An Evaluation of the Effect of Introduction of Mobile Phone Use in Ante-Natal Care (ANC) in Ikolomani Sub County, Kakamega County, Kenya

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ABSTRACT

Mobile phone technology has revolutionized communication, making information and services more accessible, and fostering innovations in healthcare, particularly in maternal and child health (MCH). Timely interventions in healthcare can significantly improve outcomes for mothers and newborns. However, maternal and neonatal mortality rates remain high worldwide, with approximately 830 maternal deaths daily due to pregnancy or delivery complications. Almost all maternal deaths occur in developing countries, with rural and poorer mothers at greater risk. Additionally, around 2.8 million newborn deaths happen annually within the first 28 days of life, accounting for 45% of all under-five child deaths. This study aimed to assess the impact of introducing mobile phone use in antenatal care (ANC) in Ikolomani Sub County, Kakamega County, Kenya. Unified Theory of Acceptance and Use of Technology (UTAUT) theory guided this research. The research utilized a correlational design, employing correlation and regression analysis to examine the relationship between mobile phone interventions and maternal health outcomes. The target population consisted of women of reproductive age in Ikolomani Sub County, with a sample size of 298 drawn using the Cochran Formula from a population of 32,803. Data were collected using the Kenya Health Information System (KHIS), ensuring a comprehensive and representative dataset. Data were analyzed using descriptive statistics and hypothesis testing, regression analysis, and Chi-Square tests were used to determine the association between mobile phone use and ANC outcomes. The findings indicated a positive trend, with 74.7% of participants confirming the use of mobile phones for ANC data capture. Regression analysis showed a significant positive association between mobile phone usage and ANC attendance ($B = 0.285$, $p < 0.001$), with mobile phone use accounting for 42.5% of the variation in ANC attendance. These results highlight the potential of mobile health interventions to enhance maternal healthcare delivery. This research concluded that introduction of mobile phone use has positively impacted ANC attendance in Ikolomani Sub County. Based on the positive impact observed, it is recommended that mobile technology be further integrated into maternal health services to improve data capture and accessibility for pregnant women.

Keywords: Infant Mortality Rate, Maternal Health, Maternal Mortality Rate, MHealth

I. INTRODUCTION

Mobile phone technology has revolutionized communication, making information and services readily available. This widespread accessibility has opened doors for innovation in healthcare delivery, particularly in areas facing challenges like limited access to medical facilities. One such area of focus is maternal and child health (MCH), where timely interventions can significantly improve outcomes for both mothers and newborns. Around the world, maternal and neonatal death rates are high. Consistently, about 830 ladies overall pass on as an outcome of issues related to pregnancy or conveyance (World Health Organization [WHO], 2015). Practically all maternal fatalities (close to 100%) happen in underdeveloped countries, and the risk is greater among rural and less fortunate mothers (Wilson, 2018). Around 2.8 million fatalities happened yearly inside the initial 28 days of life, representing roughly half (45%) of all passing among children younger than five (WHO, 2015).

The United States, despite having a robust healthcare system, also grapples with disparities in MCH access, particularly among low-income and minority populations. A 2021 study published in Obstetrics & Gynecology (Kruger, 2021) explored the use of text message reminders for prenatal care appointments. The study found that text message reminders significantly increased appointment attendance among low-income pregnant women, highlighting the potential of mHealth for improving preventative care. Similarly, a 2020 study in JMIR mHealth and uHealth found that a mobile phone app promoting postpartum depression screening increased the likelihood of women seeking mental health services (Dennis *et al.*, 2020). These studies demonstrate the effectiveness of mHealth interventions in promoting preventative and mental healthcare access within the US context.

Pregnancy-related issues kill up to 146,700 Kenyan ladies every year, as indicated by current assessments. As indicated by Family Care International (FCI) and The International Center For Research on Women (ICRW) like clockwork a lady kicks the bucket in Kenya during pregnancy or delivery (Talisuna *et al.*, 2017). Tragically, by far most of these fatalities might have been avoided. Poor topography and a poor road network contribute greatly to the inaccessibility of health care in rural Kenya, as in other Sub-Saharan nations. Because of the inability of most expecting women to reach health facilities on time, the country has been connected to up to 21% of expectant women not giving birth in health facilities (Zurovac et al., 2011). This has been seen even though free maternity treatments are offered in public clinics and institutions.

1.1 Statement of the Problem

High maternal and infant mortality rates pose a significant public health challenge in Kenya. A 2014 study by Family Care International (FCI), The International Center for Research on Women (ICRW), and Kenya Medical Research Institute-Center for Disease Control (KEMRI – CDC) reported an alarming number of pregnancy-related deaths, with nearly a woman dying every hour in childbirth (Ventola, 2014). Furthermore, the Kenya Demographic and Health Survey [KDHS] 2014 highlighted high infant mortality rates, with approximately 44,000 infants lost in their first year of life (KDHS, 2016). Kakamega County stands out with a particularly high burden, recording the highest maternal mortality rate in Kenya at the time (United Nations Population Fund [UNFPA], 2014). While various strategies and policies have been implemented to address these concerning statistics (Talisuna *et al.*, 2017), a key challenge remains: ensuring timely and relevant healthcare information reaches the intended audience. This research aims to investigate the potential of mobile phone technology, or mHealth, to bridge this gap in Ikolomani Sub County, Kakamega County, Kenya. MHealth programs have the potential to revolutionize healthcare delivery, particularly in geographically challenged areas, by leveraging the widespread accessibility of mobile phones. By assessing the effect of mHealth interventions on maternal and child health services in Ikolomani, this study seeks to contribute valuable insights to improve health outcomes in this Kenyan community.

