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Determinants of Skilled Birth Attendance and Postnatal Care in Kibera, Nairobi: Patterns, Predictors, and Policy Gaps

George Obhai[1], Harriet Nabukwasi[2]

[1]Strategic Planning and Programming, Intergovernmental Authority on Development (IGAD), Djibouti, Djibouti
[2]Health & Social Development Division, Intergovernmental Authority on Development (IGAD), Djibouti, Djibouti
Email: george.obhai@gmail.com, kharriet688@gmail.com

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Abstract

Background: Maternal morbidity and mortality remain high in Kenya, with disproportionate burdens among women in informal urban settlements. Despite the critical role of skilled birth attendance (SBA) and early postnatal care (PNC) in reducing adverse outcomes, utilisation remains suboptimal in resource-constrained settings such as Kibera, Nairobi. This study examined the determinants of SBA and early PNC utilisation, focusing on health system factors, individual-level barriers, and the role of male partner engagement. **Methods:** A convergent mixed-methods design was employed. Quantitative data were collected between March and May 2025 through a household survey of 423 women of reproductive age who had delivered within the preceding 12 months. A sub-sample of 87 male partners was purposively selected. Data were gathered using a digitalised structured questionnaire administered via handheld tablets by trained research assistants. Descriptive statistics, chi-square tests, and multivariate logistic regression were used to identify determinants of skilled birth attendance (SBA) and postnatal care (PNC) utilisation. Qualitative data were obtained through 30 in-depth interviews, 10 key informant interviews, and 4 focus group discussions. These were thematically analysed using a framework approach to explore structural, behavioural, and health system-related factors influencing maternal health service utilisation. **Results:** Utilisation of SBA was 71%, while only 38% of women received PNC within 48 hours postpartum. Predictors of SBA included maternal education, household income, parity, and proximity to health facilities. Early PNC utilization was associated with SBA use, autonomy in health service decision making, and prior ANC attendance. Among surveyed male partners, 35% reported involvement in birth preparedness, 54% contributed to delivery planning, and 32% were aware of recommended PNC timelines. Qualitative findings highlighted barriers

including mistreatment by providers, hidden costs, and limited knowledge of postnatal schedules. Notably, male partners emerged as important enablers of care-seeking, offering financial, emotional, and logistical support. **Conclusion:** Improving SBA and PNC uptake in informal urban settlements requires a multifaceted approach that addresses structural, informational, and relational barriers. Male partner engagement represents a critical and underutilised strategy to enhance maternal health service utilisation. Interventions should leverage existing community strengths while targeting systemic issues, particularly provider training and motivation, health education, and gender-inclusive care planning to improve maternal health outcomes in urban poor settings. Further research is needed to explore the long-term impact of male involvement interventions on maternal and newborn health outcomes, assess the effectiveness of community-based postnatal outreach models, and evaluate the integration of informal care providers, such as traditional birth attendants, into formal referral and support systems. Additionally, longitudinal studies examining the behavioural and institutional effects of policy shifts—such as Kenya's transition to the Social Health Insurance Fund (SHIF)—are essential to inform sustainable, equity-orientated strategies in similar urban contexts.

Keywords

Skilled Birth Attendance, Postnatal Care, Urban Informal Settlements, Maternal Health, Kenya, Kibera, Health Systems, Male Involvement, Andersen's Behavioural Model, Three Delays Model, WHO's Health System Framework, Andersen's Behavioural Model, Health Equity

1. Introduction

Skilled birth attendance (SBA) and postnatal care (PNC) are evidence-based interventions for reducing preventable maternal and neonatal morbidity and mortality. SBA refers to skilled care provided during pregnancy, childbirth, and the postnatal period by accredited health professionals—such as doctors, nurses, or midwives. The competent health professional should be able to manage normal deliveries and recognise, manage, or refer complications in mothers and newborns [1]. SBA serves as a proxy indicator for access to quality maternal services and overall health system performance.

PNC is a component of skilled care that encompasses the continuum of maternal care, covering assessments of the mother and newborn within the first 48 hours, 7 - 14 days, and up to six weeks after delivery. These services include identification and management of maternal and neonatal complications, breastfeeding support, postpartum family planning, and postpartum education [2]. Despite national progress, substantial inequalities persist—particularly within urban informal settlements like Kibera, where access to quality health services is compromised [3].

Kibera, located approximately five kilometres southwest of Nairobi's central

business district, is Kenya's largest informal settlement, housing an estimated 200,000 - 250,000 residents within 2.5 square kilometres. Kibera is marked by poverty, overcrowding, unemployment, insecure housing, and limited access to clean water, sanitation, and electricity [4] [5]. Healthcare infrastructure is fragmented, consisting of overstretched public health centres, private clinics, faith-based providers, and unregulated informal providers [6].

Frequent stockouts of essential medical supplies and weak referral systems undermine the quality and contribute to low utilisation of maternal and newborn care, even in proximity to Nairobi's top hospitals. This gap highlights the disconnect between national policies (e.g., Linda Mama and Universal Health Coverage (UHC)) and the lived realities of urban poor populations. Addressing this requires integrated, context-sensitive reforms targeting health infrastructure, supply chains, referral systems, and quality assurance.

Kenya's maternal mortality ratio (MMR) declined from 445 deaths per 100,000 live births in 2000 to an estimated 379 per 100,000 live births by 2025 [7]. Expanded maternal health interventions such as skilled birth attendance (SBA) and postnatal care (PNC) have driven this improvement. The Ministry of Health adopted the national guidelines for PNC in 2016, recommending structured care within 48 hours, 7 - 14 days, 4 - 6 weeks, and 4 - 6 months postpartum. However, data collection focuses on the first 48 hours after delivery, when most maternal and neonatal deaths occur, limiting assessment of the other defined moments.

Despite national-level statistics indicating high rates of facility-based deliveries in urban areas (exceeding 90%), significant subnational disparities persist. In Kibera, for instance, although 97% of women report delivering in health facilities, only 44% utilised public hospitals despite the availability of free maternity services [8]. Women frequently cite poor quality of care, overcrowding, staff shortages, and lack of privacy as key deterrents, prompting many to seek services in private or NGO-run clinics, or in some cases, to deliver at home. These service delivery choices are shaped by broader conditions of urban deprivation, including pervasive poverty, high unemployment, overcrowding, low educational attainment, and inadequate access to basic infrastructure such as clean water, sanitation, and quality healthcare [4] [9]. Such structural determinants substantially hinder women's ability to access timely and appropriate maternal health services.

Kenya has made commendable progress in reducing maternal mortality over the past decade, with the national maternal mortality ratio (MMR) declining from 379 deaths per 100,000 live births in 2009 to an estimated 149 in 2023 [7] [10]. However, these national gains obscure significant within-country inequalities. In Nairobi's informal settlements—such as Kibera—maternal mortality remains alarmingly high. One widely cited study estimated the MMR in these settings at 706 deaths per 100,000 live births [9]. Furthermore, only approximately 21% of maternal deaths in these slums occur under the supervision of a skilled health professional, reflecting severe gaps in access to timely and adequate emergency obstetric care [9]. Common causes of maternal death—including postpartum haemorrhage, sepsis,

hypertensive disorders, and unsafe abortion—remain poorly managed due to systemic failures within the health service delivery framework [11]. This stark inequity underscores the urgent need for localised, equity-driven reforms that prioritise quality, accessibility, and responsiveness within maternal health systems to ensure that national improvements are equitably distributed across all population groups, including those in informal urban settlements.

Reducing maternal mortality remains a top national priority for Kenya, in alignment with Sustainable Development Goal (SDG) 3.1.2, which aims for at least 90% of births to be attended by skilled health personnel as a pathway to reducing maternal deaths to fewer than 70 per 100,000 live births globally [7]. Preventing or managing life-threatening complications like haemorrhage, sepsis, and eclampsia requires skilled birth attendance and quality antenatal and postnatal care. In response, the government of Kenya has implemented a series of progressive health reforms. These include the 2007 Reproductive Health Policy and its subsequent updates, which prioritise equitable access to high-quality reproductive, maternal, newborn, child, and adolescent health services [12]. In 2013, the introduction of the Free Maternity Services policy—commonly referred to as the Linda Mama Program—abolished user fees in public health facilities to encourage facility-based deliveries [13]. The initiative significantly improved skilled birth attendance coverage, increasing from approximately 62% in 2014 to 89.3% by 2022 [14]. More recently, Kenya established the Social Health Insurance Fund (SHIF), replacing the National Health Insurance Fund (NHIF) as part of broader Universal Health Coverage (UHC) reforms. SHIF extends subsidised coverage to workers in the informal sector, offering a more inclusive safety net for reproductive and maternal health services. Despite these commendable efforts and national-level gains, significant disparities persist—particularly in informal settlements such as Kibera. While urban-level statistics suggest that more than 90% of births occur in health facilities, localised studies reveal stark contrasts. For instance, a cross-sectional study in Kibera found that, although 97% of women delivered in a health facility, only 43.9% utilised public hospitals—despite free services being available [8]. Many women preferred private clinics, NGO-run facilities, or even home deliveries due to concerns about poor service quality, overcrowding, staff shortages, and lack of privacy in public institutions. These findings demonstrate the importance of targeted, equity-focused interventions tailored to the realities of underserved urban populations.

PNC remains underutilised, particularly in informal settlements. The 2022 Kenya Demographic and Health Survey reported 73% of mothers within six weeks of delivery [14], but only 57% received a check-up within the critical first 48 hours—disparities are pronounced by location, household income, and delivery setting. Facility births often support immediate PNC, while home births—more common among poorer women—rarely offer follow-up care.

In slum areas like Kibera, early discharge, lack of structured follow-up, low awareness, and socio-cultural barriers limit PNC utilisation [8] [15] [16]. Further-

more, the quality of postnatal care services remains suboptimal, as evidenced by findings that a substantial proportion of mothers receive inadequate clinical assessments and limited counselling during the postpartum period [17]. Missed complications like sepsis, haemorrhage, high blood pressure, or neonatal infections contribute to significant maternal and neonatal death; nearly two-thirds of maternal deaths happen after childbirth [18]. Strengthening comprehensive and equitable PNC delivery in underserved urban communities is critical to reducing and improving maternal and newborn outcomes

1.1. Healthcare Workforce and Quality in Kibera

An adequately trained healthcare workforce is essential for quality maternal and child health (MCH). Kenya's health worker density remains below the WHO-recommended 44.5 per 10,000 population, with a national average of 13.8 and wide regional disparities [19] [20]. In Nairobi County, informal settlements like Kibera remain underserved [21] [22].

Public health facilities, such as the Kibera South Health Centre and Kibera DO Health Centre, face chronic staff shortages, overcrowding, resource constraints, long queues, and negative patient-provider experiences. Women report disrespectful or inadequate care during antenatal visits or labour, prompting them to seek private services despite the higher cost. For example, a woman in Kawangware noted, "*I had to start attending ANC at a private clinic because when you visit the public hospitals, they don't even check your pregnancy. They just observe you and take your weight.*" [15]

To fill the service gaps, numerous small private maternity clinics and traditional birth attendants have proliferated. These facilities may offer personalised or responsive care but often lack essential supplies, equipment, accreditation, or qualified personnel trained to handle obstetric emergencies [8]. These facilities are poorly regulated, and clinical standards vary widely, and quality assurance is minimal. National efforts to strengthen the workforce—such as decentralised recruitment and in-service training—have made a limited impact on informal areas. A 2021 audit found only 34% of urban informal facilities had midwives, and CME participation was just 19% compared to 60% in referral hospitals [23]. Without regulation, oversight, and provider support, maternal health quality remains highly uneven across Kibera.

