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Value-Based Digital Financing for Maternal Health: Descriptive Insights from MomCare Programme in Kenya

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Abstract

Background

MomCare is a value-based financing and digital intervention to improve maternal and child healthcare service delivery and accountability by incentivising pre-defined desirable health provider-pregnant women interactions. Launched in 2017, it aligns financial incentives with quality, timeliness, and continuity of care. This study assessed the implementation and performance of MomCare between 2019 and 2022 in Kenya, focusing on trends in antenatal adherence, maternal outcomes, patient satisfaction, and cost efficiency.

Methods

A descriptive analysis of longitudinal data from 32 clinics was conducted. Data on antenatal care (ANC) adherence, pregnancy journey (PJ) scores, patient-reported outcomes (PROMs), and costs were extracted from MomCare and M-TIBA health insurance digital platforms. Analyses examined quarterly (cross-cohort) trends, subgroup variations (teenage/adult, low/high-risk), and cost dynamics.

Results

Average PJ scores increased from 2.6 in the first cohort to 3.1 in the last (9th) cohort (+ 19%), with “good” journeys (≥ 3/5 scores) rising from 41% to 59%. ANC adherence improved from an average of 3.0 visits to 3.5 visits per pregnancy, and full ANC laboratory profile completion rose from 75% to 90%. Adverse pregnancy outcomes varied between 0.4% and 1.5%, and 96.3% of women rated their care as good. High-risk pregnancies achieved higher care quality scores than low-risk cases. Teenage pregnancies (women 18 years) trailed behind adult pregnancies (2.5 vs 3.7 visits; 77% vs 93% ANC laboratory profile completion rate). Average journey costs stabilized at USD 120–130 per pregnant woman, with cesarean costs declining by 37% over time.

Conclusions

Our study suggests that digital, value-based financing and care-delivery models like MomCare could help steer provider and patient behaviour towards enhanced quality, adherence, and cost efficiency in maternal care. Integrating such digital innovations into Kenya’s national health financing framework could accelerate progress toward equitable, high-quality maternal health and universal health coverage.

BACKGROUND

Health systems globally are increasingly shifting from input-based financing models toward value-based care, which links payment to the quality, efficiency, and outcomes of services rather than volumes alone.[1, 2] At the same time, digital health interventions - including electronic health management systems, mobile platforms, and real-time data systems - are enabling more transparent tracking of service delivery, patient engagement, and provider performance.[3, 4] Emerging evidence suggests that when combined, value-based financing and digital support tools for women and providers could strengthen accountability, align incentives for providers and patients, and support more coordinated, person-centred care across the continuum particularly in low- and middle-income

countries (LMICs).[5] This integrated approach is particularly relevant in maternal health, where fragmented care pathways and weak accountability mechanisms often undermine continuity and outcomes.[6, 7]

Maternal mortality remains one of the most pressing public health challenges globally. According to the World Health Organization (WHO), an estimated 260,000 women died from pregnancy-related causes globally in 2023, corresponding to 700 maternal deaths every day, or a maternal death every 2 minutes.[8] Over 90% of the deaths occurred in LMICs where access to quality maternal health services remains limited.[8] This highlights the deep inequities in access to safe, affordable, and timely maternity care: only 73% of births in LMICs were attended by skilled health professionals, versus 99% in high-income countries, with LMICs recording maternal mortality ratio (MMR) of 346 per 100 000 live births versus 10 per 100 000 live births in high income countries in 2023.[8] Beyond the human cost, maternal mortality has profound economic and social implications; the death of a mother often destabilizes households, resulting in long-term losses in family income, child health, and education.[9] These facilitate the perpetuation of poverty cycles within affected families and directly hamper labor productivity and national development in macro-economic terms.[10]

Sub-Saharan Africa alone accounts for nearly 70% of all global maternal deaths, despite that it achieved a substantial MMR reduction of 40% between 2000 and 2023.[8] In Kenya annual maternal death has decreased from 8,900 in 2000 to about 5,700 in 2023, corresponding to 379 deaths per 100,000 live births.[11] But this remains significantly higher than the global target of under 70 deaths per 100,000 under the Sustainable Development Goals (SDG 3.1). The 2022 Kenya Demographic and Health Survey (DHS) showed that more than one-third of pregnant women did not attend the then WHO minimally recommended four antenatal visits, and rural and lower socioeconomic populations are disproportionately affected.[12] For instance, 50% of the uneducated reach this minimum compared to more than 80% among those with higher education.[13] Achieving the now preferred minimum of eight contact moments might be even more challenging. Contributing factors include late initiation of antenatal care (ANC), low adherence to recommended ANC visits, inadequate skilled birth attendance, and poor continuity of postnatal care (PNC).[14] Additionally, socioeconomic disparities and health system inefficiencies often limit access to quality care for women in rural and low-income communities.[13]

The primary causes of maternal mortality include severe bleeding (hemorrhage), hypertensive disorders such as pre-eclampsia and eclampsia, infections, obstructed labor, and complications from unsafe abortions.[15] Indirect causes such as anemia, malaria, and HIV infection/AIDS also contribute significantly in regions with high disease burdens.[15] Data from the Kenya Health Information System (KHIS) identified post-partum haemorrhage (PPH) as the number one cause of maternal mortality (40%), followed by obstructed labor (28%) and eclampsia (14%).[13] Most of the causes of maternal mortalities are preventable through early diagnosis, skilled birth attendance, and access to comprehensive emergency obstetric care. However, a myriad of factors continue to undermine preventive efforts, including poor quality of care, shortage of skilled personnel, inadequate essential medical supplies, weak health information systems, financial constraints, geographic inaccessibility, harmful gender norms, and poor access to education.[8]

