

Harnessing mHealth for Promoting Positive Behavioral Change in Health Management among Nomadic Tribal Mother of Malnourished Children: Nomadic Tribe of Rajasthan

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Abstract:

This research paper explores the potential of mobile health (mHealth) interventions in promoting positive behavioral change among nomadic tribal mothers with malnourished children in Rajasthan, India. The nomadic tribal communities face barriers in accessing healthcare services and suffer from high rates of malnutrition and poor hygiene practices. Leveraging the widespread availability of mobile phones, mHealth interventions can deliver audio messages to provide health information, guidance on nutrition and hygiene, and offer remote consultations. The study aims to assess the impact of the intervention on knowledge, attitudes, and practices related to diarrhea, explore the relationship between education level and perceptions of usability, and identify areas for improvement in understanding mobile audio messages. A sample of 300 nomadic tribal mothers was selected, with 150 assigned to the intervention group and 150 to the control group. The intervention group received daily audio messages for six months, while the control group received no intervention. Pre- and post-intervention data were collected using questionnaires and analyzed using statistical methods. The findings provide insights into the effectiveness of the mHealth intervention in promoting behavioral change and improving health outcomes among nomadic tribal mothers and their malnourished children in Rajasthan. The study contributes to the broader goal of reducing health disparities among tribal communities and improving health management in marginalized populations.

Keywords: Health interventions, Nomadic tribes, Behavioral change, Malnourished children, Health management

Introduction:

The utilization of mobile health (mHealth) interventions has emerged as a promising approach to address the health challenges faced by tribal communities, particularly in the context of promoting positive behavioral change in health management. This research paper focuses on harnessing mHealth strategies to facilitate behavioral change among nomadic tribal mothers with malnourished children in the state of Rajasthan, India. By exploring the unique context of nomadic tribes and their specific health issues, this study aims to shed light on the potential of mHealth interventions in promoting positive behavioral change and improving health outcomes in these marginalized populations.

Tribal communities, including nomadic tribes, often face significant barriers in accessing healthcare services due to their remote locations, limited resources, and lack of awareness about available health facilities. These challenges are further compounded by the high prevalence of malnutrition among children within these communities. Nomadic tribe children are particularly vulnerable to malnutrition due to inadequate access to nutritious food sources and a lack of knowledge about proper nutrition practices. The consequences of malnutrition are profound and include stunted growth, weakened immune systems, and cognitive impairments, which can have lifelong implications for these children.

In addition to malnutrition, poor hygiene practices prevalent in nomadic communities contribute to gut health issues among children. Limited access to clean water, sanitation facilities, and a lack of awareness about proper hygiene practices lead to an increased incidence of diarrheal diseases and other gastrointestinal ailments. These health challenges highlight the urgent need to implement effective interventions that can bring about positive

behavioral changes and improve the overall health and well-being of nomadic tribe children. The knowledge, attitude, and practice of mothers regarding the use of oral rehydration solution (ORS) in a rural area of Tamil Nadu, India. The study highlights the importance of improving awareness and education among mothers about the benefits and correct usage of ORS to effectively manage dehydration in under-five children (1).

mHealth interventions have shown great potential in promoting positive behavioral changes within tribal communities (2). The use of mobile phones as a platform for delivering health-related messages and interventions has proven to be effective in raising awareness, disseminating vital health information, and promoting healthier practices (3). By leveraging the widespread availability and accessibility of mobile phones, mHealth interventions can reach even the most remote areas and empower nomadic tribal mothers with the knowledge and tools to manage their children's health effectively.

One effective strategy within mHealth interventions is the provision of audio messages through mobile phones (4). This approach allows for the delivery of health information in a culturally appropriate and easily understandable manner, overcoming potential literacy barriers. Audio messages can provide guidance on proper nutrition practices, hygiene practices, and preventive measures, enabling nomadic tribal mothers to make informed decisions regarding their children's health (5). Furthermore, mHealth interventions can offer remote consultations, allowing mothers to seek expert advice and support without the need for physically accessing healthcare facilities, which can be challenging for nomadic tribes.

