Health system-related barriers to prenatal care management in low- and middle-income countries: a systematic review of the qualitative literature

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Abstract

Background: Appropriate prenatal care (PNC) is essential for improving maternal and infant health; nevertheless, millions of women in low- and middle-income countries (LMICs) do not receive it properly. The objective of this review is to identify and summarize the qualitative studies that report on health system-related barriers in PNC management in LMICs.

Methods: This systematic review was conducted in 2022. A range of electronic databases including PubMed, Web of Knowledge, CINHAL, SCOPUS, Embase, and Science Direct were searched for qualitative studies conducted in LMICs. The reference lists of eligible studies also were hand searched. The studies that reported health system-related barrier of PNC management from the perspectives of PNC stakeholders were considered for inclusion. Study quality assessment was performed applying the Critical Appraisal Skills Programme (CASP) checklist, and thematic analyses performed. Results: Of the 32 included studies, 25 (78%) were published either in or after 2013. The total population sample included 1677 participants including 629 pregnant women, 122 mothers, 240 healthcare providers, 54 key informed, 164 women of childbearing age, 380 community members, and 88 participants from other groups (such as male partners and relatives). Of 32 studies meeting inclusion criteria, four major themes emerged: (1) healthcare provider-related issues; (2) service delivery issues; (3) inaccessible PNC; and (4) poor PNC infrastructure. Conclusion: This systematic review provided essential findings regarding PNC barriers in LMICs to help inform the development of effective PNC strategies and public policy programs.

Background

There has been widespread and continuing concern about maternal and newborn health across the world (United Nations, 2021; Chowdhury et al., 2022). Globally, around half a million women die as a result of pregnancy and birth complications each year (Hadden, 2012). In 2017, approximately 810 pregnant women died every day from preventable pregnancy- and childbirth-related causes (World Health Organization, 2019). In addition, it is estimated that about 15 million babies (1 in 10) are born prematurely each year around the world, over one million of them die soon after birth, and a considerable number of the remaining ones experience several lifelong disabilities (Adane et al., 2014). These statistics raise challenges for healthcare authorities and professionals to improve maternal and child health.

There is a wide agreement that early and adequate prenatal care (PNC) is essential to improve maternal and child health (Krukowski et al., 2022; Racine et al., 2022). PNC, also known as antenatal care, is a routine preventive healthcare service, with the potential to improve healthy development of a child and to decrease maternal mortality by allowing early identification and treatment of potential pregnancy-related complications, treating medical conditions, and promoting healthier lifestyle (Heaman et al., 2007; 2014). PNC, together with postpartum care, was recognized as an essential strategy to achieve targets such as reduced child mortality as part of Millennium Development Goals 4 and 5 (United Nations, 2008). World Health Organization (WHO) recommends that pregnant women should have at least four PNC appointments during...
their pregnancy, with supplementary appointments if they experience any complications (World Health Organization, 2021).

Despite the well-documented advantages of PNC services, many women globally do not receive appropriate PNC (Fagbamigbe & Iedemudia, 2015). This issue is more highlighted in low- and middle-income countries (LMICs), in which at least 94% of all maternal deaths occur and most of them could have been prevented. For example, according to WHO reports, only 39% of women meet the target of four or more PNC appointments (World Health Organization, 2021). This is while pregnancy- and childbirth-related complications are the leading cause of fatality and disability among women of reproductive age in LMICs (Azmat et al., 2021).

Identifying major barriers to PNC services is important for designing and implementing strategies to improve maternal and child health. In this regard, qualitative studies may provide fresh insights into pertinent issues in specific settings of LMICs. Systematic review and synthesis of qualitative studies can systematically gather relevant evidences regarding PNC barrier in LMICs. While several systematic reviews have been published on PNC utilizations, no systematic review yet has been conducted to comprehensively evaluate the health system-related barriers to PNC in LMICs. Most of the previous reviews focused merely on a single aspect of PNC, such as healthcare-seeking behaviors (Lassi et al., 2019), or among only a specific population, such as those who received inadequate PNC (Finlayson & Downe, 2013; Cisse et al., 2022). Thus, the aim of this review was to systematically identify and summarize qualitative studies to describe the healthcare system-related barriers to all dimensions of PNC (such as utilizations and attendance barriers, late initiation, or poor quality of care) from all stakeholders’ perspective (including pregnant women, healthcare providers, and community members) in LMICs.

Methods
A systematic review was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Page et al., 2021). A systematic search of six electronic databases was undertaken to identify studies focusing on healthcare system-related barriers for PNC in LMICs. The following electronic databases were searched: PubMed, Web of Knowledge, CINHAL, SCOPUS, Embase, and Science Direct. Databases were searched from inception to July 24, 2022 (final search). The search strategy comprises three components, with terms including (i) PNC, (ii) LMICs, and (iii) qualitative studies (Table 1) with a combination of Medical Subject Headings and free text (Title/Abstract).

Terms recommended by McMaster University Health Information Research Unit were selected as “qualitative study” filters (Mcmaster University, 2016). Search terms connected with Boolean operators “AND” and “OR”. In addition to the electronic database search, the reference lists of included studies were also reviewed for additional relevant studies. The retrieved records were handled using Endnote V.8.

