with antenatal care (ANC) at 85.5%, delivery at 71.58% and family planning services (PNC) at 55.4%. The study found that the length of time spent travelling to public health facilities significantly impacts the use of maternal health services. Pregnant women who travelled less than 30 min used services 2.29 times more than those over 2 h. The average client wait time also influenced service usage. Pregnant women with four or more prenatal care visits were more likely to use services.

Conclusion: The study conducted in Addis Ababa's capital city revealed that the utilisation of maternity health care services is not optimal, despite the concentrated resources.

Contribution: The findings of the study could be beneficial for the Addis Ababa Health Bureau, Ministry of Health, legislators, and other stakeholders. It can help in the development of affordable intervention programmes, filling knowledge gaps and updating scientific understanding.

Keywords: antenatal care; delivery service; Addis Ababa Ethiopia; maternal health; postnatal care; public health facilities; utilisation.

Introduction

Utilisation of maternal health services

Ethiopia's public healthcare system is organised into three tiers: The primary healthcare unit (PHCU) is the first tier. This is the district health system, or level one, which consists of a primary hospital and health centres along with satellite health posts. Health extension workers (HEWs) are responsible for the staffing and management of health posts, where they provide a specific and limited range of services. General hospitals are categorised as level two, representing secondary healthcare units. On the other hand, comprehensive referral hospitals are classified as level three, representing tertiary healthcare units (FMoH 2014). Every woman in Ethiopia has free access to maternity care at all three levels of the healthcare system (FMoH 2021). Blood transfusions and caesarean sections are among the complementary procedures offered (FMoH 2021).

A holistic approach to care during pregnancy, childbirth and postnatal periods is crucial for improving maternal health and preventing maternal mortality (Bhandari, Sarma & Kutty 2015). Maternal health service utilisation is a significant public health challenge, particularly among marginalised populations (Nuryana, Viwattanakulvanid & Romadlona 2022; Zhao et al. 2020). Antenatal coverage, institutional delivery and postnatal coverage should be considered to assess

health services utilisation (Kumar & Reshmi 2022). Factors such as women's characteristics, environmental situations and healthcare system accessibility contribute to the use of maternal health care (Erickson et al. 2021; Mweemba et al. 2021; WHO 2016). Figure 1 shows the determinant factors that affect the utilisation of maternal healthcare services.

In Ethiopia, the high rates of maternal mortality and morbidity are linked with inadequate access, poor quality and low utilisation rate of healthcare services (Tarekegn, Lieberman & Giedraitis 2014:2). Limited information exists regarding the utilisation of maternal healthcare services, despite the fact that doing so can offer chances for the early detection of health issues affecting mothers (WHO 2019:5, 2021:1).

Ethiopia has one of the highest maternal and infant mortality rates globally and this is largely because of the low utilisation of modern healthcare services by a significant proportion of women. Studies show that only 25% of Ethiopian women receive antenatal care and less than 10% receive professionally assisted delivery care. In Ethiopia, the number of pregnant women who did not receive antenatal care from a qualified practitioner was 76.4% (Seboka, Mamo & Mekonnen 2022). Despite the fact that maternal healthcare utilisation is essential for further improvement of maternal and child health, little is known about the current magnitude of use and factors influencing the use of these services in Addis Ababa. This study aimed to assess the utilisation of maternal healthcare services in Addis Ababa and identify factors influencing their use, focussing on women attending ANC, giving birth and visiting postnatal care services (PNC).

Research methods and design

Study design

This observational analytical study design involving cross-sectional sampling was carried out at the health facility level to collect quantitative data from the target health facilities and study participants.

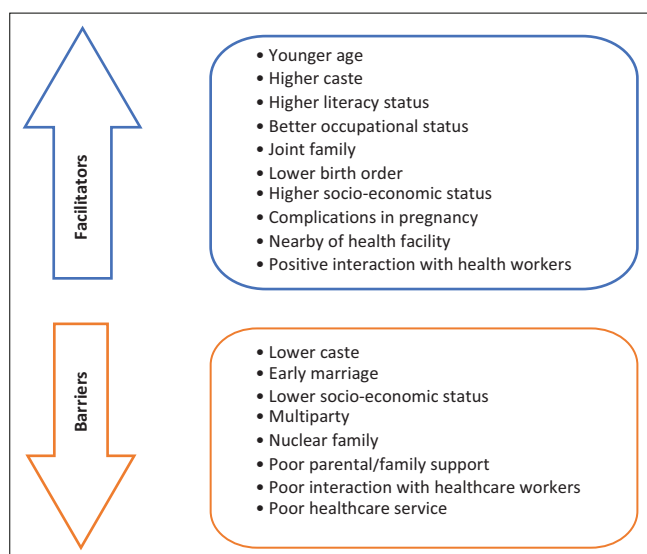


FIGURE 1: Schematic presentation of factors that determine maternal healthcare service utilisation.

Setting

This study was conducted across the 11 sub-cities of Addis Ababa, the capital city of Ethiopia from 31st August 2023 to 13th October 2023. The city has an estimated area of 526.99 square kilometres, an estimated 3854863 total population (consisting of 1389817 male and 1527478 female) and an estimated density of 5535.8 people per square kilometre. Administratively, the city is subdivided into 11 sub-cities and 120 districts. Almost 100% of the population were urban dwellers (CSA 2017:34). There are 13 public hospitals (of which 7 are under the Federal Government), 97 health centres, 42 private hospitals, 1389 private different-level clinics (primary, medium, and speciality clinics and speciality centres (FMoH 2023:21).

Study population and sampling strategy

The survey included respondents from five public hospitals and a representative sample of 10 health centres using probability sampling of simple random sampling. To randomly select the facilities, the lottery method was used whereby two boxes containing: (1) cards with names of public hospitals and (2) cards with names of health centres were used for drawing names of places. The researcher randomly picked five cards from the hospital boxes and 10 cards from the health centre boxes, thus ensuring each facility has an equal chance of selection. The reason for the selection of these health facilities was to ensure adequate representation of the quantitative samples from the hospitals and health centres.