1.2 Research Objective

The objective of this study was to evaluate the effect of introducing mobile phone use in Ante-Natal Care [ANC] in Ikolomani Sub County, Kakamega County, Kenya.

1.3 Research Hypothesis

H_0: The introduction of mobile phone did not result in an increase in ANC attendance in Ikolomani Sub County.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh *et al.*, (2003) to integrate and extend previous technology acceptance models. UTAUT incorporates performance expectancy, effort expectancy, social influence, facilitating conditions, and moderating variables (e.g., gender, age, experience) to predict technology acceptance and use. UTAUT is a comprehensive framework that offers a broader perspective on technology adoption compared to Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB). Its applicability to mHealth research lies in its ability to account for a wide range of factors influencing users' decisions to adopt and use mHealth interventions.

2.2 Empirical Review

Access to primary health care is critical for improving health outcomes among women of childbearing age, pregnant women, fetuses, infants, and young children. Research highlights various mother and child health interventions best suited for primary care settings, with studies showing that targeted and reviewed health initiatives can lead to improved outcomes, particularly within Indigenous communities in Australia (Gautam et al., 2019). While historical improvements in maternal and child health were driven by enhanced housing, environmental health, and tertiary healthcare access, expanding quality primary healthcare access and improving Indigenous communities' socioeconomic conditions are seen as vital steps to bridging current health disparities.

Mobile phone access has surged in developing nations, including Kenya, where mobile phones now serve as vital communication tools accessible to the broader population. This development provides opportunities to scale healthcare standards for underserved populations, enabling healthcare workers to deliver real-time health information, disease diagnoses, and remote health monitoring (WHO, 2011; Chaudhary *et al.*, 2023; Tomlinson *et al.*, 2009). Mobile phones' affordability, reliability, and privacy advantages facilitate these applications, akin to the financial sector's

transformation with Kenya's mobile money platform, M-Pesa (Asiri *et al.*, 2016). A WHO study in 2011 highlighted the global expansion of mHealth, with 114 countries reporting adoption of various mHealth initiatives. However, only 23% had concrete plans to develop mHealth strategies, with Africa lagging behind more industrialized regions. Short Messages Service -based interventions are especially promising in countries like Kenya, where many users rely on basic mobile devices that primarily support calls and SMS, providing a feasible pathway for delivering healthcare services (Anhøj & Møldrup, 2004; Shapiro *et al.*, 2008).

Mobile health (mHealth) initiatives in developing nations aim to bridge healthcare gaps by utilizing technology to increase access and improve service delivery. The Mobile Health Intelligent Monitoring System (I-MHMS) uses body area networks and sensors to collect patient data, transmitting it via Bluetooth or ZigBee with RFID for security. This system provides feedback based on collected environmental data, helping rural patients monitor vital signs without needing direct access to healthcare facilities. However, infrastructure limitations and low literacy rates in rural areas hinder widespread adoption (Cocosila *et al.*, 2009; Leong *et al.*, 2006; Koshy *et al.*, 2008; Seebregts *et al.*, 2009; Zimic *et al.*, 2009).

Other initiatives like Ghana's Mobile Medical Expert System (mMES) aim to reduce hospital congestion by offering remote diagnoses for minor ailments via mobile devices, alleviating strain on healthcare workers. However, users often still visit clinics, suggesting limited practical impact due to the lack of telemedicine integration (Anhøj & Møldrup, 2004; Ouma *et al.*, 2011; Achieng & Ruhode, 2023). In Uganda, the "Text to Change" campaign educated rural populations on HIV/AIDS through SMS quizzes, incentivizing engagement with rewards, which effectively increased health awareness (Kaunda-Khangamwa *et al.*, 2018; DeLone & McLean, 2003). South Africa's Masiluleke Project extended HIV/AIDS awareness through SMS messaging, enabling users to access local testing and counseling services. The program's accessibility in local languages promoted success and demonstrated mHealth's potential in addressing major health challenges like HIV/AIDS (Hermans *et al.*, 2017; Braun *et al.*, 2013).

III. METHODOLOGY

3.1 Study Site

This study was conducted in Ikolomani Sub County which is organized into four county wards: Idakho East, Idakho South, Idakho Central, and Idakho North. Administratively, it is divided into two sections: Ikolomani South, encompassing Iguhu, Eregi, and Shukumu, and Ikolomani North, which includes Shirumba, Isulu, and Shisele. Altogether, the Sub County comprises twenty-two (22) sub locations.

