

Original Research Article

A Systematic Assessment of Digital apps for Quality Content on Health and Nutritional Aspects of Infants

ABSTRACT

Internet websites and parenting apps have become a popular resource to guide parents in their children's health and nutrition. Parents in need turn to the internet for information, support, and guidance. They rely mostly on search engines and social media to look for answers to parenting questions. The apps are becoming increasingly popular among parents as these apps provide handy information on child health and nutrition. The main objective of this study was to conduct systematic analysis of infant parenting apps regarding available information about infant health and nutritional aspects. Methods: For analyzing various infant parenting apps, 40 apps were downloaded and installed on an android phone which were available for free download on Google Play Store. Each app was used and then individually assessed by the researcher for its content and quality on the various criteria by using self-structured schedule. Result: Majority of the apps did not have relevant information about infant health and nutritional aspects. These apps provided information which was insufficient and not easy to understand for parents of infants. The information was in English language only. Conclusion: The findings of this unique analysis highlight that information provided in the available apps was insufficient and lacks credibility.

Keyword: Infants, Parenting apps, Health aspects and Nutritional aspects

INTRODUCTION

Parenting means providing on-going care and support a child needs to survive and thrive. Such on-going care and support includes making sure that the child has protection from physical danger, adequate nutrition and health care, responsive and loving interactions with significant, consistent people (UNICEF, 2012). Parenting is at its greatest level of intensity during infancy and toddlerhood. In the first few years of life, children depend entirely on their caregivers, who determine most of the children's experiences. In the first few months of life, parenting focuses on the provision of basic care, ideally from a warm and

responsive caregiver. The extent and quality of knowledge of parents is often considered vital for improving children's development and health.

Parenting knowledge includes parents' understanding of normative child development, developmental processes, abilities and accomplishments of children as they grow; and parents' awareness of practices and strategies for maintaining and promoting children's health and coping effectively with children's illness (Bornstein *et al.* 2006).

Research studies indicated that mothers of infants have significant knowledge gaps. The research findings revealed knowledge gaps among parents and caregivers, with a significant proportion having partial or inadequate knowledge of common childhood illnesses and home remedies. Educational level emerged as a significant factor influencing knowledge and attitudes, with higher educational attainment associated with higher odds of adequate knowledge and positive attitudes (Chaudhari *et al.* 2023). Majority of rural women had medium level of knowledge on selected health and nutritional practices hence efforts should be made to increase the knowledge level of rural women on health and nutritional practices in rural areas (Khatri *et al.* 2022).

Earlier we had joint families where elders helped the young parents in child-rearing. They also used to teach parenting side by side by giving practical tips while actively participating in the rearing of the infants. But as we have shifted from joint to nuclear families, the traditional parenting supports and services are typically inaccessible. The spontaneous teaching-learning process is also absent, therefore, parents do not have enough knowledge about the common health and nutritional aspect of infants.

It is also a reality that present generation has much more faith in internet than knowledge of their elders. Thus, the parenting has become much more challenging for today's young parents. The Internet has become a popular medium for consumers seeking health-related information. The proportion of the population regularly accessing the Internet is large and growing. As per data provided by TRAI, 2023 overall internet penetration in the country is 61.62% with 850.95 million internet subscribers.

Increasingly, parents are turning to the Internet for information regarding infant health related problems like cold and cough remedies, teeth problem, child stomach problem, food allergy, skin problem, child weight loss, child immunity and child yoga. The proliferation of web-based health information sources is reflected by the growing literature for health care professionals discussing and advising the use of new technology (Aungst *et al.* 2014). Studies have shown that parents and pregnant women trusted hospital, government, and university

websites as accurate, regulated, useful, and current sources of pregnancy and parenting information (Chaudhry, 2018).