For the exit interview, the largest and equal number of 354 mothers sample size was taken from each group of women who attended ANC, birth and PNC, even though separate samples were calculated for each attendance group. The sample size was computed using the prevalence (proportion) formula. To enhance the reliability of the sample and to capture enhanced odds of outliers, this study took the largest sample (see Equation 1 and Equation 2):

$$n(\text{ANC / Delivery / PNC}) = \frac{Z_{\alpha/2} (P(1-P))}{d^2} \quad [\text{Eqn 1}]$$

$$n(\text{ANC / Delivery / PNC}) = \frac{(1.96)^2 (0.7)(0.3)}{(0.05)^2} = 323 \quad [\text{Eqn 2}]$$

By adding a 10% non-response rate (32), the sample size will become 354 mothers on ANC.

Where P is service utilisation at the National level of Ethiopia (70% for antenatal care [ANC] [FMoH 2021a:21], 26.2% for delivery [Ketemaw et al. 2020] and $P = 85\%$ [FMoH 2021a:31]). Non-response rate of 10% was added for each initial sample.

The survey involved respondents from 5 public hospitals and 10 health centres using probability sampling of simple random sampling. The lottery method was used to randomly select facilities, ensuring equal representation of samples. To randomly select the facilities the lottery method was used whereby two boxes containing: (1) cards with names of public hospitals and (2) cards with names of health centres

will be used for drawing names of places. The researcher will randomly pick five cards from the hospital boxes and 10 cards from the health facilities boxes, thus ensuring an equal chance of selection and adequate representation of the samples from the health facilities. The study recruited participants from public health facilities in each sub-city, based on the total number of maternal healthcare service users within 3 months. Systematic random sampling techniques were used to select participants from each selected facility, with the first subject chosen at random. The random starting number was used for retrieving maternal records. Each selected health facility shared the required number of clients in Probability proportional to size (PPS) allocation by using the list from the registration books as a sampling frame and then selected the required number of participants by systematic random sampling technique.

Data collection

The well-structured survey questionnaire, adapted from previous studies (WHO 2001:208), MEASURE DHS project (EPHI & ICF 2021:207; WHO 2015:97) was translated into local and English versions by language experts to maintain consistency in ideas. The data were collected by 25 data collectors, including Obstetrics and Gynecology residents and Senior Midwives working for the recruited health facilities and supervised by a midwifery background public health expert.

Data analysis

The study used SPSS version 26 for data analysis, with descriptive analysis producing tables and cross-tabulations for complex data. Mean or median were used to describe variables. The Shapiro–Wilk test was used to evaluate data normality. Linear regression was used to determine mean change in dependent variables.

Validity and reliability

To ensure the accuracy of the results, the authors made modifications to a questionnaire that had been used before and used it in this investigation (WHO 2001:208). The questionnaire was originally developed by the MEASURE DHS project (EPHI & ICF 2021:207; WHO 2015:97). The pilot study was conducted to ensure the reliability of the data collection instrument and determine what relevant data could be obtained from the participants. This was accomplished by using an interview guide and questionnaire, and consistently obtaining the same answers from the participants' responses over time.

Ethical considerations

Both the Ethiopian Public Health Institute (protocol number EPHI-IRB-527-2023) and the University of South Africa's College of Human Sciences (ethics clearance reference number: 10347143_CRECHS_2023) have granted ethical approval for the study. Upon obtaining ethical permission, all study activities were conducted in accordance with

established research standards. The study adhered to three ethical principles: beneficence, justice and respect for persons. Permission letters were obtained from the city administration health bureau, hospitals and health centres. The questionnaire was designed to ensure participant anonymity and the privacy of their information during data collection. Furthermore, additional security measures were implemented to protect participant information, as the data were gathered using Open Data Kits (ODKs).

Results

Socio-demographic characteristics of exit-interview participants

The study involved 354 women who received ANC, delivery care and PNC, with a 100% response rate. As indicated in Table 1, the majority (85.9%) of the respondents' age were between 20 years and 34 years. Just 11.3% of the population was over 40 years old, and the remaining 2.8%, were in the 15–19-year age range. The exit-interview respondents were divided into pregnant, woman who gave birth and postpartum women. The respondents were urban dwellers, residing in the capital city of the country. First-time mothers constituted 25.1% of the sample, while 45.8% had one to three childbirths. More than half (55.1%) of participants had a diploma or higher, while 7% had no formal education. The study revealed that 76.7% of respondents were Orthodox Tawhido Christians, 75.1% were married and 63.3% spent less than 30 min to reach health facilities. Women's wealth distribution varied, with 12.7% falling into the lowest quartile and 30.8% falling into the highest (Table 1).

TABLE 1: Socio-demographic characteristics of exit-interview participants to assess maternal healthcare services in public health facilities of Addis Ababa, Ethiopia, January 2024 (*N* = 1062).

| Variables | Category | Frequency | Percentage |
|--------------------------------|-----------------------------------|-----------|------------|
| Age (years) | 15–19 | 30 | 3.0 |
| | 20–34 | 912 | 86.0 |
| | 35–49 | 120 | 11.0 |
| Total | - | 1062 | 100.0 |
| Educational background | No formal education | 72 | 7.0 |
| | Elementary, junior or high school | 405 | 39.0 |
| | Diploma and above | 585 | 55.0 |
| Total | - | 1062 | 100.0 |
| Marital status | Single (unmarried) | 93 | 9.0 |
| | Married | 798 | 75.0 |
| | Divorced | 114 | 11.0 |
| | Widowed | 192 | 18.0 |
| | Separated | - | - |
| Total | - | 1062 | 100.0 |
| Number of children | No children | 267 | 25.0 |
| | 1–3 | 486 | 46.0 |
| | > 3 | 309 | 29.0 |
| Total | - | 1062 | 100.0 |
| Monthly household income (ETB) | ≤ 3000 | 453 | 13.0 |
| | 3001–6000 | 330 | 31.0 |
| | 6001–9000 | 270 | 25.0 |
| | > 9000 | 327 | 31.0 |
| Total | - | 1062 | 100.0 |

Utilisation of maternal healthcare services

This study analysed maternal health service utilisation indicators, revealing a 70.8% overall utilisation of services, with ANC at 85.5%, delivery at 71.58% and PNC at 55.4%. In the health facilities, there was a noticeable variation in the use of all three services (ANC, institutional delivery and PNC). The utilisation of all three services was comparatively high at the public health centres. Women who had at least four ANC visits from public health centres constituted more than two-thirds (67.4%) of the sample. Of the women who gave birth in health facilities, 72% gave birth at public health centres. The majority of women who utilised PNC services did so from public hospitals. Of the women who attended ANC, 91% gave birth in the health facilities.