3.2 Study Design

The research utilized a correlational design, employing correlation and regression analysis to examine the relationship between mobile phone interventions and maternal health outcomes, commonly utilized in behavioral research, to compare groups and assess changes resulting from experimental treatments—in this case, the integration of mobile phones into mother and child health programs. This design facilitated the evaluation of the effect of incorporating mobile phone use into these health initiatives.

3.3 Study Population

All women of reproductive age and children aged one year and under who sought and received ANC, skilled delivery, and immunization services in Ikolomani and were documented on the facilities were included in the study. This inclusion criterion applied to both the period before and after the introduction of mobile phones, collecting data from participants who engaged with healthcare services during these specific time frames.

3.4 Sample Size Calculation

The sample size was determined using the Cochran Formula

$$n = \frac{z^2.p.q.N}{e^2.(N-1) + z^2.p.q}$$

Where: N refers to the size of the total population.

n refers to the estimated size of the sample.

e refers to the error of the margin.

z refers to the variant of the standard variant.

p refers to the percentage of the population projected to have features of interest

q = 1-p

Ikolomani has around 32,308 women of reproductive age. This represents 26.399 percent of the Ikolomani sub-population. When selecting the standard variant, precision is often defined as the 95 percent assurance level. The Z value for the 95 percent confidence level is 1.96.

z = 1.96, e=0.05

Henceforth:

p = 0.26399

N= 122,380

q=1-p= (1-0.26399) = 0.73601, z=1.96, e=0.05

Therefore, the projected size of the sample is

$$\frac{1.96^2 \times 0.26399 \times 0.73601 \times 122{,}380}{0.05^2 \times (122{,}380\text{-}1) + 1.96^2 \times 0.26399 \times 0.73601}$$

297.83 = approximately 298 people.

3.5 Data Collection

Data were collected using the Kenya Health Information System (KHIS), ensuring a comprehensive and representative dataset

3.6 Data Analysis

Descriptive statistics and hypothesis testing, regression analysis, and Chi-Square tests were used to determine the association between mobile phone use and ANC outcomes.

IV. FINDINGS & DISCUSSION

4.1.1 Sociodemographic Characteristics and Basic Information of the Respondents

Table 1 shows the sociodemographic characteristics of the respondents. The survey gathered data on respondents' age, marital status, educational background, religious affiliation, employment status, monthly family income, estimated distance to the health facility, mode of transport, travel time, and transport costs. The distribution of participants across these categories offers insights into the diverse characteristics of the study population.

Table 1

Sociodemographic Factors and Basic Information of the Respondents

Characteristic	Category	Number of Participants	Percentage (%)
Age Distribution	18-24	45	15.6
	25-34	110	38.2
	35-44	80	27.8
	45-54	40	13.9
	55 and above	13	4.5
Marital Status	Married	190	65.9
	Single	45	15.6
	Divorced	20	6.9
	Separated	15	5.2
	Widow	10	3.5
	Cohabiting	8	2.8
Educational Attainment	No formal education	12	4.2
	Primary education	90	31.2
	Secondary education	134	46.5
	Tertiary College	52	18.1
Religious Affiliation	Protestant	120	41.7
	Catholic	100	34.7
	Muslim	45	15.6
	Others	23	8.0
Employment Status	Employed	120	41.7
	Self-Employed	90	31.3
	Casual	45	15.6
	Unemployed	33	11.4

Monthly Family Income (KShs.)	Below 20,000	68	23.6
	20,000 - 40,000	112	38.8
	40,001 - 60,000	65	22.5
	60,001 - 80,000	28	9.7
	Above 80,000	15	5.2
Estimated Distance to Health Facility (KM)	0-5	112	38.8
	6-10	88	30.6
	11-15	52	18.1
	16-20	24	8.3
	21 and above	12	4.2
Mode of Transport to Health Facility	Public Transport	120	41.7
	Private Car	68	23.6
	Motorbike	45	15.6
	Bicycle	25	8.7
	On Foot	30	10.4
Estimated Time Spent Traveling to Health Facility (hours)	Less than 1	65	22.6
	1-2	120	41.7
	3-4	70	24.3
	5 or more	33	11.5
Estimated Transport Costs to Health Facility (KShs.)	0-500	75	26.0
	501-1000	120	41.7
	1001-1500	60	20.8
	1501-2000	25	8.7
	Above 2000	8	2.8
Total Participants		**288**	**100.0**

The analysis of age distribution in Table 1 highlights the impact of mobile phone interventions on maternal and child health programs in Ikolomani Sub- County, focusing on participants aged 15 to 49. This age range, encompassing reproductive age, provides valuable insights into the effects of these interventions. The table demonstrates a well-balanced representation across various age groups, which strengthens the comprehension of how mobile phones influenced maternal and child health initiatives within the community. The analysis of educational attainment in Table 1 demonstrates its influence on the effectiveness of mobile phone interventions in Ikolomani's maternal and child health programs. With 46.5% of participants having at least secondary education, a large portion of the population may better engage with mobile health information. However, the 31.2% with only primary education highlight the need for clear and accessible communication to ensure inclusivity. Smaller groups, with tertiary or no formal education, add insights into tailoring interventions for diverse educational backgrounds. The study emphasizes the need for adaptable mobile health communication, aligning with other research that identifies education as a key factor in health literacy and service utilization (Nutbeam, 2000; Smith *et al*., 2016).

