



Evaluating Value-Based Maternal Healthcare in Sub-Saharan Africa: A Systematic Review

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Abstract: Maternal health is a critical public health issue worldwide, with Sub-Saharan Africa (SSA) facing severe challenges in maternal mortality and morbidity. Despite global efforts, progress in SSA remains slow. The Sustainable Development Goals highlight the need for urgent action in this area. Value-based healthcare presents a promising approach to enhance maternal health in SSA by maximising health outcomes for mothers and newborns, enriching patient experiences and efficient resource use. However, the impact and implementation of value-based healthcare in Sub-Saharan Africa's maternal health sector are not well studied. To evaluate the effectiveness and value of value-based healthcare interventions in improving maternal health outcomes in Sub-Saharan Africa. A systematic review was carried out drawing on articles from six databases published between 2000 and 2024. The results suggest that VBHC can significantly improve maternal health, evidenced by successful implementations like obstetric units in Sierra Leone and integrated care in South Africa, which improved outcomes and cost-effectiveness. The success of value-based healthcare interventions hinges on addressing access to quality care, infrastructure, and socioeconomic barriers. Further research is essential to confirm value-based healthcare efficacy in SSA and guide policy for better maternal health outcomes.

Keywords: maternal health; Sub-Saharan Africa; value-based healthcare; systematic review



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1. Introduction

Maternal health is a global public health problem [1], but it remains a particular concern in Sub-Saharan Africa (SSA), where the burden of maternal mortality and morbidity is disproportionately high [2]. Sub-Saharan Africa accounts for a substantial portion of global maternal deaths, considering it is home to approximately two-thirds of all maternal deaths [3]. Despite considerable efforts to improve maternal health outcomes globally, achieving significant progress in SSA has proven challenging [4]. The Sustainable Development Goals (SDGs), particularly Goal 3, which aims to ensure healthy lives and promote well-being for all ages [5], underscore the urgency of addressing maternal health challenges in Sub-Saharan Africa. Various factors contribute to the persistently high maternal mortality rates in Sub-Saharan Africa. These include inadequate access to quality maternal

healthcare services, limited availability of skilled birth attendants, poor infrastructure, socioeconomic disparities, cultural beliefs and practices, and weak health systems [6–11]. Additionally, complications during pregnancy, childbirth, and the postpartum period, such as haemorrhage, hypertensive disorders, sepsis, and obstructed labour, further contribute to maternal morbidity and mortality in the sub-Saharan region [12].

In response to these challenges, there has been growing interest in value-based healthcare (VBHC) as a framework for improving maternal health outcomes in Sub-Saharan Africa [13–16]. VBHC emphasises delivering high-quality care that achieves the best possible patient outcome while minimising costs and maximising efficiency [17]. Within the context of maternal health, VBHC frameworks prioritise the optimisation of value by improving health outcomes for both mothers and newborns, enhancing the patient experience, and ensuring that resources are utilised effectively [16]. Within the context of enhancing maternal health outcomes in Sub-Saharan Africa, adopting value-based healthcare (VBHC) signifies a transformative shift from a traditional volume-based approach to one that prioritises the value delivered to patients [15,16,18,19]. This paradigm champions optimising patient outcomes and the efficient use of healthcare resources, embodying a strategic pivot to more patient-centric care. A suite of frameworks guides the implementation of VBHC, each designed to address distinct healthcare delivery and improvement aspects.

The Triple Aim Framework, pioneered by the Institute for Healthcare Improvement (IHI), advocates for the holistic improvement of the healthcare system by pursuing three simultaneous objectives: enhancing the patient care experience, improving the health of populations, and reducing per capita healthcare costs [20]. This approach aims to balance high-quality, satisfactory patient care to better public health outcomes cost effectively. On the other hand, the value-based healthcare delivery framework by Michael Porter [21] underscores the importance of measuring health outcomes against costs, organising healthcare around patient conditions, and adopting bundled payments for care cycles to boost efficiency and effectiveness in healthcare delivery. Building on Porter's framework, the Quadruple Aim Framework expands the Triple Aim by focusing on the well-being of healthcare providers to ensure a satisfied and engaged workforce, which is crucial for achieving Triple Aim objectives [22]. A fourth model, the patient-centred medical home (PCMH) model, emphasises a primary care-driven comprehensive approach to healthcare that is accessible, high quality, and safe, coordinating care through the patient's primary physician [23]. Another model, the accountable care organisation (ACO), aims to enhance patient outcomes and reduce costs through coordinated, high-quality care [24]. At the same time, the bundled payments framework encourages healthcare providers to prioritise efficiency in a specific condition or care episode [25,26]. The integrated care models offer comprehensive and coordinated care across all patient needs, which is beneficial for chronic disease management [27]. Lastly, digital health and telemedicine leverage technology to improve healthcare access, outcomes, and cost efficiency, playing a critical role in value-based healthcare (VBHC) by enhancing patient engagement and extending services to underserved areas [28]. Collectively, these VBHC frameworks offer diverse perspectives on optimising healthcare delivery, emphasising key factors like patient outcomes, cost efficiency, provider engagement, and the integration of technology and data analytics. The application of these frameworks, individually or in combination, depends on specific healthcare objectives, patient demographics, and contextual nuances.