1.2. Community Health Infrastructure in Kibera

To bridge gaps, Kenya has invested in community-level interventions. In Kibera, Community Health Volunteers (CHVs) conduct home visits, promote ANC, provide health education, and refer women to facilities promoting skilled birth attendance [19]. These efforts have improved ANC coverage and health facility deliveries by reducing geographical and financial barriers [21] [24]. However, challenges persist; referral completion remains inconsistent, many women miss PNC appointments, and CHVs lack adequate training, supervision, and supplies. The

Beyond Zero Campaign, which brought mobile clinics, is not consistently deployed, limiting sustained impact [25].

Sustaining and integrating community interventions with the formal health system alongside consistent funding and policy support will be key to ensuring long-term improvement in maternal health in informal settlements like Kibera.

1.3. Problem Statement

Despite significant policy investments such as the Free Maternity Services (Linda Mama) program and Universal Health Coverage (UHC), maternal mortality and morbidity remain high in informal urban settlements like Kibera. While Kenya's skilled birth attendance (SBA) rate has risen to 89.3% nationally [14], deep inequities in access and quality of care persist for marginalised populations [8] [11]. Kibera, with an estimated population of 200,000 - 250,000 residents, exemplifies the gaps that national policies have yet to close [21].

Women in Kibera face overlapping barriers to maternal care, including poverty, informal costs, limited access to well-equipped facilities, accessing timely and appropriate maternal health services, poverty and the inability to afford ancillary costs, long distances to adequately staffed facilities, negative perceptions of care quality, low health literacy, and sociocultural norms that promote home delivery [8] [26]. Although antenatal care (ANC) attendance is relatively high, many women drop out of the care continuum during delivery or postpartum, mirroring findings from similar slum settings in the region [27]. Early postnatal care (PNC) remains severely underutilised despite being a critical window for preventing the majority of maternal and neonatal deaths [18].

This persistent gap between policy intent and maternal health outcomes reflects a critical lack of localised, disaggregated data to guide targeted interventions. Most national strategies rely on aggregate indicators that mask intra-urban inequities, resulting in programs that are ill-suited to address the unique challenges of slum environments. Without detailed information on what causes low uptake of skilled birth attendance (SBA) and postnatal care (PNC)—like not having enough healthcare workers, too many untrained providers, or poor referral systems—policies may end up being too general and not effective. Therefore, we urgently need a context-specific, data-driven investigation to inform equitable maternal health programming in urban informal settlements like Kibera. This study aimed to determine the proportion and determinants of utilisation of SBA and PNC among residents of Kibera, Kenya.

1.4. Justification for Research

Skilled birth attendance (SBA) and postnatal care (PNC) are essential interventions for reducing maternal (MMR) and neonatal mortality (NMR), particularly in resource-constrained settings. SBA enables the timely identification and management of childbirth-related complications, while PNC, especially within the first 48 hours postpartum, offers a vital window to detect and address life-threatening

conditions affecting both mothers and newborns [18].

Despite Kenya's efforts to expand maternal health services through policies such as the Free Maternity Services (Linda Mama) program, significant disparities persist in informal urban settlements [21].

Kibera, Nairobi's largest slum, exemplifies this equity gap. Although SBA coverage is above 90%, many women in Kibera deliver in informal and under-regulated settings and often miss PNC [8] [14]. This reflects a breakdown in the continuum of care, wherein women attend antenatal care but drop off before skilled delivery or postpartum follow-up.

There remains a paucity of updated, granular data on maternal health service utilisation in Kibera, particularly in the context of recent health reforms, including the introduction of social health insurance mechanisms. Existing national data often masks intra-urban disparities, limiting the precision of policy targeting. So, the study is important because it can provide useful information about how women in Kibera use maternal health services and what challenges they face, which will help improve health planning and ensure that all women and newborns receive the care they need. The findings will inform urban health planning, support more equitable deployment of maternal health resources, and contribute to national efforts to achieve SDG 3.1 and UHC by ensuring that no woman or newborn is left behind. The findings will inform policy reforms for cultural and context-sensitive service delivery for improved maternal and neonatal outcomes.

1.5. Study Objectives

This study aimed to assess the coverage and determinants of skilled birth attendance (SBA) and postnatal care (PNC) services among women of reproductive age in Kibera, Nairobi. Specifically, it aimed to quantify the proportion of births attended by skilled health personnel and explore the socio-demographic, economic, and infrastructural factors influencing the use of SBA. It also assesses the availability, timeliness, and quality of PNC, with particular attention to the critical 48-hour and six-week post-delivery periods, and explores the structural and behavioural barriers to access and continuity of maternal care, using the Three Delays framework to explore delays in seeking, reaching, and receiving care.

Finally, the study will generate context-specific, evidence-based policy recommendations to improve maternal health services in urban informal areas, focusing on fairness and supporting Kenya's commitments to Universal Health Coverage and Sustainable Development Goal 3.1.

1.6. Research Questions

1) What is the current level of skilled birth attendance (SBA) coverage in Kibera, and what influences its use among women of reproductive age in Kibera?

2) What are the key determinants of postnatal care (PNC) utilisation among mothers in Kibera?

3) What structural and behavioural barriers hinder access to SBA and PNC in

Kibera?

4) What policy and programmatic interventions can effectively address the barriers to skilled delivery and postnatal care in urban informal settlements like Kibera?

2. Literature Review and Theoretical Framework

2.1. Review of Relevant Literature

2.1.1. Skilled Birth Attendance: Trends and Determinants

Skilled birth attendance (SBA) is a cornerstone intervention for reducing maternal deaths. Tessema and Tesema (2020) reported that the pooled analysis of Demographic and Health Survey (DHS) data from 11 East African countries showed a 67% SBA rate, with Kenya performing comparatively better. Significant determinants included education, household wealth, and antenatal care (ANC) attendance—particularly the completion of four or more ANC visits as recommended by national guidelines. Specifically, women with secondary education had 2.8 times higher odds of SBA, while at least one ANC visit increased the odds of skilled delivery by 1.7 times. In Nairobi's slums, similar trends persist—women from wealthier households or those with more education are more likely to utilise skilled delivery services [9] [28].

In a related study, Atusiimire *et al.* (2019) observed in Kampala's informal settlements that early initiation of ANC and media exposure doubled the likelihood of facility delivery. In Kibera, Afulani *et al.* (2021) and Owiti, Oyugi, and Essink (2018) noted that many women bypass nearby facilities due to perceived poor quality, instead seeking care in better-equipped or more respectful environments. Jacaranda Health (2023) similarly reported that while 68% of lower-income women delivered in local clinics, many wealthier residents left the settlement to seek higher-quality care elsewhere. These patterns underscore the role of perceived service quality and socioeconomic empowerment in SBA uptake.

2.1.2. Postnatal Care Utilization and Gaps

Postnatal care (PNC) remains one of the most underutilised maternal health services, despite being a critical window for preventing complications and deaths. According to WHO guidelines, PNC should be provided within 48 hours, 7 - 14 days, and at six weeks postpartum (World Health Organisation [WHO], 2016). However, Benova *et al.* (2019) found that even among facility births in Africa, only a median of 72% received a check before discharge. The 2022 Kenya DHS reported that 73.9% of women had postnatal contact within 48 hours, yet the content and quality of PNC were inconsistent [14].

Nuwabaine, Musoke, Lubega, and Waiswa (2024) emphasised that the place of delivery, maternal age, and pregnancy intention were strong predictors of PNC use. Moreover, poor delivery treatment significantly reduced the likelihood of women returning for postnatal services. Afulani *et al.* (2021) added that fragmented discharge processes, lack of follow-up mechanisms, and low awareness further reduce PNC uptake in Nairobi's slums. Similar barriers, including limited house-

hold decision-making power and misconceptions regarding the importance of postnatal care, have also been documented in Bangladesh [29]. These studies underscore that improving postnatal care requires not only increasing access but also addressing the information and cultural gaps surrounding it.

2.1.3. Quality of Care and Emergency Readiness

Enhancing the quality of care in health facilities has been widely recognised as a critical strategy for reducing preventable maternal and neonatal mortality. The WHO (2016) defines quality of care (QoC) as the extent to which health services increase the likelihood of desired outcomes, adhere to current professional knowledge, and consider the preferences and aspirations of the women and their families. In maternal and newborn health, QoC involves both clinical effectiveness and respectful patient experience. Access to Basic and Comprehensive Emergency Obstetric and Newborn Care (BEmONC and CEmONC) services—such as assisted delivery, management of haemorrhage, caesarean sections, and newborn resuscitation—is critical for survival [11]. However, most local facilities in informal settlements like Kibera either limit or lack these services [8].

In addition to technical deficits, women's experiences shape care-seeking decisions. Evidence indicates that experiences of disrespectful maternity care—characterized by neglect, verbal abuse, and compromised privacy—are strongly associated with decreased likelihood of future utilization of facility-based maternal health services [30] [31]. Women have demonstrated a marked preference for private maternity clinics, primarily due to the provision of respectful, patient-centered care, despite the associated higher financial costs [32]. However, many of these facilities are unregulated, lack accreditation, and may compromise clinical quality. In response, WHO has promoted Respectful Maternity Care (RMC) as a core component of quality improvement initiatives [33] [34].

2.1.4. Health Infrastructure and Access in Kibera

Despite its proximity to Nairobi's advanced hospitals, Kibera's health infrastructure remains fragmented and under-resourced. The area hosts a mix of public clinics, NGO-run facilities, and numerous unregulated private providers. Most local clinics are unable to manage obstetric complications due to a lack of equipment, accreditation, and trained staff [8]. Geographic barriers—including narrow alleyways, impassable roads, and insecurity—further impede timely access, particularly during emergencies [9]. These factors contribute directly to the second delay in the "Three Delays" model: delay in reaching a facility [35].

Although government policies like Linda Mama and the Social Health Insurance Fund (SHIF) aim to eliminate user fees, uptake remains low in slums. Oyugi (2023) noted that documentation challenges, a lack of awareness, and the exclusion of some private providers from the scheme hinder full benefit realisation. Gavi (2021) evaluated Linda Mama and found that while facility deliveries increased, the gains in SBA were not statistically significant when controlling for other variables. These findings highlight the importance of both service readiness and community

engagement in enhancing maternal health outcomes.

2.1.5. Policy and Programmatic Directions

Kenya has made significant policy commitments toward maternal health, including the adoption of the Sustainable Development Goals and the pursuit of Universal Health Coverage (UHC). In theory, the Linda Mama program, Beyond Zero mobile clinics, and community health volunteer (CHV) programs have improved service availability [24] [36]. However, sustainability and scalability remain of concern. Many CHVs in Kibera face challenges such as a lack of training, inadequate supervision, and delayed stipends [4].

Research shows that we need to combine different strategies: better rules for private maternity providers, more access to basic and comprehensive emergency obstetric and newborn care in slums, improved referral systems, and investments in respectful and ongoing care. Without these reforms, maternal health disparities in informal settlements will persist despite national-level progress.

2.2. Theoretical Framework

This study draws upon three interlocking theoretical frameworks—Andersen's Behavioural Model of Health Services Use, the Three Delays Model, and the World Health Organisation's Health System Framework—to conceptualise and analyse maternal health service utilisation in Kibera, Nairobi's largest informal settlement. Each framework contributes distinct yet complementary perspectives: individual determinants of behaviour, temporal and logistical dimensions of access, and systemic structures influencing service delivery. Together, they provide a robust and multi-level lens through which to interpret the study's findings and guide policy recommendations.

