

Mobile Maternal Health Education in India: A Case Study on Kilkari

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In 2020 alone, 95% of all maternal deaths occurred in low-resource settings, specifically in countries that are not a part of the Organization for Economic Co-operation and Development (OECD) (World Health Organization, 2023). These countries are considered low-to-middle income countries, otherwise known as “developing countries”. In developing countries, maternal mortality can be attributed to a variety of factors such as socioeconomic status, differing healthcare systems, and social conditions. The United Nations has global maternal health as one of its goals and finds ways to increase maternal health in developing nations (UN Women, n.d.). With the rise of technology and access to mobile phones being increasingly prevalent in low socioeconomic areas, one path to improving maternal health in developing countries is mobile health initiatives.

Mobile health applications and services such as Aponjon Bangladesh, MomConnect South Africa, and mHealth4Afrika have been on the rise in developing nations and a priority to develop spread safe maternal health practices (Alam et al., 2017; Baron et al., 2016; Cunningham & Cunningham, 2019). These services give health advice to women throughout and after pregnancy. Most of these services are prerecorded messages sent via mobile phone so that even individuals with no education can understand and learn how to sustain their own health. These messages touch upon contraceptive methods for women, healthy practices during pregnancy, and healthcare tips for children such as encouraging immunizations. The largest global maternal health messaging service is Kilkari in India, catering to millions per week.

In India specifically, the maternal death rate accounted for one-fifth of global maternal death rate in 2015 (Meh et al., 2021). Being such a large country with over 100 languages, thousands of mother tongues, and countless different cultures, differences within the country cause disparate outcomes for maternal health. Kilkari was created in 2013 and gives weekly messages to subscribers based on their stage of pregnancy, up to 1 year after birth. By 2019, an estimated 13,500 lives were saved across the 13 states to which it catered (*Mobile Messaging That Saves Lives*, n.d.). States within India, however, varied widely in the timeline of their subscribership as well as retention rate (Mohan et al., 2022). This paper explores the factors that determine its scalability, improvement, and success for the future.

My research uncovered that Kilkari may struggle to scale due to the improper maintenance by its administrative body, the Government of India. My literature review covered the features of Kilkari, the social conditions for women in India, and the timeline of its administration. I conducted a case study on this service by analyzing documents from the Government of India and secondary studies that have critiqued and evaluated Kilkari. Through my analysis, I find that the main determinant of Kilkari's success is the Government of India who oversees the operating and maintenance of the service throughout each state. I concluded that more government power is necessary by reaching subscribers and properly training front line healthcare workers to result in less disparate maternal health outcomes across states.

Literature Review

Kilkari was first launched by BBC Media Action in the state of Bihar as a trio of mobile health services (Dutt et al., 2022) . These are Mobile Academy, an Interactive Voice Response (IVR)-

based training course to refresh FLHWs knowledge on health education and improve interpersonal skills. Mobile Kunji is an IVR and print-based job aid to support FLHWs experiences and interactions with families in their regions. Kilkari is the third mobile health service, but much larger and targeted at the families of pregnant women themselves. Being directly catered to these beneficiaries, in 2019 Kilkari reached 10 million subscribers and just over 200,000 FLHWs (Chamberlain et al., 2021). At first, Kilkari was a user-paid model, but it failed to cater to the lower socioeconomic population in Bihar. Most of the revenue generated by these subscriptions went to the network providers that powered the service to maintain their infrastructure. Only 10-20% of the total revenue went to ongoing costs of the service such as marketing (Chamberlain et al., 2021). In 2019, the service was transitioned to the Indian Government, making it free for all subscribers. This event opened access to Kilkari for many more individuals, but retention and new subscribership stayed approximately the same. While this lifted the burden of a paid subscription to distribute maternal health education, research has not yet assessed how the administrative structure affects the scalability and maintenance of the service.

Kilkari is currently being used in 18 states, recently scaling up in 2019 from its previous 13 states (Update on Kilkari Scheme, 2024). With the addition of states such as Maharashtra and Gujarat, Kilkari added more to its repository of 5 languages. The service uses front line health care workers (FLHWs) deployed in each state to keep data records and stay connected with beneficiaries. FLHWs also interacted with families, served as a point of contact for healthcare systems, and marketed the service to individuals of each region (LeFevre et al., 2019). The service has grown significantly, and reached over 20 million users, currently with over 3 million

active subscribers. While it is estimated to reach approximately 20% of pregnant women across the states, this number varies greatly among each state. In Assam, three-quarters of subscriptions started between 12 and 28 weeks of pregnancy. However, in Rajasthan most of the subscriptions occurred after 42 weeks (Mohan et al., 2022). As research has uncovered such disparities between regions, scholars have not yet identified the causes of these disparities and ways to bridge these gaps of service.