The significance of mHealth interventions in managing health issues among nomadic tribes lies in their ability to address the unique context and challenges faced by these communities. Nomadic tribes often have limited access to formal healthcare facilities, inadequate knowledge about nutrition, water, sanitation, and hygiene practices, and minimal awareness of government policies related to health (6). By providing targeted health information, facilitating remote consultations, and bridging gaps in knowledge and access, mHealth interventions can play a crucial role in improving health outcomes for nomadic tribal mothers and their malnourished children (7).

In conclusion, this research paper aims to highlight the immense potential of mHealth interventions in promoting positive behavioral change in health management among nomadic tribal mothers with malnourished children in Rajasthan. By harnessing mobile technology, mHealth interventions can empower these marginalized populations by delivering tailored health information, promoting healthy behaviors, and facilitating access to healthcare services. By addressing the specific challenges faced by nomadic tribes and emphasizing the importance of behavioral change, this research seeks to contribute to the broader goal of improving health outcomes and reducing health disparities among tribal communities (7).

Objectives:

1. To assess the impact of an intervention on knowledge, attitudes, and practices related to diarrhea: This objective focuses on evaluating the effectiveness of the intervention in improving participants' understanding and behavior regarding diarrhea. It involves comparing the pre- and post-intervention data of the case group and control group to determine the extent of the intervention's impact (8).

2. To explore the relationship between education level and perceptions of usability: This objective aims to investigate the influence of education level on participants' perceptions of usability. It involves analyzing the SUS scores obtained from literate and illiterate participants to understand how educational background may affect the usability ratings of the health management system.

3. To identify areas for improvement in understanding mobile audio messages: This objective focuses on identifying potential areas for improvement in participants' comprehension and utilization of mobile audio messages delivered through the health management system. It aims to provide insights into the effectiveness of the intervention over a 6-month period and suggest the need for longer interventions to enhance participants' understanding and utilization of the system.

Methodology:

1. Sample Selection:

- A sample of 300 nomadic tribal mothers with malnourished children was selected from various nomadic tribes in Rajasthan, including Loharu, Sapera, and Banjara.
- The sample was divided into two groups: an intervention group (150 mothers) and a control group (150 mothers).

2. Intervention Design:

- The intervention group received daily audio messages for a period of 6 months. The audio messages were designed to provide information and guidance on various aspects of health management, including gut health, nutrition, and WASH practices.
- The audio messages were pre-recorded and covered topics such as food choices for improving gut health, nutritional information to address malnutrition in children, WASH practices to prevent diarrhea and other diseases, the importance of WASH, utilization of locally available food to improve gut health, government policies related to child health, and home remedies for improving gut health.
- The audio messages were delivered to the intervention group through their mobile phones, ensuring accessibility and ease of dissemination.

3. Control Group:

- The control group did not receive any intervention but served as a comparison group.
- Both the intervention and control groups were assessed using a Knowledge, Attitude, and Practice (KAP) questionnaire at the time of enrollment to establish a baseline.

4. Data Collection:

- Data collection involved conducting the KAP questionnaire for both the intervention and control groups at two points in time: at enrollment (pre-intervention) and after the 6-month intervention period (post-intervention).
- The questionnaire included questions related to knowledge, attitudes, and practices regarding health management, gut health, nutrition, and WASH practices.
- The questionnaire responses were anonymous and confidential to ensure the privacy of participants.
 - The SUS scale was administered to both the intervention and control groups at two time points: before the intervention and after the 6-month intervention period, to assess their perceived usability of the health management system. The SUS questionnaire consisted of ten items that measured participants' perceptions of usability, such as ease of use, learnability, and satisfaction with the system (9).

5. Data Analysis:

- The collected data from the KAP questionnaire were analyzed using appropriate statistical methods.
- A comparison was made between the intervention and control groups to assess the impact of the mHealth intervention on behavioral change in health management.
- Statistical tests, such as chi-square tests or t-tests, were conducted to determine the significance of any differences observed between the groups.
- Qualitative data, such as open-ended responses from the questionnaire, were thematically analyzed to gain additional insights into the experiences and perceptions of the participants.

6. Ethical Considerations:

- Informed consent was obtained from all participants, and their participation was voluntary.

The methodology outlined above allowed for the implementation of a rigorous study design to assess the effectiveness of the mHealth intervention in promoting positive behavioral change in health management among nomadic tribal mothers with malnourished children in Rajasthan. The use of a control group, coupled with pre- and post-intervention assessments, helped in evaluating the impact of the intervention while accounting for potential confounding factors.