2.2.1. Andersen's Behavioral Model of Health Services Use

The Andersen model, first introduced by Ronald Andersen in 1995, conceptualises health service utilisation as a function of three main factors: predisposing characteristics such as age, education, and cultural norms; enabling resources including income, health insurance, and geographic access; and the individual's perceived or actual need for care, such as the presence of health complications or awareness of potential risks [18] [37]. The model has been extensively applied to maternal health research in low- and middle-income countries (LMICs), offering a structured approach to examining both demand- and supply-side barriers.

In this study, Andersen's model informed the design of the quantitative survey, which captured individual-level determinants such as education, marital status, ANC attendance, household wealth, and parity. For instance, women with lower education and limited enabling resources (e.g., no health insurance or long distances to facilities) were significantly less likely to use skilled birth attendance (SBA) or postnatal care (PNC). Conversely, perceived need—such as prior obstetric complications or ANC counselling—enhanced the likelihood of seeking facility-based delivery or PNC. These findings are consistent with previous research

in urban slums, where perceived low risks and logistical constraints jointly influence health-seeking behaviour [8] [38].

2.2.2. The Three Delays Model

The Three Delays Model, developed by Thaddeus and Maine (1994), conceptualises maternal mortality as the result of sequential barriers at three critical stages: 1) a delay in deciding to seek care; 2) a delay in reaching a healthcare facility; and 3) a delay in receiving adequate care upon arrival [35]. Although it was originally applied to maternal mortality, the framework is equally valuable for examining barriers to maternal health service utilisation more broadly.

This framework guided both the survey instrument and the qualitative interview protocols. Delay I factors (decision to seek care) encompassed socio-cultural beliefs, mistrust of public health providers, and family influence. Delay II factors included poor transport infrastructure, financial constraints, and insecurity—especially at night. Delay III covered issues such as long wait times, provider absenteeism, and perceived mistreatment at facilities. The model provided a temporal structure to understand when and why women in Kibera either did not reach facilities or did not receive appropriate services once there—especially pertinent to explaining the 22% of women who delivered without skilled attendance and the 45% who missed timely PNC [8] [17].

2.2.3. WHO Health System Framework

To assess systemic and structural determinants of maternal health service gaps, the study employed the WHO Health System Framework, which outlines six essential building blocks: (i) (i) service delivery, (ii) health workforce, (iii) health information systems, (iv) access to essential medicines, (v) health financing, and (vi) leadership/governance [39]. This macro-level lens enabled the identification of policy-relevant health system bottlenecks.

In the context of Kibera, systemic issues were evident across nearly all blocks. Service delivery was compromised by nonfunctional referral systems and facility overcrowding. Health workforce challenges included staff shortages, low motivation, and poor training in respectful maternity care. Health information systems failed to ensure continuity of care post-delivery, contributing to low PNC uptake. Facilities frequently experienced stockouts of essential drugs and supplies, undermining quality and continuity of care. Although Kenya's Free Maternity Services (Linda Mama) policy removed formal fees, indirect costs (e.g., transport and supplies) remained prohibitive for many women [40]. Governance gaps—such as unregulated private clinics and poor coordination among NGOs—further compounded the fragmented maternal health ecosystem in Kibera [11].

2.2.4. Integrated Analytical Lens

The triangulation of these three frameworks allowed for a multi-dimensional analysis aligned with the study's objectives and research questions. Andersen's model explained the individual-level determinants, the Three Delays model elucidated

the temporal and process-related access barriers, and the WHO framework addressed the systemic bottlenecks. This layer illustrates that the problem statement has uncovered multiple factors—both enabling and constraining—across various levels in Kibera, thereby supporting the study's aim to develop context-specific and actionable recommendations for local implementation and strategic alignment.

This integrated framework also ensured that findings were actionable across multiple stakeholder domains. For instance, while community organisations might prioritise interventions addressing Delay I (e.g., health literacy, cultural norms), policymakers may be more responsive to insights derived from the WHO framework (e.g., strengthening facility staffing and drug supply chains). Moreover, the approach is consistent with global maternal health discourse emphasising respectful, timely, and equitable care as essential to achieving Sustainable Development Goal 3.1 [7].

3. Methods

3.1. Study Design and Setting

This study employed a convergent mixed-methods cross-sectional design to examine maternal health service utilisation—specifically skilled birth attendance (SBA) and postnatal care (PNC)—in Kibera, one of Nairobi's largest and most densely populated informal settlements. The study aimed to quantify coverage rates and identify determinants of SBA and PNC.

Kibera, located approximately five kilometres from Nairobi's central business district, is home to an estimated 200,000 - 250,000 residents within 2.5 square kilometres [5]. It's characterised by poverty, unemployment, limited infrastructure, and a fragmented healthcare ecosystem that includes public clinics, private maternity homes, faith-based facilities, and traditional birth attendants (TBAs). Despite geographic proximity to referral hospitals, women in Kibera face significant access barriers, ranging from socio-cultural norms and health system limitations to financial constraints and safety concerns [8]. Six administrative villages were purposively selected to represent a cross-section of the community's demographic and health service variation.

While WHO guidelines recommend that maternal health services be available within 5 km, our use of a 3 km threshold reflects contextual realities in Kibera, where poor transport infrastructure and congestion render even moderate distances a substantial barrier. The closeness of the observed proportions (0.45 vs. 0.55) across distance groups may have limited statistical contrast, but the trend remains meaningful.

3.2. Study Population and Sampling

The target population is women aged 18 - 49 years who delivered within the past 24 months and male carers (e.g., spouses or partners) involved in perinatal decision-making. Including male carers reflected emerging evidence on the role of men in influencing maternal health-seeking behaviour, particularly in patriarchal

and resource-limited urban settings [41].

Six villages in Kibera—Laini Saba, Gatwekera, Kianda, Soweto, Makina, and Silanga—were purposively selected in consultation with local administrative leaders and community health volunteers (CHVs) to capture the broader socio-demographic and infrastructural heterogeneity of the settlement. A systematic household sampling approach was employed. In collaboration with CHVs, household mapping was conducted, and every fifth household was approached from a randomly determined starting point. If an eligible respondent was absent, the nearest adjacent household was considered.

A total of 423 women of reproductive age and 87 male carers were successfully recruited. The sample size was determined using Cochran's formula for proportions, based on an assumed 50% prevalence of SBA or PNC utilisation, with a 5% margin of error and a 95% confidence level. Of the 513 eligible households approached, the response rate was 82.5%, with consistent participation observed across the selected villages and no substantial clustering effects detected. Given the purposive selection of villages and the high response rate, no post-stratification weighting adjustments were applied. Nevertheless, findings are interpreted with caution and are generalisable primarily to similar informal urban settlement contexts.

For the qualitative component, purposive sampling was employed to ensure diversity and thematic depth to saturation. Data were gathered through:

- Six focus group discussions (FGDs) with women stratified by age, birth setting (home vs. facility), and PNC use.
- One FGD with male carers to explore gendered perspectives.
- Fifteen key informant interviews (KIIs) with maternal health stakeholders, including healthcare providers, CHVs, TBAs, NGO staff, Nairobi County policy staff, and local health administrators.
- Ten in-depth interviews (IDIs) with women who experienced adverse maternal outcomes (e.g., stillbirth, neonatal death, or fistula), offering insight into lived experiences and barriers to care.

3.3. Data Collection Procedures

3.3.1. Variable Selection and Cluster Adjustment

Variables were selected based on Andersen's Behavioural Model, the Three Delays Model, and the WHO Health System Framework, as well as empirical evidence from maternal health literature in informal urban settings. Bivariate associations were examined using chi-square tests ($p < 0.05$) to inform inclusion in the multivariate models. Robust standard errors were applied to account for clustering at the village level, enhancing statistical inference while minimising the risk of overparameterization.

3.3.2. Quantitative Survey

Between March and May 2025, data were collected via REDCap using a structured digital questionnaire on handheld tablets. Modules covered sociodemographics,

antenatal care (ANC), delivery location, PNC, decision-making, quality of care, and access barriers. Questions were adapted from the Kenya Demographic and Health Survey (KDHS) and validated maternal health tools [42].

Trained nurses and community health volunteers (CHVs) familiar with the Kibera context conducted the interviews after a three-day training focused on ethical procedures, obtaining informed consent, and ensuring data quality. Field supervisors reviewed data daily, and REDCap's logic checks flagged inconsistent or implausible responses.

3.3.3. Qualitative Interviews

In-depth interviews, key informant interviews, and focused group discussions were conducted in English or Kiswahili, depending on the participants' preferences. The interviews were audio-recorded with consent and transcribed verbatim. Interview guides were informed by conceptual frameworks and explored decision-making, access experiences, perceptions of care, and health system interactions.

3.4. Data Analysis

3.4.1. Quantitative Analysis

Descriptive statistics were used for summary variables (frequencies, means, medians, and proportions). Quantitative data were analysed using Stata version 17.0. IVE statistics—including frequencies, means, and medians—were employed to summarise socio-demographic characteristics and maternal health behaviours. Bivariate analysis (chi-square) assessed the associations between predictors (e.g., education, wealth tertile, ANC visits, parity, and proximity to the nearest health facility) and skilled birth attendance (SBA) and postnatal care (PNC) outcomes.

Multivariate logistic regression identified independent predictors reporting adjusted odds ratios (aORs) with 95% confidence intervals (CIs). Model assumptions were assessed using variance inflation factors (VIFs); the tested multicollinearity and the Hosmer–Lemeshow test confirmed fit ($p = 0.45$).

3.4.2. Qualitative Analysis

Thematic analysis was guided by a combination of deductive and inductive coding strategies informed by the study's conceptual models. Two researchers independently conducted open and axial coding and resolved discrepancies through consensus. This ensured the reliability and trustworthiness of the qualitative analysis. A coding matrix was developed to facilitate thematic convergence and triangulation across the focus group discussions, in-depth interviews, and key informant interviews. To enhance credibility, member checking was conducted with a subset of participants to validate the accuracy and resonance of the interpreted themes.

3.5. Ethical Considerations

Ethical clearance was obtained from the Kenya Institutional Ethics Review Committees (IERCs). Written or verbal informed consent was secured. Data was anonymised, and confidentiality was maintained. Psychosocial support was available

for participants sharing sensitive issues, particularly during IDIs involving obstetric trauma or neonatal loss.

4. Results

4.1. Statistical Analysis: Descriptive Results and Logistic Regression

4.1.1. Studying Sample Characteristics

A total of 423 women (mean age 26.8 years, SD = 5.7) and 87 male partners (mean age 32.4 years, SD = 6.1) participated. Most women (343, 81%) were either married or in a stable partnership, over half had only primary or no education, approximately half were multiparous, and 60% were unemployed or had informal work.

The living conditions were indicative of typical urban slum environments: the majority of households occupied single-room dwellings, fewer than one in five had access to piped water, and approximately 40% were classified as having low wealth status.

Approximately 40% of women were first-time mothers, while the others had two or more previous births. Although antenatal care (ANC) attendance was nearly universal, only 68% of women met the minimum recommended four visits, and fewer exceeded six visits. Fewer than one-third started ANC during the first trimester, citing delayed recognition of pregnancy, competing household responsibilities, and misconceptions about the appropriate timing for ANC.

Male partners completed a separate questionnaire on their knowledge, attitudes, and involvement in maternal health, with analysis conducted independently to explore their influence on maternal health-seeking behaviours.