Utilisation of maternal healthcare services among pregnant women

Using the three ANC service adequacy indicators – the timing of the first visit, the frequency of visits and ANC service items – this study evaluated the extent and determinants of sufficient prenatal care service utilisation among the mothers in public health facilities of Addis Ababa. Acknowledging pregnancy concerns and managing birth issues are closely related to the number and timing of antenatal visits and the prescribed service items obtained during antenatal appointments.

The types of maternal healthcare services that clients used, the number of ANC visits and the proportion of clients who experienced pregnancy-related problems while undergoing care in Addis Ababa's public health facilities are all shown in Table 2. Of the 354 pregnant mothers who attended ANC visits, 272 (76.8%) had four or more visits. Almost all (99.7%) women who sought maternal health services had a physical examination, and 92.9% received an ultrasound checkup. Nearly one-third, 110 (31.1%) of pregnant women who visited health facilities were found to have pregnancy-related complications, and 104 (94.6%) of them were referred to another hospital for further treatment (Table 2).

Maternal healthcare services utilised by women who have given birth

A total of 354 women who attended ANC all received medical care from skilled providers, according to the findings of the exit interview with maternity care consumers. Midwives attended to more than two-thirds (68.1%) of the deliveries; doctors and nurses assisted with the remaining 28.8% and 3.1% of births, respectively. Just about 8 out of 10 (82.5%) respondents reported that they were completely satisfied with the care they received from the skilled birth attendants. Table 3 shows that, of the 62 women who expressed dissatisfaction with their care, 30.6% cited uncertainty of professionals' skill, 24.2% noticed lengthy waiting time and 16.1% revealed unanticipated negative outcomes for women or newborns. Moreover, 14.5% cited disregard of professionalism by health personnel, 12.9% mentioned the high ultrasound costs and 11.3% cited a lack of infrastructure as reasons for their discontent (Table 3).

TABLE 2: Utilisation of maternal health care services among pregnant women who visited public health facilities in Addis Ababa, Ethiopia, January 2024 (*N* = 354).

| Variables | Category | Frequency | Percentage |
|--|--|-----------|------------|
| Did you receive medical care during your pregnancy at the public health facility? | Yes | 354 | 100.0 |
| | No | 0 | 0.0 |
| | Total | 354 | 354.0 |
| How many times did you visit the clinic during your pregnancy? | 1 to 3 visits | 82 | 23.0 |
| | More than 3 visits | 272 | 77.0 |
| | Total | 354 | 100.0 |
| What health services did you receive when you visited the clinic during your pregnancy? (multiple responses) | Physical examination | 353 | 100.0 |
| | Gynaecological examination | 270 | 76.0 |
| | Ultrasound | 329 | 93.0 |
| | HIV/STD testing | 325 | 92.0 |
| | Blood tests | 320 | 90.0 |
| | Nutritional supplements | 236 | 67.0 |
| | Tetanus vaccine | 328 | 93.0 |
| | Average of the availability of the listed services | - | 87.0 |
| Were any complications detected during your pregnancy? | Yes | 110 | 31.0 |
| | No | 244 | 70.0 |
| | Total | 354 | 100.0 |
| Were you referred to another hospital for treatment of these complications? | Yes | 104 | 95.0 |
| | No | 6 | 5.0 |
| | Total | 110 | 100.0 |

Note: Overall utilisation of ANC services = 85.0.
ANC, antenatal care.

Utilisation of postpartum maternal healthcare services by women

As shown in Table 4, of the 354 women who gave birth in the health facilities, 311 (87.9%) received follow-up care. The overall utilisation rate of PNC among women who gave birth was 55.4%. Eighteen percent (18%) of the PNC-received women made more than two visits to the health facility following birth, compared to 82% who made one or two. The majority (95.5%) of the women who used services had a physical examination, 62.1% used contraceptives and just 29 (9.3%) had a blood test for anaemia (Table 4).

Factors affecting the utilisation of maternal healthcare services

The findings of a linear regression model's analysis of the statistical significance of the association between the utilisation of maternal health services and the majority of predictor factors are displayed in Table 5.

It was found that the duration of the journey to the public health facility significantly affected the utilisation of maternal healthcare. Pregnant women who travelled for less than 30 min used maternal healthcare 2.29 times as much as those who travelled for more than 2 h, according to the data (AOR = 2.29; 95%CI = 1.16–7.35).

The utilisation of maternal healthcare services is significantly influenced by the average client wait time, with those receiving care in less than half an hour having a 23.6-fold higher utilisation rate (AOR = 23.64; 95%CI = 4.11–46.13) than those who waited more than 2 h.

TABLE 3: Utilisation of delivery care services among women attending antenatal care at the public health facilities of Addis Ababa, Ethiopia, January 2024 (*N* = 354).

| Variables | Category | Frequency | Percentage |
|---|--------------------------------------|-----------|------------|
| During delivery, were you attended by a skilled birth attendant (doctor, nurse or midwife)? | Yes | 337 | 95.0 |
| | No | 27 | 5.0 |
| Total | - | 354 | 100.0 |
| Who were you attended by? | Doctor | 102 | 29.0 |
| | Nurse | 11 | 3.0 |
| | Midwife | 241 | 68.0 |
| Total | - | 354 | 100.0 |
| How satisfied were you with the care you received from the skilled birth attendant? | Completely satisfied | 292 | 82.0 |
| | Partially satisfied | 50 | 14.0 |
| | Neither satisfied nor dissatisfied | 3 | 1.0 |
| | Dissatisfied | 9 | 2.0 |
| Total | - | 354 | 100.0 |
| What were the reasons for your dissatisfaction? | Uncertainty on professionals' skill | 19 | 31.0 |
| | Waiting time | 15 | 24.0 |
| | Bad outcome(s) on baby and/or woman | 10 | 16.0 |
| | Disrespect professionals' approach | 9 | 14.0 |
| | Cost for Ultrasound | 8 | 13.0 |
| | Lack of infrastructures | 7 | 11.0 |
| | Discomfort with the waiting area | 6 | 10.0 |
| | Leading to unwanted Cesarean Section | 6 | 10.0 |
| | From the 62 dissatisfied women | - | - |
| Did you experience any complications during delivery? | Yes | 65 | 18.0 |
| | No | 289 | 82.0 |
| Total | - | 354 | 100.0 |
| Did the primary clinic provide emergency care for these complications? | Yes | 55 | 84.0 |
| | No | 10 | 14.0 |
| Total | - | 65 | 100.0 |
| Were you taken to a secondary hospital for emergency care? | Yes | 6 | 9.0 |
| | No | 59 | 91.0 |
| Total | - | 65 | 100.0 |

Note: Overall utilisation of delivery services -71.0.