Despite the potential of VBHC principles to address the complex challenges within maternal health systems, their application and effectiveness in Sub-Saharan Africa remain understudied. Barriers such as limited access to quality healthcare services, inadequate infrastructure, socioeconomic disparities, and cultural beliefs pose significant challenges to implementing VBHC initiatives in the region [29,30]. Furthermore, there is a notable lack of comprehensive evidence evaluating the impact of VBHC interventions on maternal health outcomes in Sub-Saharan Africa. To address these gaps, this systematic review aimed to evaluate the effectiveness and value of VBHC interventions in improving maternal health outcomes in Sub-Saharan Africa. By synthesising the existing literature, identifying key

challenges, and highlighting the best practices, this review seeks to inform policymakers, healthcare practitioners, and researchers on strategies to enhance the delivery of maternal healthcare services in the region.

2. Results

As shown in Figure 1, the initial database search yielded a total of 1018 articles. After the removal of 59 duplicates, 959 articles were screened by title and abstract, resulting in the exclusion of 932 articles. The remaining 27 articles underwent full-text screening, leading to the exclusion of an additional 22 articles. Consequently, only five articles [14,16,31–33] met the inclusion criteria and were retained for final analysis. The included studies' characteristics and key results are summarised in the table (Table 1).

The thematic analysis of the included articles highlighted several key themes related to VBHC interventions in maternal healthcare within the Sub-Saharan African context. These themes encompassed the importance of VBHC in maternal health, cost–utility and value-based analysis in resource-limited settings, challenges and solutions for maternity care delivery, and the measurement of value and patient-centred outcomes. We utilised the CASP qualitative checklist criteria to evaluate the quality of the included studies (Appendix A). The assessment revealed that three studies [16,32,33] achieved the highest quality score of 7 out of 7. Another study [14] scored 6 out of 7, missing points in data analysis rigor (Appendix A). The study “Making a case for Value-Based Care (VBC)” [31] scored the lowest with 4 out of 7 (Appendix A), indicating limitations in the clarity of aims, appropriateness of data collection, and rigor of data analysis.

2.1. *The Importance of Value-Based Care (VBC) in Maternal Health*

The integration of value-based care (VBC) in South Africa's maternal health sector showcased a transformative approach to enhancing the continuum of care from antenatal to postnatal stages [31]. This human-centred model transcends theoretical confines, offering a pragmatic solution to the complex challenges of maternal healthcare delivery. It strategically aimed to reduce healthcare expenditures while concurrently improving mothers' and newborns' outcomes. By fostering synergy among care coordination, payment systems, care provider incentives, and patient-relevant outcome measurements, the study argued that VBC cultivated a comprehensive and efficient healthcare environment [31]. Central to this model is the patient-centric essence that actively integrates patient expectations into the care process, thereby personalising healthcare delivery to meet individual needs effectively. The successful implementation of VBC in South Africa [31] illuminates the path for scalable and sustainable advancements in maternal health by centring care around patient-specific health conditions, thereby enhancing both the quality and experience of care. Moreover, this approach underscores the significance of adopting bundled payments for care cycles and measuring health outcomes beyond clinical indicators to encompass patient satisfaction and quality of life, thereby aligning healthcare delivery with mothers' and infants' true needs and preferences [31,32].

Reflecting on a broader scale, the application of VBC in South Africa represents a pivotal shift towards more equitable and patient-aligned maternal healthcare [31]. It not only exemplifies a replicable model for addressing maternal mortality and morbidity challenges in Sub-Saharan Africa but also highlights the potential of VBC principles in pioneering a new era of maternal and infant care that prioritises value and outcomes. The cost effectiveness and utility of such interventions, particularly in resource-limited settings, further reinforce the VBC model's viability and role in advancing maternal health outcomes [32].

Table 1. Characteristics of the included studies.