Kenya has implemented several key interventions, programs, and policies to enhance maternal health outcomes, addressing barriers such as financial constraints, limited access, and inadequate quality of care. The Free Maternity Services (FMS) policy, launched in 2013, abolished user fees for deliveries in public facilities,[16] while its 2017 expansion into the Linda Mama programme extended free coverage to ANC, skilled birth attendance, cesarean sections, and PNC in public, private, and faith-based facilities, integrated with the National Hospital Insurance Fund.[17, 18] FMS and Linda Mama were associated with substantial increases in facility births and skilled deliveries

though implementation challenges (such as stock-outs, human resource gaps and variable quality) have limited uniform gains across Kenyan counties.[19, 20] Complementary efforts include community-based strategies like the "find-link-treat-retain" (FLTR) approach which trains community health workers to actively recruit, enroll and retain pregnant women in ANC,[21] and the Service Delivery Reform (SDR) in Kenyan Counties such as Kakamega, concentrating deliveries in equipped "delivery hubs" for comprehensive emergency obstetric care.[22] Targeted maternal health programmes include UN-supported maternal death surveillance and response, quality improvement, provider training and county-level service integration. While these contribute to measurable improvements in selected maternal and newborn indicators they have also revealed the need for sustained financing, supply-chain reliability and equity-focused implementation for translating increased service contacts into consistent survival gains.[23, 24] Digital innovations have emerged as a potential solution to bridge these gaps by linking patients, providers, and payers through transparent, data-driven systems.[25]

The MomCare programme is a digital, value-based maternal healthcare initiative launched by PharmAccess Foundation (PAF) with, county governments, public and private health providers in Kenya in 2017.[26] On one hand, the platform integrates a standardized WHO-aligned care bundle - encompassing early ANC enrollment, regular antenatal visits, skilled birth attendance, emergency obstetric services, and postnatal check-ups - with a mobile-enabled health wallet via M-TIBA.[27] This allows women to track their "journey" on phones through SMS and simple interfaces, while at the same time offering providers real-time data analytics for risk detection, and referral enhancements to mitigate complications like postpartum hemorrhage.[28, 29] On the other hand, providers receive payments tied to verified delivery of the predefined standards of maternal services. By 2023, the programme had enrolled more than 50,000 women, across several Kenyan Counties including Nairobi, Kisumu, and Kakamega.[30] Although challenges such as digital literacy barriers and rural connectivity persist, early insights position the programme as a scalable model for Sustainable Development Goal 3 in low-resource settings.[31, 32]

This study is a descriptive assessment of the MomCare programme implementation in Kenya between 2019 and 2022, focusing on provider performance, adherence, costs, process evolution/trends and outcomes, as tracers of behavioural shifts among clinicians and the service users. It contributes to the literature on the role of value-based care, digital health data defragmentation and financial solutions in strengthening maternal healthcare systems in low-resource settings.

METHODS

Study Setting

With a population of approximately 54.7 million in 2023, Kenya, a lower-middle-income nation with a GDP per capita of 2,100 USD in 2023,[33] serves as East Africa's economic powerhouse and constitutes about 40% of the region's GDP[34]. The country has experienced steady economic expansion, with average annual GDP growth of around 5% from 2010 to 2019, though this was disrupted by the COVID-19 pandemic, leading to a contraction of 0.3% in 2020 before rebounding to 7.5% in 2021 and stabilizing at approximately 5% in 2022.[35] Kenya comprises 47 semi-autonomous counties with national capital, Nairobi, governed under a devolved system established by the 2010 Constitution. Nairobi County, located in the central region, is the most populous county, with an estimated population of 5.1 million in 2022, and Nairobi City houses over 4.4 million residents, driving national commerce, innovation, and services.[36] In 2021, the universal health coverage (UHC) index in the country stood at 52%, reflecting moderate progress in service coverage and financial protection but highlighting persistent gaps in equitable access.[37]

To advance UHC, Kenya has pursued a series of health system reforms starting with the establishment of the National Hospital Insurance Fund (NHIF) in 1966 as a mandatory social health insurance scheme for formal sector workers. Devolution policy in 2013 transferred health service delivery responsibilities to county governments while retaining national oversight for policy, regulation, and financing via the NHIF. By 2022, the NHIF covered about 25% of the population through contributions, subsidies, and enhanced benefits packages.[38] Most recently, the Social Health Insurance Act (SHIA) of 2023 replaced the NHIF Act and established the Social Health Authority (SHA) to manage three new funds: the Social Health Insurance Fund (SHIF), Primary Health Care Fund, and Emergency, Chronic, and Critical Illness Fund, aiming for broader coverage with mandatory registration for all residents.[39] These efforts have seen a surge in Kenya's health insurance coverage which stood at 50% by the end of 2025.[40]

Momcare design

The MomCare programme comprises three core pillars: 1. M-TIBA digital health wallets that cover the cost gap left by NHIF/ LindaMama for pregnant women and link costs to quality of care; 2. Quality improvement support of providers through SafeCare standards;[29] and 3. Journey tracking tools such as SMS nudges (health education, visit reminders, surveys, and experiences and well-being) for mothers and clinical support tools for providers (Patient Journey App).

