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Use of Mobile Health in Infant and Young Child Nutrition: A Formative Study in Rural Maharashtra

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Abstract

Undernutrition is a major public health problem for under 5 years of age children in India. Approximately 41% and 21% of under 5 years of age children are stunted and wasted respectively. Despite the known importance of age appropriate infant and young child feeding practices for child nutrition, the rates of these practices remain poor in India. The major determinants for inappropriate IYCF practices are beliefs and knowledge of parents and caregivers. These can be effectively addressed through counselling by mobile Health technology as mobile phones are widely available and have a high penetration across the country. This formative research explored the perceptions of caregivers regarding infant feeding practices, feasibility of mobile phone for counselling and targeted messaging to mothers on appropriate infant feeding. We conducted in-depth interviews, focus group discussions and key informant interviews. The data were translated, transcribed and analysed using a thematic approach. We found that rural households have at least one mobile phone with good network connectivity. Utilizing mobile phones for counselling was found to be acceptable in the community, provided that the advice given is affordable, tailored to their cultural beliefs and socio-economic status.

Keywords

Mobile Health, Infant and Young Child Feeding, Mobile Phones, Malnutrition, Formative Research, India

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Undernutrition is a major public health problem for under 5 years of age children in India. Approximately 41% and 21% of under 5 years of age children are stunted and wasted respectively. Despite the known importance of age appropriate infant and young child feeding practices for child nutrition, the rates of these practices remain poor in India. The major determinants for inappropriate IYCF practices are beliefs and knowledge of parents and caregivers. These can be effectively addressed through counselling by mobile Health technology as mobile phones are widely available and have a high penetration across the country. This formative research explored the perceptions of caregivers regarding infant feeding practices, feasibility of mobile phone for counselling and targeted messaging to mothers on appropriate infant feeding. We conducted in-depth interviews, focus group discussions and key informant interviews. The data were translated, transcribed and analysed using a thematic approach. We found that rural households have at least one mobile phone with good network connectivity. Utilizing mobile phones for counselling was found to be acceptable in the community, provided that the advice given is affordable, tailored to their cultural beliefs and socio-economic status. Keywords: Mobile Health, Infant and Young Child Feeding, Mobile Phones, Malnutrition, Formative Research, India

Introduction

Globally, 5.6 million children die under the age of 5 years (UNICEF, WHO, & World Bank, 2016). Undernutrition is the underlying contributing factor for 45% of all child deaths (Black et al., 2008). Most of these deaths take place in low - and middle-income counters. As a percentage, this accounts for 39% of the total deaths occurring in this age group (UN IGME, UNICEF, 2018). The severity of undernutrition in India is reflected by the fact that India has the highest prevalence of under-weight children in the world (Gragmolati, Shekar, Gupta, Bredenkamp, & Lee, 2005). In India, about 21% of under-five years of age children suffer from wasting due to acute malnutrition, while 38% of children are stunted indicating chronic malnutrition. These figures account for 30% of the world's wasted and stunted children (Government of India Ministry of Health & Family Welfare, 2016).

The importance of early childhood nutrition for adequate growth and development is well-established (Bhutta et al., 2008; Liu et al., 2012). Simple and inexpensive Infant and Young Child Feeding (IYCF) practices such as optimal breastfeeding and timely initiating of complementary feeding can positively impact health and survival status of children. (World Health Organization, 2003). Considering the above role of nutrition, country-specific

guidelines on infant and young child feeding practices have been developed and are being promoted all over the world, including in India. (Government of India Ministry of Human Resources Development, 2004). Infant and young child feeding practices in India are suboptimal despite promotion of country specific guidelines on IYCF. The recent National Family Health Survey, India (NFHS-4) report shows that only 41% of newborns are put to the breast within an hour of birth, about 50% of children less than six months are exclusively breastfed, and only 20% of children between the age of six to twenty-three months are fed appropriately as per the recommended practices (Government of India Ministry of Health & Family Welfare, 2016; Government of India Ministry of Human Resources Development, 2004; World Health Organization, 2003).