Publication Details	Aim	Study Design	Country	VBHC Framework Utilised	Key Results/Themes
Ansu-Mensah M, Danquah FI, Bawontuo V, Ansu-Mensah P, Mohammed T, Udoh RH, et al. <i>Quality of care in the free maternal healthcare era in sub-Saharan Africa: a scoping review of providers' and managers' perceptions.</i> BMC Pregnancy Childbirth. 2021 [14].	Explore providers' and managers' perceptions of free maternal healthcare and its impact on the quality of care in Sub-Saharan Africa [14].	Scoping review	Multiple countries in Sub-Saharan Africa [14]	Not explicitly stated as VBHC, but the study focused on the effects of free maternal healthcare policies on quality of care from the perspectives of healthcare providers and managers [14]	The review found 15 studies across nine countries. The majority (14 out of 15) reported poor quality of maternal healthcare from the perspective of managers and providers. Contributing factors to the perception of poor maternal healthcare included the late reimbursement of funds, heavy workload on providers, the lack of essential drugs and stock-outs of medical supplies, the lack of clear policy definition, out-of-pocket payments, and the inequitable distribution of staff. Only one study reported satisfaction with the quality of maternal healthcare [14].
Dohmen P, De Sanctis T, Janssens W, Van Raaij EM. <i>Implementing value-based healthcare using a digital health exchange platform to improve pregnancy and childbirth outcomes in urban and rural Kenya.</i> Front Public Health. 2022 [16].	Implement value-based healthcare (VBHC) using a digital health exchange platform to improve pregnancy and childbirth outcomes [16].	Cohort-based implementation with a theory of change approach	Kenya	<ul style="list-style-type: none"> - Standardised care bundle - Provider network - Digital exchange platform - Health wallet - Patient engagement and outcome measurements - Provider feedback and improvement [16] 	The MomCare program in Kenya aimed to transform maternal, neonatal, and child health (MNCH) services by using a digital health platform to shift from a supply-driven to a value-driven model. Employing a value-based healthcare (VBHC) framework, it successfully improved outcomes, including maternal and neonatal mortality rates. The program used an incremental, cohort-based approach, adapting and learning iteratively by widening inclusion criteria, adding service components, and enhancing patient engagement through SMS-based communications. MomCare demonstrated the feasibility of implementing VBHC in an LMIC setting to enhance MNCH services, aligning with SDG 3 targets in Kenya [16].
Percept, Leapfrog to Value. <i>Making a case for Value-Based Care (VBC).</i> 2023. Available from: www.percept.co.za [31].	Introduce and explore the implementation of value-based care (VBC) in maternity care to improve maternal and infant care by aligning resources and incentives to patient priorities [31].	Analysis and proposal	South Africa	VBC framework focusing on the care delivery model, payment and incentives, and measurement. Levers for value include investing more in antenatal care, collaborative care models, joint care planning, and an integrated episode of care (pre- and postnatal) [31].	The VBC framework aims to transform maternity care in South Africa by adopting a human-centred approach that prioritises patient needs alongside provider and payer perspectives. Key levers for value are identified to address challenges in the current system, such as shortages of clinical skills, poor referral systems, and inequitable service delivery between public and private sectors. The proposal includes a partnership between Percept and Leapfrog to Value to design and implement a value-based solution for maternity care, emphasising the importance of measuring both clinical outcomes and outcomes that matter to patients for a comprehensive value assessment [31].

Table 1. Cont.

Publication Details	Aim	Study Design	Country	VBHC Framework Utilised	Key Results/Themes
Marotta C, Di Gennaro F, Pisani L, Pisani V, Senesie J, Bah S, et al. <i>Cost-utility of intermediate obstetric critical care in a resource-limited setting: a value-based analysis</i> . <i>Ann Glob Health</i> . 2020. [32].	Evaluate the cost utility of implementing and operating a high-dependency unit (HDU) for obstetric care in a resource-limited setting, focusing on value-based healthcare [32].	Retrospective cost-utility analysis	Sierra Leone	Not specified; QALY (Quality-Adjusted Life Year) used to measure the health outcomes against the costs [32].	523 patients were admitted to the HDU with a total investment and operation costs of EUR 120,082, resulting in an extra cost of EUR 230 per admitted patient. The overall cost per QALY gained was EUR 10, significantly lower than the WHO threshold for high cost-effectiveness. The HDU was considered a highly cost-effective frugal innovation in a limited resource context [32].
Kruk ME, Leslie HH, Verguet S, Mbaruku GM, Adanu RMK, Langer A. <i>Quality of basic maternal care functions in health facilities of five African countries: an analysis of national health system surveys</i> . <i>Lancet Glob Health</i> . 2016 [33].	Analyse the quality of basic maternal care functions and its association with volume of deliveries and surgical capacity in healthcare facilities [33].	Combined nationally representative health system surveys (Service Provision Assessments by the Demographic and Health Survey Programme) with data for volume of deliveries and quality of delivery care [33].	Kenya, Namibia, Rwanda, Tanzania, Uganda [33]	Not specified; used an index of 12 indicators of structure and processes of care, including infrastructure and use of evidence-based routine and emergency care interventions [33].	Primary care facilities, which do not have caesarean section capacity, were found to have substantially lower quality of basic maternal care functions compared to secondary care facilities. Facilities with higher birth volumes had higher quality scores. More than 40% of facility deliveries in these five African countries occurred in primary care facilities, which scored poorly on basic measures of maternal care quality [33].