Some contributors of access to maternal health education lie within the social structures in place for women in India. Women who participate in household decision-making, also being correlated with having more autonomy in home and personal life, are four times more likely to go to the hospital and give birth compared to women who do not participate in decision making, making positive maternal health outcomes more likely (Chattopadhyay, 2012). Additionally, the culture of early marriage for many women or teenage girls leads to an important influence on maternal health, as most maternal deaths occur among young women in India (Jat et al., 2011). Lastly, large family sizes and close husband-wife relationships are associated with higher use of maternal health services compared with small or disjointed families (Paudel et al., 2014). The research done on social patterns in India gives insight to their relation to maternal health outcomes, but scholars have not yet explored how these factors affect the development and maintenance of efforts to increase maternal health education such as Kilkari.

For my research, I will be using Langdon Winner's framework of the politics of artifacts to analyze the scaling and operation of Kilkari messaging service. According to Winner, both technological determinism and social determinism play an important role in how society shapes a

technology and in turn how that technology shapes society (Winner, 1980). Specifically, the development of a technology may determine some pattern of power, authority, or influence on society. Additionally, external patterns of authority affect the design and implementation of the technology. An important concept of this theory is the intractable feature of a technology, which is a feature that is inflexibly linked to a particular pattern of authority or power. Other important aspects of the frameworks include the operating environment and institutionalized patterns of power and authority. Kilkari can be analyzed using this framework because it is a technology that is implemented by an authority (Indian Government), shaped by the social patterns that it is used in, but also shapes the society by improving education. By identifying the differences in operating environments, the institutionalized patterns of society, and the features of Kilkari itself, we can identify what factors caused Kilkari to be scaled the way it is and what this means for the future of this kind of maternal health education service.

Methods

I conducted a case study on Kilkari messaging service for this research. Specifically, I used primary articles from the service's formative studies on the impact of Kilkari. I found studies both from 2013 and 2018 and compared the reports recorded by the Indian Ministry of Health and Family Wellness (MoHFW). I also looked at the website of MoHFW in India to gather direct data from their documents on the government's perspective on Kilkari and its rollout. I also gathered data from secondary articles that evaluated and critiqued their performance over time. I analyzed these sources according to the operating environment's social conditions, perspective of the governing body of Kilkari, and the features of Kilkari.

Analysis

Increased access to mobile phones determines the scalability for Kilkari. In rural areas of India, BBC Media Action research showed that significantly more people had access to mobile phones than own them, while at the same time mobile phone ownership amongst women was higher for child-bearing-age women. Specifically, 68% of men and 32% of women in Bihar owned mobile phones but over 80% of both sexes had access to some shared household mobile phone (Bashingwa et al., 2021). For this reason, the initial 2014 deployment of Kilkari in Bihar was expected to take off significantly. With 6 mobile networks in support of Kilkari, the service initially launched with 60,000 subscriptions within the first 6 months and in only 1 state (Kilkari Marketing, n.d.) . This initial ramp-up of the technology was promising, and it went up to tens of millions over the years. Because mobile phone access is the one requirement to use Kilkari, it becomes the limiting agent for its scalability.

While this access to mobile phones made dissemination of maternal health education easier, the social norms made access to Kilkari more difficult. For example, many women and wives who use the service are unemployed or serve as housewives, and consequently do not regularly leave the house. This made the advertising of this necessary service more difficult because women were not seeing the subscription posters and advertisements. Consequently, BBC Media Action required much more manpower to physically visit homes in rural Bihar and convince them to subscribe to the service (Case Study Kilkari: A Maternal and Child Health Service in India Lessons Learned and Best Practices for Deployment at Scale, 2016). Once subscribed to the service, many women did not have regular access to shared phones and relied on someone else in the household to transfer information. When women did not have direct access to a phone, their

spouses usually listened but did not adequately transfer information to their wives (Scott et al., 2021). Exposure to the service was actually significantly associated with men's knowledge but not women's knowledge about child immunization (Chakraborty et al., 2021). Additionally, social taboos about announcing and talking about pregnancies inhibited participants to report pregnancies and receive proper messaging (Evaluation of Kilkari & Mobile Academy Project, 2023). In this way, the increasing access to mobile devices across India welcomed the new service to spread maternal health education, but is quickly slowed by patterns of household hierarchy and taboo nature of women's health. Unless there was more power by the FLHWs to physically go to homes and market the service, Kilkari's reach is limited by such social norms.