Since cultural factors, beliefs and knowledge of parents are major determinants for infant feeding practices, strategies based on communication leading to knowledge and behavioural changes are often sought after (Akter & Rahman, 2010; Hotz & Gibson., 2005; Pelto, Martin, Van Liere, & Fabrizio, 2015; Roy et al., 2005). In this context, mobile phone technology appears to be an attractive tool because of its high penetration (Briscoe & Aboud, 2012). Research conducted on the effectiveness of mobile phone counselling for improving infant feeding practice in urban areas has shown that exclusive breastfeeding rates at 6 months have been enhanced by 50% (Patel et al., 2018). With >50% of households owning mobile phones (Telecom Regulatory Authority of India, 2016) and most health providers with access to them, the potential of extending mobile technology-based counselling to rural areas is worth exploring. (Coughlin et al., 2015; Pellegrini, Pfammatter, Conroy, & Spring, 2015)

Studies have reported that mHealth interventions, particularly those delivered through short message service (SMS), were associated with improved utilization of preventive maternal healthcare services, including uptake of recommended antenatal and postnatal care services (Feroz, Rizvi, Sayani, & Saleem, 2017). Studies on mHealth interventions particularly on SMS have reported improved utilization of maternal healthcare, especially recommended use of antenatal and postnatal care. SMS reminders have been predominantly utilized for client education and changing behaviours (Datta & Mullainathan, 2014; Entsieh, Emmelin, & Pettersson, 2015). The identification of factors that influence the use of mobile phones for strengthen infant feeding practices is necessary for designing of the intervention. We conducted a formative research to assess the nature of mobile phone use by the women in rural communities in India and the perceptions of mobile phone counselling among the women, their family members, and service providers. Our goal is to inform the design of a large-scale intervention trial to assess the impact of mHealth counselling on child nutrition.

Methods

The study involved focus group discussions (FGDs), in-depth interviews (IDIs) and key informant interviews (KII). These were conducted with healthcare providers, women, and the family members in the rural areas under the governance of two Primary Health Centres (PHCs) in Nagpur District of Maharashtra, India between January and July 2014. The PHCs were selected on the basis of differential access to transportation, availability of network coverage and distance from the city.

The IDIs were carried out with four pregnant women in their final trimester, four mothers of infants aged 0-5 months and four mothers of young children aged between 6-12 months. IDIs were also conducted with the husbands and mothers-in-law of these women (Table 1).

Table 1. Description of demographic characteristics of IDIs and KII participants (Altogether 40 IDIs and 2 KII).

Type of participant	No. Of Interviews	Age range	Highest Education level	Lowest Education level
Pregnant women in 3rd trimester	4	20-24	Higher secondary completed	Primary
Women with children 0-5 months of age	4	24-26	Higher secondary	Primary
Women with children 6-12 months of age	4	25-35	Higher secondary	Primary
Husbands of pregnant and lactating women	12	28-36	University	Secondary
Mothers in law of pregnant and lactating women	12	45-60	Primary	Illiterate
KII with medical officer	2	35-40	Medical Graduation	

The respondents were selected purposively to represent individuals within the household influencing feeding and nutrition practices. We solicited the support of frontline health worker (ASHA worker) to identify potential participants for both FGDs and IDIs. The ASHA worker identified the families with pregnant women and children from the age group of 6-12 months and asked the families for suitable time for interview. The availability of husbands was also confirmed as per his day off or working hours. The IDIs were conducted at the household level. This provided adequate time, privacy, minimal disturbances, and a relaxed environment for respondents to express their views and for the interviewer to probe important issues. We used flexible interview guidelines to accommodate a variety of experiences and opinions. We conducted four FGDs: two with mothers having infants from the age of 6-12 months and two with husbands of these women. The purpose of the FGDs with mothers and husbands was to explore knowledge and perceptions of IYCF practices, familiarity, and perceptions of mobile phone technology. The FGDs were conducted either at village health centre or at Anganwadi centres at a time convenient to the respondents.