4.1.2 Maternal and Child Health Indicators in Ikolomani Sub County (2018)

The analysis of Figure 1 examines the impact of mobile phone integration into Ikolomani Sub County's maternal and child health programs throughout 2018, revealing monthly trends in key health indicators. Notably, the fluctuations in new ANC clients reflect dynamic influences, such as seasonal shifts and outreach facilitated by mobile technology, underscoring the need for targeted interventions to sustain ANC attendance. A positive trend in expectant mothers completing the recommended four ANC visits indicates enhanced healthcare access and awareness, likely due to mobile interventions, supporting improved pregnancy outcomes.

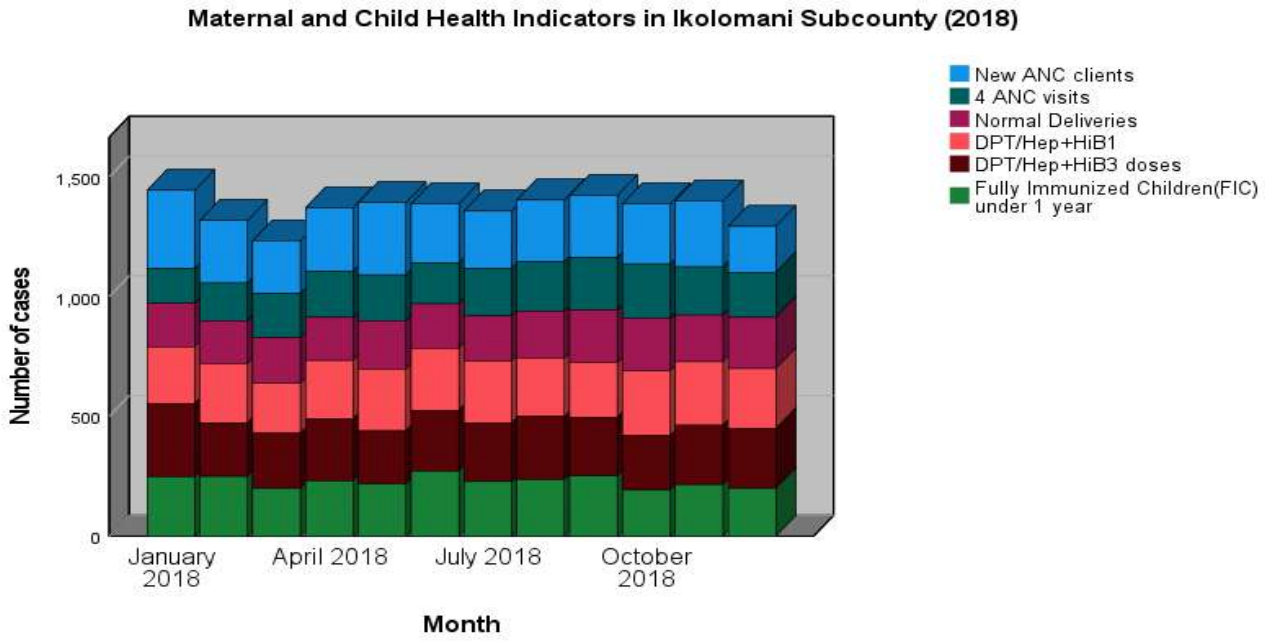

Figure 1
Maternal and Child Health Indicators in Ikolomani Sub County (2018)

In delivery services, variability in normal deliveries highlights the multifaceted effects of mobile technology, shaped by infrastructure and cultural factors. Immunization indicators also show fluctuating trends, with a notable peak in fully immunized children under 1 year, suggesting successful immunization activities supported by mobile communication. These findings demonstrate the potential of mobile technology to positively impact maternal and child health, guiding targeted healthcare strategies in resource-limited settings.

4.1.3 Maternal and Child Health Indicators: Monthly Variations in Maternal and Child Health Indicators in Ikolomani Sub- County (2019)

The analysis of Figure 2's stacked bar graph outlines monthly changes in key maternal and child health indicators in Ikolomani Sub- County for 2019, highlighting the impact of mobile phone interventions. Monthly peaks in New ANC clients and 4 ANC visits, notably in May and October, suggest increased outreach and engagement potentially due to mobile-enabled awareness campaigns. Variability in Normal Deliveries, especially a drop in July, may reflect mobile-facilitated adjustments in delivery coordination and facility capacity. Immunization data show consistent DPT/Hep+HiB1 and DPT/Hep+HiB3 doses with peaks in March and September, possibly aided by mobile tracking of immunization schedules. However, the significant decline in Fully Immunized Children under 1 year in July indicates challenges in maintaining coverage. Overall, the analysis suggests mobile phones have positively influenced healthcare access, service delivery, and community engagement, reinforcing the need for continuous evaluation to optimize maternal and child health outcomes.