Kuo *et al.* (2012) developed A New born Baby Care Support App and found that mothers are willing to pay for this kind of new mobile services that is going to be very typical and popular in future mobile health services. This new type of mobile app for assisting new-born baby care, as well as other mobile applications in healthcare deserves close attention and could be put into market for promotion. Parenting application indicated that parents were excited about the app concept and its specific features. This showed that parents work will become easier in an organized manner and they will get the answers to various parenting issues quickly. Also, the excitement revealed that parents will become more enthusiastic with the idea of using app to make sure that their parenting actions are giving the best possible results (as reflected from the post testing feedback) Sharma *et al.* (2017).

Taki *et al.* (2015) assessed the quality, comprehensibility, suitability, and readability of websites and apps on infant feeding by usage of a developed tool. They found that the majority of the websites and apps were rated poor quality. The apps provided insufficient information and lacks credibility (Richardson *et al.* 2018). There are a lot of foreign parenting apps available that are meant for western parents who have a different climate, environment, genetic makeup, social conditions, physical facilities, etc. (Virani *et al.* 2019). These apps are of poor quality and are in English language only. These apps do not cater to the needs of Indian parents.

METHODOLOGY

Sample selection

The digital sample of the study comprised of 40 infant parenting apps available for free download on Google Play Store which were analyzed for their content and quality.

Data collection

The total number of 40 apps was downloaded and installed on an android phone which were available free of cost on Google Play Store.

Data analysis

Each app was used and individually assessed by the researcher for its content and quality on the various criteria by using self-structured schedule. The collected data were classified and tabulated to draw meaningful inferences as per the objectives of the study. For interpretation of results, following descriptive statistics were used: Frequency and percentage.

RESEARCH FINDINGS

Table 1: Availability of information on infant health

N=40

Health Aspects	Yes		No	
	F	%	F	%
Cold and cough remedies	09	22.5	31	77.5
Teeth problem	07	17.5	33	82.5
Child stomach problem	11	27.5	29	72.5
Food allergy	07	17.5	33	82.5
Skin problem	13	32.5	27	67.5
Child weight loss	12	30.0	28	70.0
Child immunity	11	27.5	29	72.5
Child yoga	04	10.0	36	90.0
Dadi home remedies	06	15.0	34	85.0
Reminds the pills	10	25.5	30	75.5
Vaccination tracker	15	37.5	25	62.5
Health Care Professionals	11	27.5	29	72.5
Daily doctor advice	11	27.5	29	72.5

Results of information regarding infant health have been depicted in Table 1. According to above results, most of the apps lacked information on the health aspects such as teeth problem (82.5%), food allergy (82.5%), child yoga (90.0%) and dadi home remedies (85.0%) while remaining of the apps provided such information. Three -fourth of the apps did not provide information on the aspects such as cold and cough remedies (77.5%), child stomach problem (72.5%), skin problem (67.5%), child weight loss (70.0%), child immunity (72.5%), reminds the pills (75.5%), vaccination tracker (62.5%), health Care professionals (72.5%) and daily doctor advice (72.5%). It is clearly visible that a small number of apps provided information on all of the health aspects.

Table 2: Availability of information on infant nutrition

N=40

Nutritional Aspects	Yes		No	
	F	%	F	%
Breastfeeding	32	80.0	08	20.0
Colostrum	08	20.0	32	80.0
Bottle feeding	19	47.5	21	52.5
Weaning	11	27.5	29	72.5
Nutrition information	23	57.5	17	42.5

Healthy food tips	19	47.5	21	52.5
Child diet plan	05	12.5	35	87.5
Recipe ideas	08	20.0	32	80.0

Results of information regarding infant nutrition have been portrayed in Table 2. As results illustrate that majority of the apps provided information on nutrition aspect of breastfeeding (80.0%) but at the same time they did not provide information on nutrition aspects such as child diet plan (87.5%), colostrum (80.0%), recipe ideas (80.0%), and weaning (72.5%), only few of the apps provided such information. Around half of the apps provided information on nutrition information (42.5%) and healthy food tips (52.5%) bottle feeding (52.5%) while rest of the apps did not provide information on these aspects.