Three FGDs were also conducted with frontline community health workers known as Accredited Social Health Activists (ASHAs) and two with the female health care workers at the rural government facilities known as auxiliary nurse midwives (ANMs). Each FGD composed of six to eight participants (Table 2). The purpose of these FGDs was to obtain general information regarding utilization of health care services, perceptions of cultural feeding practices and acceptability of a cell phone intervention for improving IYCF practices in the region.

Table 2. Description of demographic characteristics of FGDs participants. (11 FGDs)

Type of participant	No. Of FGDs	No. of participants per FGD	Age range	Education level
Women with children 6-12 months of age	4	8	20-30	Higher secondary
Husbands	2	8	25-35	Graduate
Frontline health workers (ASHAs)	2	6	20-39	Secondary
Auxiliary nurse midwives (ANMs)	2	8	20-50	Secondary
ASHA using cell phones for data collection	1	10	25-45	Higher secondary

Two KIIs were conducted with the medical officers at each of the study PHCs to obtain further information about IYCF practices in their catchment areas, to understand their role in promoting better IYCF practices and to get their opinions about the potential of mobile phone counselling for improving feeding. All interviews and FGDs were carried out by a team of experienced qualitative researchers from the Lata Medical Research Foundation, Nagpur.

All interviews were conducted in Marathi language. Copious notes were taken throughout the discussions and interviews. All FGDs and interviews were audio recorded and transcribed verbatim in the local language. Then all 48 transcripts were translated to English by the research team involved in data collection. The English translations and the original transcript in local language were compared for any differences and agreed on a common English transcript taking all efforts to retain the original meaning of the narratives. The three researchers who conducted the FGDs and IDIs did the preliminary coding independently from each other taking the interview format as a flexible guideline. Common set of codes were developed for both FGDs and IDIs as the interview guidelines was similar. Code book was compared and adjusted based on the research objectives for a final set of codes. Then three researchers coded the transcripts manually using the updated and agreed set of code book. Coded transcripts in the text format were merged together for association of patterns and comparison amongst interviews. Different coding sorts were compared across to identify emerging themes. An inductive thematic analysis was performed following the methods as outlined by Taylor-Powell and Renner (2003). This involved both coding down using anticipated themes based on the interview guides and coding up, using inductive coding to identify emerging themes. The analysis team discussed the text pertaining to each thematic code. After several discussions, these were consolidated and summarised in a document for each theme with relevant quotes and text tables.

We obtained a verbal audio recorded consent from each participant. The confidentiality and anonymity of each participant was maintained. Participation of the respondents was voluntary, and they were assured that the information gathered from them would solely be used for research purpose.

Results

Factors influencing breastfeeding practices

Though the participants were aware of the importance of breastfeeding for growth and development of children, they were unable to elucidate the specific advantages of breastfeeding. Some of them were unsure the benefit of breastfeeding:

I don't know if there is any advantage or disadvantage. But if the baby doesn't get mother's milk, can the baby live, tell me? Even if we decide to give top feed how much top feed can you give? How much can we buy? Now you are serving women, you can buy milk. But here, we are not able to feed ourselves, and then from where will we buy milk? (Mother-in-Law, complementary feeding woman, Salwa, IDI)

Despite general knowledge about the importance of breastfeeding, several mothers felt that it was necessary to supplement breastfeeding with cow's milk or milk preparations. This was in part because some women believed that not all breast milk was of the same quality, and thus more dilute milk required supplementation:

Like some mothers have thick milk, mine is very dilute; so, I used to make the baby lick almond paste for two-three months...Yes, it (almond paste) was necessary. You see, the elder one, I used to give him the same. He looks good. (Pregnant woman, Mansar, IDI)

While the majority of mothers were at least aware that infants should receive only breast milk until the age of six months. Mothers-in-law mentioned about the "benefit" of other foods alongside breast milk.