4.1.2. Skilled Birth Attendance (SBA) Rate

The majority of respondents reported receiving skilled birth care, with nurses and midwives identified as the primary providers in over 67% of cases. Physician-assisted deliveries accounted for fewer than 20% of reported births, while paramedical personnel were involved in only a small fraction. Notwithstanding the predominance of skilled attendance, a proportion of births still occurred outside the formal health system, including those attended by traditional birth attendants or conducted at home. These findings underscore persistent challenges in achieving universal coverage of skilled birth attendance and highlight disparities related to access, sociocultural preferences, and perceptions of the quality of facility-based intrapartum care.

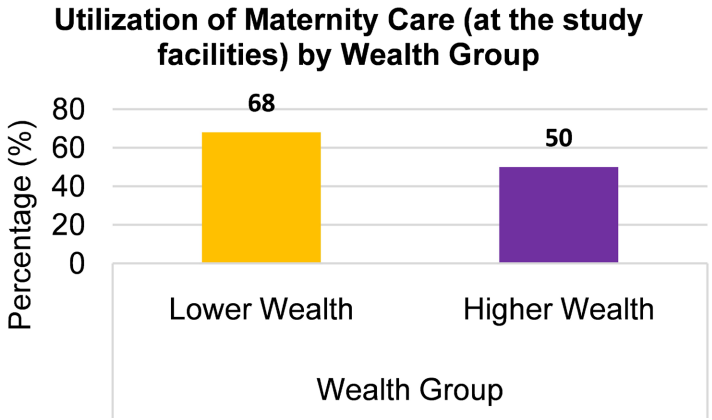
4.1.3. Postnatal Care (PNC) Utilization

Postnatal care uptake is low compared to antenatal care and skilled birth attendance. About 55% received at least one postnatal check-up within six weeks of delivery, and only 37% received early postnatal contact. Among those who accessed PNC, 60% said that either the mother or newborn was examined within the first two weeks. Conversely, 45% of women had no postnatal care contact by six weeks. And 52% reported no newborn checkup during the same period.

The primary reasons for non-utilisation of PNC included perceived lack of need (45%), lack of awareness (25%), logistical barriers (15%), financial or transport-related constraints (10%), and prior negative facility-based care experiences (5%). Antenatal counselling on PNC was significantly associated with increased uptake (aOR = 2.22; 95% CI: 1.30 - 3.79). Timing of ANC was not associated with PNC utilisation after adjustment.

Graph: We summarise some of these results visually.

Figure 1 (embedded below) illustrates differences in care-seeking by wealth group in an urban slum context, which aligns with our findings. Lower-wealth mothers (orange) were more likely to seek delivery care at local facilities within the slum, whereas higher-wealth mothers (purple) more often went outside the Kibera slum for delivery. The figure, drawn from a related study, shows ~68% of lower-wealth women delivered in local (project) facilities vs. ~50% of higher-wealth women.



Percent of mothers who sought maternity care at study facilities by wealth group (orange = lower wealth tertile, purple = higher wealth tertile). Note that lower-wealth women were significantly more likely to give birth in local informal settlement facilities than higher-wealth women, who often opted for external or private facilities (Jacaranda Health, 2023). There were no major wealth differences in ANC and initial PNC utilisation in this specific dataset, indicating the wealth gap is most pronounced for place of delivery.

Figure 1. Percent of mothers seeking maternity care by wealth group (Adapted from Jacaranda Health, 2023).

4.1.4. Male Partner Engagement in Maternal Health

Eighty-seven male partners participated in the survey. Reflecting educational patterns in Kibera, approximately 45% had completed secondary education, 30% had primary-level education, 20% had attained tertiary education, and a small proportion (5%) had no formal schooling. Employment was predominantly informal, with around 60% engaged in casual or non-salaried work, 15% formally employed, and the remainder either unemployed or involved in irregular income-generating activities.

Regarding engagement in maternal health, 35% of male partners reported participating in birth preparedness, primarily by accompanying their spouses to at least one antenatal care (ANC) visit. More than half (54%) provided financial or

logistical support for facility-based delivery, though only 32% were aware of the recommended timing for early postnatal care (PNC). Furthermore, 48% had discussed maternal health plans with their partners prior to delivery.

Despite their involvement, only 29% had received maternal health information from community health volunteers (CHVs) or local awareness campaigns. Notably, just 21% reported joint decision-making regarding the place of delivery, with most indicating that such decisions were made either by the female partner alone or through collective household consensus, often without their direct input. Table 1 shows detailed sample characteristics.

Table 1. (a) Socio-demographic and obstetric characteristics of study participants (N = 423); (b) Maternal health service utilization and related determinants (N = 423).

(a)	
Characteristic	**n (%)**
Age (years)	
18 - 24	142 (33.6%)
25 - 34	232 (54.8%)
35 - 43	49 (11.6%)
Mean (SD)	26.8 (±5.7)
Marital status	
Married/stable partnership	343 (81.0%)
Single/divorced/widowed	80 (19.0%)
Education level	
Primary or less	237 (56.0%)
Secondary	144 (34.0%)
Post-secondary	42 (10.0%)
Employment status	
Formal employment	62 (14.7%)
Informal employment (e.g., vending)	107 (25.3%)
Not employed	254 (60.0%)
Parity	
Primiparous (first birth)	169 (40%)
Multiparous (2 - 3 children)	190 (45%)
Grand multiparous (≥4)	64 (15%)
Wealth index tertile	
Low	169 (40.0%)
Medium	148 (35.0%)
High	106 (25.0%)
Health insurance coverage	
Yes	103 (24.3%)
No	320 (75.7%)

Continued

(b)	
Characteristic	**n (%)**
ANC attendance	
≥1 visit	410 (96.9%)
≥4 visits	288 (68.0%)
≥6 visits	195 (46.1%)
>6 visits	127 (30.0%)
Place of delivery	
Public facility	216 (51%)
Private facility	76 (18%)
NGO/Charity facility	38 (9%)
Home/Community delivery	93 (22%)
Skilled Birth Attendance (SBA)	
Doctor	75 (17.7%)
Nurse/Midwife	289 (68.3%)
Paramedical	59 (13.9%)
PNC within 6 weeks	
Within 48 hours	89 (21.0%)
Between 7 - 14 days	146 (34.5%)
Between 15 days and 6 weeks	98 (23.2%)
ANC counselling on PNC	
Yes	276 (65.2%)
No	147 (34.8%)
Primary decision maker (on pregnancy/delivery)	
Self	219 (51.8%)
Husband	68 (16.1%)
Mother-in-law	84 (19.9%)
Other	52 (12.3%)
Received spousal/family support (on pregnancy/delivery)	
Yes	301 (71.2%)
No	122 (28.8%)
Previous birth experience	
High-risk	113 (26.7%)
Low-risk	310 (73.3%)
Availability of transport	
Yes	49 (11.6%)
No	142 (33.6%)

Continued

Perceived QoC	
Excellent	133 (31.4%)
Good	99 (23.4%)
Bad	56 (13.2%)
Don't know	238 (56.3%)
Cost of maternal health services	
High	292 (69.0%)
Average	129 (30.5%)
Low	131 (31.0%)
Access to referral facilities	
Yes	292 (69.0%)
No	131 (31.0%)

4.1.5. Factors Associated with Skilled Birth Attendance

Multivariable logistic regression analysis was conducted to identify factors associated with the utilisation of skilled birth attendance (SBA). The model demonstrated adequate fit (Hosmer-Lemeshow test: p = 0.45) and explained approximately 30% of the variance in SBA utilisation. The key determinants of SBA identified in the analysis included maternal education level, household wealth status, ANC attendance, parity, and distance to the nearest health facility (see Table 2).

Women with secondary education or higher had significantly greater odds of SBA (adjusted odds ratio [aOR] = 2.54; 95% confidence interval [CI]: 1.30 - 4.96), followed by those with primary education (aOR = 1.64; 95% CI: 1.01 - 2.66), compared to women with no formal education. Wealthier households were more likely to utilise SBA, with the highest wealth tertile showing the strongest association (aOR = 3.12; 95% CI: 1.68 - 5.80) and the middle tertile also demonstrating increased odds (aOR = 1.83; 95% CI: 1.07 - 3.11), relative to the lowest tertile.

ANC attendance was positively associated with SBA. Women who attended four or more ANC visits had higher odds of SBA (aOR = 2.88; 95% CI: 1.65 - 5.04), and those with 2 - 3 visits showed a modest association (aOR = 1.67; 95% CI: 0.92 - 3.00), compared to those with one or no visit. Parity was inversely associated with SBA utilisation: women with five or more children had lower odds (aOR = 0.40; 95% CI: 0.20 - 0.80), as did those with 2 - 3 children (aOR = 0.63; 95% CI: 0.41 - 0.96), compared to primiparous women.

Geographic distance to the nearest facility also affected utilisation. Women living more than 3 km away had significantly lower odds of SBA (aOR = 0.42; 95% CI: 0.20 - 0.88), while those residing 1 - 3 km away also had reduced odds (aOR = 0.55; 95% CI: 0.31 - 0.97), relative to those living within 1 km.

ANC counselling, age, and employment status were included in the model but were not statistically significant. The aORs for ANC counselling (Yes vs No), age (35 - 43 years vs 18 - 24 years), and employment (Formal vs Unemployed) were

1.11 (95% CI: 0.72 - 1.72), 0.93 (95% CI: 0.53 - 1.63), and 1.08 (95% CI: 0.65 - 1.81), respectively. Details of all the above findings, including effect sizes and levels of statistical significance, are presented in Table 2.

Table 2. Multivariate logistic regression for predictors of Skilled Birth Attendance (SBA) and Postnatal Care (PNC).

Factor	SBA (aOR [95% CI])	PNC (aOR [95% CI])
Education (≥Secondary vs None/Primary)	2.54 [1.30 - 4.96]***	1.80 [1.07 - 3.03]*
Household Wealth Tertile (High vs Low)	3.12 [1.68 - 5.80]***	2.03 [1.20 - 3.41]*
ANC Visits (≥4 vs <4)	2.88 [1.65 - 5.04]***	2.20 [1.30 - 3.72]**
Distance to Facility (>3 km vs <1 km)	0.42 [0.20 - 0.88]*	0.76 [0.41 - 1.42]
Parity (≥4 vs Primiparous)	0.40 [0.20 - 0.80]**	0.50 [0.25 - 0.98]*
Facility Delivery (Yes vs No)	N/A	7.10 [4.00 - 12.50]***
ANC Counselling (Yes vs No)	1.11 [0.72 - 1.72]	2.22 [1.30 - 3.79]**
Age (35 - 43 Years vs 18 - 24 Years)	0.93 [0.53 - 1.63]	1.02 [0.58 - 1.78]
Employment Status (Formal vs Unemployed)	1.08 [0.65 - 1.81]	1.14 [0.66 - 1.98]

*$p < 0.01$, **$p < 0.05$, ***$p < 0.001$; aOR = Adjusted Odds Ratio; CI = Confidence Interval. Note: For brevity in this write-up, the detailed tables are not fully shown. However, key statistics have been described in the text. All reported odds ratios are adjusted for multiple factors and are significant at $p < 0.05$ unless noted as marginal.

4.1.6. Factors Associated with Postnatal Care Utilization

Multivariable logistic regression analysis was conducted to identify factors associated with postnatal care (PNC) utilisation within six weeks postpartum. The model demonstrated adequate fit (Hosmer-Lemeshow $p > 0.05$) and explained approximately 30% of the variance in PNC utilisation. Significant predictors included place of delivery, maternal education, household wealth, ANC attendance, parity, and receipt of antenatal counselling on PNC. Additional variables such as maternal age and employment status were included in the model, but did not reach statistical significance. Details of all findings, including effect sizes and levels of statistical significance, are presented in Table 2.