DISCUSSION

A. Infant health

In present study it observed that majority of apps focused on infant health and nutrition has revealed a notable gap in the coverage of crucial health-related aspects. A majority of the apps evaluated in this study were found to provide insufficient information on key topics such as cold and cough remedies, teeth problems, child stomach problems, food allergies, skin problems, child weight loss, child immunity, child yoga, dadi home remedies, pill reminders, vaccination tracking, access to healthcare professionals, daily doctor advice. This observation suggests that many current apps are not meeting the comprehensive informational needs of their intended users, primarily parents and caregivers seeking reliable guidance on infant health management. This finding aligns with previous research by Samanta *et al.* (2021), which identified a strong demand among mothers for information on essential health aspects including cold and cough remedies, teething, skin problems, vaccination schedules, and common digestive issues such as diarrhea, constipation, and gas. Moreover, insights from other researchers highlight persistent knowledge gaps among mothers concerning various health aspects affecting infants. Another studies by Elbur *et al.* (2015), Purani *et al.* (2015), and Srinivasa *et al.* (2018) underscored similar gaps in knowledge regarding skin care, teething issues, and other common health concerns. Ramawat and Goswami (2018) studied immunization, which was one of the most significant aspect of infant health care, found that lack of awareness 67 resulted in incomplete vaccination of infants.

B. Infant Nutrition

Evaluation of infant nutritional aspects revealed a significant disparity between the information provided and the informational needs expressed by mothers. While many apps offered some content on breastfeeding, it was often insufficient, particularly concerning crucial aspects such as colostrum, bottle feeding, nutrition information, healthy food tips, child diet plans, recipe ideas, and the weaning process. These findings highlight a clear discrepancy between the available digital resources and the comprehensive nutritional guidance desired by mothers. In previous research by Samanta *et al.* (2021), indicated that Indian mothers expressed a strong preference for information on breastfeeding and colostrum, emphasizing a cultural inclination against bottle feeding. Majority of the mothers said that information on various aspects of infant nutrition (i.e. colostrum, breastfeeding and weaning) except bottle feeding is very much needed. It can be inferred that Indian mothers do not want to bottle feed their children and hence, they were not interested in getting information on this aspect. However, they have some idea (but not sufficient knowledge) about the importance of the colostrum and breastfeeding and accordingly they seek knowledge on these aspects. These results are in line with findings of the other research studies which indicates that majority of mothers had some knowledge about health benefits of colostrum (Sohail *et al.*, 2017 and Hussein *et al.*, 2013) but breastfeeding knowledge was suboptimal among the rural North Indian mothers (Kishore *et al.*, 2009). Berisha *et al.* (2017) found that mothers have good knowledge of complementary feeding while they did not have good practices regarding time for starting complementary feeding.

CONCLUSION

The findings of this unique analysis highlight that parenting apps has lack of relevant information for parents of infants regarding various aspects such as teeth problem, food allergy, child yoga, dadi home remedies, cold and cough remedies, child stomach problem, skin problem, child weight loss, child immunity, reminds the pills, vaccination tracker, health care professionals, and daily doctor advice, breastfeeding, child diet plan, colostrum, recipe ideas, weaning, nutrition information, healthy food tips, bottle feeding. The available apps provided insufficient information to parents for their infant health and nutrition. These apps also have lack of credibility. The present research also indicated that there was a strong demand among mothers for comprehensive information on infant health and nutritional aspects.