Inclusion/exclusion criteria
All studies with an aim to qualitatively identify and report on pregnant women’s or/and any healthcare providers’ or general population’s views of health system-related barriers to PNC were eligible. For the purpose of this review, we defined healthcare system as a set of activities and actors whose primary objective is to improve population health through provision of public or private medical services (Panda & Thakur, 2016). Thus, we considered studies that concerned with health system inputs (e.g., physical or human resources) and characteristics (e.g., deliver, financing, and governance). We defined LMICs according to World Bank criteria. We did not apply any participant’s age/sex restrictions during the search. Mixed-methods studies from which it was possible to extract relevant findings derived from qualitative research were also included. We considered any domains of PNC (e.g., utilization barriers, delay in PNC utilization, provision of PNC, and quality of PNC).

We excluded studies focusing only on special pregnant groups such as HIV-infected women. We also excluded studies that did not identify or discuss the health system related, that is, we excluded studies that focused on factors other than health system-related factors such as family culture. Studies that were not peer reviewed, such as dissertations, were also excluded. We excluded unpublished gray literature because of the fact that they score poorly on methodological quality.

Studies not focusing on PNC or focused on specific PNC initiatives such as group antenatal care were also excluded. Moreover, papers not focusing on LMICs were excluded. We also excluded survey-based studies with close-ended questions. In addition, articles of non-English publications were not included in this review as there was no funding for translation.

Study selection
Results of search strategy were imported to an EndNote library, and it was shared between the two reviewers after removing the duplicates. These two reviewers independently conducted the screening of the titles and abstracts against inclusion and exclusion criteria. This process was followed by obtaining full texts and double screening of potentially eligible studies. Discrepancies regarding eligibility were handled by discussion among team members.

Quality assessment and data extraction
All articles remaining after full-text verification were quality assessed in terms of study design and other characteristics using Critical Appraisal Skills Programme (CASP) tool (CASP UK, 2018). Quality appraisal was done independently by two authors, and any disagreements were solved by discussion. All studies were included regardless of quality appraisal results. We performed extraction of data based on the main review question: healthcare system-related barriers to PNC. Two reviewers extracted independently this data from the included studies, and disagreements were resolved through discussion. Data extracted using a customized data extraction form piloted on three studies. Data were extracted from each paper on first author, publication year, country, participants, data collection method, and key relevant findings.

Data synthesis
As a qualitative evidence synthesis method, we applied thematic synthesis (Thomas & Harden, 2008), which has been recognized as a routine approach in the synthesis of qualitative research in systematic reviews (Joseph et al., 2019; Dattilo et al., 2020). This technique is designed to identify new themes, while preserving an explicit and transparent link between conclusions and the text of primary studies. Synthesis included becoming familiar with the data by open-minded reading of each study and being familiar with the results, line-by-line coding of each study results, and categorization of codes into groups of health system-related
barriers to PNC. This data synthesis process was conducted by two reviewers.

Results
The defined search strategy identified 987 citations, of which 96 articles were removed due to duplication while 891 potentially relevant studies were retained for further screening. Screening of titles and abstracts of remaining articles for their eligibility resulted in exclusion of 786 obviously irrelevant records. In the next step, the full text of the remaining 105 studies was assessed for eligibility. During this phase, 73 studies were excluded from the review because of meting exclusion criteria. The remaining 32 studies were critically appraised and included in the review (Table 2). A flow diagram of the study selection process is provided in Figure 1.

Overview of included studies
Of the 32 included studies, 25 (78%) were published either in or after 2013. The studies took place in 21 countries across four continents. Of the included studies, 59% discussed countries or regions in Africa, with Tanzania and Malawi being the most common of these; 25% discussed Asian countries or regions and only one study (3.1%); and discussed barriers in the South America and one in Papua New Guinea from Oceania (3.1%).

Numbers of participants varied from five to 295, with most between 20 and 80 participants. The total population sample included 1677 participants including 629 pregnant women, 122 mothers, 240 healthcare providers, 54 key informed, 164 women of child bearing age, 380 community members, and 88 participants from other groups (such as key informants or male partners).

Quality of studies
The overall quality assessment of the studies was conducted by rating CASP items (Table 2). All of them had a clear statement of the research objectives and appropriate qualitative methodology (the first two essential items of CASP); thus, no study was excluded due to quality issue.

Overview of health system barriers identified
We categorized the review findings into four main themes: healthcare provider-related issues, service delivery issues, inaccessible PNC, and poor PNC infrastructure. There are one to five subthemes under each theme that are presented in Figure 2 and Table 3.

Theme 1: healthcare provider-related issues
Concerns about the negative impact of healthcare providers’ issues on the PNC emerged as a prominent theme with five subthemes: (1) human resource shortage; (2) lack of female PNC providers; (3) insufficient PNC providers’ knowledge; (4) poor relationship with PNC clients; and (5) lack of motivation.

Human resource shortage
Participants in many of included studies expressed concerns over insufficient human resources (Mathole et al., 2005; Graner et al., 2010; Andrew et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Mgata & Maluka, 2019; Maluka et al., 2020; Udenigwe et al., 2021). They believed that this PNC shortage makes PNC providers overloaded with work (Mathole et al., 2005; Conrad et al., 2012; Manithip et al., 2013; Andrew et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Alana and others, 2019).