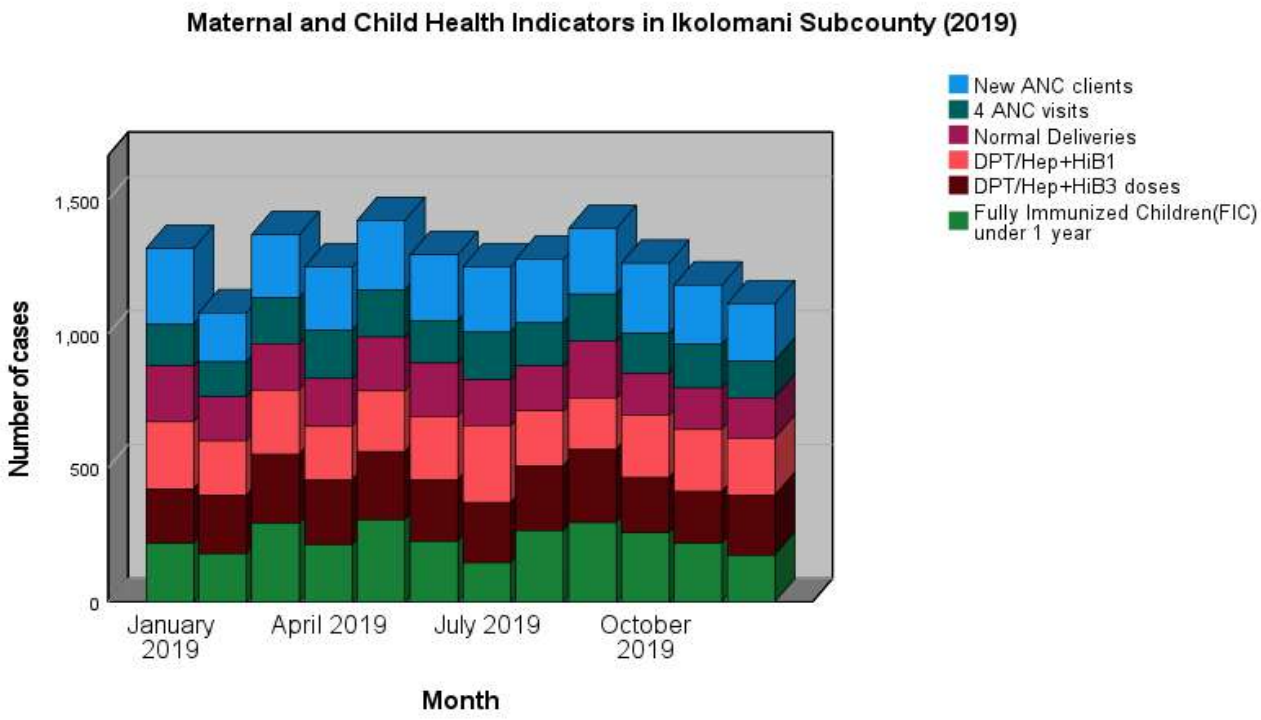

Figure 2
Monthly Variations in Maternal and Child Health Indicators in Ikolomani Sub- County (2019).

4.1.4 Maternal and Child Health Indicators in Ikolomani Sub County (2020)

The analysis of Figure 3 reveals fluctuations in maternal and child health indicators in Ikolomani Sub- County throughout 2020, following the introduction of mobile phone interventions. New ANC clients peaked in January but saw a decline, with a sharp drop in December, indicating possible barriers related to mobile integration. Similarly, 4 ANC visits dropped notably in December, mirroring the trend in new ANC clients and suggesting an influence of mobile interventions on maternal health-seeking behavior. Normal Deliveries remained relatively steady but also declined in December, potentially due to seasonal factors or intervention effects. Immunization indicators, including DPT/Hep+HiB1 and DPT/Hep+HiB3 doses, fluctuated throughout the year, with decreases in December that align with declines in other services, suggesting a systemic effect of mobile interventions on immunization delivery. The Fully Immunized Children (FIC) indicator showed variable trends, with a notable drop in February, hinting at possible challenges in healthcare access for young children post-intervention. The observed patterns indicate both positive and challenging effects of mobile integration, highlighting the importance of ongoing monitoring to optimize maternal and child health outcomes.