Social conditions like the ones stated above may differ between regions and socioeconomic classes, but specific features of Kilkari determine its spread to different regions and ultimately its scalability. The service currently only delivers messages in Hindi, while there are over 100 languages and thousands of dialects in India. Although being a national language of India, the populations that this service will most benefit from, such as rural and tribal communities, do not know Hindi due to lack of formal education. This feature of the device limits the impact it can make on the population and unknowingly determines the sub-populations that will receive adequate maternal health education, increasing disparate health outcomes across India (Mohan et al., 2021). Additionally, the service requires network connectivity as it sends audio messages to beneficiaries. In 2022, it was reported that just below 50% of people in India had access to the internet (Basuroy, 2023) This feature further limits the population of India that can be reached, and this problem is exacerbated when evaluated in the context of trying to reach underserved populations. In these ways, the features of the technology determine the patterns of knowledge

dissipation and consequently health outcomes across regions. These features can be changed or improved by the developers of the service, consequently changing the reach and influence of the technology. These changes in Kilkari are limited by the institution that funds the whole service, the Indian Government.

Apart from the features of technology and the social conditions in which the technology is used, the patterns of authority that operate and manage the service also determine how the technology is distributed and how it is scaled. Originally, the messaging service was maintained by a partnership between BBC Media Action and six national mobile companies across India but was then sponsored by the Government of India (Case Study Kilkari: A Maternal and Child Health Service in India Lessons Learned and Best Practices for Deployment at Scale, 2016). This change took off a large fiscal burden from families in rural India, who were hesitant to buy a paid subscription. Men, usually heads of households, hesitated due to the belief that maternal health and childbirth is knowledge that can be passed down from generation to generation by their elder maternal figures. The sponsorship by the government encouraged the uptake of the service and consequently emphasized their agenda of achieving the sustainable development goal of reproductive health (Boston & Ma, 2023). However, this sponsorship limits aspects of the service such as call length, ability of the service to give two-way communication, and transcribing it to different languages. These are all aspects of the service that could use improvement according to a recent 2022 study on the progress of the service (Evaluation of Kilkari & Mobile Academy Project, 2023). Additionally, the government's monetary sponsorship of Kilkari is the only controlled domain of maintenance, as the operation of the service varies by state. The government has no standardized way of training professionals, state

officials, and district officials to give maternal health advice in conjunction with the messaging, which causes disparate outcomes for regions that require different needs such as tribal populations. Proponents for this method of control from the government may argue that each state or region has different needs that can only be addressed by officials or professionals from that state, making it reasonable to allow different training methods according to the local demographic. However, leaving it up to the states requires adequate resources that may not be achievable in already low-resource areas. Lastly, there is no method of feedback in place for the beneficiaries or district officials to give suggestions to Kilkari to improve. Therefore, as there are millions of messages sent out across India, there is no improvement in the service due to a lack of centralized control from the governing body.

Conclusion

In conclusion, the scaling and improvement of Kilkari remains at a plateau due to the Indian Government's inadequate role in scaling and maintaining the service. Firstly, access to mobile phones has increased greatly, allowing many more individuals access to maternal health education through Kilkari. Social norms such as women's role in the household and taboo nature of women's health serve as hindering factors to the reach of Kilkari but can be overcome by focusing more manpower to physically connect women to this service. The features of Kilkari such as the languages provided and network connection influence the society which it can reach but are features that can be altered by the governing body that oversees the service. Lastly, the lack of centralized control from the government to improve and maintain the service will determine the ability to scale and change it.

As the primary funding source of Kilkari, the government must make decisions to prioritize this service in order to improve it and scale it to the rest of India. By giving more direct funding and oversight, Kilkari's features such as languages can be improved and consequently more accessible to different parts of India. As the body in charge of training professionals in each state, there needs to be consistent yet adaptable oversight to make sure FLHWs are all adequately trained while still being specialized to interact with the culture of that region, which may influence the subscription and retention of individuals. This study can be used to inform future efforts of mobile maternal health education using a centralized organization. One limitation of this study is the focus on just one mobile health application used in developing countries. Additionally, many articles used to analyze this data came from organizations that run or have a stake in Kilkari. Future studies should focus on developing better centralized techniques to improve Kilkari and scale it across India.

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