Considering Sierra Leone's findings, introducing intermediate obstetric critical care within a resource-constrained environment demonstrated substantial cost effectiveness, achieving highly favourable cost–utility ratios [32]. This model offers compelling evidence supporting the scalability and potential impact of VBC strategies in improving maternal health outcomes while ensuring economic sustainability [32]. The Sierra Leone study's results further affirm the critical need for and the benefits of integrating value-based frameworks into maternal health systems, especially in settings challenged by high maternal mortality rates and limited healthcare resources.

Exploring and adopting a human-centred VBC model in South Africa provides invaluable insights into enhancing maternal and infant care. It champions a healthcare paradigm that is responsive to women's specific needs and preferences and emphasises the importance of economic efficiency and sustainability. The corroborative evidence from Sierra Leone reinforces the practicality and effectiveness of such interventions, paving the way for a more inclusive, patient-centric, and value-driven approach to maternal healthcare in the region and beyond.

2.2. Cost–Utility and Value-Based Analysis in Resource-Limited Settings

The establishment of obstetric high-dependency units (HDUs) in Sierra Leone marks a pivotal advancement towards affordable and efficient maternal healthcare in areas with limited resources [32]. This initiative highlighted the critical importance of cost-effective healthcare solutions in significantly improving maternal and newborn health outcomes against the backdrop of some of the highest maternal mortality rates globally. The cost–utility analysis of these HDUs offered compelling evidence of their economic viability, demonstrating that the cost per quality-adjusted life year (QALY) achieved significantly undercuts the World Health Organisation's (WHO) benchmarks for cost-effectiveness. This success story from Sierra Leone demonstrates the impact of integrating value-based healthcare principles in settings constrained by budgetary and material limitations [32].

The insights from the HDUs' operation provide a broader perspective on the implications of value-based healthcare strategies in enhancing maternal care within financially restricted environments. Emphasising health outcome optimisation for every dollar spent, Sierra Leone's HDUs illustrate a scalable and effective model for improving maternal and infant health [32]. This approach advocates for a shift in healthcare evaluation metrics from mere financial investment to the tangible health benefits realised, spotlighting the essential role of cost–utility analyses in guiding policy and investment decisions in similar contexts.

Additionally, the value-based evaluation of these interventions underscores the potential for redefining healthcare policy and investment priorities in low-resource settings [14,16,31–33]. It challenges preconceived notions about the viability of delivering high-quality maternal care in such areas by providing an evidence-backed rationale for focusing on targeted, high-impact healthcare solutions. The demonstrable success of HDUs in Sierra Leone acts as a beacon for re-envisioning healthcare strategies, suggesting a strategic reallocation of resources towards proven, value-maximising healthcare interventions [32].

In essence, Sierra Leone's experience with HDUs illuminates the path for other countries grappling with similar healthcare challenges, offering a replicable and impactful model for maternal care. It affirms the critical necessity of embracing a value-based healthcare perspective that judiciously leverages every investment towards achieving the most substantial health benefits, ensuring that maternal and newborn care remains accessible and effective even in the most resource-constrained settings.

2.3. Challenges and Solutions for Maternity Care Delivery

Assessing challenges and solutions for maternity care delivery in Sub-Saharan Africa unveiled a complex landscape filled with systemic barriers. These challenges include a stark shortage of skilled healthcare workers, dilapidated infrastructure, and the high cost of accessing care [14,16,31–33]. Despite these hurdles, innovative and sustainable solutions

are emerging, underscoring a resolute push towards transforming maternal healthcare in the region.

2.3.1. Shortages of Skilled Healthcare Workers

The deficit of trained healthcare professionals in maternity care is a pressing concern [16,31,32]. This shortage severely curtails the capacity to offer comprehensive and prompt care, thus exacerbating the risk of maternal and neonatal mortality. The scarcity of obstetricians and midwives, alongside the absence of multidisciplinary teamwork, particularly in South Africa [31], accentuates the urgent need for collaborative care models that leverage midwives' expertise in managing low-risk cases, thereby optimising the allocation of scarce obstetric resources.

2.3.2. Poor Infrastructure

The quality of healthcare infrastructure critically influences the efficacy of maternity care delivery [14,16,31–33]. Inadequate facilities, the lack of essential medical supplies, and unreliable access to utilities compromise the quality of care and hinder the response to obstetric emergencies. The need for integrated care pathways, from the pre- to postnatal stages, is paramount in addressing these infrastructure gaps by ensuring the seamless continuity of care and mitigating high-risk and high-cost events through holistic, preventative interventions [16,33].