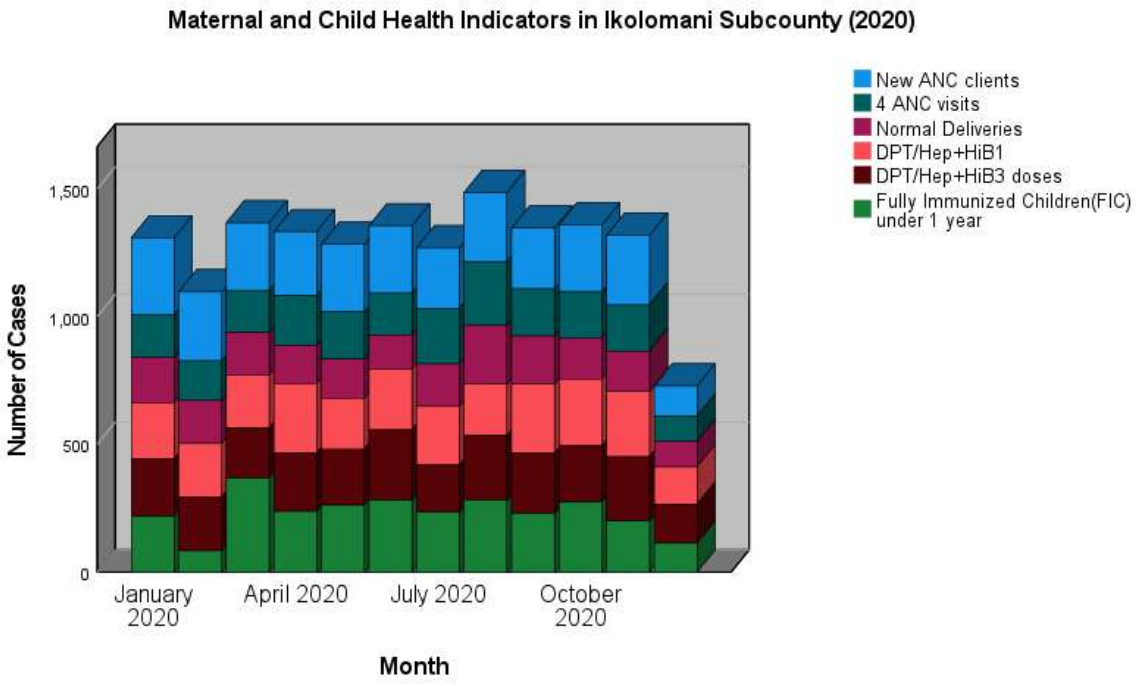

Figure 3
Maternal and Child Health Indicators in Ikolomani Sub County (2020)

4.1.5 Maternal and Child Health Indicators Over Time

The analysis of Figure 4's stacked bar graph shows the impact of mobile phone integration on key maternal and child health indicators in Ikolomani Sub- County, Kakamega County.

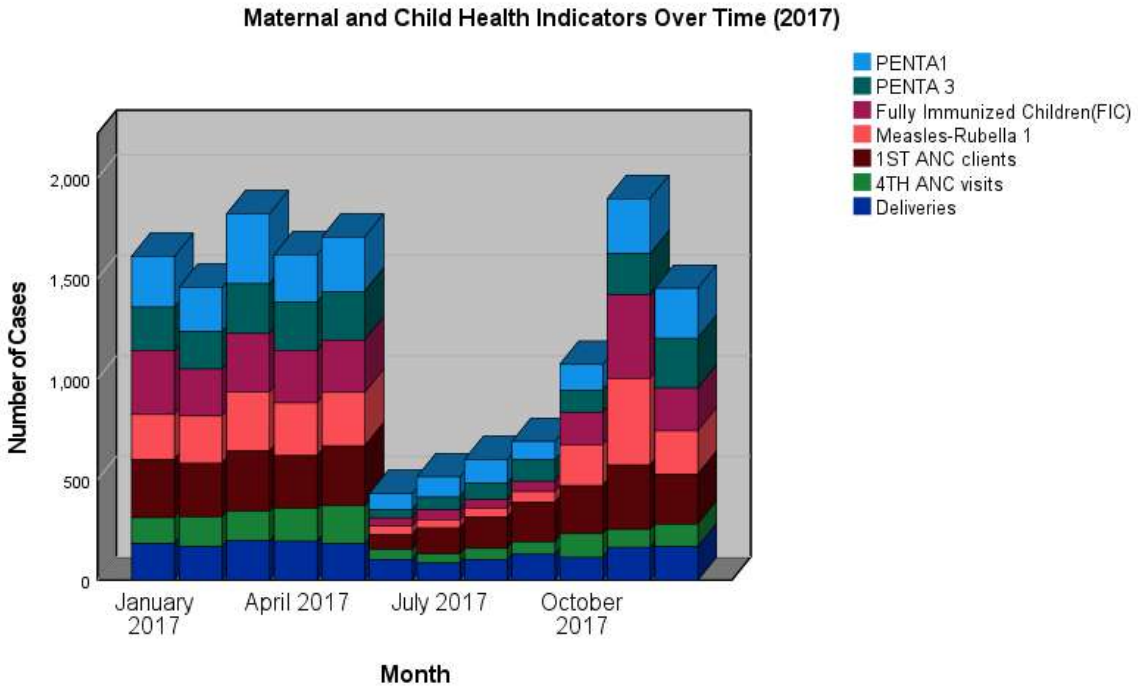

Figure 4
Temporal Trends in Maternal and Child Health Indicators

Variations in PENTA1 and PENTA3 immunizations suggest mobile-enabled outreach efforts, with consistent PENTA3 trends indicating potential positive effects on immunization regularity. Fully Immunized Children (FIC) data suggests improvements in coverage, although missing data points highlight the need for better reporting, which mobile technology could support. Fluctuating Measles-Rubella 1 immunization rates indicate the possible influence of mobile-

enabled campaigns on child immunization. Increasing trends in 1st ANC visits reflect improved early antenatal care uptake, while variability in 4th ANC visits points to ongoing challenges in consistent maternal care. Recorded deliveries also show peaks possibly linked to mobile-facilitated healthcare interventions, though data gaps emphasize the need for improved data collection. These findings underscore the role of mobile technology in enhancing maternal and child health services, while highlighting the importance of robust data systems to support accurate healthcare planning in Ikolomani.