TABLE 4: Utilisation of family planning services services among women who gave birth in public health facilities of Addis Ababa, Ethiopia, January 2024 (*N* = 354).

| Variables | Category | Frequency | Percentage |
|--|------------------------------|-----------|------------|
| Do you receive medical care after delivery? | Yes | 311 | 88.0 |
| | No | 43 | 12.0 |
| Total | - | 354 | 100.0 |
| How many times did you visit the health facility after delivery? | One to two visits | 254 | 82.0 |
| | More than two visits | 57 | 18.0 |
| Total | - | 311 | 100.0 |
| What health services did you receive when you visited the clinic after your delivery? (multiple responses) | Physical examination | 297 | 95.0 |
| | Counselling on breastfeeding | 203 | 65.0 |
| | Contraceptives | 193 | 62.0 |
| | Blood test for anaemia | 29 | 9.0 |
| | Nutritional supplements | 143 | 46.0 |
| | On warning signs of problems | 254 | 82.0 |
| Total | - | 60.0 | 60.0 |

Note: The average for every 311 women who received medical care after delivery = 55.0.

Pregnant women with four or more prenatal care visits are 4.86 times more likely to use maternity care services as compared to women who went no more than three times (AOR = 4.86; 95%CI = 4.11–12.83). Similarly, the utilisation of maternal health services was significantly associated with the physical examination services obtained during pregnancy,

TABLE 5: Factors affecting utilisation of maternal healthcare services among public health facilities of Addis Ababa, Ethiopia, January 2024.

| Variables | <i>n</i> | % | <i>p</i> | AOR | 95% CI |
|--|----------|------|----------|--------------|-------------------|
| Travel time to go to the public health facility | | | | | |
| Less than 30 min | 672 | 63.0 | 0.048 | 2.29 | 1.16–7.35 |
| 30 min to 1 h | 255 | 24.0 | - | 7.21 | 0.19–10.52 |
| 1 to 1½ h | 283 | 8.0 | - | 4.17 | 0.94–52.17 |
| 1½ to 2 h | 45 | 4.0 | - | 15.02 | 0.33–21.76 |
| More than 2 h | 6 | 0.6 | - | 1.00 | 1 |
| Average waiting time to see medical staff | | | | | |
| Less than 30 min | 612 | 58.0 | 0.013 | 23.64 | 4.11–46.13 |
| 30 min to 1 h | 288 | 27.0 | - | 0.92 | 0.39–5.13 |
| 1 to 1½ h | 111 | 10.0 | - | 4.58 | 0.14–7.60 |
| 1½ to 2 h | 36 | 3.0 | - | 12.92 | 0.15–32.72 |
| More than 2 h | 15 | 1.0 | - | 1.00 | 1 |
| Number of ANC visits | | | | | |
| 1 to 3 visits | 82 | 23.0 | - | 1.00 | 1 |
| More than 3 visits | 272 | 77.0 | 0.001 | 4.86 | 4.11–12.83 |
| Type of services received during pregnancy | | | | | |
| Physical examination | 297 | 95.0 | 0.023 | 21.09 | 6.15–38.53 |
| Counselling on breastfeeding | 203 | 65.0 | - | 11.92 | 0.75–44.81 |
| Contraceptives | 193 | 62.0 | - | 9.31 | 0.43–25.47 |
| Blood test for anaemia | 29 | 9.0 | - | 0.79 | 6.29–12.25 |
| Nutritional supplements | 143 | 46.0 | - | 31.97 | 0.12–53.68 |
| On warning signs of problems | 254 | 82.0 | - | 1.00 | 1 |
| Facing pregnancy complications | | | | | |
| Yes | 110 | 31.0 | 0.005 | 13.89 | 2.65–25.18 |
| No | 244 | 69.0 | - | 1.00 | 1 |
| Level of satisfaction with received care | | | | | |
| Completely satisfied | 292 | 82.0 | <0.05 | 4.50 | 2.57–12.09 |
| Partially satisfied | 50 | 14.0 | - | 1.48 | 0.073–6.27 |
| Neither satisfied nor dissatisfied | 3 | 1.0 | - | 5.02 | 0.46–31.65 |
| Dissatisfied | 9 | 2.0 | - | 1.00 | 1 |

Note: The bold values are only to indicate the significant association between explanatory variables and the outcome variable which can be adjusted to make them similar to others. AOR, adjusted odds ratio; 95% CI, 95% confidence interval; ANC, antenatal care.

the presence of pregnancy difficulties and the patient's degree of satisfaction with the care they received (Table 5).

The perception and desire of clients to receive the service have increased with the start of electronic records (ERs) registration for ANC and PNC. The majority of clients are content with their electronic maternal records. They get reminders for routine checkups, brief wait times, targeted visits, assistance from knowledgeable staff, courteous services, timely and consistent notifications, a well-equipped facility, on-site medication availability and information on risk reduction techniques (Addis Ababa Health Bureau annual report 2022/2023).

Discussion

Utilisation of maternal healthcare services

The study evaluated the utilisation of maternal health services using three indicators: prenatal care services throughout pregnancy, delivery care services during institutional delivery and PNC services within 42 days after delivery. The timing of the first visit, the number of visits and the ANC service items are the three ANC service adequacy indicators that were employed in this study to assess the extent and factors influencing women's utilisation of

adequate prenatal care services in Addis Ababa's public health facilities, focussing on identifying pregnancy hazards and managing delivery problems. As shown by these parameters, the overall utilisation of maternal health services was 70.8% (85.5% for ANC, 71.58% for delivery and 55.4% for PNC).