Lack of female PNC provider
Finding of this review indicates that lack of female PNC provider is a significant barrier to PNC in LMICs. Some article indicated that one of the important reasons for women to not seek PNC was feeling embarrassed, discomfort, and mistrust about having a male health worker (Ayala et al., 2013; Akter et al., 2018).

Insufficient PNC providers’ knowledge
Stakeholders believed that availability of skilled and well-trained healthcare providers is an important requisite for provision of quality PNC. However, some of included studies reported insufficient trainings regarding PNC among healthcare providers (Manithip et al., 2013). According to the participants’ points of view, healthcare providers do not receive sufficient professional retraining (Graner et al., 2010; Manda-Taylor et al., 2017).
<table>
<thead>
<tr>
<th>First author /year</th>
<th>Country</th>
<th>Objectives</th>
<th>Data collection</th>
<th>participants</th>
<th>Analysis approach</th>
<th>Key emerged themes</th>
</tr>
</thead>
</table>
| Udenigwe (Udenigwe et al., 2021) | Nigeria | Perspectives of policymakers and health workers on facilitators and barriers to women’s use of skilled pregnancy care | In-depth interviews | 13 key stakeholders (policymakers and healthcare providers) | Thematic analysis | * Financial constraints  
* Women’s lack of decision-making power  
* Ignorance and poor understanding of health  
* Competitive services offered by traditional birth attendants  
* Previous negative experience with skilled healthcare  
* Shortage of health workforce  
* Poor financing  
* Governance of the health system |
| Hajian (Hajian et al., 2022) | Iran | Explore the barriers and facilitators of Iranian men’s involvement in perinatal care | In-depth interviews | 21 Pregnant women, spouses, policymakers, and midwifery service providers | Content analysis | * Individual factors  
* Organizational factors  
* Legislative factors |
| Mourtada, 2021 (Mourtada et al., 2021) | Syria | Compares two governorates to highlight the barriers to women’s adequate uptake of ANC that existed in Syria preconflict | Semi-structured interviews | 30 pregnant women, 15 observation sessions at health facilities | Framework analysis | * Women’s assessment of their health status and reasoning of causes of ill health in pregnancy  
* Women’s evaluation of the risks of seeking ANC  
* Women’s appraisal of the value of different types of service providers |
| Tsegaye, 2021 (Tsegaye et al., 2021) | Ethiopia | Potential contributing barriers to loss to follow-up of pregnant women from antenatal care services in villages | In-depth interviews | 20 zonal, woreda and health center managers, midwives and health extension workers | Thematic analysis | * Shortage of the required medical equipment, drugs, and other supplies  
* Poor care, respect, and receptiveness of service providers  
* Lack and cost of transport  
* Community culture and pervious maternal experiences  
* Maternal sociodemographic factors like maternal age and educational status |
| Dadras, 2020 (Dadras et al., 2020) | Iran | Explores the potential barriers to prenatal care among Afghan women in Iran. | Face-to-face interviews | 30 pregnant Afghan women | Content analysis | * The financial constraints  
* Lack of affordable health insurance with adequate coverage of prenatal care services |
| Akter, 2018 (Akter et al., 2018) | Bangladesh | To explore perceived barriers to prenatal care among pregnant women | A descriptive qualitative research | 20 pregnant women and 20 of their significant others | Content analysis | * a lack of female doctors  
* Unaffordable laboratory tests and medications |
| Alanazy, 2019 (Alanazy et al., 2019) | Saudi Arabia | To understand the beliefs of pregnant women and health professionals about the factors leading to low attendance rates | A qualitative exploratory study | antenatal (n = 14) and postnatal women (n = 7) and health professionals working with pregnant and new mothers (n = 9) | Thematic analysis | * poor, or a lack of facilities  
* Long waiting time  
* Lack of specialized facilities  
* Dismissive staff  
* Pressurising staff  
* Poor care |
Table 2. (Continued)