The programme involves four core parties working together for the expectant women: (i) A panel of providers accredited by SafeCare, an internationally accredited quality improvement methodology for healthcare providers; [29] (ii) CarePay, the lead developer and implementer of the M-TIBA technology; (iii) PAF, the programme designer and manager and (iv) a payment subsidy scheme (advertised in the communities via various means) that reduces financial barriers thus incentivising enrollment and retention in ANC. On the first contact with a provider, accounts are created for a beneficiary on the CarePay platform (M-TIBA wallet) and these accounts are linked to the beneficiary's mobile phone. The pregnant mother is then covered and "tracked" through the pregnancy journey from this first visit up to six weeks post-delivery. Apart from subsiding care, the programme also incorporates behavioral nudges – reminding women to keep their follow up.

A contracted provider commits to providing a predefined set of services, and MomCare ensures timely retrospective payment to providers using digital claims submitted by the providers, subject to successful verification by the CarePay team. On top of this, providers receive a bonus payment (US$5) for each mother that has received high quality care, which for this purpose is defined as timely provision of care and utilization rates measured in terms of "journey scores" on a scale of 1–5. The bonus payment is awarded for journeys with a score of 3 or higher. The MomCare Patient Journey App provides daily operational support for clinics on patient-level by, for instance, capturing the gestational age of enrollment and adherence to ANC visits and facility delivery and risk stratification which classifies the women into low, medium and high risk.

To capture the voice of the mothers and facilitate care quality improvement based on clients' feedback, MomCare also enables interval administration of SMS-delivered patient-reported outcomes measures (PROM) questionnaire to the women. The questionnaire is based on the International Consortium of Health Outcomes Measurement (ICHOM) set of standards for pregnancy and childbirth and its adaptation and pilot trial in Kenya prior to use in MomCare have been reported elsewhere.[41] At the end (6 weeks after childbirth), a final evaluation interview (standard closed-ended questions as well as open-ended questions) was conducted using a telephone call. A detailed description of the design, functionality, network, technology, and roll out of MomCare has been published by Dohmen et al (2022).[31]

Definition of terms

MomCare enrolled women in batches described as “cohorts” at quarterly intervals. A “pregnancy journey” (PJ) is the period from the point of enrollment till six weeks after childbirth and comprises a bundle of ANC, skilled delivery and PNC. There were also bundles specifically for complications like hypertension, gestational diabetes, anaemia and abortal care. PJs are “completed” either with delivery or a maximum total follow up duration of 50 weeks. An “incomplete” journey is recorded where a woman is lost to follow up before gestational age of 28 weeks. A “good” PJ is a PJ that has a journey score of > = 3 out of 5. “ANC profile” refers to a set of laboratory tests performed during pregnancy including Hb, syphilis, HIV, blood glucose, urine, TB tests. “Adverse” pregnancy outcomes included any incidence of stillbirth, newborn death, and maternal death (up to 6 weeks after delivery).

Study Design

The study was a descriptive analysis of retrospectively collected longitudinal data. The assessment covered the implementation of the programme from 2019–2022.

Data, collection & sources

Primary data pertaining to service utilization metrics, ANC adherence, PJ scores, outcomes and were extracted from the MomCare digital platform while PROMs data were retrieved from the dedicated PROMs database. Cost data were extracted from CarePay M-TIBA claims and payment records and complemented with PAF expenditure records.

Pregnancy journey scores

The journey score measures how closely a pregnant woman’s care pathway aligns with recommended maternal care and how effectively it mitigates clinical risks over time. Risk is assessed weekly and linked to key conditions such as anemia, pre-eclampsia, or teenage pregnancy. For each stage of pregnancy, expected care is defined based on WHO guidelines, including timely antenatal visits (at least four in-person visits), essential tests, supplements, ultrasound, facility-based delivery, postnatal care, and appropriate immunisations.

Actual care is then compared to this standard. When care meets or exceeds expectations, risks are considered mitigated; missed or delayed services leave risks unaddressed. Each service is weighted according to its clinical importance and relevance to the identified risk and gestational stage. These contributions are accumulated over time to generate a journey score ranging from 1 to 5, reflecting how consistently appropriate, risk-responsive care was delivered throughout pregnancy.

Cost data

The cost analysis includes recurrent implementation costs reported by PAF. These cover reimbursements to health facilities for maternal services (ANC, delivery, and PNC) rendered and performance-based bonuses for clinicians delivering high-quality care. Additional costs include SMS reminders and nudges, outcome measurement systems for mothers, hospital management software with risk stratification and clinical decision support. Annual SafeCare support per clinic, and training activities (one day per clinic plus biannual knowledge exchange sessions) were not

included. The unit costs of maternal services reimbursed were based on price agreements between PAF and the participating facilities (see Additional file 1).