The overall utilisation of ANC services was 85.5%, which is higher than that of the studies carried out in Southern Ethiopia, which found that just 23.13% of the pregnant women utilised the available ANC services (Gebreselassie, Id & Wube 2021:1–10), Hawassa University (69.1%) (Shudura, Yoseph & Tamiso 2020:1) and Haryana, India (58.3%) (Chowdhury & Chakraborty 2021:2879). The observed differences in the extent of ANC utilisation across these studies could be attributed to variations in the study period and population, where sociocultural backgrounds and the opinions of impoverished communities regarding ANC use are evident and could impact ANC uptake.

Four antenatal visits are necessary in a focussed ANC programme in order to provide a mother and her infant with the necessary interventions and ensure their safety (Biadgo et al. 2021:1–10; Defar et al. 2020:1–9). Hence 86% of pregnant women who attended ANC visits had four or more visits which is higher than reported in Lucknow, India (37.8%) (Singh Dipti 2019:1–3) and Hawassa University (37.8%). A hospital referral was made for additional care for 94% of the pregnant mothers experiencing pregnancy-related problems. The research's differing temporal locations and the potential variations in safe parenting practices between countries (Singh et al. 2019) and across Ethiopia's regions (Gebreselassie et al. 2021) could be the cause of these discrepancies.

The utilisation of delivery care in this study is 71.5%, which is less than a study conducted in Southwest Ethiopia, 86.4% (Yoseph et al. 2020:4), but higher than the study findings of Dessie City, Northeast Ethiopia, which are 43.4% (Yalew et al. 2022:1). The results of this study indicate a coverage of 55.4% for PNC services. This percentage is somewhat higher than the pooled magnitude of PNC utilisation in sub-Saharan African nations (52.48%) (Tessema et al. 2020:5), but lower than the findings of another study conducted in Debreabor town, which reported a coverage of 57.5% (Wudineh et al. 2018:2). These disparities may arise from the fact that women who were well-informed had higher chances of being well-aware, having higher levels of knowledge and expertise in maternal health care, and having more access to these services. The introduction of ER registration for ANC and PNC might help women understand the importance of continued health professional visits for optimal care and safety, and to increase client satisfaction with their services.

Postpartum family planning services were used by 62.1% of the participants in this study. In relation to other research, this result is higher than the findings of studies conducted in Oromia region, 40.7% (Seifu, Yilma & Daba 2020:170), North Shoa zone, 21.3% (Silesh et al. 2022:4), rural Eastern Ethiopia, 18.4% (Mulatu et al. 2020:1) and Arba Minch town,

44% (Wassihun et al. 2021), but lower than the findings in Addis Ababa, 71.8% (Tafa & Worku 2021:6). The increased use of family planning in this finding could have several causes. A residential factor (living in an urban area) with better access compared to regions (CSA 2017:34) could be one of these, leading to a greater awareness among clients about their freedom and responsibility to choose the number, spacing and timing of their children; to improve the health of women and children by lowering the risks of unintended pregnancy, unsafe abortion, maternal and infant mortality; to engage in responsible sexual behaviour; and to reap socioeconomic benefits. It is possible that the different timeframes at which the investigations were conducted contributed to the difference from the earlier Addis Ababa findings.

The study's findings showed that, in certain public health institutions, the utilisation of ANC, delivery, PNC and postpartum family planning has consistently increased. Several variables have been identified as the cause of these increases, such as the expansion of services, the recruitment of additional healthcare professionals, the provision of round-the-clock emergency maternal healthcare and the provision of 24-h emergency care for mothers, and the division of work within the health facilities, as evidenced from the Addis Ababa Health Bureau report (Addis Ababa Health Bureau annual report 2022/2023).

Moreover, the implementation of ER in public hospitals and FANC has resulted in improvements to the acceptance, accessibility and utilisation of maternal health services, particularly ANC. The ANC registration feature and attendance at these hospitals had consistently increased when the ER and FANC technique was reemphasised. The records that are now available indicate a precise percentage rise per year for the last 2 years. As ER registration for ANC through PNC began, clients' perceptions of and desires for the service have grown. Most women are happy with their ER mother record, routine checkup reminders, short wait times, focussed visits, professional staff support, polite services, prompt and reliable notifications, a clean and well-equipped facility, access to on-site medication and education about risk reduction strategies.

Women in ANC and delivery in health facilities were encouraged to use PNC after giving birth, following FMOH National Guidelines for Family Planning Service. Many made appointments for PNC within a week, aligning with guidelines (FMOH Ethiopia 2020:1–74). Postpartum women, especially those with complications, prefer returning to the same health facility or advanced facilities, citing improved instruction and counselling during ANC.

To reduce the dangers of pregnancy, women want to know about the ANC phase, have access to routine exams and have skilled attendants to do prenatal checkups and births, based on the findings. Despite the inadequate quality of care they receive, mothers keep visiting the health institution to receive FP, ANC and PNC care. Most clients did not refuse to use maternal health

services, except for dissatisfaction with the standard of care. However, as the respondents reply, the majority of women would prefer to speak with a hospital attendant rather than the health centre's staff members because they lack trust in their abilities. The decisions of a client about where and how to receive maternal health services seem to be influenced by their family, place of residence and marital status.

In comparison, the public health centres had quite high usage of all three services. Approximately two-thirds (67.4%) of the users were women who had received at least four ANC visits from public health centres. Nearly 72% of the women who gave birth in health facilities during this time did so at public health centres. On the other hand, public hospitals provided PNC services to the great majority of women who used them. Ninety-nine per cent of the women who attended ANC gave delivery in health facilities. One possible explanation for this could be the proximity of health centres to clients' residences, reduced waiting times and low patient load.

According to this survey, public health facilities in Ethiopia provide official free maternity and neonatal health services; however, due to frequent shortages of drugs and supplies, clients were sometimes requested to procure missing items. Certainly, providing free maternity health care improves utilisation and accessibility (Nuamah et al. 2019:7). Nonetheless, the lack of knowledge among women about free maternal health services, particularly in underprivileged populations, has a negative effect on the use of health care.

This study also revealed the presence of clients' negative opinions regarding public health facilities, particularly maternity services. They did not even want to go to the hospitals because of the poor quality of certain facilities and services they received. The attitudes of the skilled attendants, the facilities, the students and other elements all contribute to their lack of interest in public health institutions.