REFERENCES

- Aungst, T. D., Clauson, K. A., Misra, S., Lewis, T. L., & Husain, I. (2014). How to identify, assess and utilise mobile medical applications in clinical practice. *International journal of clinical practice*, 68(2), 155-162.
- Berisha, M., Ramadani, N., Hoxha, R., Gashi, S., Zhjeqi, V., Zajmi, D. and Begolli, I. (2017). Knowledge, attitudes and practices of mothers in kosova about complementary feeding for infant and children 6-24 months. *Medical Archives*, 71(1): 37.
- Bornstein, MH. (2006). Parenting science and practice. Handbook of child psychology. ed-4. Hoboken, N.J., John Wiley and Sons, New York, USA.
- Chaudhari, C., Patel, A., Patel, B. and Punasanvala (2023). Knowledge of common childhood illnesses and home remedies: examining the knowledge and attitudes of parents and caregivers toward common childhood illnesses, such as colds, fevers, or diarrhea, and their understanding of appropriate home remedies and when to seek medical care. *Int J Acad Med Pharm* 5 (4); 971-975.
- Chaudhry, B. M. (2018). Expecting great expectations when expecting. *Mhealth*, 4.
- Elbur, A. I., Yousif, M. A., Albarraq, A. A. and Abdallah, M. A. (2015). Parental knowledge and practices on infant teething, Taif, Saudi Arabia. *BMC research notes*, 8(1): 1-6.
- Hussein, K. A. and Aziz, A. R. (2013). Assessment of knowledge and attitude of colostrum among postnatal mothers. *Mosul Journal of Nursing*, 1(1): 1-6.
- Khatri, K., Singh, S. P., Khatri, M., & Shinde, R. (2022). Knowledge level of rural women on health and nutritional practices in Tikamgarh district of MP 135-139.
- Kishore, M. S. S., Kumar, P. and Aggarwal, A. K. (2009). Breastfeeding knowledge and practices amongst mothers in a rural population of North India: a community-based study. *Journal of Tropical Pediatrics*, 55(3): 183-188.
- Kuo, M. C., Lu, Y. C. and Chang, P. (2012). A newborn baby care support app and system for mHealth. *11th International Congress on Nursing Informatic*, 12:123-134.
- Purani, C., Patel, P., Gupta, K., Mehariya, K. M. and Holda, A. (2015). Knowledge, awareness, and practice of postnatal care among mothers. *Indian Journal of Child Health*, 2(2): 83-85.
- Ramawat, P. and Goswami, V. P. (2018). A study of knowledge about immunization amongst mothers of children below 5 years of age. *International Journal of Pediatric Research*, 5(3): 109-112.
- Richardson, B., Dol, J., Rutledge, K., Monaghan, J., Orovec, A., Howie, k., Boates, T., Smit, M. and Yeo, M.C. (2018). Evaluation of mobile apps targeted to parents of infants in the neonatal intensive care unit: systematic app review. *JMIR Mhealth Uhealth*, 7(4): 123-146.
- Samanta, Malik, P., Dahiya, M., & Yadav, P. (2023). Need Analysis of Parents Regarding Knowledge of Aspects of Infant Parenting. *International Journal of Education and Management Studies*, 13(3), 315-319.
- Sharma, C., Dirin, A. and Mostakhdemin-Hosseini, B. (2017). Mobile learning concept for parenting. In *ICERI2017 Proceedings. 10th International Conference of Education, Research and Innovation. Seville, Spain*. International Academy of Technology, Education and Development.
- Sohail, J. and Khaliq, A. (2017). Knowledge, attitude and practice of mothers regarding colostrum feeding to newborns in rural Pakistan: a cross-sectional study. *Khyber Medical University Journal*, 9(4).112-145.
- Srinivasa, S., Bhavya, G., Patel, S., Harish, S. and Anjum, S. K. (2018). Knowledge, attitude and practice of mothers in infantile skin care. *International Journal of Contemporary Pediatrics*, 5(2): 536-541.
- Taki, S.1., Campbell, K.J., Russell, C.G., Elliott, R, Laws, R. and Denney-Wilson, E. (2015). Infant feeding websites and apps: a systematic assessment of quality and content. *Interact J Med Res*, 4: 18-21.
- UNICEF (2012). Early childhood. Retrieved from https://www.unicef.org/earlychildhood/index_40754.html.

Virani, A., Leager, L.D. and Letourneau, N. (2019). Parenting app review: In search of good quality app. *Mhealth*, (5): 44.

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