Facility-based delivery was strongly associated with increased odds of PNC utilisation (adjusted odds ratio [aOR] = 7.10; 95% confidence interval [CI]: 4.00 - 12.50), compared to home or community births. Women with secondary education or higher had greater odds of utilising PNC services (aOR = 1.80; 95% CI: 1.07 - 3.03), compared to those with no or primary education. Women in the highest wealth tertile also had increased PNC uptake (aOR = 2.03; 95% CI: 1.20 - 3.41), relative to those in the lowest tertile.

Attending four or more ANC visits was positively associated with PNC utilisation (aOR = 2.20; 95% CI: 1.30 - 3.72). Grand multiparity was negatively associated with PNC utilisation (aOR = 0.50; 95% CI: 0.25 - 0.98), relative to primipa-

rous women. Receiving antenatal counselling on PNC was also associated with higher odds of service uptake (aOR = 2.22; 95% CI: 1.30 - 3.79).

Maternal age (35 - 43 years vs. 18 - 24 years; aOR = 1.02; 95% CI: 0.58 - 1.78) and formal employment status (aOR = 1.14; 95% CI: 0.66 - 1.98) were included in the model but were not statistically significant predictors of PNC utilisation.

4.2. Qualitative Themes from FGDs, KIIs, and IDIs

The qualitative component comprised 6 FGDs, 15 KIIs, and 10 IDIs (how have the male carer interviews been captured? The FGDs included women 18 - 42 years old, stratified by age and parity.

The 15 KIIs were held with frontline health workers (4) [from two public, one private, and one faith-based organisation]; community health volunteers (CHVs) (2); facility managers (2) [from one public and one private facility]; local opinion leaders (2); county policy staff (1); traditional birth attendants (2); and NGO staff (2). (already described in the methodology).

Ten IDIs were conducted with women who experienced adverse maternal outcomes (e.g., stillbirth, neonatal death, or fistula) to deepen understanding of the barriers not fully captured through group settings.

Household decision-making dynamics were included in exploratory models. Though not statistically significant, exploratory models suggest higher SBA use when husbands were the primary decision-makers and lower when mothers-in-law did. These results suggest the potential influence of gender norms and family power structures on health-seeking behaviour, which may merit further qualitative investigation.

4.2.1. Cultural Norms and the Decision to Seek Maternal Health Services

Cultural beliefs and traditional norms strongly influenced maternal care. Many participants, particularly older women and community elders, describe childbirth as a natural and private process best managed within the home. In focus group discussions (FGDs), older women referenced a longstanding belief that "*giving birth is a woman's ultimate test*," which is often framed as an expectation of endurance and self-reliance. Within this cultural logic, facility delivery was sometimes viewed as unnecessary or even indicative of weakness. as sometimes viewed as unnecessary or even indicative of weakness.

These traditional norms extended across generations. Some young women reported familial or spousal pressure against facility-based births. One respondent recounted, "*My mother-in-law told me women in our family don't cry out in hospitals—they deliver at home with the granny's help*." Such accounts highlight how deference to senior relatives and embedded gender expectations contribute to delays in the decision to seek care, characteristic of Delay 1 in the Three Delays model.

Many women and KIIs reported using herbal remedies to "*quicken*" delivery or reduce labour pain, often administered by traditional birth attendants (TBAs), elderly women, or trusted relatives. One woman shared, "*They gave me herbal tea*

to help the baby come faster, so I didn't see the need to go to the hospital." Health workers corroborated this practice in key informant interviews (KIIs), noting that herbal use not only delays the decision to seek care but can also mask early signs of complications. However, the belief in the efficacy of these remedies remains strong in some communities, particularly where facility-based services are perceived as impersonal or inaccessible.

While these norms persist, they are not static. Several participants described gradual shifts in perception following adverse events or positive encounters with health professionals. As one woman noted, "*After my neighbour lost her baby at home, the whole area started saying it's better to go to the clinic*." Such transformative experiences illustrate a gradual cultural recalibration, particularly among younger mothers exposed to health education and peer support.

This theme underscores the complex interplay between cultural identity, generational beliefs, and health-seeking behaviour. Although traditional norms, including the use of labour-enhancing herbs, continue to shape maternal health decisions, they are increasingly being re-evaluated in light of emerging knowledge, community experiences, and efforts by health providers to build trust and engagement at the household level.

4.2.2. Perceptions of Quality and Trust in Health Facilities

Mistrust in public facilities due to disrespectful care—verbal abuse, neglectful treatment, indifference by staff, lack of emotional support, and corruption—discouraged mothers from seeking both skilled birth attendance (SBA) and postnatal care (PNC). One participant recounted, "*I was slapped on my thigh because I screamed during pushing. I felt humiliated*." Others described being left unattended for prolonged periods or being denied care for lacking social connections or informal payments. Such narratives contributed to widespread apprehension and avoidance of public facilities, reinforcing Delay 1—the postponement or refusal to seek skilled care.

The consequences of these negative encounters extended beyond delivery. Several women reported forgoing PNC follow-up because of prior mistreatment. As one mother expressed, "*I didn't go back there* [*for PNC*]; *I preferred to recover on my own rather than be insulted again*." These findings underscore how patient experience at the point of delivery can shape subsequent care-seeking behaviours.

By contrast, private maternity clinics operating in or near Kibera were consistently described in more favourable terms. Participants noted respectful treatment, attentive care, and continued communication post-discharge. One woman shared, "*The midwife at* [*private clinic*] *was kind*; *she even checked on me the next day by phone*." For women with the means to afford it, private facilities were often preferred, not only for perceived better clinical quality but also for the dignity and attention provided. This aligns with broader evidence suggesting that perceived quality of care—including provider behaviour—is a key determinant of health service utilisation [15].

Health workers corroborated these findings. A nurse at a public health facility

candidly acknowledged systemic limitations, noting, "*We are overwhelmed here. Sometimes one midwife has to handle five labouring women; we can't give each the attention they need, and maybe we come off as harsh. It's not ideal, and women sense that.*" Such reflections underscore how shortages in human resources, essential supplies, and infrastructure may compromise the quality of interpersonal care. These constraints not only impede the delivery of respectful maternity care but may also erode trust in the health system, inadvertently reinforcing community preferences for traditional providers or home-based delivery options.

Together, these insights emphasise the importance of not only improving clinical capacity but also addressing interpersonal aspects of care to enhance maternal health service uptake in underserved settings. These insights into perceived quality of care, cultural norms, economic barriers, and male partner involvement were further illustrated by participant voices captured in Table 3, which presents representative quotes aligned to the core themes emerging from the qualitative data.

Table 3. Illustrative quotes aligned to themes.

Theme	Illustrative Quote
Perceived Quality of Care	"*I delivered my first at* [*public hospital*], *but I was abused so much. The second time I saved money and went to a private clinic—it cost, but I was treated well.*"
Cultural Influence	"*Our grandmothers gave birth at home; we have that knowledge. Hospitals are good if trouble comes, but if not, I can help them just fine.*" (*Traditional Birth Attendant*)
Financial Barriers	"*I had no bus fare to go to the hospital when my labour started at night.*"
Trust in the System	"*I was slapped on my thigh because I screamed during pushing. I felt humiliated.*"
Community Support Mechanisms	"*The ambulance from the XYZ project came fast when my neighbour haemorrhaged—it saved her.*"
Complications after Home Birth	"*My baby didn't cry after birth. We rushed to the clinic too late, and they said he had passed. Maybe if I had gone earlier, things would be different.*"
Delay in Seeking Care	"*I laboured at home all night, thinking it was normal. By morning, I was bleeding too much. They said I should have come earlier.*"
Health System Resource Gaps	"*The nurse said there were too many women in labour. I waited almost one hour before anyone looked at me, and by then, I had bled so much.*"
Peer Accountability	"*None of us delivered at home because we kept each other accountable.*"
Male Partner Support	"*I made sure we had money saved, and I even took off work to take her to the clinic—this is my child too.*"
Technology as an Enabler	"*The messages kept me alert about when to go to the clinic after delivery.*"

4.2.3. Economic and Logistical Barriers to Facility-Based Care

Despite the Free Maternity Services policy, economic barriers continue to impede access to both skilled birth attendance (SBA) and postnatal care (PNC). Many women reported experiencing indirect costs, including out-of-pocket payments for essential medical supplies, transportation expenses, and opportunity costs associated with time away from income-generating activities. These financial burdens were particularly pronounced among women from low-income households

and those engaged in informal or casual labour.

Several participants described being required to purchase medical items, such as gloves, cord clamps, and injectable medications, when public facilities experienced stockouts. One woman shared, "*They told me to buy a cord clamp and some injection because they had none. I sent my sister to the pharmacy…it cost money.*" Even minor expenditures were described as prohibitive in the context of labour onset and economic precarity. A teenage mother recounted, "*I had no bus fare to go to the hospital when my labour started at night*," resulting in an unplanned home delivery.

Key informants, including community health volunteers (CHVs) and health facility staff, corroborated these accounts. A CHV noted, "*A casual labourer may choose a day's wages over spending that day at the clinic unless she's really convinced it's necessary.*" Health workers acknowledged the impact of recurrent stockouts and resource constraints on patient experience. A senior nurse commented, "*Sometimes we have no gauze, no antiseptic…and the mother is told to buy it herself. It's frustrating for everyone.*"

Policymakers and programme officers from non-governmental organisations (NGOs) who were interviewed during key informant interviews (KIIs) also echoed these concerns. One county health administrator remarked, "*The policy on free maternity is sound, but implementation at the facility level is uneven. Stockouts and staffing gaps undermine the promise of free care.*" Representatives from NGOs supporting maternal health initiatives emphasised the need to strengthen last-mile delivery systems and explore conditional cash transfers or voucher programmes to support the most vulnerable women. As one programme manager noted, "*Our data shows that even with free services, women still face cost barriers—transport, food, childcare. These hidden costs must be acknowledged and addressed.*"

Transport barriers during emergencies and night hours due to a lack of a dedicated ambulance service, reliance on commercial motorcycle taxis ("*boda bodas*"), or private vehicles that are inaccessible during night hours, adverse weather conditions, or security restrictions such as curfews. One carer described an incident during the COVID-19 curfew in which a woman in labour was unable to find transport and delivered at home with the assistance of a traditional birth attendant (TBA). Another health worker noted, "*We've lost mothers because they couldn't reach us in time. That's the reality.*"

These economic and logistical challenges represent structural contributors to Delay 2 in the Three Delays model—barriers to reaching appropriate care. Addressing them requires multisectoral interventions, including improved commodity supply chains, decentralised emergency transport mechanisms, and expanded partnerships with community-based organisations to deliver outreach services and mitigate financial hardship for women in informal settlements.

4.2.4. Role and Integration of Traditional Birth Attendants (TBAs)

Traditional birth attendants (TBAs) continue to occupy a nuanced and evolving

role in the maternal health landscape of Kibera. While historically respected for their experience and accessibility, their relevance in the era of facility-based delivery is increasingly contested. In FGDs, older participants reflected on the legacy of TBAs—locally known as *nyakinyua*—but acknowledged a growing recognition of their limitations in managing obstetric complications.

Despite this awareness, TBAs remain involved in maternal care, particularly during unanticipated or precipitous labours, or when facility access is constrained by time or cost. Several women reported choosing TBAs based on personal trust or kinship ties. One participant described, "*She massaged me through pregnancy, and I felt safe with her.*" Such relationships reinforce Delay 1, wherein the decision to seek formal care is deferred in favour of traditional support.