Factors affecting utilisation of maternal healthcare services

Using a linear regression model, the statistical significance of the relationship between the utilisation of maternal health services and the most predictor factors was examined. It was discovered that the length of time spent travelling to the public health facility had a substantial impact on the utilisation of services related to maternal health.

The result (AOR = 2.29; 95% CI = 1.16–7.35) indicates that pregnant women who travelled for less than 30 min utilised maternal health services 2.29 times as much as those who went to the facility for more than 2 h. This study's findings are consistent with those of a study carried out in Ghana by Nuamah et al. (2019:7). Similar conclusions were also made in rural southern Ghana by (Manyeh et al. 2020:5). In Mogadishu, Somalia Ahmed and Husein (2020:1649) found that the utilisation of maternal health services was enhanced by shorter travel distances to health facilities. However, some research conducted in the globe (Galle et al. 2023:6), in

sub-Saharan Africa (Modisakeng et al. 2020:6) and in Arba Minch (Wassihun et al. 2021:5) did not identify any significant association between maternal health services and travel times to health facilities.

The utilisation rate was 23.6 times higher for pregnant women who received care in less than 30 min waiting hours (AOR = 23.64; 95%CI = 4.11–46.13) compared to those who waited longer than 2 h. This is consistent with research from another study carried out in Ethiopia (Bradley et al. 2021:226), India (Lefevre et al. 2019:11) and sub-Saharan Africa (Wigley et al. 2020:7; Kolleh et al. 2022). Women's waiting times were shortened, which led to a rise in the use of maternal health services, especially for women living in places where roads, geography and distance make it difficult to go to health facilities in a timely manner. However, the findings of studies conducted in Africa (Kolleh et al. 2022:7; Frank 2020:696) did not show any association. Nonetheless, research suggests that receiving care in private health facilities can lead to favourable outcomes, including reduced wait times and more provider time dedicated to mothers (Biadgo et al. 2021:8–10).

Compared to women who went less frequently or no more than three times, pregnant women who had four or more prenatal care visits were 4.86 times more likely to utilise maternity care services (AOR = 4.86; 95%CI = 4.11–12.83). Similarly, the utilisation of maternal health services was significantly correlated with the physical examination services obtained during pregnancy, the presence of pregnancy difficulties and the patient's degree of satisfaction with the care they received.

Strengths and limitations

Strengths

This study used various techniques for data collection, including ODK. Open Data Kit significantly enhances a study by providing robust data collection tools that work offline, ensuring data accuracy with built-in validation rules, and enabling real-time data analysis with its instant upload features once a connection is available. Using an instrument or data collection tool that has been previously validated could potentially be seen as a strength of this study. Also, because women participated in the study, it was possible to identify shared perspectives on the use of services, experiences and difficulties.

Limitations

Some limitations to the study are evident because not all components of basic maternal care services were assessed. In addition, the results might not apply to the entirety of Ethiopia because the study was limited to Addis Ababa.

Recommendations

Policymakers, health managers, healthcare institutions and healthcare providers should all play their specific roles in

order to improve the utilisation of maternal health services. Any developed strategies should be tailored to both service users and providers. In addition to establishing functional links between facilities and health systems, health managers should guarantee the integration, quality and accessibility of service-delivery packages. They also need to promote the application of evidence-based practices for PNC, ANC and intrapartum care. To improve maternal health services utilisation, health facilities should protect women's privacy, empower women, provide adequate medications and supplies, and enhance care continuity. Healthcare providers should also recognise pregnancy-related hazards and regularly monitor service provision and adherence to standards. Women should also be encouraged to take charge of their own healthcare, often with assistance from their families. Pregnancy-related risks, health behaviours, medications, preventive care and information should all be offered.

Conclusion

The study examined how mothers' use of perinatal care in Addis Ababa's public health facilities was impacted by service adequacy factors. It was shown that access to and utilisation of various maternal health services are frequently influenced by financial conditions, which results in unequal service provision at some health care facilities and providers. In comparison to delivery and PNC, ANC services are used more frequently. As the city is the nation's capital and the location of the majority of the nation's resources, even if the service utilisation finding appears to be greater than comparable findings from the regions, it is yet below ideal and expected levels.

Acknowledgements

The authors would like to express their gratitude to all the data collectors and supervisors. Additionally, the authors appreciate the valuable insights and information provided by the study participants during data collection in the field.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

S.A.T. and T.R.N. contributed to the conceptualisation of the study. T.R.N. contributed to the data collection, formal analysis, investigation, methodology and supervision. S.A.T. and T.R.N. contributed to the writing, review and editing of the article.

Funding information

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Data availability

Raw data were generated at Public health facilities of Addis Ababa. Derived data supporting the findings of this study are available from the corresponding author, S.A.T., on request.

Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. It does not necessarily reflect the official policy or position of any affiliated institution, funder, agency or that of the publisher. The authors are responsible for this article's results, findings and content.