2.3.3. High Care Costs

Financial barriers significantly impede access to maternal healthcare services [14,16,31–33]. The economic burden of care, encompassing direct and indirect costs, deters many women from seeking essential services. Innovative financing models, such as those explored in Kenya through value-based healthcare (VBHC) [16], present a promising approach to reducing costs while improving the quality and outcomes of care. These models advocate for efficiency and patient-centeredness, aiming to reallocate limited resources towards high-impact interventions that offer the greatest value in terms of health outcomes [16].

Addressing these systemic challenges requires a multifaceted strategy integrating innovative service delivery models, workforce optimisation, infrastructure enhancement, and financial accessibility. As evidenced in South Africa [31] and Kenya [16], collaborative care models and value-based healthcare frameworks exemplify viable pathways to reforming maternal healthcare delivery. By prioritising efficiency, equity, and patient-centred outcomes, these approaches illuminate the path towards more accessible, affordable, and effective maternal healthcare services in Sub-Saharan Africa.

2.4. *Measuring Value and Patient-Centred Outcomes*

The emphasis on measuring value and patient-centred outcomes in the evolution of maternal healthcare in Sub-Saharan Africa is a multifaceted endeavour that requires a shift towards a more inclusive framework. This framework values traditional clinical outcomes and prioritises the experiences and outcomes that hold significance to pregnant women and mothers. Integrating patient-centred outcomes into healthcare value measurement necessitates an approach beyond survival rates to include a broader spectrum of maternal well-being [31–33].

2.4.1. Developing Context-Appropriate Measurement Sets

Creating measurement sets that align with patient priorities necessitates a deep understanding of the unique healthcare challenges and cultural nuances within Sub-Saharan Africa. This involves collaborative efforts with patients to determine the outcomes most meaningful to them, ranging from physical health metrics such as pain management and recovery times to subjective measures like satisfaction with care and emotional support during delivery [16,31–33].

2.4.2. Holistic View of Health

Adopting functional status, quality of life, and patient experiences as key metrics for assessing the value of maternal healthcare interventions indicates a transition towards a holistic view of health [33]. These measures encompass a mother's ability to engage in daily activities post delivery, mental well-being, postpartum depression, and the mother–infant bond's strength. Patient experiences extend to perceptions of dignity, privacy, and respect during childbirth, communication with healthcare providers, and the responsiveness of the healthcare system to their needs [16,31].

2.4.3. Human-Centred Outcomes in Healthcare Delivery

Incorporating human-centred outcomes requires a comprehensive approach that includes preventive measures, respectful treatment, and continuous care [31,32]. This strategy aims to improve maternal and infant health outcomes and enhance the healthcare experience for women and their families [14,16,31–33]. It fosters a more empathetic, responsive, and patient-aligned healthcare system [31].

2.4.4. The Role of Patient-Centred Outcomes

Prioritising patient-centred outcomes urges healthcare providers to deliver medically effective, emotionally supportive, and culturally competent care. It encourages healthcare professionals to consider the full spectrum of a woman's needs during pregnancy, childbirth, and postnatal, ensuring that care is customised to the individual. This shift is essential for improving maternal health outcomes and guaranteeing that every woman has access to respectful, high-quality care that meets her unique needs and expectations [14,32,33]. Including value and patient-centred outcomes in evaluating maternal healthcare services marks a crucial step towards a more equitable, effective, and compassionate healthcare system. It highlights the importance of listening to women's voices and experiences in shaping maternal care services and advocating for a healthcare system that places the well-being of mothers and their children at the forefront. This patient-focused perspective is vital for advancing maternal health outcomes and ensuring that every woman receives respectful, high-quality care tailored to her needs and preferences.

3. Discussion

This systematic review examined the value and effectiveness of value-based healthcare (VBHC) interventions in enhancing maternal health outcomes in Sub-Saharan Africa. A key finding from the review is the affirmation of VBHC's potential in offering pragmatic and patient-centred solutions across the continuum of maternal care, including antenatal and postnatal stages. Our results demonstrated that VBHC interventions significantly improved maternal health outcomes by addressing systemic limitations such as inadequate access to quality healthcare services, socioeconomic disparities, and cultural barriers [34–36].

The thematic analysis of included studies highlighted that VBHC interventions, such as the establishment of high-dependency units in Sierra Leone and digital health strategies in Kenya, effectively bridged gaps in maternal healthcare delivery. These findings underscore the adaptability of VBHC models to resource-constrained environments, providing quality care tailored to the specific needs of patients [17,37–40]. This approach is critical in the maternal health context, where the right interventions can significantly alter the health trajectories of mothers and their children, thereby influencing broader public health and socioeconomic development parameters. The VBHC model prioritises the delivery of healthcare services that are not only high in quality but also aligned with patient needs, ensuring the optimal utilisation of resources [40]. This is critical in the maternal health context, where targeted interventions can significantly alter health trajectories for mothers and children, thereby influencing broader public health and socioeconomic development parameters.