Data analysis

Clinics participated non-uniformly in different cohorts of PJs; cohorts with fewer than ten clinics or 300 PJs were excluded for reliability. Overall, the analysis included data from 32 clinics within the MomCare network, covering a total of nine cohorts. Each included clinic completed at least two PJ cohorts, while ten clinics contributed data for at least nine cohorts.

Quantitative PJ data were analyzed using descriptive statistics and longitudinal trend analyses. Each cohort provides PJs completed within a quarter; hence we can track quarterly changes in the clinics' performance in terms of, for instance, ANC adherence (expressed as average number of ANC visits in the cohort), average PJ scores, percentage of PJs with scores classified as "good", and percentage of PJs with ANC profile conducted. Regarding patient satisfaction and outcomes, routine interval claims data and end-of-journey survey data were combined and analysed descriptively together to understand overall satisfaction. Similarly, cost analyses involved estimation of mean PJ costs per clinic per cohort as well as disaggregated analyses of the various cost components. All costs were converted from Kenyan Shillings to United States Dollars (USD) using market exchange rates as of January 01, 2021, the midpoint of the study period. For both care and cost data analyses, we explored heterogeneities by conducting series of sub-group analyses across demographic and risk categories (teenager/adult, low/high-risk).

Ethical clearance

Ethical clearance for MomCare in Kenya was obtained from the African Medical Research Foundation (AMREF) Ethical and Scientific Review Committee (reference number: P911-2020). Informed consent for the use of their data for research purposes was obtained from all women enrolled in the MomCare programme. The study was conducted in accordance with the Declaration of Helsinki.

RESULTS

The results are summarised in four themes: pregnancy journeys and adherence; health outcomes; women's experiences and satisfaction; and costs.

Pregnancy journeys and adherence

MomCare demonstrated a consistent improvement in PJ scores and adherence to ANC protocols. Average PJ scores increased from approximately 2.6 in the first study cohort to 3.1 in the last (9th) cohort (+ 19%), while the proportion of 'good' journeys steadily rose from 41% to 59% (see Fig. 1). Clinics that participated longer in the programme achieved higher performance, suggesting learning effects and quality improvement over time. Adherence to ANC visits also improved: average ANC visits rose from 3.0 to 3.5 per PJ (+ 16%), and the share of women completing a full ANC laboratory profile grew from 75% to 90%. Adult pregnancies consistently achieved higher adherence scores and quality scores than teenage pregnancies (maximum of 3.7 vs 2.5 visits; 93% vs 77% maximum ANC profile completion rate). Similarly, high-risk pregnancies achieved superior care quality scores, with up to 79% classified as 'good' journeys compared to 60% for low-risk cases. Further details are available in Additional files 2–4.

Health outcomes

Improvements in PJ scores also reflected good clinical outcomes. The incidence of adverse pregnancy outcomes across all cohorts varied between 0.4% and1.5% (Fig. 2). The incidence of neonates requiring resuscitation diminished from 3.4% to 0% (Fig. 2). Among the high-risk pregnancy sub-group, the incidence of adverse outcomes remained less than 3% and the proportion of neonates needing resuscitation collapsed from 4.4% to 0% (Additional file 5).

Women's experiences and satisfaction

End-of-journey surveys and PROMs indicated very high satisfaction levels. Overall, 96.3% of women rated their experience as 'good,' with 3.2% as 'fair' and only 0.5% rated as 'bad.' More than 90% reported feeling comfortable with care received and well-handled during delivery. Programme engagement tools also achieved strong uptake: 71% of participants received SMS reminders for ANC visits, 89% received breastfeeding information, and 73% reported successful breastfeeding at six weeks postpartum (Fig. 3).

Costs

Average pregnancy journey (PJ) costs remained stable between 120–130 USD across cohorts, reflecting cost containment and efficiency gains despite expanded service quality (Fig. 4). Delivery costs represented the largest expenditure component (over 60% of total PJ cost). Teenage pregnancies averaged 100–110 USD per journey, while adult pregnancies cost slightly more (averaging about 125 USD) (Additional file 6). High-risk PJs incurred higher costs initially (rising up to 173 USD) but decreased gradually as clinics gained experience, narrowing the cost gap with low-risk cases (Additional file 7). Costs for journeys with Cesarean deliveries declined by 37% over time (from 260 USD in the first cohort to 164 USD in the last cohort), suggesting improved efficiency in obstetric care (Fig. 5). Overall, MomCare maintained cost stability while adherence and outcomes improved.

DISCUSSION

This study examined the implementation of the MomCare digital health programme in Kenya between 2019 and 2022, evaluating trends in maternal health service adherence, maternal and neonatal outcomes, patient experience, and cost efficiency, using data covering nine cohorts over 32 clinics. The results show that MomCare was associated with progressive cross-cohort improvements in critical indicators of maternal care quality and continuity: PJ scores increased by 19%, driven by gains in antenatal care attendance and completed ANC profiles, while the proportion of "good journeys" rose from 41% to 59%. Incidence of adverse outcomes remained below 1.5%, which is lower than the recorded overall national neonatal mortality rate of 2.1% in 2020,[42] and women's experiences with care were very positive, with 96.3% rating their journey as "good". At the same time, the cost of pregnancy journeys remained largely stable, with 37% fall in payments for PJs with Cesarean deliveries over time.