<table>
<thead>
<tr>
<th>Study Reference</th>
<th>Country</th>
<th>Research Question</th>
<th>Methods</th>
<th>Sample Size</th>
<th>Analysis</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew EV, 2014 (Andrew et al., 2014)</td>
<td>Papua New Guinea</td>
<td>To explore the influences on ANC attendance and timing of first visit</td>
<td>Free listing and sorting of terms and definitions, focus group discussions, in-depth interviews, observation</td>
<td>Pregnant women (n = 9), their relatives (n = 13), biomedical and traditional health providers (n = 7), opinion leaders (n = 12), and community members (57)</td>
<td>Thematic analysis</td>
<td>unaccusable services (distance and cost), poor relationships among healthcare providers and women, lack of privacy, insufficient follow up, the nurse is overworked and understaffed</td>
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<tr>
<td>Mamba KC, 2017 (Mamba et al., 2017)</td>
<td>Malawi</td>
<td>To identify barriers that were inadvertently working against increasing PNC attendance in the first trimester</td>
<td>Structured interviews</td>
<td>NA</td>
<td>Thematic analysis</td>
<td>unaffordable services</td>
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<tr>
<td>Maluka SO, 2020 (Maluka et al., 2020)</td>
<td>Tanzania</td>
<td>To understand the factors leading to delay in seeking ANC services among pregnant women</td>
<td>Focus group discussions (FGDs) and semi-structured interviews</td>
<td>40 FGDs (with both male and female participants, 10-12 participants in each FGD), and 36 health workers</td>
<td>Thematic analysis</td>
<td>partner accompany policy, rude language from health personnel, shortage of healthcare providers</td>
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<tr>
<td>Manithip C, 2013 (Manithip et al., 2013)</td>
<td>Laos</td>
<td>To explore the healthcare providers’ perceptions of the PNC services they provide</td>
<td>Semi-structured interviews</td>
<td>26 healthcare providers engaged in ANC services</td>
<td>Content analysis</td>
<td>PNC providers are overloaded with work at the health centers, insufficient training regarding antenatal care among PNC providers, insufficient equipment, lack of motivation, feedback and support in terms of human resources</td>
</tr>
<tr>
<td>Titaley CR, 2010 (Titaley et al., 2010)</td>
<td>Indonesia</td>
<td>To explore community members’ perspectives on antenatal and postnatal care services</td>
<td>Focus group discussions (FGDs) and in-depth interviews</td>
<td>295 community members</td>
<td>Content and thematic analysis</td>
<td>perceived cost of health services, lesser quality of both health services and medications, physical proximity to health services</td>
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<tr>
<td>Huaman Ayala LS, 2014 (Heaman et al., 2014)</td>
<td>Peru</td>
<td>To investigate factors affecting pregnant women’s decision to seek or avoid antenatal care</td>
<td>Semi-structured interviews</td>
<td>24 women utilizing ANC and 10 women avoiding ANC</td>
<td>Content analysis</td>
<td>long ANC wait time, inconvenient hours of operation, masculine gender of health workers</td>
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<tr>
<td>Baffour-Awuah A, 2015 (Baffour-Awuah et al., 2015)</td>
<td>Ghana</td>
<td>To explore the perceptions of midwives on focused antenatal care</td>
<td>Semi-structured interviews</td>
<td>40 Midwives</td>
<td>Content analysis</td>
<td>lack of sufficient resources, workload, long waiting time, inadequate personal</td>
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<tr>
<td>Conrad P, 2012 (Conrad et al., 2012)</td>
<td>Uganda</td>
<td>To understand how women experience the quality of ANC services</td>
<td>Semi structured interviews</td>
<td>30 pregnant women</td>
<td>Thematic analysis</td>
<td>skipping some of the routine examinations by midwives, overcrowded midwives, lack of adequate equipment, drugs, and reagents, not providing any pregnancy related education during ANC visits, providers arrive late or are absent without prior notice, healthcare providers are not available at night or during weekends</td>
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<tr>
<th>First author /year</th>
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<th>Data collection</th>
<th>participants</th>
<th>Analysis approach</th>
<th>Key emerged themes</th>
</tr>
</thead>
</table>
| Gross K, 2011 (Gross et al., 2011) | Tanzania       | To study the interplay between policy, context, and practice and its effect on PNC provision | Observations, informal conversations, in-depth interview | 5 health workers | A mix of inductive and deductive category building | * pregnant women complained of rude midwives  
  * healthcare providers do not report lab tests and do not explain the steps ahead in the care |
| Graner S, 2010 (Graner et al., 2010) | Vietnam        | To study the perspectives of midwives and PNC providers on the content and quality of PNC | Four focus group discussions                 | 21 midwives and 29 PNC providers | Latent content analysis                  | * inadequate facilities  
  * inadequate human resources  
  * inadequate professional re-training  
  * shortage of appropriate gloves and sterilizers  
  * lonely work  
  * long work hours  
  * few possibilities for collegial support even during obstetrical emergencies |
| Larsen G, 2004 (Larsen et al., 2004) | Papua New Guinea | To identify perceptions, barriers and strengths regarding the utilization of PNC | Semi-structured interviews and FGDs          | 20 pregnant or parous women and 4 PNC providers | NA                                      | * geographical availability  
  * long waiting times  
  * negative attitudes of healthcare workers  
  * occasional and unannounced closures of clinics  
  * antenatal healthcare worker absents  
  * lack of nutritional supplements or medications |
| Mahiti GR, 2015 (Mahiti et al., 2015) | Tanzania       | To explore women’s views about the PNC                                     | Focus group discussions                      | 105 women attending a health facility after child birth | content analysis                         | * lack of geographical access  
  * shortage of human resources  
  * multiskilled nurses  
  * lack of good PNC provider-utilizer relationship  
  * long waiting times  
  * instances of informal payments  
  * drug shortages  
  * dirty environment of healthcare facilities |
| Mathole T, 2005 (Mathole et al., 2005) | Zimbabwe       | To investigate the experiences of PNC providers, in caring for pregnant women | Individual interviews                        | 18 nurses and midwives                      | —                                       | * overworked healthcare providers  
  * staff shortages  
  * ambiguous job descriptions  
  * drug shortage  
  * poor quality of service  
  * shortage of ambulances  
  * cost of care |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Country</th>
<th>Research Objective</th>
<th>Methodology</th>
<th>Sample Size</th>
<th>Data Analysis</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Myer L, 2003</td>
<td>South Africa</td>
<td>To document perceptions of PNC and to investigate factors shaping the utilization of PNC</td>
<td>Semi-structured interviews</td>
<td>29 pregnant women</td>
<td>Thematic analysis</td>
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<td>* Lack of physical access to PNC clinics</td>
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<td>Rahmani Z, 2013</td>
<td>Afghanistan</td>
<td>To investigate how pregnant women and healthcare providers experience the existing PNC</td>
<td>Semi-structured interviews</td>
<td>12 women who were pregnant or had recently given birth and 15 healthcare workers</td>
<td>Giorgi’s phenomenological analysis</td>
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<td></td>