References

- Addis Ababa Health Bureau, 2022/2023, *Annual Report of the Addis Ababa Health Bureau, 2022/23*, p. 124, Health Bureau of Addis Ababa City Administration, Addis Ababa.
- Ahmed, A.Y. & Husein, A.M., 2020, 'Utilization of primary health care and its associated factors among women of childbearing age living in Mogadishu-Somalia', *Health* 12(12), 1640–1652. <https://doi.org/10.4236/health.2020.1212120>
- Bhandari, T.R., Sarma, P.S. & Kutty, V.R., 2015, 'Utilization of maternal health care services in Ethiopia', *International Journal of Women's Health* 7(November 2002), 783–790. <https://doi.org/10.2147/IJWH.S90556>
- Biadgo, A., Legesse, A., Seifu, A.E., Singh, K., Mulissa, Z., Kiflie, A. et al., 2021, 'Quality of maternal and newborn health care in Ethiopia: A cross-sectional study', *BMC Health Services Research* 21(1), 1–10. <https://doi.org/10.1186/s12913-021-06680-1>
- Bradley, E., Thompson, F.W., Byam, P., Webster, T.R., Zerihun, A., Alpern, R. et al., 2021, 'Access and quality of rural healthcare: Ethiopian Millennium Rural Initiative', *International Journal for Quality in Health Care* 23(3), 222–230. <https://doi.org/10.1093/intqhc/mzr013>
- Chowdhury, S. & Chakraborty, P., 2021, 'A cross-sectional study to assess the utilization pattern of maternal health services and associated factors in aspirational district of Haryana, India', *Journal of Family Medicine and Primary Care* 10(8), 2879–2885. https://doi.org/10.4103/jfmpc.jfmpc_1762_20
- CSA, 2017, *Ethiopia Demographic and Health Survey 2017*, Central Statistical Agency of Ethiopia, Addis Ababa.
- Defar, A., Getachew, T., Taye, G., Tadele, T., Getnet, M., Shumet, T. et al., 2020, 'Quality antenatal care services delivery at health facilities of Ethiopia, assessment of the structure/input of care setting', *BMC Health Services Research* 20(485), 1–9. <https://doi.org/10.1186/s12913-020-05372-6>
- EPHI & ICF, 2021, *Ethiopia service provision assessment 2021–22 final report*, EPHI, MoH and ICF, Addis Ababa, Ethiopia, and Rockville, Maryland.
- Erickson, A.K., Abdalla, S., Serenska, A., Demeke, B., Darmstadt, G.L. et al., 2021, 'Association between maternity waiting home stay and obstetric outcomes in Yatebon, Ethiopia: A mixed-methods observational cohort study', *BMC Pregnancy and Childbirth* 21(1), 1–11. <https://doi.org/10.1186/s12884-021-03913-3>
- FMoH Ethiopia, 2020, *National guideline for family planning services in Ethiopia Third Edition*, pp. 1–74, Ethiopia's Federal Ministry of Health, Addis Ababa.
- Federal Ministry of Health-Ethiopia (FMoH), 2014, *Health Sector Transformation Plan II (HSTPII) (2010/11 - 2014/15)*, pp. 1–120, Addis Ababa, viewed n.d., from <http://faolex.fao.org/docs/pdf/eth186138.pdf>.
- Federal Ministry of Health-Ethiopia (FMoH), 2021, *Health Sector Transformation Plan II (HSTPII) 2020/21-2024/25*, pp. 1–113, Addis Ababa, viewed n.d., from https://extranet.who.int/countryplanningcycles/sites/default/files/public_file_rep/ETH_Ethiopia_Health-Sector-Transformation-Plan-II_2021-2026.pdf.
- Federal Ministry of Health (FMoH) Ethiopia, 2021a, *Special bulletin, Federal Ministry of Health, Ethiopia The twenty-Third Annual Review meeting of the Health Sector*, pp. 1–126, viewed 17 February 2023, from file:///C:/Users/user-pc/Downloads/Specialbulletin_FINAL.pdf.
- FMoH 2023, *Health health*, pp. 310–331, Ethiopia's Federal Ministry of Health, Addis Ababa.
- Frank, O., 2020, 'Maternal health outcome and economic growth in sub-Saharan Africa: A dynamic panel analysis', *International Journal of Economics and Management Engineering* 14(9), 696–704.
- Galle, A., Moran, A.C., Bonet, M., Graham, K., Muzigaba, M., Portela, A. et al., 2023, 'Measures to assess quality of postnatal care: A scoping review', *PLOS Global Public Health* 3(2), e0001384. <https://doi.org/10.1371/journal.pgph.0001384>
- Gebreselassie, L., Id, G. & Wube, T.B., 2021, 'Magnitude and determinants of adequate antenatal care service utilization among mothers in Southern Ethiopia', *PLoS One* 16(7), 1–19. <https://doi.org/10.1371/journal.pone.0251477>
- Ketemaw, A., Tareke, M., Dellie, E., Sitotaw, G., Deressa, Y., Tadesse, G. et al., 2020, 'Factors associated with institutional delivery in Ethiopia: A cross sectional study', *BMC Health Services Research* 20(1), 1–6. <https://doi.org/10.1186/s12913-020-05096-7>