4.1.6 Analysis of Monthly Health Indicators in Ikolomani Sub County (2021)

The analysis of Figure 5 shows the impact of mobile phone integration on maternal and child health indicators in Ikolomani Sub- County, Kakamega County, throughout 2021. Immunization coverage, particularly for PENTA1 and PENTA3, shows peaks in February and March, suggesting enhanced immunization efforts facilitated by mobile communication. The trend in Fully Immunized Children (FIC) aligns with PENTA immunizations, underscoring the comprehensive impact of mobile phone-driven initiatives on child health.

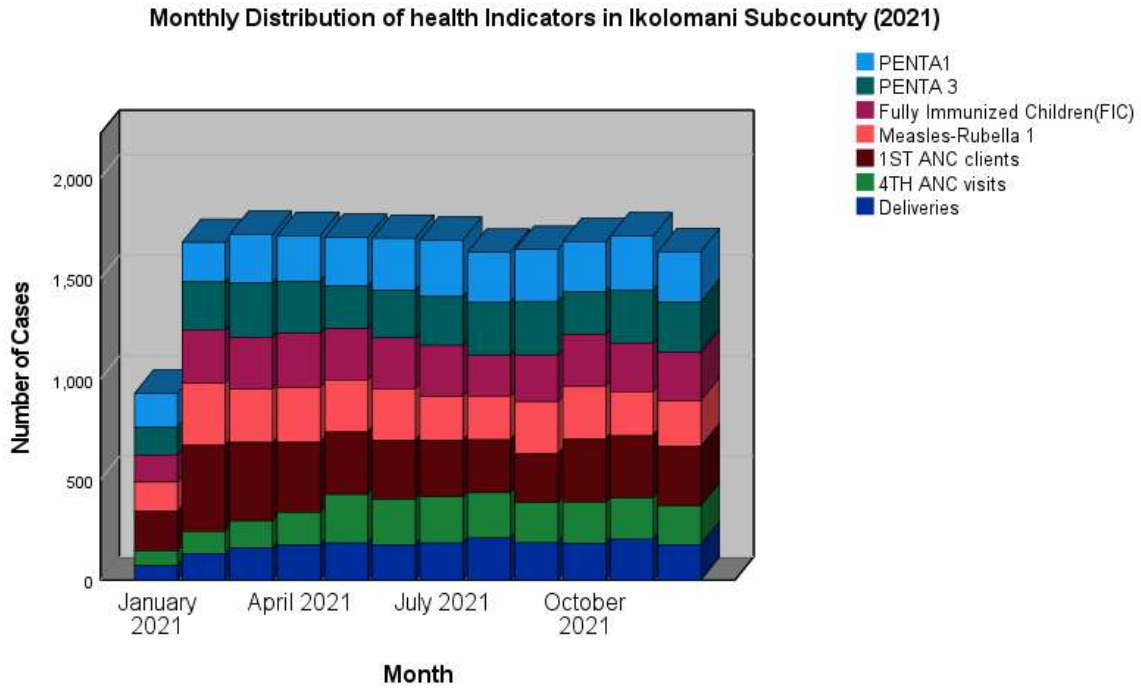

Figure 5

Monthly Distribution of Health Indicators in Ikolomani Sub County (2021)

Measles-Rubella 1 immunizations also show coordinated peaks, reflecting the effectiveness of mobile interventions in boosting overall vaccination rates. For maternal health, indicators such as 1st ANC clients, 4th ANC visits, and deliveries show steady trends, with gradual increases in ANC uptake and consistent delivery rates, suggesting sustained benefits from mobile-supported maternal healthcare. Overall, mobile phone interventions appear to contribute positively to healthcare access and outcomes for mothers and children, emphasizing the value of strategic mobile communication in health program planning.

4.2 Effect of Introducing Mobile Phone Use on ANC Attendance in the Ikolomani Sub County

4.2.1 Mobile Phone Usage for ANC Attendance Data Capture

Table 2 shows that 74.7% of participants in Ikolomani Sub- County report using mobile phones to collect data on ANC attendance, suggesting significant uptake of mobile technology within maternal health programs. However, 25.3% of respondents do not use mobile phones for this purpose, indicating a portion of the population may not fully benefit from this integration. Addressing barriers such as limited access to mobile phones, technological literacy issues, or infrastructure gaps is crucial to ensuring equitable access. The results underscore both the potential of mobile technology to improve healthcare data management and the need to address access challenges for inclusive benefits. This insight is essential for guiding policies that aim to enhance maternal and child health outcomes.