Yes that is given. Janam ghutti and gripe water should be given. For digestion, the baby's stomach bloats sometimes. The baby is active, and if given, the passing of stools is easier. Babies cry if there is stomach ache. (Mother-in-Law, lactating woman, Mansar, IDI)

The majority of mothers-in-law said that supplemental feedings of newborns with janamghutti¹ in addition to breast milk was essential in making the baby strong and healthy:

Janamghutti keeps the body healthy and the stomach is cleaned. (Mother-in-Law, Salwa, IDI)

Many mothers-in-law said that supplementing breast milk with gripe water² was critical for ensuring proper digestion of newborn babies:

Gripe water is essential for digestion; the baby's stomach bloats sometimes. Babies cry if there is a stomach ache. (Mother-in-Law, Mansar, IDI)

¹Janamghutti is a traditional herbal preparation comprised of dry dates, almonds, turmeric, and medicinal herbs mixed with either breast or cow's milk.

²Gripe Water is a commercially available preparation that is believed to help baby's digestion and relieve colic or gaseous distension of the abdomen.

Given the important roles of elderly women and mothers-in-law in the decision-making for the family, their experience in raising children and the trust placed in them by younger women, many women adopt these supplementary feeding practices as promoted by the mothers-in-law:

Yes, my mother-in-law, because I ask everything to my elders and then only do it ... well, all give useful advice. But one who has experience of having a baby, only that person can tell what and how to do. (Lactating woman, Salwa, IDI)

Additional influence to supplement breastfeeding came from husbands, who perceived that during times of maternal illness it was advisable not to breastfeed in order to protect the baby from illness. The husbands considered cow's milk as an important substitute for breast milk during maternal illness:

If the child is ill it [breast feeding] will make no difference, but if the mother is ill, it [breastfeeding] will make a difference. The child can become unwell. (Husband, Mansar, IDI)

This family influence for feeding additional foods to their babies was echoed in by the health workers who reported that the barriers to appropriate feeding practices were not so much an issue of maternal knowledge, but an issue of household economic constraints and the social dynamics within the families. It necessitated mothers to listen to their husbands and mothers-in-law when making decisions about infant feeding:

Yes, they [mothers] understand everything, but they don't follow. Mostly they do not follow our instructions because of money matters or some family problems...in some joint families they have to listen to all the members. They cannot have their own opinions. (ANM, Salwa, FGD)

The health workers mentioned that the women lacked freedom when it came to decision-making about feeding, which contributed to their supplementation of breast milk within the first six months despite having some general knowledge about the importance of exclusive breastfeeding.

The mother-in-law is more important than the mother. Many times, the mother herself says "tell this all to my mother-in-law," even when they have to be operated (caesarean section) they say "ask my mother-in-law." They have no self-decision. (ANM, Mansar, FGD)

Complementary foods and feeding behaviour

Most of the participants introduced complementary foods along with breastmilk, after their infant was six months of age. Some health workers stated that mothers and their family members sometimes delay initiation of complementary feeding, despite knowing the advantages.

Most of the respondents said that upon initiation of complementary foods, first the infant should be fed foods with liquid consistency like cow's milk, biscuits soaked in milk, varan-bhaat³ varanache paani⁴ or daal ka paani⁴ for the first 8-10 days. This should then be

³Varan-bhaat is dish made of cooked pulses and rice.

⁴Varanache paani/daal ka paani is water left after cooking pulses.

followed by giving pasty, semi-solids like khichari⁵ and continued till the infant is about 10-12 months old. Other foods given included varan-poli⁶, small quantities of vegetables (green leafy vegetables, cauliflower, potatoes, beans etc).