Interestingly, some TBAs have begun to adapt to the shifting maternal care environment. Key informant interviews with health personnel revealed that a few TBAs have been informally integrated into the referral pathway, serving as *birth companions* who accompany women to health facilities. While this practice remains limited in scope, it suggests a potential model for bridging cultural familiarity with formal health systems.

Nevertheless, this role remains largely unregulated. A TBA interviewed stated, "*I usually take them to the hospital if there's a problem, but if it's a smooth delivery, I can handle it. I've delivered hundreds of babies.*" Such confidence may delay critical referrals in cases where complications arise unpredictably. Consequently, TBAs may contribute to Delay 1—either by being the first (and sometimes only) point of contact or by delaying appropriate transfer to facility-based care.

Health officials expressed ambivalence about the role of TBAs. While acknowledging their reach in underserved communities, they emphasised the absence of formal oversight mechanisms. One official noted, "*We can't officially allow TBAs to practice, but maybe we should train them on first aid and referral because they are there anyway.*" This perspective points to a governance gap and opens the door for policy innovation—potentially formalising referral roles or offering basic emergency training to TBAs to enhance maternal health outcomes without legitimising unskilled delivery care.

4.2.5. Information Gaps and Health Literacy

Knowledge of skilled delivery was high, but significant gaps remained regarding postnatal care (PNC) and maternal or newborn danger signs. Participants broadly agreed that health facility delivery is safer, with many attributing this awareness to community health volunteers (CHVs) and targeted public health campaigns. As one woman noted, "*These days, we all know the hospital is the best place to give birth, because if something happens, they can save you.*" This aligns with survey findings indicating that 90% of respondents recognised the importance of skilled birth attendance.

In contrast, the understanding of PNC was limited. Many women believed postnatal care was only necessary if complications arose. "*After birth, I thought you only go back for the baby's vaccine unless you feel sick,*" said one mother, reflect-

ing a narrow perception of PNC. Few participants could identify danger signs requiring urgent care, such as heavy postpartum bleeding or neonatal jaundice. These knowledge deficits contribute to Delay 1 for PNC, where the perceived need for care is absent.

Health workers acknowledged the challenge of information retention. "*We tell them about PNC before discharge, but they are tired or focused on the baby—they might not take it in*," explained a nurse. CHVs also reported efforts to provide postpartum education, though outreach was inconsistent due to limited resources. Notably, women with prior positive facility-based experiences often served as informal educators. One mother shared, "*I encourage my neighbours to go to the hospital. I had a complicated birth, but the doctor saved me*." Such peer-to-peer influence proved a powerful vector for shifting norms and enhancing service uptake.

4.2.6. Health System Constraints: Infrastructure, Staffing, and Governance

Systemic weaknesses in the public health infrastructure and services, which include overcrowding, staff shortages, and stockouts of essential supplies, are barriers to both SBA and PNC utilisation. One maternity unit with a capacity for three concurrent deliveries was reported to handle up to ten births per day (sounds incomplete). A midwife explained, "*Sometimes one nurse is managing two women in active labour and monitoring another in early labour. We do our best, but we can't provide close support*." These structural issues directly contribute to negative patient experiences and reinforce community mistrust.

Policy-level informants highlighted that while the Linda Mama programme covers delivery costs, reimbursement delays and limitations in coverage (e.g., lack of dedicated funding for PNC) further disincentivise facilities from prioritising postnatal services.

Fragmentation in health governance was also evident. Kibera is served by a patchwork of actors, including government facilities, county services, and NGOs. The closure of an NGO-run maternity clinic without community notification disrupted care for several women who had planned to deliver there. Informants suggested that while devolution holds potential for responsive health management, marginalised urban populations often lack the political voice needed to drive accountability and resource allocation.

4.2.7. Positive Deviance and Community-Based Solutions: Enabling Behaviors from Households and Communities

Despite numerous barriers, several examples of positive deviance and community resilience were identified. Some participants praised targeted emergency response interventions. One woman noted, "*The ambulance from the XYZ project came fast when my neighbour haemorrhaged—it saved her*," underscoring the life-saving impact of localised response systems. Others highlighted the role of community peer groups in fostering mutual accountability. A young mother shared, "*None of us delivered at home because we kept each other accountable*," referring to an

NGO-supported maternal support group that organised joint clinic visits and education sessions.

Technological innovations also emerged as important enablers. A key informant described an mHealth initiative—such as Jacaranda Health's PROMPTS SMS service—that sends reminders for ANC and PNC visits. Several participants confirmed its usefulness, particularly for first-time mothers navigating unfamiliar maternal health systems.

Importantly, the convergence of qualitative and quantitative findings revealed consistent patterns. Women who did not utilise SBA or PNC were often characterised by intersecting vulnerabilities—low income, high parity, geographic distance from facilities, and previous negative experiences with the healthcare system. In contrast, those who accessed care typically benefited from enabling factors such as basic education, access to nearby facilities, and supportive household environments, including engaged male partners. These profiles can inform the design of more nuanced and equity-driven interventions that leverage existing community strengths while addressing persistent barriers to maternal healthcare access and outcomes.

4.2.8. Male Partner Engagement in Maternal Health: Qualitative Perspectives

Male partners are a significant but often overlooked dimension of household-level support in maternal health, from emotional, financial, informational, and logistical support through the antenatal, delivery, and postnatal periods.

In addition, decision-making about health service seeking, saving money in anticipation of delivery-related expenses, and intervening in familial or social situations that could hinder facility-based care, such as discouragement from in-laws or conflicting traditional beliefs.

One respondent shared, "*When my wife was pregnant, I made sure we had money set aside and told my mother not to discourage her from going to the hospital.*" Another explained, "*I went with her to the clinic because she was afraid to go alone. I believe it's part of being a successful husband.*"

In addition to financial and emotional support, some men actively sought health information from community health volunteers (CHVs) or accompanied their partners to health talks. Some men also encouraged peers to support their spouses, implying that peer influence and informal networks could reinforce positive male engagement.

These narratives underscore the range of enabling behaviours demonstrated by male partners and the relational, cultural, and contextual factors that shape their engagement. The findings point to an opportunity for maternal health programs to more intentionally integrate men as active stakeholders—co-decision-makers, logistical supporters, and community-level advocates—in improving access to and uptake of skilled maternal care.

Through these results, we achieve a composite understanding: maternal health service delivery gaps in Kibera are not due to a single factor but a confluence of

individual, community, and system-level issues. In the next section, we delve deeper into interpreting these findings and discussing their implications in light of theory and prior research.

4.3. Mixed-Methods Integration of Key Results

A convergent parallel mixed methods design, with qualitative and quantitative findings to be collected and analysed independently, followed by integration during interpretation. Integration was achieved through the development of a joint display to compare key findings across both strands, identifying areas of convergence, divergence, and complementarity. Table 4 illustrates how the triangulation of findings enhanced the depth of analysis, with converging evidence on financial constraints, autonomy, and cultural perceptions influencing maternal care decisions.

Table 4. Mixed-methods integration: joint display of quantitative and qualitative insights on maternal health service utilization.

Thematic Focus	Quantitative Findings	Qualitative Insights	Integration Outcome
Skilled Birth Attendance (SBA)	71% of women delivered under skilled care; lower odds associated with low education level.	Fear of mistreatment and poor provider attitude were recurrent reasons for avoiding facility-based delivery.	**Convergent**—Both point to barriers despite relatively high SBA rates.
Postnatal Care (PNC)	Only 38% attended PNC within 48 hours postpartum.	PNC is undervalued due to a lack of awareness, household responsibilities, and provider indifference.	**Convergent**—Low PNC uptake reflects systemic and demand-side barriers.
Decision-Making Autonomy	Women with higher autonomy were significantly more likely to access SBA and PNC.	Qualitative narratives underscored the role of partner support and social norms in influencing decisions.	**Complementary**—Qualitative data provides depth to quantitative associations.
Financial Constraints	Significant association between household income and maternal health service use.	Cost of transport and informal facility charges cited as barriers across interviews.	**Convergent**—Financial barriers confirmed across methods.
Perceived Quality of Care	Not directly measured but inferred via satisfaction proxies.	Widely reported dissatisfaction with facility cleanliness, congestion, and provider interaction.	**Divergent**—Qualitative data reveals dimensions not captured quantitatively.

5. Analysis

5.1. In-Depth Interpretation of Results

The study reveals both achievements and persistent gaps in maternal healthcare

in Kibera. While 78% of women accessed skilled birth attendance (SBA), a likely attribute of Kenya's free maternity policy and community mobilisation, approximately 22% still delivered without skilled assistance. This gap underscores ongoing disparities that affect women who are less educated, economically disadvantaged, multiparous, and reside further from healthcare facilities [40].

Postnatal care (PNC) utilization revealed even more pronounced deficiencies. Only 55% of women received any PNC within six weeks postpartum, and merely 37% accessed care within the critical first 48 hours, a period essential for identifying and managing postpartum complications such as infection, haemorrhage, and neonatal distress. PNC utilization was significantly associated with facility-based delivery, highlighting a substantial break in the continuum of care for women who delivered at home. This gap suggests that women outside the formal health system are less likely to be captured by routine postnatal follow-up services. Qualitative findings further illuminated contributing factors, including low perceived need for follow-up care, lack of awareness of PNC schedules, transport-related challenges, and competing childcare responsibilities. Together, these structural and behavioural barriers illustrate the multifaceted nature of underutilization and underscore the need for targeted interventions that bridge facility- and community-level maternal care pathways [43].

The results align with broader urban disparities reported in Kenya, confirming that Kibera's SBA coverage remains below Nairobi's urban average (approximately 90%) yet exceeds historical rates reported for urban slums [8] [44]. This improvement, while noteworthy, falls short of universal coverage goals, particularly in the context of equitable healthcare delivery. As shown in **Table 4**, both quantitative and qualitative data converged on several critical themes—including low postnatal care (PNC) uptake and the influence of perceived care quality—highlighting shared barriers across methods.

5.1.1. Determinants of Service Utilization

This study applied Andersen's Behavioural Model alongside the Three Delays and WHO Health System Building Blocks frameworks to interpret the determinants of skilled birth attendance (SBA) and postnatal care (PNC) utilisation in Kibera.

Quantitative results indicate that maternal education, household wealth, and antenatal care (ANC) attendance were significant predictors of service utilisation. Women with secondary education or higher had substantially increased odds of both SBA and PNC use, reinforcing the role of education in enhancing health literacy, risk perception, and navigation of the healthcare system [38]. Similarly, household wealth correlated positively with utilisation, with women in the highest wealth tertile significantly more likely to access facility-based services. Proximity to health facilities was another enabling factor; women residing more than 3 km away were significantly less likely to utilise SBA, suggesting that even in urban settings, infrastructural and socio-economic constraints persist.

Multiparity reduced utilization of both SBA and PNC, with qualitative narratives indicating that experienced mothers often perceived facility-based care as

unnecessary based on prior uneventful births. This aligns with Delay I of the Three Delays framework, where cultural norms, previous experiences, and family influence—particularly from elder women—discouraged health-seeking. Addressing this perceptual barrier is critical, especially in low-resource settings where complications may arise unpredictably.

The findings were consistent with the Three Delays framework. Delay I was influenced by the male partner, mother-in-law, attending ANC, and mother's education. Delay II—physical access—remains salient in Kibera despite its urban location. Women cited inadequate transport, safety concerns, and indirect costs as key barriers, particularly during labour emergencies. These access issues confirm that geographic proximity alone does not ensure service availability or utilisation. Delay III factors were also evident, with many women reporting mistreatment, staff shortages, and drug stock-outs in public facilities. Such experiences led to mistrust and disengagement, especially from PNC services, underscoring the centrality of care quality in shaping future utilisation.