Together, the findings signal the potential of digitally enabled, value-based financing models in strengthening maternal health systems in resource-constrained settings. MomCare's success is grounded in its integration of behavioral nudges, data transparency, and financial incentives for providers. The platform's feedback-driven design seems to have enabled continuous monitoring and rapid identification of service delivery gaps. The observed improvements over time likely reflect a combination of provider learning curves, behavioural change, and increasing familiarity with programme requirements, as well as growing awareness and engagement within the communities. Notably, these trends were observed across different cohorts of women, suggesting system-level effects rather than improvements limited to repeat users. In addition, increased and more predictable funding flows to facilities

may have enabled investments in infrastructure and service readiness, which is a desired long-term effect of linking payments to individuals and quality of care.

The increase in mean ANC visits from 3.0 to 3.5 per journey and the rise in complete ANC laboratory profiles from 75% to 90% indicate increased adherence to WHO recommendations for pregnancy care, which currently emphasize at least eight ANC contacts and comprehensive laboratory testing to prevent complications.[43] Such improvements align with evidence from studies in other LMICs that show that mobile health (mhealth) interventions such as SMS-based reminders, digital cash transfers, and equipping healthcare providers with digital planning and scheduling tools are associated with better utilization of maternal services.[44] The role of mhealth in LMICs continues to expand and diverse disparate applications have been reported, triggering efforts to build consensus around taxonomy.[45] This study highlights the strengths of comprehensive and multi-dimensional approach in mhealth intervention design.

Disaggregated analyses reveal noteworthy heterogeneities. First, we find teenage pregnancies scoring consistently lower in outcomes than adult pregnancies. This mirrors existing regional data indicating that adolescents are more likely than older women to delay ANC initiation or drop out before completion, often due to stigma, financial constraints, or limited decision-making power. For instance, Owolabi et al (2017) showed that 41% of adolescents compared with 47% of all 17 386 women began the use of antenatal care during the first trimester; and 62% of adolescents had four or more antenatal care visits compared with 81% of adults in West Africa.[46] Yet, the finding is contrary to our expectations given the special adjustments MomCare made to accommodate the adolescents, including lowering their eligibility criteria (e.g., allowing for their enrollment post-20 weeks gestational age). Moreover, while MomCare covered adult women for costs not covered by the Government-run Linda Mama, it covered teenagers in full as they are ineligible for the Linda Mama programme. This suggests that the challenges of access to care in teenage pregnancy may be more complex than we currently understand and calls for adolescent-focused maternal health interventions that integrate digital tools with broader social support and empowerment strategies. This is especially needed in rural settings where teenage pregnancies remain prevalent.[47, 48]

Second, we find that high-risk pregnancies achieved better ANC quality scores than low-risk cases. This suggests that the programme's risk stratification model, which flags high-risk pregnancies for increased monitoring and tailored support, may be effectively compensating for clinical vulnerabilities. These are consistent with WHO guidance on differentiated care and targeted follow-up for high-risk groups.[43] Our results are encouraging, especially in Kenya where delays in diagnosis and referral often drive poor outcomes.[6] Although the potential role of intrinsic motivation in high-risk women to adhere to ANC protocols after they are informed of their status is noted, even just the programme capacity for early detection of high-risk pregnancy is an encouraging development. Moreover, consistent upward trend in the PJ scores across cohorts represents conscious efforts on the part of the facilities to improve the care of high-risk women.

Our findings spotlight the MomCare dashboard as a candidate prototype for use of digital tools in surveillance and decision-making in this setting. Previous publications have reported the role clinical dashboards in improving patient care especially in HICs, including the "Maternity Dashboard" which had been used in identifying and promoting best clinical practices to safeguard patient care in maternity service, as well as detect and rectify areas requiring improvement in the United Kingdom.[49] Beyond maternity care, a systematic review of evidence on role dashboards in aiding and improving the quality of decision making in healthcare by Iftikhar et al (2019) concluded that the use of data visualization dashboards in healthcare improves the quality of decision making in healthcare.[50] Uptake of such interventions in LMICs remains low, likely due to technological and resource limitations. Our

study demonstrates the feasibility and effectiveness of use of digital dashboards to optimise clinical decision making in low-resource settings. A next generation of MomCare dashboards is in the making, that shift from unilateral to bilateral information by answering specific questions of their uses.

Furthermore, the reported high maternal satisfaction levels suggest that MomCare contributed not only to better clinical outcomes but also to improved trust and engagement between patients and providers. Our study provides a reinforcement of earlier results reported by Izudi et al (2023) in a qualitative assessment of MomCare.[30] According to the study, the beneficiary women reported accessing improved ANC care, being served with respect, receiving high quality care during delivery, experiencing enhanced laboratory testing, receipt of sufficient health education, and relief from financial constraints. Similarly, the health workers reported a high sense of fulfillment due to the provision of quality maternal and newborn care, as well as health system improvements such as prompt emergency response, infrastructural developments, enhanced supply chain, staffing, and increased documentation.