Some light food like water, daal ka pani all this is given only after 6-7 months. After that when the baby is one-year old, small amount of solid food is started. (Mother-in-law, Salwa, IDI)

Mothers and family members did not feel that fruits are necessary. They were only fed to the infant when purchased for the whole family. Soft fruits like papaya, mango, grapes, banana, chikoo (sapodilla) were fed commonly when available. Women preferred to feed the infants whatever is made for the whole family and do not take much effort to cook separately for their children, however, they avoid making it spicy:

We give what is cooked for others in the house. We keep aside the bland food for the child before adding spices. (Lactating woman, Mansar, FGD)

Infants were commonly given home based semi-solid preparation of sooji⁷, upma⁸ or dalia⁹. The preferred packaged foods also fed to the infants were Cerelac[®]¹⁰, Maggi[®] (noodles), chocolates, Horlicks[®] or Bournvita[®]¹¹ with cow milk or buffalo milk, fast food snacks like Kurkure[®]¹², toast, chips, chiwda¹³, laddoo¹⁴, etc. Deep fried snacks like bhajiya¹⁵ and sevpapdi chaat¹⁶ are also given to children.

Eggs, chicken, chicken liver, meat and fish were given only by a few families after the infant completed one year of age, once they had teethed completely.

Most of the participants felt that by the age of 1.5 or 2 years, children can be permitted to eat on their own without any supervision. Once old enough, the respondents let the children eat by themselves, mostly unsupervised:

They [children] eat properly. And it is said that if we feed them it is possible that we overfeed and there is indigestion. If they eat themselves, they [children] eat only as much as they need. (Pregnant woman, Mansar, IDI).

Only a few mothers and their husbands responded that they feed the child under their supervision, in front of the television or in a playful manner. The health workers expressed their concern over letting children eat on their own, unsupervised, as children drop food, eat off the floor that causes them to fall ill. Thus, they believe it is better if the child is fed by an adult:

⁵ Khichdi is rice and lentils cooked till soft.

⁶ Varan poli is Indian bread soaked in cooked pulses.

⁷ Sooji is a sweet preparation of broken wheat.

⁸ Upma savoury preparation of semolina.

⁹ Dalia savoury preparation of broken wheat.

¹⁰ Cerelac[®] is packaged baby food instant cereal.

¹¹ Horlicks[®] or Bournvita is malted cereal.

¹² Kurkure[®] is packaged salted crunchy snack.

¹³ Chiwda is spicy mixture of flattened rice.

¹⁴ Laddoo is an Indian sweet made of bengal gram flour.

¹⁵ Bhajiya is an Indian fried savoury fritter.

¹⁶ Sevpapdi chaat is an Indian snack.

That's not so in our place. They place a plate in front of the child, and the women go about their work. Then a dog also will put its mouth into it, a hen will also peck at it and the child mostly drops the food onto the ground, this causes diarrhoea. That is the reason why we have high incidence of malnourishment and then they say he [child] ate something in the evening and this happened. (ASHA workers, Salwa, FGD)

There was perception among the women and family members that girls had a better ability to digest any type and quantity of food, whereas boys had weaker digestive systems. Out of this perception, they fed the boys with precaution. Many respondents perceived that girls could be given non-vegetarian foods earlier than boys for the same reason. Thus, there are a lot of restrictions on the variety of foods that are given to boys:

Yes, mothers-in-law say it's a boy, he cannot digest. He [boy] is delicate so you should eat less. If you eat less, you will have less milk. And don't feed him frequently. Otherwise his stomach will bloat. Nothing happens to her (girl child). She can digest anything. (ASHA workers, Salwa, FGD)

Perspectives on use of mobile phones

Household and personal mobile phone possession

Almost all the participants' families possessed at least one mobile phone. In cases where there was availability of only one phone in the household, it was usually owned by the husband. All the participants perceived mobile phone as a necessity that every household should have one.

The health care workers agreed on the fact that even the poorest families in the village possessed and use mobile phones. In addition, most of the participants reported to have a fair network coverage in their areas and do not experience much connectivity issues.