<td>* Lack of professional ethical standards</td>
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<td>* Poor working conditions contribute to poor behavior</td>
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<td>* corruption in PNC clinics</td>
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<td>Shabila NP, 2014</td>
<td>Iraq</td>
<td>To explore the views and experiences of antenatal care in a sample of women</td>
<td>Q methodology</td>
<td>38 women</td>
<td>By-person factor analysis</td>
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<td>* lack of convenient waiting amenities</td>
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<td>* unavailability of laboratory and ultrasound investigations</td>
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<td>* weak communication skills among PNC providers</td>
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<td>* receiving inadequate information during antenatal care visits</td>
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<td>* long waiting time</td>
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<td>* Pregnant women were usually seen by a nurse rather than a doctor</td>
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<td>* conflicting advice from different care providers</td>
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<td>Uldbjerg CS, 2020</td>
<td>Uganda</td>
<td>To identify perceived barriers to utilization of ANC services</td>
<td>In-depth interviews and focus group discussions</td>
<td>17 participants (13 pregnant women, 3 health workers, and 1 traditional birth attendant)</td>
<td>Inductive conventional content analysis</td>
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<td>* Lack of resources at health centers</td>
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<td>* Poor attitude of health workers</td>
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<td>* Poor acceptance of cultural practices and beliefs at health centers</td>
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<td></td>
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<td>* Compulsory HIV testing</td>
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<td>Callaghan-Koru, 2016</td>
<td>Tanzania</td>
<td>To explore providers’ communication about ANC visits and identify barriers to completing four visits</td>
<td>In-depth interviews (with providers) and exit interviews (with clients)</td>
<td>30 PNC providers and 203 PNC clients</td>
<td>Framework analysis</td>
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<td>* Recommendation to bring male partners to ANC clinics for HIV testing</td>
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<td>* Out of pocket costs</td>
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<td>* Women turned away from services during first trimester</td>
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<td>* Poor provider communication about ANC visit schedule</td>
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<td>* Poor quality of care: long wait times, harsh treatment by providers, stock outs of drugs and tests</td>
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<td>* Long distances between homes and health facilities</td>
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<td></td>
<td>* Scheduling of specific dates for return ANC visits</td>
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<tr>
<td>Chimatiro CS, 2018</td>
<td>Malawi</td>
<td>To explore barriers contributing to low utilization of PNC during the first trimester of pregnancy</td>
<td>In-depth interviews and Focus Group Discussions</td>
<td>10 PNC clients, 9 key informants, 3 health services professionals, and 126 women of child-bearing age (15–49 years)</td>
<td>Thematic analysis</td>
<td>9</td>
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<td>* Long distances from home to the facility</td>
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<td>* Poor attitude of health workers</td>
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<td>* Long waiting time</td>
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<tr>
<th>First author / year</th>
<th>Country</th>
<th>Objectives</th>
<th>Data collection</th>
<th>participants</th>
<th>Analysis approach</th>
<th>Key emerged themes</th>
<th>CASP score</th>
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| Jacobs C, 2018 (Jacobs et al., 2018) | Zambia     | To explain why one ANC visit with a skilled provider seemed more common than four ANC visits among women | Focus group discussions | 38 Mothers, 28 community health volunteers, and 16 key informants | Thematic analysis       | * Unavailable and Poor-quality services in the health posts  
  * Inadequate supplies  
  * Unavailable/Inadequate skilled healthcare providers  
  * Long distances to the health facilities | 8          |
| Manda-Taylor, 2017 (Manda-Taylor et al., 2017) | Malawi     | To identify barriers to antenatal care uptake                               | Semi-structured interviews | 12 pregnant mothers and 8 health workers          | Thematic content analysis | * Insufficient data management  
  * Sometimes women received ANC without any health education if they arrived early in the day  
  * Limited counseling and testing room  
  * lack of a consistent system to educate clients  
  * women who attended late received no health education at all  
  * lack of mid-career training for PNC providers | 8          |
| Nyathi L, 2017 (Nyathi et al., 2017) | Zimbabwe   | To investigate the accessibility factors influencing the use of PNC        | Semi-structured interviews | 15 mothers                                       | Thematic analysis       | * Long distance to the health facility  
  * Poor healthcare workers’ attitude  
  * not providing advice about pregnancy care  
  * long waiting times | 8          |
| Nachinab, 2019 (Nachinab et al., 2019) | Ghana      | To explore the determinants of PNC uptake among women who failed to utilize PNC services | Face-to-face interview | 15 mothers who did not attend ANC clinic          | Inductive thematic analysis | * poorly equipped PNC clinics  
  * negative attitude of PNC providers | 8          |
| Mgata S, 2019 (Mgata & Maluka, 2019) | Tanzania   | To understand factors that lead to the delay in seeking ANC services among pregnant | In-depth interviews   | 20 pregnant women and 5 healthcare workers       | Thematic analysis       | * Distance to the health facility  
  * Required escort of a spouse during the first ANC visit  
  * shortage of health providers | 8          |
| Meyer, 2016 (Myer & Harrison, 2003) | Georgia    | To identify the PNC access barriers experienced by women                  | Semi-structured, in-depth interviews | 24 mothers and 4 key informant                   | Applied thematic analysis | * difficulties in locating providers with their preferred criteria  
  * insufficient health insurance coverage  
  * Lack of consistency and continuity in PNC care  
  * poor communication among healthcare providers and clients | 9          |
Poor relationship with PNC clients
Stakeholders perceived lack of a good relationship between healthcare providers and PNC clients as a key barrier to PNC (Larsen et al., 2004; Conrad et al., 2012; Rahmani & Brekke, 2013; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Alanazy et al., 2019; Maluka et al., 2020; Uldbjerg et al., 2020; Mourtada et al., 2021; Tsegaye et al., 2021; Udenigwe et al., 2021). Some of them reported that PNC providers have negative attitudes toward PNC clients (Larsen et al., 2004; Nyathi et al., 2017; Chimatiro et al., 2018; Nachinab et al., 2019; Uldbjerg et al., 2020) and they refuse to consider them seriously (Alanazy et al., 2019). Participants in some of included studies even stated that they were treated rudely by PNC providers (Conrad et al., 2012; Maluka et al., 2020).