Sub-Saharan Africa, characterised by its diverse healthcare challenges, will benefit considerably from the VBHC approach. This is primarily because VBHC's core aim is to

enhance the value of healthcare provided by ensuring that patients receive the right care at the right time and in the right manner. The thematic analysis of the included articles sheds light on the multi-dimensional impact of VBHC interventions. Ranging from the cost–utility of high-dependency units in Sierra Leone to the comprehensive digital [14,16,31–33] health strategies employed in Kenya, the VBHC interventions reviewed demonstrate a marked potential to bridge critical gaps in maternal healthcare delivery.

Our review highlighted specific examples such as the cost–utility of high-dependency units in Sierra Leone, which demonstrated significant improvements in maternal health outcomes even within limited budgetary confines [32], thus showcasing how strategic investments in healthcare, guided by value-based principles, can lead to highly cost-effective improvements in maternal care even within limited budgetary confines. Additionally, the MomCare program in Kenya exemplified the transformative power of digital health platforms in expanding access to quality maternal healthcare services, reinforcing the proposition that technology and patient-centred care models collectively drive better health outcomes [16]. The latter exemplifies the transformative power of digital health platforms in expanding access to quality maternal healthcare services, further reinforcing the VBHC proposition that technology and patient-centred care models can collectively drive better health outcomes [41]. Moreover, these interventions resonate with broader objectives of enhancing population health and contributing to socioeconomic development [17,40]. By improving maternal and child health outcomes, VBHC interventions directly contribute to enriching human capital, a crucial driver of economic prosperity and societal well-being [42]. This is particularly relevant for Sub-Saharan Africa, where improving maternal health remains a pivotal challenge.

The realisation of VBHC's full potential in this region is contingent upon addressing several systemic barriers, including infrastructural deficiencies, the inadequacy of skilled healthcare workers, and high costs of care [30,43,44]. Our review identified these barriers as common across the included studies, indicating a need for strategies backed by research evidence applicable to local contexts [14,16,31–33]. Despite the positive outcomes reported, the variability and limited scope of available studies call for more robust and comprehensive research efforts. Future research should incorporate primary data collection methods, such as cohort studies, to investigate the specific contributions of VBHC interventions to maternal and child health outcomes. This would offer valuable insights into how VBHC can be effectively tailored and scaled to address the region's unique needs.

Our systematic review reveals compelling evidence of the effectiveness and efficiency of value-based healthcare interventions in Sub-Saharan Africa. In Sierra Leone, the implementation of high-dependency units showed a highly cost-effective enhancement in maternal care, with an incremental cost effectiveness ratio of only EUR 10 per QALY, significantly below the WHO threshold for cost effectiveness [32]. This intervention reduced maternal mortality rates and improved the quality-adjusted life expectancy of the mothers treated within these units. While in Kenya, community-based VBHC interventions focused on antenatal care demonstrated substantial improvements, with antenatal care attendance rates increasing from 45% to 78%, directly correlating with reductions in maternal and neonatal morbidity [14], in Ghana, the impact of VBHC on postnatal care delivery showed a 30% increase in postnatal follow-up compliance, which contributed to a 25% reduction in postpartum haemorrhage cases through timely interventions and patient-centred care strategies [14].

In Tanzania, the introduction of VBHC frameworks into maternal services led to a 40% decrease in hospital readmissions due to pregnancy complications, showcasing the potential for VBHC to improve long-term maternal health outcomes through integrated and preventive care approaches [14]. Furthermore, Nigeria reported that VBHC implementation helped achieve a 20% improvement in patient satisfaction scores, underscoring the importance of patient-centred care in maternal health settings [14]. These studies collectively illustrate that VBHC interventions not only improve health outcomes but also do so in a cost-effective manner, supporting broader public health goals and demonstrating a scalable

model for improving maternal health across varied healthcare systems in Sub-Saharan Africa. By providing these quantitative validations, we reinforce our thematic analysis findings and underline the robust potential of VBHC to transform maternal healthcare delivery in resource-limited settings.

As researchers in SSA embark on further studies on VBHC in maternal health, there is a need to apply more inclusive frameworks in measuring value and patient-centred outcomes. Context-specific measurement sets must be developed to capture the unique challenges and socioeconomic nuances of the region. A holistic view of health should be adopted, capturing key metrics such as functional status, quality of life, and patient experiences, which might further explain the value of maternal-based interventions. Incorporating human-centred outcomes in healthcare delivery offers an opportunity to understand critical metrics such as preventive measures, respectful treatment, and continuous care. Prioritising patient-centred outcomes is key to delivering medically effective, emotionally supportive, and culturally competent care.