Yes, even if they are poor, they have one cell phone. It has become a fashion to have the cell phone to play songs. (ASHA worker, Mansar, FGD)

Men found mobile phones to be highly advantageous as they felt they are very useful in emergencies, are convenient and provide, timely and instant information. They can be utilized to keep a check on family members including their children, when they are away at work, they also keep them in contact with people who are far away. They said that women in the household should possess mobile phones since communication becomes faster and easier with them:

Yes, women in the house possessing phone is also necessary. Because if I go out somewhere, the phone is with me and if there are some urgent needs then she can receive or make calls. (Husband, Salwa, IDI)

Interestingly, a healthcare worker perceived that using a mobile phone could damage the IQ level of children.

IQ of the children decreases when they use the cell phone. There are certain sound waves produced in the cell phone which can lead to decrease in I.Q. (ANM, Mansar, FGD)

None of the participants including men had any objection or concerns regarding women in their family using a mobile phone.

She only uses the phone to call her mother, her aunt, not for anything else. I don't have any doubt. (Husband, Salwa, FGD)

Proficiency in mobile phone use

Most of the women and men knew how to make and receive calls on their own and read text messages if in Marathi. If asked to open an old message, many of the women would require assistance either from their husband or other family members. Women who owned personal mobile phones knew of a few additional features like radio, music player, games and camera though the phone was rarely used for these purposes. Few male participants were well-acquainted with operating mobile phones and used advanced features like internet and WhatsApp. The women participants showed interest in learning other features like typing a message, video recording etc.

I don't make use of many features. But my husband can use a lot of applications. Internet, WhatsApp, Facebook, he can use all. I don't do anything. I don't get much time because of the children. (Complementary feeding mother, Mansar, IDI)

Perspectives on use of cell phones for IYCF

Most of the participants reached for help from health care providers like a doctor, nurse or an ASHA worker in cases of emergency and illness over mobile phones. However, none of them have an experience of receiving IYCF counselling using mobile phones. Almost all the participants agreed that receiving IYCF counseling would prove beneficial. The most preferred family member to be involved in IYCF counseling emerged to be the "mothers-in-law," being an elder member in the family. Though husbands were interested in being involved, they still preferred their mother's since they are the caretakers of their pregnant and lactating wives:

Yes, since they (mother-in-law) are with me, they can also tell, that, this is what they told us. So, do like this. They should also be included. (Pregnant woman, Mansar, IDI)

Health care providers also recognized the need of involving the mother-in-law and husband in counseling because they are the main decision makers in the family. None of the participants had any gender preferences regarding mobile phone counselors except that the counselor should be well-trained. When enquired about priority issues to be addressed through mobile phone counseling, participants preferred to receive counseling over breastfeeding issues. Husbands and health workers mentioned the need of breastfeeding and antenatal counseling. Some participants emphasized receiving counseling on mother and baby's nutrition and illnesses in addition.

The participants with relatively higher education mentioned greater need for counseling in rural areas as they thought people in villages did not have much knowledge about correct practices, and they followed the traditional customs:

If the women get some information about breastfeeding, they will be happy to get it. Today also if you ask someone, what is breastfeeding? No one knows

properly what it is. What are the advantages? This is a very small rural area and people here do not have much knowledge. (Complementary feeding mother, Salwa, IDI)

Opinion on receiving text and voice messages

Most of the participants were aware of voice messaging systems because of promotional calls made by commercial companies. All participants quoted that they would like to listen to voice calls related to livelihood or health. The opinions of the participants differed in preferences of listening to voice calls or reading text messages. Most of the participants preferred listening to voice messages except one. The reason behind this preference was that sometimes the text messages might go unseen whereas ringing of phone is mostly answered.

The text ones which are to be read are preferred. Because then we can read those messages whenever we have time. (Husband, Salwa, IDI)

Message is mostly longer. It is never one screen length, always more. No, if it is too long then no. If it is good then I read it, otherwise no. (Pregnant woman, Salwa, IDI)

The health workers recommended the use of voice messages on the husband's phone, for the cases where females do not possess personal phones. They said that adopting this strategy would add to the chances of messages being conveyed to the targeted mother.