The programme also demonstrated cost stability and efficiency gain, suggesting that digital tools could spur service expansion without cost escalation. The average pregnancy journey cost remained relatively stable over time despite expanded service adherence and capacity-building among providers. Moreover, the cost gap between high- and low-risk cases narrowed significantly as providers became more skilled in managing high-risk pregnancies under the bundled payment model. In particular, the reduction in costs of journeys with cesarean delivery by 37% across cohorts potentially reflects efficiency gains from reduced unnecessary interventions with earlier risk detection and caesarean delivery decision, increased clinical efficiency and decreased resource use, and/or improved scrutiny of caesarean service-related claims on the part of PAF, which are critical for cost-sustainability in scaled programmes. Yet we acknowledge this could at least in part be driven by changes in the mix of participating facilities across cohorts. Nevertheless, these results are consistent with evidence from results-based financing of maternal and child services in similar contexts which show improved cost-efficiency over time as providers adapt to incentive structures and clinical pathways.[51, 52]

Policy implications

The policy implications of this study are significant. First, as Kenya implements the Social Health Insurance Act (2023) and expands universal health coverage, MomCare could provide an attractive model for embedding quality and continuity into maternal health financing. Digital verification systems could ensure that health insurance reimbursements are tied to service delivery, reducing fraud and improving accountability. This is especially relevant in light of the knowledge that 20–40% of healthcare costs are considered waste[53] National adoption of such models could accelerate progress toward SDG 3. Further, this study demonstrates the value of financing health care through digitally verified outcomes rather than traditional input-based funding for donors and development partners. By rewarding providers only once quality-based standards are met and verified digitally, MomCare offers a more transparent and outcome-focused funding model, one that could be adapted for use in other high-priority health areas, such as chronic diseases management. Lastly, there are learning and practice implications for providers as well. Adoption of digital platforms such as the Patient Journey App may facilitate clinical and administrative efficiency.[54] As digital health expands, providers will need training not only in clinical skills but also in data interpretation and patient-centered digital communication.

Strengths & limitations

The strengths of this study include its reliance on real-world implementation data across nine cohorts, offering longitudinal insights into programme performance and provider learning curves. The combination of clinical,

experiential, and cost data allows for holistic evaluation beyond traditional clinical metrics. However, the study also has limitations. The lack of control groups and pre-intervention data precludes causal inference, and the clinics involved were SafeCare-assessed and likely better-resourced compared to the national average, potentially overestimating outcomes. Over time, the number of participating MomCare centres decreased due to attrition. The results may be biased if only the best performing centres are retained in the programme. Lastly, it is difficult to attribute the results exclusively to MomCare programme considering multiple other on-going maternal health interventions in the country, particularly the Linda Mama policy.

CONCLUSIONS

The findings of this study suggest that the MomCare programme may offer a scalable, adaptable and affordable model for driving desirable behaviour towards improving maternal health care delivery and financing in low-resource settings. The programme highlights how digital tools, bundled financing, and real-time data could work together to deliver high-quality care while maintaining cost efficiency. Moving forward, further research should focus on comparative evaluations and quasi-experimental studies to isolate causal impacts of the programme.

Abbreviations

AIDS
Acquired immunodeficiency syndrome
AMREF
African Medical Research Foundation
ANC
Antenatal care
COVID-19
Coronavirus disease 2019
DHS
Demographic and Health Survey
FLTR
Find-link-treat-retain
FMS
Free Maternity Services
GDP
Gross domestic product
HICs
High-income countries
HIV
Human immunodeficiency virus
ICHOM
International Consortium for Health Outcomes Measurement
KHIS
Kenya Health Information System
LMICs
Low- and middle-income countries
MMR

Maternal mortality ratio
NHIF
National Hospital Insurance Fund
PAF
PharmAccess Foundation
PJ
Pregnancy journey
PNC
Postnatal care
PPH
Post-partum haemorrhage
PROMs
Patient-reported outcome measures
SDG
Sustainable Development Goal
SDR
Service Delivery Reform
SHA
Social Health Authority
SHIA
Social Health Insurance Act
SHIF
Social Health Insurance Fund
SMS
Short message service
TB
Tuberculosis
UHC
Universal health coverage
UN
United Nations
USD
United States dollars
WHO
World Health Organization

Declarations

Declarations

Ethics approval and consent to participate

Ethical clearance for MomCare in Kenya was obtained from the African Medical Research Foundation (AMREF) Ethical and Scientific Review Committee (reference number: P911-2020). Informed consent for the use of their data

for research purposes was obtained from all women enrolled in the MomCare programme. The study was conducted in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Additional file 1

Unit prices of maternal services reimbursed under MomCare, based on price agreements between PharmAccess Foundation and participating facilities.

Additional file 2

ANC adherence and pregnancy journey scores by maternal age group (teenage vs adult pregnancies), by cohort.

Additional file 3

ANC laboratory profile completion by maternal age group, by cohort.

Additional file 4

Pregnancy journey scores and share of ‘good’ journeys by risk status (high-risk vs low-risk pregnancies), by cohort.

Additional file 5

Incidence of adverse pregnancy outcomes and neonatal resuscitation among high-risk pregnancies, by cohort.

Additional file 6

Average pregnancy journey costs by maternal age group, by cohort.

Additional file 7

Average pregnancy journey costs by risk status, by cohort.

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Author Contribution

MI wrote the initial draft of the manuscript. RN was involved in the implementation of the MomCare programme and contributed to data acquisition and interpretation. FC led and conducted the data analysis. TFRdW and CD supervised the study and reviewed the manuscript. JF contributed to the interpretation of the findings and critically revised the manuscript. All authors read and approved the final manuscript.