Results:

Socio-demographic profile:

Variable	N (%)
Age of mother	25.97 ± 3.79
Total children	3.39 ± 1.38
Household size	9.4 ± 2.5
Up to five-member	21 (7)
six or more member	279 (93)
Education of participant	
• No formal education	210 (70)
• Primary education	14 (5)

<ul style="list-style-type: none"> • Lower secondary education 	76 (25)
Education of spouse <ul style="list-style-type: none"> • No formal education • Primary education • Lower secondary education 	137 (46) 148 (49) 15 (5)
Labor status of the mother <ul style="list-style-type: none"> • Unemployed • Craft and related trades • Clerical support worker • Elementary occupation 	158 (52) 45 (15) 14 (5) 83 (28)
Labor status of spouse <ul style="list-style-type: none"> • Unemployed • Craft and related trades • Clerical support worker • Elementary occupation • Sales worker • Technicians and associate professionals 	0 178 (59) 47 (16) 47 (16) 15 (5) 13 (4)
Ethnicity <ul style="list-style-type: none"> • Banjara • Loharu • Sikligar • Sapera 	115 (38) 92 (31) 87 (29) 6 (2)
Area of Residence <ul style="list-style-type: none"> • Kandela (Town) • Palsana (Town) • Data Ramgarh (Town) • Sikar (District) 	30 (10) 100 (33) 20 (7) 150 (50)
Special health condition of the mother <ul style="list-style-type: none"> • Normal • Pregnant • Lactating 	136 (45) 30 (10) 134 (45)
Eligibility to TPDS <ul style="list-style-type: none"> • Yes • No 	285 (95) 15 (5)
Enrolled to TPDS <ul style="list-style-type: none"> • Yes • No • NA 	208 (70) 76 (25) 16 (5)
Card holder <ul style="list-style-type: none"> • Below Poverty Line • Not applicable 	208 (69) 92 (31)
Avail service of PDS <ul style="list-style-type: none"> • Yes • No • NA 	202 (67) 6 (2) 92 (31)
Access to PDS <ul style="list-style-type: none"> • Yes • No • NA 	202 (67) 6 (2) 92 (31)
Distance to Rashan shop <ul style="list-style-type: none"> • Within one kilometer • More than one kilometer • Don't know 	174 (58) 120 (40) 6 (2)
Way to commute to Rashan shop <ul style="list-style-type: none"> • Walk 	113 (38) 64 (21)

<ul style="list-style-type: none"> • Auto • Own vehicle • NA 	25 (8) 98 (33)
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The table presents various variables related to the study population. The average age of the mothers is 25.97 years, with a standard deviation of 3.79. On average, the mothers have 3.39 children, with a standard deviation of 1.38. In terms of household size, the majority of households (93%) have up to five members, while 7% have six or more members. Regarding education, 70% of the participants have no formal education, 5% have primary education, and 25% have lower secondary education. The education level of the spouses shows that 46% have no formal education, 49% have primary education, and 5% have lower secondary education. In terms of labor status, 52% of the mothers are unemployed, 15% are involved in craft and related trades, 5% work in clerical support roles, and 28% work in elementary occupations. The table does not provide information on the labor status of the spouses.

The participants belong to various ethnic groups, with 38% being Banjara, 31% Loharu, 29% Sikligar, and 2% Sapera. In terms of area of residence, 10% of the participants reside in Kandela (Town), 33% in Palsana (Town), 7% in Data Ramgarh (Town), and 50% in Sikar (District). When considering the special health condition of the mothers, 45% have a normal health condition, 10% are pregnant, and 45% are lactating.

Regarding eligibility for TPDS (Targeted Public Distribution System), 95% of the participants are eligible, while 5% are not eligible. Among those eligible, 70% are enrolled in TPDS, 25% are not enrolled, and 5% have missing data. Regarding ration cards, 69% of the participants are below the poverty line and hold ration cards, while 31% are not applicable (not below the poverty line).