WHO Health System Building Blocks analysis reinforced and exposed Weaknesses in service delivery; chronic workforce shortages, inconsistent information systems, frequent stock-outs, and fragmented governance—especially regarding regulation of private clinics and integration of traditional birth attendants—collectively constrained maternal care in Kibera. While national reforms such as Linda Mama and UHC have reduced direct financial barriers, indirect costs and structural limitations remain substantial.

This study not only supports the utility of these frameworks in diagnosing barriers to maternal healthcare utilisation but also underscores the need for integrated interventions targeting both demand- and supply-side determinants. These include improving the quality of care, expanding respectful maternity care training, decentralising maternity services, and leveraging community-based mechanisms to address persistent inequities.

5.1.2. Integration and Community Engagement

Crucially, findings highlighted the importance of community engagement in maternal health interventions. Peer education, male involvement, and culturally sensitive approaches to integrating TBAs emerged as effective strategies for promoting skilled care. Such community-driven solutions should accompany system-level reforms, fostering trust and shared ownership in maternal health improvements.

5.1.3. Male Partner Engagement in Maternal Care

Male partner involvement emerged as a critical yet underutilized dimension of maternal health support in the study setting. Although only 35% of male respondents reported active participation in birth preparedness activities—such as attending antenatal care visits—a majority contributed financially or provided logistical support, and 48% engaged in discussions about delivery plans with their partners. Nonetheless, substantial knowledge and communication gaps were identified. Only

32% of male partners were aware of recommended postnatal care (PNC) schedules, and a mere 29% had received maternal health information through community health volunteers (CHVs) or local awareness campaigns. These findings suggest missed opportunities to harness male involvement as a strategic lever for improving maternal health service uptake and continuity of care.

Qualitative insights underscored the diverse forms of male engagement, including accompaniment to health facilities, conflict mediation, and emotional support. These findings suggest that male involvement is both functional and relational, shaped by household dynamics and broader social norms.

Enhancing male engagement through targeted education, couple-based interventions, and community mobilisation could strengthen maternal health service utilisation—particularly for PNC—and support more inclusive, household-centred approaches to care in informal urban settlements.

5.2. Synthesis and Policy Implications

The study underscores that improving maternal health outcomes in Kibera requires an integrated approach addressing individual, community, and system-level determinants. Interventions must simultaneously improve physical access, service quality, health literacy, and trust in healthcare systems. Notably, successful interventions identified through qualitative insights—such as community-based maternity waiting homes, dedicated transport services, respectful maternity care programmes, and structured CHV involvement—offer practical pathways for policy implementation. These strategies, validated by both qualitative narratives and quantitative evidence, represent actionable solutions tailored to Kibera's unique urban health context.

Bridging the maternal health service gap in Kibera demands targeted investments and sustained community involvement. Addressing structural inequities, enhancing service quality, and fostering community trust are not merely complementary but essential components for achieving equitable maternal health outcomes. These insights provide a blueprint not only for Kibera but potentially for other urban informal settlements facing similar health service challenges globally.

6. Discussion

6.1. Synthesis of Findings

This mixed-methods study assessed maternal healthcare utilization in Kibera, revealing a skilled birth attendance (SBA) rate of 78%, which, while slightly below Nairobi's 87% and the national average of 89% [45], represents substantial progress in an informal settlement context. The relatively high SBA uptake likely reflects the positive impact of the Free Maternity Services initiative (Linda Mama) [23] [46], in combination with targeted community health strategies [47] and urban health outreach interventions [48]. These interventions appear to have enhanced service access, awareness, and demand for skilled care during childbirth,

even in the face of ongoing infrastructural and socio-economic challenges.

However, postnatal care (PNC) utilization remains comparatively low at 55%, with even fewer women receiving care within the recommended 48 hours postpartum. Uptake is particularly low among women with limited education, lower household income, higher parity, and those living more than three kilometres from health facilities—underscoring persistent geographic, financial, and social barriers to continued maternal care [40]. These findings suggest that while SBA coverage is approaching national targets, gaps in continuity of care remain, highlighting the need for integrated and equity-focused interventions to strengthen postnatal service delivery and access in urban informal settlements.

6.2. Determinants of Healthcare Utilization

Key determinants of SBA and PNC utilization were socioeconomic status and education, which enhanced women's ability to navigate and access healthcare services, aligning with global evidence emphasising education's role in promoting maternal health [49]. Wealth influenced not only direct access to facilities but also enabled women to bypass poorer-quality public services in favour of private clinics perceived as providing higher-quality care [26].

Multiparity was associated with reduced likelihood of care seeking due to complacency rooted in prior uneventful births. This aligns with findings from other studies indicating that tailored interventions for multiparous women are needed to enhance maternal service uptake [30].

6.3. Frameworks for Interpretation

Applying Andersen's Behavioural Model and the Three Delays framework deepened our understanding of utilisation patterns. Predisposing factors, notably education and cultural beliefs, strongly influenced the decision to seek care (Delay 1). Financial and geographical barriers were critical obstacles to accessing healthcare (Delay 2). Furthermore, experiences of poor-quality care and disrespectful treatment at facilities (Delay 3) significantly influenced future care-seeking decisions, underscoring the need for respectful maternity care [41] [43]. The integration of data presented in **Table 4** reinforces the importance of addressing both supply-side and demand-side barriers simultaneously, particularly in resource-constrained urban settings like Kibera.

6.4. Health System Implications

Using the WHO Health System Building Blocks framework, the study identified systemic weaknesses critical for policy intervention. These include inadequate service delivery infrastructure, health workforce shortages and burnout, limited health information systems, frequent stock-outs of essential medicines, financial barriers despite free maternity services, and governance gaps in integrating informal providers and private clinics [39]. Addressing these systemic issues through comprehensive policy interventions is essential to bridge the service gaps.

6.5. Policy and Practice Recommendations

As summarised in Table 4, areas of methodological convergence provide robust evidence for prioritising respectful maternity care and community-based PNC outreach in future policy planning. The following recommendations outline key actionable strategies to improve maternal healthcare utilization in Kibera by addressing identified barriers and leveraging existing community strengths:

1) Addressing Last-Mile Barriers

A dedicated 24/7 maternal transport service and voucher system or community emergency fund could finance rapid transportation, addressing logistical and financial constraints that disproportionately affect disadvantaged women during labour emergencies.

2) Strengthening Primary Maternity Care

Decentralizing Midwife-led birthing centres within Kibera for enhanced skilled maternity care is available closer to women's homes. These facilities should operate around the clock, be equipped to handle normal deliveries and basic emergency care, and have clear referral pathways for complicated cases. Such proximity could significantly increase the likelihood of facility-based deliveries.

3) Improving Quality and Respectful Maternity Care (RMC)

The quality of care provided in health facilities directly influences women's willingness to utilise maternal health services. Implementing comprehensive RMC training programmes for healthcare workers is critical. Facilities should establish robust accountability measures, such as patient feedback mechanisms and community oversight committees, to monitor and enforce standards of respectful and dignified care.

4) Integrating Traditional Birth Attendants (TBAs)

Given their continuing role in the community, integrating TBAs into the formal healthcare system as referral partners can significantly improve skilled care utilisation. Policy measures should include training TBAs in early recognition of obstetric complications, equipping them with referral resources, and potentially compensating them for timely referrals. This integration respects local cultural norms while enhancing maternal safety.

5) Strengthening Postnatal Care (PNC) Systems

To improve continuity of care postpartum, Nairobi County health authorities should institutionalise routine postpartum visits within the first week after delivery. These visits could be conducted by trained community health volunteers (CHVs) or midwives through home visits, ensuring both maternal and neonatal health checks. Aligning these visits with routine newborn immunisations could enhance compliance and coverage.

6) Community Education and Male Engagement

Targeted community-based education campaigns are essential to increase awareness and knowledge about the benefits of SBA and PNC. Programs specifically designed to engage men and influential family members (such as mothers-in-law) could enhance household-level support for women seeking skilled care.

Initiatives like male-friendly antenatal classes or family health forums could effectively shift cultural norms to prioritise maternal health.

7) Expanding Health Financing Options

Although Kenya's free maternity policy has improved service utilisation, indirect costs and limited provider choices remain barriers. Expanding coverage of the Linda Mama scheme to include accredited private maternity clinics could increase women's healthcare options, reduce financial barriers, and distribute patient loads more equitably across facilities. Additionally, conditional incentives for postnatal attendance (e.g., maternal health kits) could further promote service uptake.

8) Enhancing Monitoring and Evaluation Systems

Strengthening health information systems to track maternal health indicators specifically within informal settlements will support evidence-based decision-making. Creating a dedicated urban slum maternal health dashboard would facilitate continuous monitoring, timely identification of service gaps, and effective evaluation of intervention outcomes, informing ongoing policy adjustments and resource allocation.

These integrated recommendations aim to address identified service gaps comprehensively, promoting equitable access and sustained maternal healthcare improvements in Kibera and similar urban contexts.

6.6. Barriers to Implementation

Potential barriers include resource limitations, governance complexities, sociocultural resistance, and sustainability concerns. These challenges require coordinated multi-sectoral responses, sustainable financing strategies, and strong local governance to ensure effective implementation. Despite these hurdles, leveraging partnerships, community involvement, and strategic alignment with broader health policies can mitigate these barriers effectively.

7. Conclusions

This study provides a nuanced understanding of maternal health service utilisation in Nairobi's Kibera informal settlement by integrating quantitative and qualitative evidence. While the 78% skilled birth attendance rate reflects progress, particularly in light of Kenya's Free Maternity Services initiative and community health interventions, the markedly lower postnatal care utilisation rate of 55% underscores critical discontinuities in the continuum of care. Disparities were especially pronounced among women with lower socioeconomic status, limited education, higher parity, and those residing farther from health facilities. Qualitative findings illuminated how entrenched sociocultural attitudes—such as the normalisation of home births, mistrust of facility-based care, and deference to familial influence—shape health-seeking behaviour and perpetuate Delay I factors in the maternal care pathway.

To achieve more equitable and comprehensive maternal health coverage, policy

responses must address both structural and normative barriers. Outreach strategies, including mobile clinics and health worker-led home follow-ups from nearby public health facilities, present viable solutions to improve access and promote PNC uptake. Concurrently, targeted community engagement is essential to challenge harmful cultural perceptions and build trust in formal healthcare. Given their substantial role in service provision within informal settlements, private facilities must be systematically integrated into national maternal health frameworks through strengthened regulatory oversight, quality assurance mechanisms, and public-private partnerships. Only through coordinated, multisectoral efforts can Kenya realise its commitments to universal health coverage and ensure that maternal health gains extend to all women, regardless of their social or geographic location.

Areas for Further Research

While this study offers important insights, several gaps remain that warrant additional investigation. First, longitudinal studies are needed to examine how maternal health-seeking behaviours and service utilization evolve over time, particularly in response to recent policy shifts such as the rollout of the Social Health Insurance Fund (SHIF). Second, implementation research is necessary to evaluate the effectiveness and scalability of community-based interventions—such as male engagement programs, respectful maternity care initiatives, and CHV-led PNC outreach—in urban informal settings. Third, cost-effectiveness analyses of public-private partnerships and alternative financing models (e.g., conditional cash transfers or maternal vouchers) could provide crucial evidence for sustainable maternal health programming. Finally, further exploration into the role of traditional birth attendants (TBAs)—particularly their potential integration into formal referral systems—could inform context-sensitive strategies that balance cultural preferences with clinical safety.