Lack of motivation
There was also some evidence that there is lack of motivation and satisfaction among healthcare workers (Manithip et al., 2013). Participants believed that because of this problem, providers arrive late or are absent without any prior notice (Larsen et al., 2004; Conrad et al., 2012) and clients experience occasional and unannounced closures of clinics (Larsen et al., 2004).

Theme 2: service delivery issues
Stakeholders participated in the included studies constantly described service delivery issues as important barriers to PNC. There were five subthemes related to this theme:

Poor quality of care
According to some participants’ point of view in several included studies, barriers regarding the poor quality of care hinder PNC provision/utilization (Mathole et al., 2005; Titaley et al., 2010; Alanazy et al., 2019). They believed that sometimes essential PNC procedures such as routine examinations were skipped during the PNC visits (Conrad et al., 2012). They also mentioned that the PNC process is not transparent and healthcare providers do not explain the steps ahead in the care (Conrad et al., 2012). Some participants even complained that PNC clients do not receive lab tests results (Conrad et al., 2012).

Insufficient follow-up
One of the perceived barriers regarding PNC management in LMICs was lack of sufficient follow-up to ensure continuity of care (Andrew et al., 2014). Participants believed that this factor can lead to discontinuity in PNC (Myer & Harrison, 2003).
Strict roles and routines
One of the commonly mentioned barriers to PNC was strict roles and routines in PNC clinics such as partner accompany policy (Gross et al., 2011; Callaghan-Koru et al., 2016; Mgata & Maluka, 2019; Maluka et al., 2020) or compulsory HIV testing (Uldbjerg et al., 2020) and sanctioning the PNC clients because of their noncompliant behavior. Scheduling of specific dates for return PNC visits was mentioned as another strict role hindering PNC utilization (Callaghan-Koru et al., 2016; Hajian et al., 2022; Udenigwe et al., 2021). Some of studies even reported that clients who attend earlier or later than predefined times will never receive PNC education (Manda-Taylor et al., 2017).

Insufficient education provision
The participants widely reported that PNC clients have not been provided with the necessary knowledge and training (Conrad et al., 2012; Shabila et al., 2014; Nyathi et al., 2017). Some of respondents in included studies highlighted that there is not a consistent system to do this important component of PNC management (Manda-Taylor et al., 2017).

Unavailable PNC guidelines
Lack of evidence-based PNC guidelines was highlighted by participants as a major barrier regarding PNC (Larsen et al., 2004; Titaley et al., 2010; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Jacobs et al., 2018; Mgata & Maluka, 2019).

Theme 3: inaccessible PNC
The theme of inaccessible PNC emerged to organize barriers related to different aspects of PNC accessibility. This theme emerged from three categories including (1) long distance; (2) unaffordable PNC; and (3) long waiting times.

Unaffordable PNC
Many of participants believed that pregnant women cannot afford the cost of PNC. They reported high cost of care, laboratory tests, and medications (Mathole et al., 2005; Titaley et al., 2010; Andrew et al., 2014; Mamba et al., 2017; Akter et al., 2018) most of which should be paid out of pocket as a result of insufficient health insurance coverage (Callaghan-Koru et al., 2016; Meyer et al., 2016). We found that corruptions in PNC clinics and instance of informal payment being demanded from clients pose additional barrier in terms of financial accessibility (Rahmani & Brekke, 2013; Mahiti et al., 2015). In addition, financial constraints were highlighted by some participants as a barrier regarding PNC (Dadras et al., 2020; Tsegaye et al., 2021; Udenigwe et al., 2021).