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Data Availability

The data analysed in this study are routine programme data owned by PharmAccess Foundation and are not publicly available. Data may be made available from the corresponding author upon reasonable request and with permission of PharmAccess Foundation.

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Figures



Figure 1

Trends of average PJ scores and percentage of PJs with “good” scores across cohorts of pregnant women

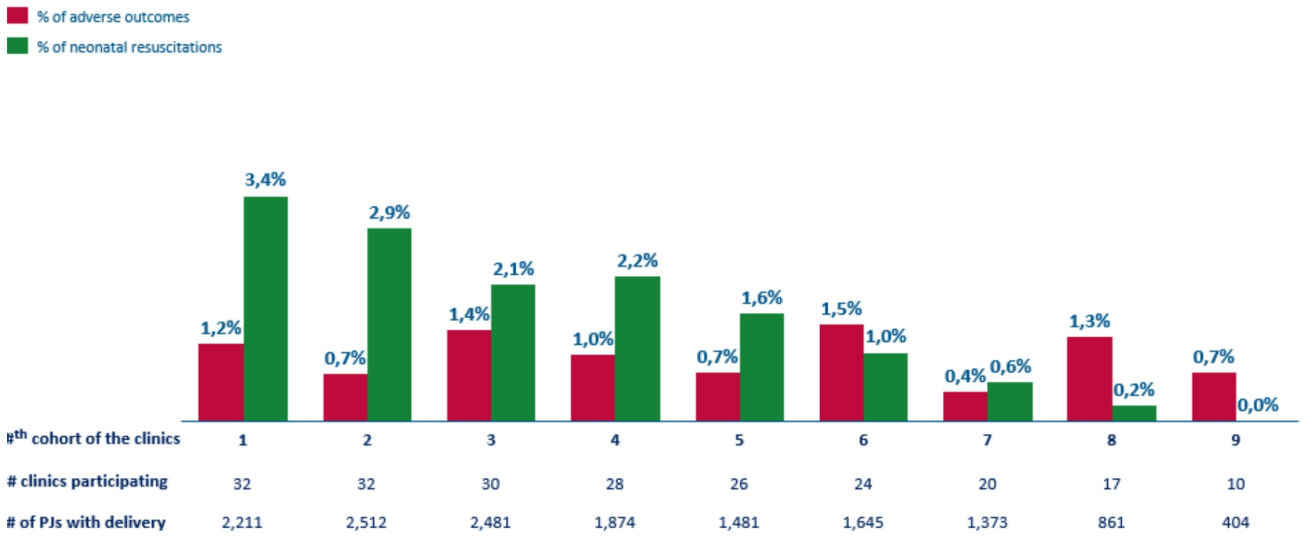


Figure 2

Trends in the incidence of adverse outcomes and neonates requiring resuscitation.