Such targeted research will help bridge the persistent equity gaps in maternal health outcomes and inform future policy reforms tailored to the unique realities of urban informal settlements like Kibera.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] World Health Organization (WHO) (2018) WHO Recommendations: Intrapartum Care for a Positive Childbirth Experience. https://www.who.int/publications/i/item/9789241550215

[2] World Health Organization (WHO) (2014) WHO Recommendations on Postnatal Care of the Mother and Newborn. https://www.who.int/publications/i/item/9789241506649

[3] Kimani-Murage, E.W., Fotso, J.-C., Egondi, T., Abuya, B., Elungata, P., Ziraba, A.K. and Ezeh, A.C. (2014) An Emerging Double Burden of Malnutrition in Urban Poor Settings: Evidence from Nairobi, Kenya. *PLOS ONE*, **9**, e96400.

[4] African Population and Health Research Center (APHRC) (2014) Population and Health Dynamics in Nairobi's Informal Settlements: Report of the Nairobi Cross-Sectional Slum Survey (NCSS) 2012. https://assets.publishing.service.gov.uk/media/57a089f240f0b64974000338/NCSS2-FINAL-Report.pdf

[5] UN-Habitat (2020) World Cities Report 2020: The Value of Sustainable Urbanization. https://unhabitat.org/sites/default/files/2020/10/wcr_2020_report.pdf

[6] Zulu, E.M., Beguy, D., Ezeh, A.C., Bocquier, P., Madise, N.J., Cleland, J., *et al.* (2011) Overview of Migration, Poverty and Health Dynamics in Nairobi City's Slum Settlements. *Journal of Urban Health*, **88**, 185-199.

https://doi.org/10.1007/s11524-011-9595-0

[7] World Health Organization (2023) Trends in Maternal Mortality 2000 to 2020: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. https://www.who.int/publications/i/item/9789240068759

[8] Owiti, A., Oyugi, J. and Essink, D. (2018) Utilization of Kenya's Free Maternal Health Services among Women Living in Kibera Slums: A Cross-Sectional Study. *Pan African Medical Journal*, **30**, Article 86. https://doi.org/10.11604/pamj.2018.30.86.15151

[9] Ziraba, A.K., Madise, N., Mills, S., Kyobutungi, C. and Ezeh, A. (2009) Maternal Mortality in the Informal Settlements of Nairobi City: What Do We Know? *Reproductive Health*, **6**, Article No. 6. https://doi.org/10.1186/1742-4755-6-6

[10] World Bank (2020) Maternal Mortality Ratio (Modeled Estimate, Per 100,000 Live Births)—Kenya. World Bank Data. https://data.worldbank.org/indicator/SH.STA.MMRT?locations=KE

[11] Maina, R., Yamashita, T. and Wanjohi, C. (2023) Assessing the Quality and Coverage of EmONC Services in Kenya's Urban Health Facilities. *BMC Pregnancy and Childbirth*, **23**, Article No. 94.

[12] Ministry of Health (2022) National Reproductive Health Policy 2022-2032. Division of Reproductive and Maternal Health, Government of Kenya. https://repository.kippra.or.ke/items/551684ca-2a88-413f-a789-e83831b2768b/full

[13] Oyugi, B. (2023) Kenya Introduced Free Maternal Health Services a Decade Ago—It's Been a Success, Saving Lives. The Conversation. https://theconversation.com/kenya-introduced-free-maternal-health-services-a-decade-ago-its-been-a-success-saving-lives-200556

[14] Kenya National Bureau of Statistics, Ministry of Health, Kenya Medical Research Institute and ICF International (2023) Kenya Demographic and Health Survey 2022: Key Indicators Report. https://dhsprogram.com/pubs/pdf/PR145/PR145.pdf

[15] Jacaranda Health (2023) Voices from the Frontline: Women's Experiences with Maternal Care in Nairobi's Informal Settlements. Jacaranda Maternity.

[16] Nuwabaine, L., Musoke, D., Lubega, G.B. and Waiswa, P. (2024) Gaps in Quality Postnatal Care and Their Influence on Maternal Health Outcomes: Evidence from Low-Income Urban Settings. *East African Medical Journal*, **101**, 123-131.

[17] Nuwabaine, L., Musoke, D., Lubega, G.B. and Waiswa, P. (2024) Quality of Postnatal Care Services in Kenya: Analysis of 2022 Demographic and Health Survey Data. *Archives of Public Health*, **82**, Article 35.

[18] World Health Organization (2015) Trends in Maternal Mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. https://www.who.int/publications/i/item/9789241565141

[19] Ministry of Health (MoH) (2021) Community Health Strategy Implementation Guidelines. Government of Kenya.

[20] Kenya Ministry of Health (2021) Kenya Health Workforce Report: The Status of Healthcare Workers in Kenya, 2021. Government of Kenya.

[21] Ministry of Health (MoH) (2020) Beyond Zero Strategic Framework 2020-2023: Delivering Health Equity to Communities. Government of Kenya.

[22] World Bank (2023) Health Service Delivery in Kenya: Progress and Challenges. World Bank Group.

[23] Ministry of Health (MOH) (2021) Evaluation of the Free Maternity Services Programme (Linda Mama). Government of Kenya.

[24] World Health Organization (2015) WHO Country Cooperation Strategy: Kenya 2014-2019. https://www.afro.who.int/countries/kenya/publication/kenya-country-cooperation-strategy-2014-2019

[25] Ndwiga, C., Wamalwa, D. and Ouma, P. (2020) Challenges Facing Community Health Volunteers in Urban Informal Settlements: A Qualitative Study in Nairobi County, Kenya. *BMC Health Services Research*, **20**, Article No. 845.

[26] Jacaranda Health (2023) How Does Wealth Status Influence Care Seeking in Nairobi's Informal Settlements [Blog Post]. Jacaranda Health Insights. https://jacarandahealth.org/how-does-wealth-status-influence-care-seeing-in-nairobis-informal-settlements/

[27] Atusiimire, L.B., Kaula, H.N., Mugyenyi, G.R., Bodo, B. and Nabirye, R.C. (2019) Determinants of Health Facility Utilization for Childbirth in Urban Slums of Kampala City, Uganda. *International Journal of Community Medicine and Public Health*, **6**, 1905-1911.

[28] Fotso, J.C., Ezeh, A.C. and Oronje, R. (2009) Provision and Use of Maternal Health Services among Urban Poor in Kenya: What Do We Know and What Can We Do? *Health Policy and Planning*, **24**, 449-460.

[29] Ahmed, S., Chowdhury, S.N. and Sarker, A.R. (2023) Health Care-Seeking Behavior in Slum-Dwellers of Dhaka City. *Journal of Urban Health*, **100**, 112-122.

[30] Afulani, P.A., Phillips, B., Aborigo, R.A., Moyer, C.A. and Sudhinaraset, M. (2021) Person-Centred Maternity Care and Perceived Quality of Maternity Care in Kenya. *BMJ Global Health*, **6**, e003408.

[31] Afulani, P.A., Kiruja, J., Fatemi, K. and Lyndon, A. (2019) Determinants of Person-Centered Maternity Care: Evidence from Kenya. *Reproductive Health*, **16**, 1-14.

[32] Jacaranda Health (2023) Quality Care and Dignity in Childbirth: Why It Matters. https://jacarandahealth.org/quality-of-care/

[33] World Health Organization (2016) Standards for Improving Quality of Maternal and Newborn Care in Health Facilities. WHO. https://www.who.int/publications/i/item/9789241511216

[34] USAID (2020) Respectful Maternity Care Resource Package: A Practical Tool for Providers. USAID.

[35] Thaddeus, S. and Maine, D. (1994) Too Far to Walk: Maternal Mortality in Context. *Social Science & Medicine*, **38**, 1091-1110. https://doi.org/10.1016/0277-9536(94)90226-7

[36] Gavi and the Vaccine Alliance (2021) How Kenya's Free Maternity Services Saved Lives. https://www.gavi.org/vaccineswork/how-kenyas-free-maternity-services-saved-lives

[37] Andersen, R.M. (1995) Revisiting the Behavioral Model and Access to Medical Care: Does It Matter? *Journal of Health and Social Behavior*, **36**, 1-10. https://doi.org/10.2307/2137284

[38] Tessema, Z.T. and Tesema, G.A. (2020) Pooled Prevalence and Determinants of Skilled Birth Attendant Delivery in East Africa Countries: A Multilevel Analysis of Demographic and Health Surveys. *Italian Journal of Pediatrics*, **46**, Article No. 177. https://doi.org/10.1186/s13052-020-00943-z

[39] World Health Organization (2007) Everybody's Business: Strengthening Health Systems to Improve Health Outcomes. WHO's Framework for Action. WHO.

[40] Oyugi, B. (2023) Determinants of Maternal Health Service Utilization in Urban In-

formal Settlements of Kenya. *International Journal of Public Health Studies*, **5**, 45-58.

[41] Afulani, P.A., Kiruja, J., Lyndon, A. and Moyer, C.A. (2021) Understanding Disrespect and Abuse in Maternity Care: A Mixed-Methods Study of Women's Experiences in Urban and Rural Settings in Kenya. *BMC Pregnancy and Childbirth*, **21**, Article No. 246.

[42] Benova, L., Owolabi, O., Radovich, E., Wong, K.L.M., Macleod, D., Langlois, E.V., *et al.* (2019) Provision of Postpartum Care to Women Giving Birth in Health Facilities in Sub-Saharan Africa: A Cross-Sectional Study Using Demographic and Health Survey Data from 33 Countries. *PLOS Medicine*, **16**, e1002943. https://doi.org/10.1371/journal.pmed.1002943

[43] Wangari, C., Kabue, M., Maina, T., Ndirangu, M. and Wanyoro, A. (2022) Missed Opportunities in Postpartum Care: Incomplete Continuum of Care among Women in Kenya. *Archives of Public Health*, **80**, 24.

[44] Atahigwa, C., Kadengye, D.T., Iddi, S., Abrams, S. and Van Rie, A. (2020) Trends and Determinants of Health Facility Childbirth Service Utilization among Mothers in Urban Slums of Nairobi, Kenya. *Global Epidemiology*, **2**, Article 100029. https://doi.org/10.1016/j.gloepi.2020.100029

[45] Kenya National Bureau of Statistics (KNBS) and ICF Macro (2022) Kenya Demographic and Health Survey 2022 (Preliminary Report). KNBS. https://dhsprogram.com/pubs/pdf/FR308/FR308.pdf

[46] Gavi and the Vaccine Alliance (2023) Kenya's Free Maternity Service Programme Saves Lives, but Challenges Remain. https://www.gavi.org/vaccineswork/kenyas-free-maternity-service-programme-saves-lives-challenges-remain

[47] Wangalwa, G., Avan, B.I., Jayaraman, A. and Raza, H. (2012) Effectiveness of Kenya's Community Health Strategy in Delivering Community-Based Maternal and Newborn Health Services in Busia County. *BMC Health Services Research*, **12**, Article No. 219. https://doi.org/10.1186/1472-6963-12-219

[48] African Population and Health Research Center (APHRC) (2020) Access to Maternal Health Services in Nairobi's Informal Settlements. APHRC.

[49] Arroyave, L., Saad, G.E., Victora, C.G. and Barros, A.J.D. (2021) Inequalities in Antenatal Care Coverage and Quality: An Analysis from 63 Low and Middle-Income Countries Using the ANCq Content-Qualified Coverage Indicator. *International Journal for Equity in Health*, **20**, Article No. 102. https://doi.org/10.1186/s12939-021-01440-3