Table 2

Mobile Phone Usage for ANC Attendance Data Capture

Mobile Phone Usage for ANC Attendance Data Capture	Number of Participants	Percentage (%)
Yes	215	74.7
No	73	25.3
Total	**288**	**100**

4.2.2 Regression Analysis of Mobile Phone Usage and ANC Attendance Data Capture

The analysis in Ikolomani Sub- County shows a statistically significant positive effect of mobile phone usage on ANC attendance data capture. Table 3 presents the regression results, where a 0.285 coefficient for mobile phone usage indicates that each one-unit increase in mobile phone usage percentage corresponds to a 0.285-unit increase in ANC data capture. The t-value of 3.800 ($p < 0.001$) confirms the significance of this effect. The R^2 value of 0.425 shows that mobile phone usage accounts for 42.5% of the variation in ANC data capture.

Table 3

Regression Analysis of Mobile Phone Usage on ANC Attendance

Variable	B	St. Error	Beta	t-value	p-value
Intercept	0.720	0.038		18.947	<0.001
Mobile Phone Usage (Yes)	0.285	0.075	0.285	3.800	<0.001
Model Summary					
R: 0.652					
R^2: 0.425					
Adjusted R^2: 0.421					

The regression analysis reveals a significant positive association between mobile phone usage and ANC attendance data capture in Ikolomani Sub- County, reflecting a global trend of using digital tools to enhance healthcare, as supported by studies from Kibria *et al.* (2023) and Kabongo *et al*. (2021). Future research could explore the specific mechanisms through which mobile phones improve ANC attendance data capture, offering insights for developing targeted interventions in maternal health programs.

4.2.3 Pearson Chi-Square Test for Mobile Phone Usage and ANC Attendance Data Capture

The analysis shows a statistically significant association between mobile phone usage and satisfaction with ANC attendance data capture in Ikolomani Sub- County, with a Chi-Square value of 52.146 ($p < 0.001$) and a Cramer's V of 0.39, indicating a medium effect size

Table 4

Pearson Chi-Square Test for Mobile Phone Usage and ANC Attendance Data Capture

Condition	Observed	Satisfied	Neutral	Dissatisfied	Total
Mobile Phone used	215	120	60	35	215
Mobile Phone Not Used	73	20	14	39	73
Total	**288**	**140**	**74**	**74**	**288**
	Chi-Square (x^2):52.146, df=2, p<0.001				
	Carmer's V: 0.39				

A higher proportion of mobile phone users reported satisfaction with ANC data capture (120 participants) compared to non-users (20 participants). This pattern aligns with previous research, such as Kibria *et al.* (2023), which found that mobile health technology enhances healthcare satisfaction. While this study indicates a positive relationship, it is limited by its observational design and cannot establish causation. Further research could investigate specific aspects of mobile phone use that contribute to increased satisfaction, aiding in the optimization of maternal health programs.

The analysis indicates a significant positive impact of mobile phone introduction on maternal health programs in Ikolomani Sub County, evidenced by increased ANC attendance. Hypothesis testing ($p < 0.05$) supports a clear link between mobile phone usage and higher ANC attendance, rejecting the null hypothesis that the introduction of mobile phone did not result in an increase in ANC attendance in Ikolomani Sub County. Regression analysis further substantiates this, with a positive beta coefficient (0.285) showing that increased mobile phone use corresponds with improved ANC attendance data capture ($p < 0.001$). Additionally, the Pearson Chi-Square Test reveals a significant association between mobile phone use and satisfaction with ANC data capture, as mobile phone users reported higher satisfaction levels. Together, these findings highlight mobile phones' beneficial role in enhancing ANC attendance and satisfaction among pregnant women in Ikolomani.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

The introduction of mobile phone use has positively impacted ANC attendance in Ikolomani Sub County. The findings indicate that mobile technology enhances data capture for ANC attendance and increases satisfaction among expectant mothers engaging with maternal health services. Statistical evidence, including significant results from hypothesis testing, regression analysis, and Chi-Square tests, strongly supports the association between mobile phone use and improved ANC outcomes. One-unit increase in mobile phone usage percentage corresponded to a 0.285-unit increase in ANC data capture. The R^2 value of 0.425 showed that mobile phone usage accounted for 42.5% of the variation in ANC data capture. These results underscore the potential of mobile health interventions to strengthen maternal healthcare delivery and suggest that expanding mobile phone use in similar contexts could further improve maternal health program effectiveness and accessibility.

5.2 Recommendations

Based on the positive effects observed from introducing mobile phone use on ANC attendance in Ikolomani Sub County it is recommended that the use of mobile technology across all maternal health services should be increased to improve data capture and accessibility for pregnant women. This includes leveraging SMS reminders and app-based systems to ensure timely ANC visits. Secondly, for pregnant women without access to mobile phones or limited technological literacy, the government should consider providing community-supported mobile devices or partnering with local organizations to facilitate access. Training programs can also help build confidence in using mobile health tools. Furthermore, county governments and the national government should collaborate to create customized, culturally appropriate messaging on ANC benefits and reminders via mobile platforms to maintain high engagement. This could include periodic messages on maternal health tips and the importance of ANC attendance. Finally, Policymakers should be encouraged to support mobile health initiatives in maternal care by providing resources for mobile infrastructure improvements and subsidizing mobile health programs in underserved areas.

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