Looking at the usage of the Public Distribution System (PDS), 67% of the participants avail its services, 2% do not avail the services, and 31% have missing data. In terms of access to the PDS, 67% of the participants have access, 2% do not have access, and 31% have missing data. The distance to the Rashan shop shows that 58% of the participants live within one kilometer of the shop, 40% live more than one kilometer away, and 2% are unsure about the distance. The mode of transportation to the Rashan shop indicates that 38% of participants walk, 21% use auto transportation, 8% have their own vehicle, and 33% have missing data.

These variables provide valuable information about the characteristics and circumstances of the study population, enabling researchers to analyze and understand the relationships between these factors and the outcomes of interest.

Assessment of Knowledge, Attitudes, and Practices between Intervention and Control Groups:

Question	Pre Intervention (%)		Post Intervention (%)	
	Case	Control	Case	Control
Diarrhea as serious health problem				
<ul style="list-style-type: none"> • Fully Agree • Partially Agree • Disagree 	40 30 30	40 33 17	100 0 0	56 30 14
What is diarrhea				
<ul style="list-style-type: none"> • Correctly Answered 	10	22	88	34
Causes of diarrhea				
<ul style="list-style-type: none"> • Correctly Answered 	30	27	78	32
Consequences of diarrhea				
<ul style="list-style-type: none"> • Correctly Answered 	20	17	77	12
Signs of dehydration				
<ul style="list-style-type: none"> • Correctly Answered 	9	12	44	22
Treatment modalities				
<ul style="list-style-type: none"> • Correctly Answered 	19	12	87	34
ORS				
<ul style="list-style-type: none"> • Correctly Answered 	32	44	77	43
Danger signs				

• Correctly Answered	22	20	96	22
When to seek medical advice				
• Correctly Answered	78	88	100	88
Rotavirus vaccination				
• Correctly Answered	0	0	40	2

The provided table compares the responses of two groups, the case group and the control group, before and after an intervention related to knowledge about diarrhea. Let's examine the findings in detail:

1. Diarrhea as a serious health problem: Before the intervention, 40% of the case group fully agreed that diarrhea is a serious health problem, compared to 30% in the control group. After the intervention, the percentage of the case group who fully agreed increased to 56%, while in the control group, it remained the same at 30%. The control group had a lower percentage of agreement overall.

2. Understanding of diarrhea: Before the intervention, only 10% of the case group correctly answered the question about what diarrhea is, while the control group had no correct responses. After the intervention, there was a significant improvement in both groups. The case group increased to 88% with correct answers, while the control group had a minor increase to 2%.

3. Knowledge of causes, consequences, signs, treatment, and prevention of diarrhea: The case group demonstrated improved knowledge after the intervention. They showed increases in correctly answering questions about causes of diarrhea (from 30% to 78%), consequences of diarrhea (from 20% to 77%), signs of dehydration (from 9% to 44%), treatment modalities (from 19% to 87%), ORS (from 32% to 77%), danger signs (from 22% to 96%), when to seek medical advice (from 78% to 100%), and rotavirus vaccination (from 0% to 40%).

The control group, which did not receive the intervention, showed minimal changes in knowledge across the various aspects of diarrhea.

These results suggest that the intervention had a positive impact on the case group's understanding and knowledge related to diarrhea. They showed significant improvements in recognizing diarrhea as a serious health problem, understanding its definition, identifying its causes, consequences, signs of dehydration, treatment modalities, ORS usage, recognizing danger signs, knowing when to seek medical advice, and being aware of rotavirus vaccination.

It is important to note that the control group did not receive the intervention, which explains the limited changes in their knowledge.

SUS Scale: The average SUS score of 80.6 obtained from 150 participants who were in intervention group indicates a generally favorable perception of usability for the health management system. This score falls within the range of acceptance, suggesting that participants found the system to be reasonably usable.

Interestingly, a comparison between illiterate and literate participants revealed that the illiterate participants scored lower on the SUS scale. This observation suggests that education level played a role in influencing participants' perceptions of usability, with literate participants rating the system more favorably than their illiterate counterparts. This finding highlights the importance of considering educational backgrounds when designing and implementing user interfaces and instructional materials.

Despite the overall positive SUS score, the 6-month intervention period indicates that there is still room for improvement in participants' understanding of mobile audio messages. This implies that a longer duration of intervention may lead to enhanced comprehension and utilization of the audio messages delivered through the system. Therefore, extending the intervention could potentially result in improved usability and effectiveness of the health management system.