Long waiting times
Waiting time was another important accessibility area in which frustration was expressed. The participants believed that long waiting times would be the factor which would discourage pregnant women from seeking PNC services (Larsen et al., 2004; Ayala et al., 2013; Shabila et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Alanazy et al., 2019).

Long distances
According to participants’ perspectives, geographical access to PNC appears inadequate. They mentioned that PNC seekers’ access to care is restricted by long distance (Larsen et al., 2004; Titaley et al., 2010; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017;
Table 3. Thematic analysis

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<tr>
<th>Main themes</th>
<th>Subthemes</th>
<th>References</th>
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<tr>
<td>1. Healthcare providers’</td>
<td>Human resources shortage</td>
<td>(Larsen et al., 2004; Conrad et al., 2012; Rahmani &amp; Brekke, 2013; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Alanazy et al., 2019; Nachinab et al., 2019; Maluka et al., 2020; Uldbjerg et al., 2020; Udenigwe et al., 2021)</td>
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<td></td>
<td>Lack of female PNC providers</td>
<td>(Ayala et al., 2013; Akter et al., 2018)</td>
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<td></td>
<td>Insufficient PNC providers’ knowledge</td>
<td>(Graner et al., 2010; Manithip et al., 2013; Manda-Taylor et al., 2017)</td>
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<td></td>
<td>Poor relationship with PNC clients</td>
<td>(Larsen et al., 2004; Conrad et al., 2012; Rahmani &amp; Brekke, 2013; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Alanazy et al., 2019; Nachinab et al., 2019; Maluka et al., 2020; Uldbjerg et al., 2020; Mourtada et al., 2021; Tsegaye et al., 2021; Udenigwe et al., 2021)</td>
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<td></td>
<td>Lack of motivation</td>
<td>(Larsen et al., 2004; Conrad et al., 2012; Manithip et al., 2013)</td>
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<td>2. Service delivery</td>
<td>Poor quality of care</td>
<td>(Mathole et al., 2005; Titeley et al., 2010; Conrad et al., 2012; Alanazy et al., 2019)</td>
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<td></td>
<td>Insufficient follow-up</td>
<td>(Myer &amp; Harrison, 2003; Andrew et al., 2014)</td>
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<td></td>
<td>Strict roles and routines</td>
<td>(Gross et al., 2011; Callaghan-Koru et al., 2016; Manda-Taylor et al., 2017; Mamba et al., 2017; Akter et al., 2018; Dadras et al., 2020; Tsegaye et al., 2021; Udenigwe et al., 2021)</td>
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<td></td>
<td>Insufficient education provision</td>
<td>(Conrad et al., 2012; Shabila et al., 2014; Manda-Taylor et al., 2017; Nyathi et al., 2017)</td>
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<td></td>
<td>Unavailable PNC guidelines</td>
<td>(Larsen et al., 2004; Titeley et al., 2010; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Jacobs et al., 2018; Mgata &amp; Maluka, 2019)</td>
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<td>3. Inaccessible PNC</td>
<td>Unaffordable PNC</td>
<td>(Mathole et al., 2005; Titeley et al., 2010; Rahmani &amp; Brekke, 2013; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Mamba et al., 2017; Akter et al., 2018; Dadras et al., 2020; Tsegaye et al., 2021; Udenigwe et al., 2021)</td>
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<td></td>
<td>Long waiting times</td>
<td>(Larsen et al., 2004; Ayala et al., 2013; Shabila et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Alanazy et al., 2019)</td>
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<td></td>
<td>Long distance</td>
<td>(Larsen et al., 2004; Titeley et al., 2010; Andrew et al., 2014; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Meyer et al., 2016; Nyathi et al., 2017; Chimatiro et al., 2018; Jacobs et al., 2018; Mgata &amp; Maluka, 2019)</td>
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<td>4. Poor PNC infrastructure</td>
<td>Lack of:</td>
<td>(Larsen et al., 2004; Mathole et al., 2005; Granner et al., 2010; Gross et al., 2011; Conrad et al., 2012; Manithip et al., 2013; Shabila et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Manda-Taylor et al., 2017; Jacobs et al., 2018; Alanazy et al., 2019; Nachinab et al., 2019; Maluka et al., 2020; Uldbjerg et al., 2020; Udenigwe et al., 2021)</td>
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<tr>
<td></td>
<td>• Specialized PNC facilities</td>
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<td>• Essential equipment</td>
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<td></td>
<td>• Needed drugs and supplies</td>
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<td>• Convenient waiting amenities</td>
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<td></td>
<td>• Ambulances</td>
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<td>• Adequate service rooms</td>
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2017; Chimatiro et al., 2018; Jacobs et al., 2018; Mgata & Maluka, 2019).