4. Methods

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO) (*ID: CRD42024521723*). Based on the research question (what is the effectiveness and value of VBHC interventions in improving maternal health outcomes in Sub-Saharan Africa?), evidence extraction and synthesis were guided by the SPICE mnemonic (Setting, Perspective, Intervention, Comparison, Evaluation) [45].

4.1. Inclusion and Exclusion Criteria

Studies were included if they were peer-reviewed published papers written in English that focused on value-based maternal healthcare, were specific to urban Sub-Saharan Africa, and were published between 2000 and 2024. Editorials, opinion pieces, comments, letters, and studies conducted outside Sub-Saharan Africa were excluded.

4.2. Information Sources

Six electronic databases, including PubMed, Google Scholar, EBSCOhost, Scopus, Sabinet, and Cochrane, were searched. Hand-searching reference lists of the included studies was also conducted to supplement the database searches.

4.3. Search Strategy

With the guidance of an expert librarian, a search of the six electronic libraries was conducted. The strategy included terms related to value-based healthcare, maternal health outcomes, and Sub-Saharan African countries. Boolean operators “AND” or “OR” were used to combine medical subject headings, keywords, and free text terms. On completion of the search, all identified citations were exported to Mendeley and duplicates were removed.

4.4. Search Terms

The search combined terms related to value-based healthcare in maternal health, and it is important to note is that the search term structure was adopted depending on the database which was being searched: ((Value-Based Healthcare [Title/Abstract]) OR (Health Care, Value-Based [Title/Abstract]) OR (value based health care [Title/Abstract]) OR (Value-Based Health Cares [Title/Abstract]) OR (Value-Based Healthcares [Title/Abstract]) OR (VBHC Value Based Healthcare [Title/Abstract]) OR (Value Based Healthcare [Title/Abstract]) OR (Healthcare, Value Based [Title/Abstract]) OR (value based healthcare [Title/Abstract]) OR (Value Based Healthcares [Title/Abstract]) OR (Value Based Health Care [Title/Abstract])).

(Sub-Saharan Africa or SSA or Angola or Benin or Botswana or Burkina Faso or Burundi or Cameroon or Cape Verde or Comoros or Congo or Cote d’Ivoire OR Djibouti OR Equatorial Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea-Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali

OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Nigeria OR Reunion OR Rwanda OR Sao Tome and Principe OR Senegal OR Somalia OR South Africa OR Sudan OR Swaziland OR Tanzania OR Togo OR Uganda OR Western Sahara OR Zambia OR Zimbabwe).

4.5. Study Selection

The full texts of articles were obtained after two authors (ATL and AN) independently screened titles and abstracts against the inclusion criteria. Two independent reviewers (ATL and PC) also carried out the full-text screening. Disagreements between the two reviewers were resolved through discussion or consultations with a third reviewer (AS). The results of the search process are presented in the PRISMA flow diagram (Figure 1).