- Kolleh, E.M., Bestman, P.L., Bajinka, O., Weamie, S.J.Y. & Luo, J., 2022, 'Maternal mortality and its risk factors in Africa: A systematic review and meta-analysis', *Archives of Clinical Obstetrics and Gynecology Research* 2(1), 1–12. <https://doi.org/10.33425/2768-0304.1007>
- Kumar, G. & Reshmi, S., 2022, 'Availability of public health facilities and utilization of maternal and child health services in districts of India', *Clinical Epidemiology and Global Health* 15, 101070. <https://doi.org/10.1016/j.cegh.2022.101070>
- Lefevre, A.E., Scott, K., Mohan, D., Shah, N., Bhatnagar, A., Labrique, A. et al., 2019, 'Development of a phone survey tool to measure respectful maternity care during pregnancy and childbirth in India: Study protocol', *JMIR Research Protocols* 8(4), p. 13. <https://doi.org/10.2196/12173>
- Manyeh, A.K., Amu, A., Williams, J. & Gyapong, M., 2020, 'Factors associated with the timing of antenatal clinic attendance among first-time mothers in rural southern Ghana', *BMC Pregnancy and Childbirth* 20(1), 1–7. <https://doi.org/10.1186/s12884-020-2738-0>
- Modisakeng, C., Matlala, M., Godman, B. & Catharina, J.M., 2020, 'Medicine shortages and challenges with the procurement process among public sector hospitals in South Africa; findings and implications', *BMC Health Services Research* 20(1), 1–10. <https://doi.org/10.1186/s12913-020-05080-1>
- Mulatu, T., Sintayehu, Y., Dessie, Y. & Dheresa, M., 2020, 'Modern family planning utilization and its associated factors among currently married women in rural Eastern Ethiopia: A community-based study', *BioMed Research International* 20, 234. <https://doi.org/https://doi.org/10.1155/2020/6096280>
- Mweemba, C., Mapulanga, M., Jacobs, C., Katowa-Mukwato, P. & Maimbolwa, M., 2021, 'Access barriers to maternal healthcare services in selected hard-to-reach areas of Zambia: A mixed methods design', *Pan African Medical Journal* 40(4), 1–13. <https://doi.org/10.11604/pamj.2021.40.4.28423>
- Nuamah, G.B., Agyei-Baffour, P., Mensah, K.A., Boateng, D., Quansah, D.Y., Dobin, D. et al., 2019, 'Access and utilization of maternal healthcare in a rural district in the forest belt of Ghana', *BMC Pregnancy and Childbirth* 19(1), 1–11. <https://doi.org/10.1186/s12884-018-2159-5>
- Nuryana, D., Viwattanakulvanid, P. & Romadlona, N.A., 2022, 'Maternal health services utilization and its contributing factors among adolescent mothers', *Journal of Public Health Science (JPHS)* 11(1), 77–87. <https://doi.org/10.11591/ijphs.v11i1.21041>
- Seboka, B.T., Mamo, T.T. & Mekonnen, T., 2022, 'Identifying geographical inequalities of maternal care utilization in Ethiopia: A Spatio-temporal analysis from 2005 to 2019', *BMC Health Services Research* 22(1), 1455. <https://doi.org/10.1186/s12913-022-08850-1>
- Seifu, B., Yilma, D. & Daba, W., 2020, 'Knowledge, utilization and associated factors of postpartum family planning among women who had delivered a baby in the past year in Oromia knowledge, utilization and associated factors of postpartum family planning among women who had delivered a baby', *Open Access Journal of Contraception* 11, 167–176. <https://doi.org/10.2147/OAJC.S268561>
- Shudura, E., Yoseph, A. & Tamiso, A., 2020, 'Utilization and predictors of maternal health care services among women of reproductive age in Hawassa University Health and Demographic Surveillance system site, South Ethiopia: A cross-sectional study', *Advances in Public Health* 2020, 1–10. <https://doi.org/10.1155/2020/5865928>
- Silesh, M., Lemma, T., Abdu, S., Fenta, B., Tadese, M. & Taye, B.T., 2022, 'Utilisation of immediate postpartum family planning among postpartum women at public hospitals of North Shoa Zone, Ethiopia: A cross-sectional study', *BMJ Open* 12(e051152), 1–10. <https://doi.org/10.1136/bmjopen-2021-051152>
- Singh Dipti, S.M., 2019, 'A study to assess utilization of maternal health care services in urban slums of Lucknow', *International Journal of Scientific Research* 8(7), 1–3.
- Singh, R., Neogi, S.B., Hazra, A., Irani, L., Ruducha, J., Ahmad, D. et al., 2019, 'Utilization of maternal health services and its determinants: A cross-sectional study among women in rural Uttar Pradesh, India', *Journal of health, population, and nutrition* 38(1), 13. <https://doi.org/10.1186/s41043-019-0173-5>
- Tafa, L. & Worku, Y., 2021, 'Family planning utilization and associated factors among postpartum women in Addis', *PLoS One* 16(1), 1–13. <https://doi.org/10.1371/journal.pone.0245123>
- Tarekegn, Lieberman, L.S. Giedraitis, V. and Shegaw M., 2014, 'Determinants of maternal health service utilization in Ethiopia: Analysis of the 2011 Ethiopian Demographic and Health Survey', *BMC Pregnancy and Childbirth* 14(1), 1–13. <https://doi.org/10.1186/1471-2393-14-161>
- Tessema, Z.T., Lake Yazachew, L., Antehunegn, G.T. & Birhanu, A.T., 2020, 'Determinants of postnatal care utilization in sub-Saharan Africa: A meta and multilevel analysis of data from 36 sub-Saharan countries', *Italian Journal of Pediatrics* 46(175), 1–12. <https://doi.org/10.1186/s13052-020-00944-y>
- Wassihun, B., Wosen, K., Getie, A., Belay, K., Tesfaye, R. & Tadesse, T., 2021, 'Prevalence of postpartum family planning utilization and associated factors among postpartum mothers in Arba Minch town', *Contraception and Reproductive Medicine* 6(6), 1–9.
- WHO, 2001, *The World health report: 2001: Mental health: New understanding, new hope*, World Health Organization, viewed n.d., from <https://iris.who.int/handle/10665/42390>
- WHO, 2016, *Standards for improving quality of maternal and newborn care in health facilities*, WHO Library Cataloguing-in-Publication Data WA 310, p. 84, viewed from http://www.who.int/about/licensing/copyright_form.
- WHO, 2019, *Monitoring health for the SDGs (Sustainable Development Goals)*, pp. 1–5, WHO, Geneva.
- WHO, 2021, *Maternal, Newborn and child health (MNCH) strategy 2021–2025*, pp. 1–5, Women's, Children and Adolescent Health, WHO, Geneva.
- WHO, UNICEF, UNFPA, World Bank Group & the United Nations Population Division, 2015, *Trends in maternal mortality: 1990 to 2015*, p. 12, WHO, Geneva.
- Wigley, A.S., Tejedor-Garavito, N., Alegana, V., Carioli, A., Ruktanonchai, C.W. & Pezzulo, C., 2020, 'Measuring the availability and geographical accessibility of maternal health services across sub-Saharan Africa', *BMC Medicine* 18(237), 1–10. <https://doi.org/10.1186/s12916-020-01707-6>
- Wudineh, K.G., Asres, N.A., Shiferaw, S.G., Arega, A.T. & Yenealem, F.B., 2018, 'Postnatal care service utilization and associated factors among women who gave birth in Debretabor town, North West Ethiopia: A community-based cross-sectional study', *BMC Pregnancy and Childbirth* 18(1), 1–9. <https://doi.org/10.1186/s12884-018-2138-x>
- Yalew, M., Nigatu, D., Yasin, T., Kefale, B. & Damtie, Y., 2022, 'Respectful delivery care and associated factors among mothers delivered in public health facilities of Dessie city, Northeast Ethiopia: A cross-sectional study', *BMC Women's Health* 22(1), 1–8. <https://doi.org/10.1186/s12905-022-01713-1>
- Yoseph, M., Mekonnen, S.A., Ayenew, F.M., Sisay, M. & Kedir Abdela, K.G., 2020, 'Institutional delivery services utilization and its determinant factors among women who gave birth in the past 24 months in Southwest Ethiopia', *BMC Health Services Research* 20(1), 1–10. <https://doi.org/10.1186/s12913-020-05121-9>
- Zhao, P., Han, X., You, L., Zhao, Y., Yang, L. & Liu, Y., 2020, 'Maternal health services utilization and maternal mortality in China: A longitudinal study from 2009 to 2016', *BMC Pregnancy and Childbirth* 20(1), 220. <https://doi.org/10.1186/s12884-020-02900-4>