**Theme 4: poor PNC infrastructure**

We found that many of participants complained that poor PNC clinic facilities hindered PNC provision or utilization (Larsen et al., 2004; Mathole et al., 2005; Granner et al., 2010; Gross et al., 2011; Conrad et al., 2012; Manithip et al., 2013; Shabila et al., 2014; Baffour-Awuah et al., 2015; Mahiti et al., 2015; Callaghan-Koru et al., 2016; Manda-Taylor et al., 2017; Jacobs et al., 2018; Alanazy et al., 2019; Nachinab et al., 2019; Uldbjerg et al., 2020). They mentioned long list of infrastructure-related barriers including lack of specialized PNC facilities (Alanazy et al., 2019), lack of sufficient resources (Baffour-Awuah et al., 2015), such as essential equipment such as appropriate gloves and sterilizers (Conrad et al., 2012; Manithip et al., 2013; Shabila et al., 2014; Nachinab et al., 2019), needed drugs and supplies (Larsen et al., 2004; Mathole et al., 2005; Gross et al., 2011; Conrad et al., 2012; Callaghan-Koru et al., 2016; Jacobs et al., 2018; Tsegaye et al., 2021), ambulances (Mathole et al., 2005), convenient waiting amenities (Shabila et al., 2014), adequate service rooms such as counseling and testing room (Manda-Taylor et al., 2017), and clean PNC clinics’ environment (Mahiti et al., 2015).

**Discussion**

PNC is an essential component of improving maternal and infant health during pregnancy and birth, by treating and monitoring potential complications. This review set out to summarize the qualitative literature concerning the healthcare system-related barriers in PNC management in LMICs. Included studies came from a variety of countries and help understand the range of different potential difficulties in PNC management from several continents. Findings of this systematic review suggest that PNC in LMICs can be challenged by a number of barriers at different levels of healthcare systems, including human resources aspects, service delivery issues, PNC accessibility, and PNC infrastructures.
In addition to a wide range of countries with low- and middle-income settings, the included studies encompassed a wide range data from different types of PNC stakeholders such as health-care providers, pregnant women, male partners, and community members. This indicates that PNC stakeholders, in any role, are aware that PNC is provided in a context lead by the healthcare system.

It is notable that the majority of barriers identified within the evidence emerged within the human resources and service delivery themes. This stakeholder perception is supported by other systematic reviews investigating LMICs barriers in other maternal health contexts such as midwifery care (Filby et al., 2016). In addition, many of WHO’s healthcare system-related recommendations on PNC improvement could be mapped directly to some of the findings identified in this systematic review. These were mainly to do with continuity of care, communication, and PNC contact schedule (World Health Organization, 2021). One of the main results that was not considered seriously in this recommendation was attitudes and behaviors of healthcare staff. This issue is also ignored in some other effectiveness studies in the area of antenatal care design and provision (Finlayson & Downe, 2013; Downe et al., 2016). This seems to be an important omission.

Many of the emerged barriers in this review of qualitative studies also match those observed in earlier quantitative studies. For example, one of them highlighted insufficient geographical accessibility (Kuupiel et al., 2020). The findings of previous quantitative studies also suggest a need to cultivate quality of PNC care (Sommer Albert et al., 2020), train PNC providers in communication skills (Sommer Albert et al., 2020), and expand technical capacity by continuing education and supportive supervision to train PNC providers to follow standard protocols for provision of quality ANC services (Sommer Albert et al., 2020). We recommend that the results of this review should be considered when implementing PNC strategies in LMICs and other low resource settings.

Strengths and limitations of this review

This review provides a comprehensive approach to qualitative studies of healthcare system-related barriers to PNC in LMICs. Exploring pregnant women, PNC providers, and general population accounts also provided a rounded understanding of PNC barriers from multiple perspectives.

There are several important limitations to note when interpreting the results of this review. One limitation is that it we only included articles published in English, which may suggest that the potentially relevant studies from cultural contexts where English is not the norm may be missed. In addition, limited time and resources prevented a more thorough and comprehensive search of the gray literature, a body of evidence that may have had more to offer PNC clients’ experiences and perspectives.

Gaps in the evidence base

Despite all of the works that have been conducted in the area of PNC barriers, the current review noted a significant gap in the evidence base related to PNC and healthcare systems. This important gap is the perspectives of women who are underrepresented in the data: pregnant women who did not make it to PNC. Because of health system-centric nature of the majority of related literature, there is much more information about pregnant women who stayed in care than about those who never attend PNC.

Conclusion

This review contributes to the current debate on the knowledge of key barriers to PNC in LMICs contexts. Findings of this systematic review suggest that PNC in LMICs can be challenged by a number of barriers at different levels of healthcare systems, including human resources aspects, service delivery issues, PNC accessibility, and PNC infrastructures. Healthcare policymakers in LMICs, when planning and managing the PNC, should consider the lessons learnt from previous reports as synthesized in this review and should carefully develop strategies to prevent and mitigate common barriers to successful PNC.

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References


Tsegaye ZT, Abawollo HS, Desta BF, Mamo TT, Heyi AF, Mesele MG and Lose AD (2021) Contributing barriers to loss to follow up from antenatal care services in villages around Addis Ababa: a qualitative study. BMC Women’s Health 21, 1–9.