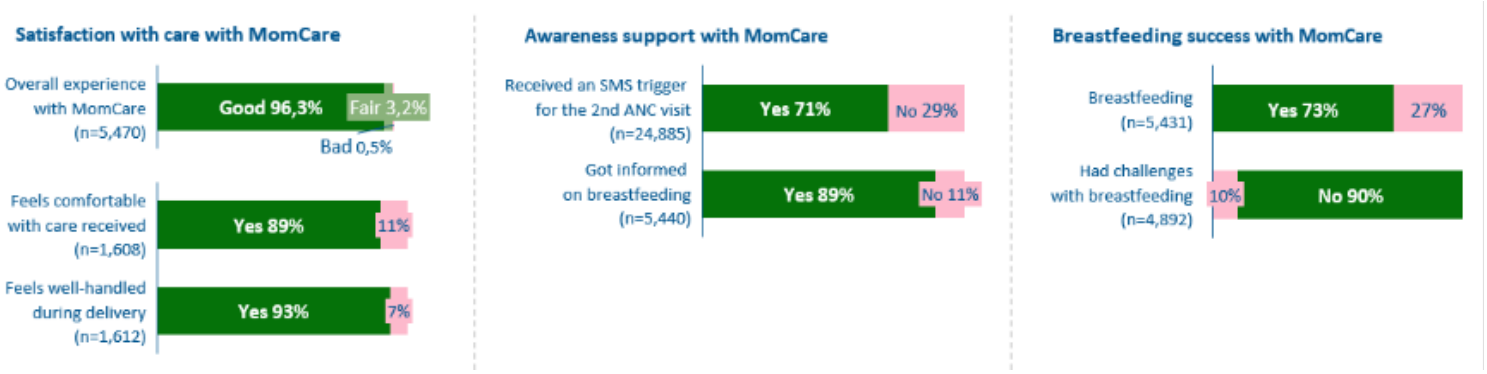


Figure 3

Overview of users' self-reported experiences with MomCare

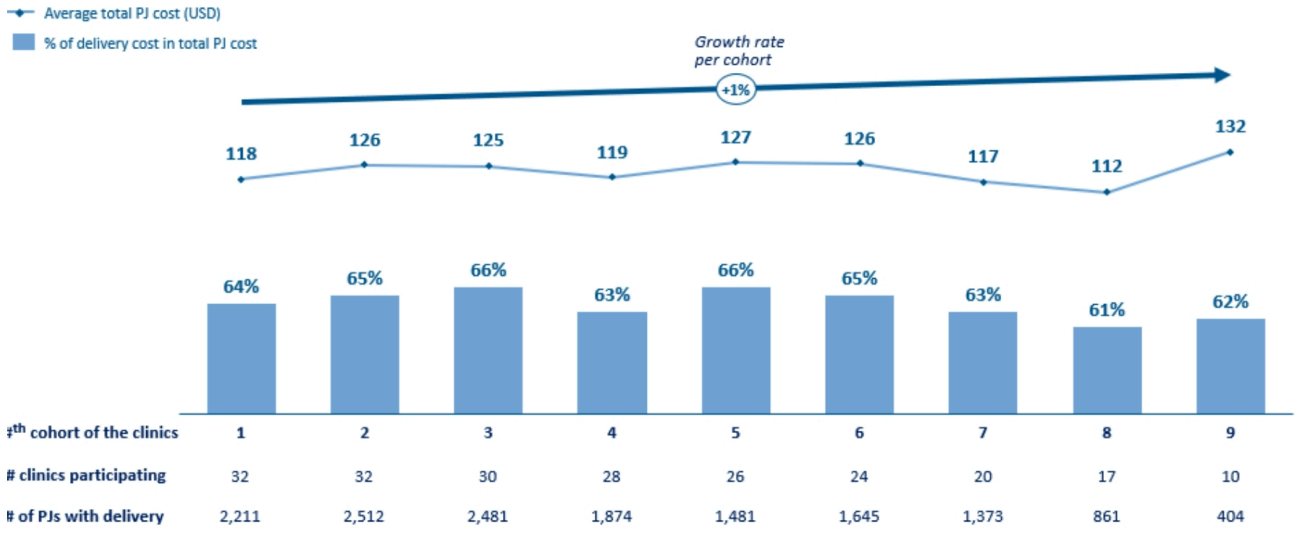
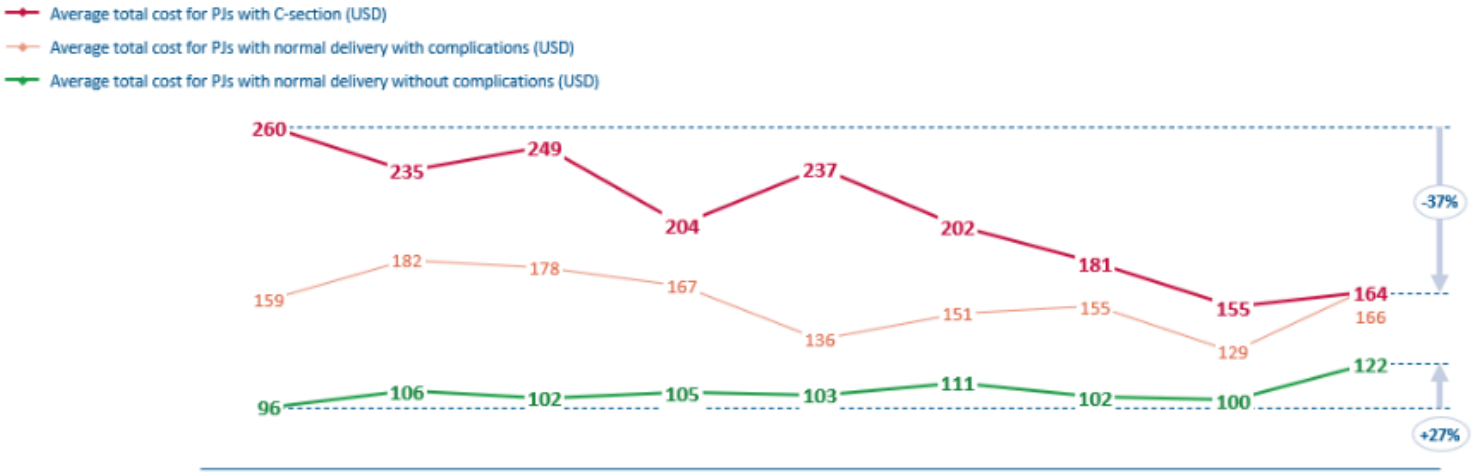


Figure 4

Trends of average total PJ costs and shares of delivery costs in total PJ costs across cohorts



#th cohort of the clinics	1	2	3	4	5	6	7	8	9
# clinics participating	32	32	30	28	26	24	20	17	10
# of PJs with delivery	2,211	2,512	2,481	1,874	1,481	1,645	1,373	861	404
% of PJs with C-section	11%	13%	14%	13%	16%	15%	16%	19%	22%
% of PJs with delivery with complications	3%	2%	2%	2%	4%	2%	2%	2%	1%

Figure 5

Trends of average total PJ costs by type of delivery

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Additionalfile4ANCvisitsandcompletionofANCprofilebyriskgroups.png
- Additionalfile2TrendsofANCvisitisandpercentageofPJswithcompleteANCprofile.png
- Additionalfile6PJcostsbyage.png
- Additionalfile5Trendofincidenceofadverseoutcomesinhighriskpregnancies.png
- Additionalfile7PJcostsbyriskgroup.png
- Additionalfile1Unitpricesofresourcesandservicesv2.docx
- Additionalfile3ANCvisitsandcompletionofANCprofilebyage.png