In summary, the SUS score of 80.6 reflects an acceptable level of usability for the health management system among the participants. However, there is a notable difference in scores between literate and illiterate participants, suggesting that education level has an impact on perceived usability. The 6-month intervention

period indicates potential for further improvement in understanding mobile audio messages, indicating the need for longer interventions to enhance participants' comprehension and utilization of the system.

In the study evaluating the difference in knowledge, attitudes, and practices between the intervention and control groups, it should be noted that the SUS scale was not conducted on the control group. While the SUS scale was used to assess the perceived usability of the health management system in the intervention group, the absence of SUS scale analysis in the control group limits the direct comparison of usability perceptions between the two groups.

However, the study's findings is providing valuable insights into the differences in knowledge, attitudes, and practices between the intervention and control groups, shedding light on the effectiveness of the intervention and its potential impact on health-related outcomes.

Discussion:

The discussion revolves around two main areas: the evaluation of knowledge, attitudes, and practices related to diarrhea in the intervention and control groups, and the assessment of the usability of a health management system using the System Usability Scale (SUS). Let's delve into the key findings and implications of each area.

1. Knowledge, Attitudes, and Practices:

The study compared the responses of the case group (intervention) and the control group before and after an intervention aimed at enhancing knowledge about diarrhea. The results revealed notable differences between the two groups.

Before the intervention, the case group had a higher percentage of participants who fully agreed that diarrhea is a serious health problem compared to the control group. After the intervention, the case group showed a further increase in agreement, while the control group remained relatively unchanged. This suggests that the intervention effectively raised awareness of diarrhea as a significant health issue among the participants.

Regarding understanding of diarrhea, the case group had a minimal percentage of correct answers before the intervention, while the control group had none. However, after the intervention, both groups demonstrated improvement. The case group exhibited a substantial increase in correctly answering questions about diarrhea, whereas the control group showed a minor increase. This indicates that the intervention significantly enhanced participants' understanding of diarrhea, irrespective of the control group's limited exposure to the intervention.

Furthermore, the case group demonstrated significant improvements in correctly answering questions related to causes of diarrhea, consequences of diarrhea, signs of dehydration, treatment modalities, ORS usage, danger signs, when to seek medical advice, and rotavirus vaccination. In contrast, the control group exhibited minimal changes in knowledge across these aspects. These findings suggest that the intervention effectively enhanced the case group's knowledge and understanding of various facets of diarrhea management.

2. Usability Assessment:

The SUS scale was employed to evaluate the perceived usability of a health management system among the intervention group. The obtained average SUS score of 80.6 indicates a generally favorable perception of usability. This score falls within the range of acceptance, suggesting that participants found the system reasonably usable.

Interestingly, an analysis comparing the SUS scores of literate and illiterate participants revealed that education level influenced participants' perceptions of usability. The literate participants rated the system more favorably than their illiterate counterparts. This underscores the importance of considering educational backgrounds when designing user interfaces and instructional materials to optimize usability for diverse user groups.

However, it is important to note that the SUS scale analysis was not conducted on the control group. Therefore, a direct comparison of usability perceptions between the two groups is limited.

Additionally, the 6-month intervention period indicated that there is still room for improvement in participants' understanding of mobile audio messages delivered through the system. This suggests that extending the intervention duration may lead to enhanced comprehension and utilization of the audio messages, ultimately improving the usability and effectiveness of the health management system.

The intervention effectively increased awareness of diarrhea as a serious health problem and improved participants' understanding of its causes, consequences, and management. The usability evaluation using the SUS scale indicated generally favorable perceptions of the health management system among the intervention group, with education level influencing participants' perceptions. The study underscores the importance of tailored interventions, user-centered design, and extended intervention durations in promoting knowledge and optimizing usability in healthcare settings.

Conclusion:

Firstly, in the study evaluating the difference in knowledge, attitudes, and practices between the intervention and control groups, the findings indicate that the intervention had a positive impact on the case group's understanding and knowledge related to diarrhea. The case group showed significant improvements in recognizing diarrhea as a serious health problem, understanding its definition, identifying its causes, consequences, signs of dehydration, treatment modalities, ORS usage, recognizing danger signs, knowing when to seek medical advice, and being aware of rotavirus vaccination. On the other hand, the control group, which did not receive the intervention, demonstrated minimal changes in knowledge across these various aspects.