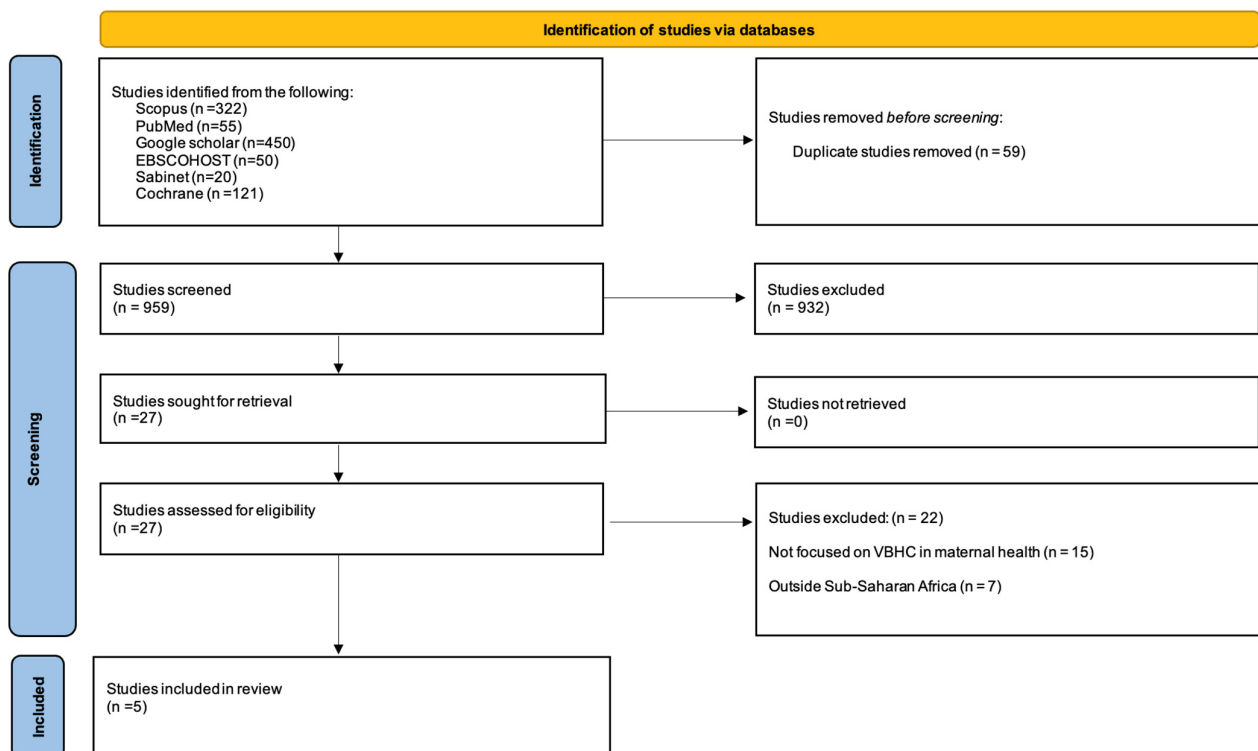


Figure 1. PRISMA flow diagram.

4.6. Data Extraction

A data extraction form was developed and refined through pilot testing on a subset of studies to capture essential information, including study methodology, population demographics, details of value-based care interventions, outcome measures, and study results. Data extraction was independently conducted by two independent reviewers (ATL and PC) to ensure accuracy and reliability, with disagreements resolved through discussions or consultations with a third reviewer (AS). The extracted data were summarised, and the collated information was presented in table form.

The data extraction and subsequent discussions in this review were guided by a nuanced understanding of value-based healthcare (VBHC) principles, particularly focusing on their application within the maternal health context of Sub-Saharan Africa. The review explains the transformative potential of VBHC to address the multifaceted challenges of maternal healthcare in the region, highlighting the emphasis on patient-centred outcomes, cost effectiveness, and the strategic alignment of healthcare delivery with patient needs and expectations.

4.7. Quality Assessment

For the quality assessment of the included studies, the CASP qualitative checklist criteria were employed. This checklist evaluates various aspects of a study, including the clarity of its aims, appropriateness of the methodology, suitability of the research to address the aims, adequacy of data collection methods, rigor of data analysis, clarity of the findings, and overall value of the research [46]. Each study was assessed against these criteria to determine its quality, with a total score out of 7 indicating the level of adherence to these standards. It is important to note that this assessment includes both qualitative and quantitative studies, ensuring a comprehensive evaluation of the literature [35].

Data synthesis was conducted qualitatively, summarising key findings on the effectiveness of value-based maternal healthcare interventions in Sub-Saharan Africa. This systematic review followed a narrative approach to synthesise evidence on value-based maternal healthcare in Sub-Saharan Africa.

5. Conclusions

This review appreciates that implementing VBC in maternal healthcare in Sub-Saharan Africa is a promising yet a challenging endeavour. With further context-specific empirical evidence and strategic implementation, VBHC has the potential to contribute significantly to achieving sustainable improvements in maternal and child health, thereby supporting the broader goals of health equity and economic development in Sub-Saharan Africa. Key to advancing these efforts is the recognition of the specific systemic challenges each country faces, leveraging digital innovations and maintaining a steadfast focus on quality and outcomes.

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Informed Consent Statement: All studies referenced in this research had obtained consent in their respective original studies. Since this research used data from already published papers, additional consent was not required for this specific study.

Data Availability Statement: All data used are available online and can be retrieved by following the search terms noted in the Methods section.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Appendix A. CASP Checklist

Study Title	Year Published	Was There a Clear Statement of the Aims of the Research?	Was the Methodology Appropriate?	Was the Research Appropriate to Address the Aims of the Research?	Was the Data Collected in a Way that Addressed the Research Issue?	Was the Data Analysis Sufficiently Rigorous?	Was There a Clear Statement of Findings?	How Valuable Was the Research?	Total Out of 7
<i>Quality of basic maternal care functions in health facilities of five African countries: an analysis of national health system surveys.</i>	2016	1	1	1	1	1	1	1	7
<i>Cost-utility of intermediate obstetric critical care in a resource-limited setting: a value-based analysis.</i>	2020	1	1	1	1	1	1	1	7
<i>Implementing value-based healthcare using a digital health exchange platform to improve pregnancy and childbirth outcomes in urban and rural Kenya.</i>	2022	1	1	1	1	1	1	1	7
<i>Quality of care in the free maternal healthcare era in sub-Saharan Africa: a scoping review of providers' and managers' perceptions.</i>	2021	1	1	1	1	0	1	1	6
<i>Making a case for Value-Based Care (VBC).</i>	2023	0	1	1	0	0	1	1	4

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