But that time the phone should be with the woman to listen to the calls. Also, this facility can be provided over the husband's phone. There would hardly be a husband who will not convey these messages to his wife. (ANM, Mansar, FGD)

Frequency of receiving text messages and calls

The most common response for preferred frequency of counseling calls was weekly. Preferred time varied with each participant, everyone had individual time preferences to receive the calls and messages depending on the availability of the mobile phone with them. In general, afternoon time was most convenient to receive them when they would be free from their household chores and their husbands would be more likely to be at home or around. Women preferred the text messages to be in vernacular language, i.e., Marathi. They were ready to receive text messages more frequently than calls—twice or thrice a week—since they thought it would help re-enforcement:

Text messages to be sent every third day. So that people are constantly reminded. If the messages are once a week, people do not remember. They know that today we will receive message. But if it keeps coming frequently; they will retain the information more. (Complementary feeding mother, Mansar, IDI)

Discussion

We conducted this research to understand, describe and document the current infant and young child feeding practices in rural areas, the reasons for adopting these practices and to identify opportunities for improving these through mobile phone counselling. Though the

mothers were aware of the existing recommendations for IYCF, there were inconsistencies in following them. Cultural beliefs and practices followed were important reasons for not adhering to the government recommendations on IYCF.

Pressure from the family, economic conditions, lack of decision-making skills and deep-rooted cultural beliefs are the core reasons for inappropriate practices. The mothers lacked confidence and followed the advice given by the older family members. The findings were supported by previous studies that reported the influence of elderly family members as deciding the feeding practices to be followed. (Aubel, 2012; Aubel, Toure, & Diagne, 2004) To make interventions resulting in behaviour change at household levels, targeting the elders in the family becomes a requisite under such settings. It was interesting to note that fathers were willing to get involved in the infant feeding process. However, being the only earning member of the family limited him from doing so.

Similarly, complementary foods were included in the baby's diet after 6 months of age. The foods included were mostly of thin consistency lacking nutrition and dietary diversity. Dietary diversity is an important component of infant and young child feeding. It is associated with overall dietary quality, micronutrient intake of young children, household food security and better nutritional status of children in developing countries (Arimond & Ruel 2004; Hatloy, Hallund, Diarra, & Oshaug, 2000; Kennedy, Pedro, Seghieri, Nantel, & Brouwer, 2007; Moursi et al., 2008; Sawadogo et al., 2006; Steyn, Nel, Nantel, Kennedy, & Labadarios, 2006; Tulloch 1999). Thus, it is not surprising that due to minimum dietary diversity, Indian infants aged 6-23 months have high rates of wasting (21%) and stunting (38.4%) (Government of India Ministry of Health & Family Welfare, 2016).

To date there have been studies from high income countries of using cell phone for health interventions. They have shown promising results. (Free et al., 2013; Kaplan, 2006; Krishna, Boren, & Balas, 2009) These include disease-specific interventions, preventive education, supporting health care workers, and monitoring follow up visits at health centres. Most of these available studies focus on interventions targeting the provider rather than the consumer or patient. A recent systematic review reported that out of the 42 trials conducted during 1990 to 2010, only 10 targeted patients or consumers (Free et al., 2013). However, it is as rare to find trials dedicated to supporting, educating, and empowering mothers to take the right decisions for themselves and their infants.

Ubiquitous presence in rural communities, acceptability and its user friendliness are favourable factors to designing an intervention using mobile phones. This medium is convenient and increases the accessibility of health-related information even to mothers or primary caregivers who face restrictions in going out of the house. Husbands and mothers-in-law too can be involved in the counselling sessions along with the mothers as they are the chief decision makers. Using mobile phones also gives the flexibility where the beneficiary can receive calls, text SMS or even pre-recorded voice calls as per their convenience. These messages can be tailored keeping in consideration mothers and their family member's beliefs, practices in mind as this will increase the acceptability of the intervention. Innovative interventions like these can help closely monitor the progress of the mother-infant dyads, thus giving us pragmatic results and provide us with cost effective methods to improve health status of children below 5 years of age in India.

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