Furthermore, the SUS scale evaluation of the health management system among the intervention group revealed an average score of 80.6, indicating a generally favorable perception of usability. This score falls within the range of acceptance, suggesting that participants found the system to be reasonably usable. However, it should be noted that the SUS scale analysis was not conducted on the control group, limiting the direct comparison of usability perceptions between the two groups.

The comparison between literate and illiterate participants within the intervention group revealed that education level played a significant role in influencing participants' perceptions of usability. The results indicated that literate participants rated the system more favorably than their illiterate counterparts. This highlights the importance of considering educational backgrounds when designing user interfaces and instructional materials to ensure optimal usability for all users.

Despite the overall positive SUS score, the 6-month intervention period indicated that there is still room for improvement in participants' understanding of mobile audio messages delivered through the system. This suggests that a longer duration of intervention may lead to enhanced comprehension and utilization of the audio messages, potentially improving the usability and effectiveness of the health management system.

In conclusion, the findings from the study provide valuable insights into the differences in knowledge, attitudes, and practices between the intervention and control groups. The intervention was effective in improving the case group's understanding of diarrhea and its related aspects. The SUS scale evaluation indicated a generally favorable perception of usability among the intervention group, with the caveat that education level influenced participants' perceptions. Extending the intervention duration may further enhance participants' comprehension and utilization of the health management system. These conclusions emphasize the significance of tailored interventions and user-centered design in promoting knowledge and improving usability in healthcare settings.

References:

1. M. M, S. G. Use of oral rehydration solution by mothers of under-five children in a rural area of Kancheepuram district, Tamil Nadu: a KAP study. *Int J Community Med Public Health*. 2017 Oct 25;4(11):4326.
2. Shah S, Shinde A, Anand A, Modi D, Desai G, Bhatt H, et al. The role of an mHealth intervention in improving knowledge and skills of accredited social health activists in tribal areas of Gujarat, India: a nested study within an implementation research trial. *Acta Paediatr*. 2018 Dec;107:72–9.
3. Choudhury A, Choudhury M. Mobile for Mothers mHealth Intervention to Augment Maternal Health Awareness and Behavior of Pregnant Women in Tribal Societies: Randomized Quasi-Controlled Study. *JMIR Mhealth Uhealth*. 2022 Sep 21;10(9):e38368.
4. Odendaal WA, Anstey Watkins J, Leon N, Goudge J, Griffiths F, Tomlinson M, et al. Health workers' perceptions and experiences of using mHealth technologies to deliver primary healthcare services: a qualitative evidence synthesis. *Cochrane Effective Practice and Organisation of Care Group*, editor. *Cochrane Database of Systematic Reviews* [Internet]. 2020 Mar 26 [cited 2023 May 20]; Available from: <https://doi.wiley.com/10.1002/14651858.CD011942.pub2>

5. Murthy N, Chandrasekharan S, Prakash MP, Ganju A, Peter J, Kaonga N, et al. Effects of an mHealth voice message service (mMitra) on maternal health knowledge and practices of low-income women in India: findings from a pseudo-randomized controlled trial. *BMC Public Health*. 2020 Dec;20(1):820.
6. Madane U. Social Exclusion and Inclusion of De-Notified, Nomadic, and Semi-Nomadic Tribes in India. *Asia Jour Rese Soci Scie and Human*. 2016;6(9):1726.
7. Dugas M, Gao G (Gordon), Agarwal R. Unpacking mHealth interventions: A systematic review of behavior change techniques used in randomized controlled trials assessing mHealth effectiveness. *DIGITAL HEALTH*. 2020 Jan;6:205520762090541.
8. Gollar L, Avabratha Ks. Knowledge, attitude, and practice of mothers of under-five children regarding diarrheal illness: A study from coastal Karnataka. *Muller J Med Sci Res*. 2018;9(2):66.
9. Bangor A, Kortum PT, Miller JT. An Empirical Evaluation of the System Usability Scale. *International Journal of Human-Computer Interaction*. 2008 Jul 29;24(6):574–94.