

Usage of Smartphone Apps by Women on their Maternal Life

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Abstract

Mobile phone usage has proliferated in recent years. Few places worldwide people are enjoying speedy utilization mobile phone. Women appear to be taking the lead when it comes to smart phone technology phone use when compared with men. Mobile phones apps make participation possible for women to access the health care they need, including family planning, birth, child care, and survival. This article begins to address the usage of smart phone apps and its role in the everyday life of the pregnant women and young mothers. The overall result of the study reveals that the women in the middle class and lower middle class families use smart phone and its applications more frequently during their pregnancy period for various reasons when comparing to the women in the upper middle class and higher income women.

Keywords: E-health; Pregnancy; New media; Mobile-applications; Smart phones

Introduction

In today's technology driven world, electronic devices have become an essential one in everyday life. Whether used for official or personal life, these devices influence and shape the way we think, in both thoughtful and accidental ways. The rapid development of internet and communication technologies in the past twenty years had changed the lifestyle of human beings in the entire world. People who are in city and village can access equal eminence lifestyles. Edward and Bruce observed that, "sources of information and other opportunities available via the new media are increasing exponentially [1]. The communication technology using mobile devices improves education, health and economics of people.

Mobile phone usage has proliferated in recent years. Few places worldwide people are enjoying speedy utilization mobile phone. May and Hearn most of the mobile phones nowadays are addressed as 'smart phone', as they are very much advanced in technological factor and being in connected than the ordinary mobile phone [2]. Smart phones has now repositioned as "new information medium" with all the basic facilities like making calls, short message services and multimedia messages. Agarwal and Prasadh explores, smart phones have extended list of information processing functionalities such as managing personal time schedule, accessing Internet contents, editing documents, utilizing location-awareness function, and many other exciting applications [3].

According to Donald women are much more likely than men to read news information found within social media on their smart phones according to the latest mobile media survey. Boston Consulting Group (BCG) report stated, that 'a large proportion of India's new internet users is likely to be female who are in rural, regional language speakers, compared with existing users who are mostly young, urban and professional'.

Hyeon and Iftekhar in their research they pointed out that Korea showed that only 1% participants are not willing to use an application even though it is useful to them [4]. This research concluded smart phone applications for pregnant women will be an effective educational tool compared to other existing mediators even though frequency or scope of using it would be varied according to the user's age.

Oglivy Action women appear to be taking the lead when it comes to smart phone technology (ST) phone use, with 56 percent owning a

smart phone compared with 51 percent men [5]. This also translates when it comes to using health applications (apps) with around 9 percent women more likely to use these compared with 4 percent men.

Ming-Chuan Kuo says mobile health application becomes a very important tool to provide high quality health services [6]. Smartphone medical applications have a major role to play in women's health with their roles being very broad, ranging from improving health behaviors to undertaking personalized tests.

Petrie conducted a survey, in which 203 pregnant women found that 94 percent reported that smart phone had changed their life for better, with 65 percent reporting that they had downloaded pregnancy apps, with an average of three being downloaded during the gestation period [7]. Rotheram-Borus in low- and middle-income countries smart phones also provide an excellent platform to support and improve the quality of healthcare systems for women [8].

According to a study from AOL, mothers are using their smart phones 11.4% normally than the regular adult smart phone user, racking up 1,850 minutes per month with their phones [9]. Mothers of young kids aged 5 and under were the most active users, devoting almost 37 hours a month to apps and web browsing on their phones AOL noted that smart phones most likely helped these new mothers adjust to tasks related to their new role, including managing multiple schedules, connecting with friends they had not seen recently, and looking up symptoms- that is, satisfying multidimensional roles mammas enact as parents, teachers, friends, doctors, and more.

Importance of the Study

Technology has been a core player in helping improve healthcare, by reducing costs, improving patient safety and satisfaction, saving time and effort for both patients and clinics alike, and reducing

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potential errors [10]. In recent years, mobile technology, in particular, has greatly evolved and become a mature platform, and according to CBS News, there are around 4.6 billion mobile phones worldwide. Because of this, many health organizations such as the World Health Organization and experts from across the healthcare industry are looking to tap into the potential of mobile technology to revolutionize healthcare management and delivery [11].

Sophia Alice Johnson Smartphone applications (-apps) and social media platforms are important elements in the rapidly changing environment around pregnancy and the transition to motherhood [12]. Despite much theoretical research highlighting significant changes in digital health technologies, studies analyzing these technologies, their possible implications and the experiences of users are few. This article begins to address the usage of smart phone apps and its role in the everyday life of the pregnant ladies and young mothers.

Theoretical Frame Work

A structured survey questionnaire was employed to assess the acceptance of the application from user's perspective. The survey questionnaire was constructed based on the "Measuring usability with the USE questionnaire" developed by Lund and the "Technology acceptance model for mobile service (TAMM)" proposed by Kaasinen [13,14]. The survey was composed of two sections: (1) mothers' demographic data and (2) smart phone application usage.

Objective of the Study

- To identify is there any difference in usage of mobile phone before and during pregnancy.
- To measure the influence of mobile apps among new mothers.
- To measure the nature of association between the users' demographics (occupation) and the dependent variables (usage of mobile apps).
- To study the usage pattern among the users (Do they use mobile apps).

Review of Literature

Rolf Wynn study suggests that the use of cell phones could strengthen the primary healthcare system and increase access to healthcare. Pregnant women accessing cell phones and would increase their utilization of the primary healthcare system and health services [15]. West explains there are a number of ways in which advanced mobile technologies can help improve maternal care and aid in reducing infant mortality [16]. According Dolan mobile phones apps make participation possible for women to access the health care they need, including family planning, birth, child care, and survival [17].

According to Rothman pregnancy and mothering are no longer seen as simply a reading assignment [18]. Sophia explains smart phone revolution over the past few years has had a significant impact on our lives, Smartphone applications (-apps) and social media platforms are important elements in the rapidly changing environment around pregnancy. Hearn, Miller and Lester explores young women are frequent users of smart phones and internet technology; they want short, quick answers to their pregnancy and child rearing concerns, and prefer information readily accessible on mobile devices. The Yukon baby smart phone app engages women, men and their families and supports them during pre-pregnancy.

Victoria many of the participants found the pamphlets and flyers

that their doctors gave them, as well as the once popular book "What to Expect When You're Expecting," out-of-date and feels that information should be in different base. They use to see videos and use social network and pregnancy-tracking mobile applications for pregnancy related information.

Shadrack, the researcher explores in the field of maternal health, mobile technology (-apps) can offer general health and health-care information to pregnant women, provide emergency-care tips and alerts, and supply post-delivery support. The same systems can also be used to offer information about emerging risks to which women are frequently exposed and remind women of the need for preventive care.

Rodger conducted a survey in his research in which the, 45% women reported the use of at least one pregnancy related smart phone app, with some participants describing them as being more relevant and useful to them than other forms of health communication and receiving information related to pregnancy [19].

One of the most prevalent and natural life situations that may increase the need for more health related information among women is pregnancy. According to the research conducted by Lagan it was suggested that the most sought-after topics on the smart phone apps by pregnant women were fetal development (57%), nutrition during pregnancy (56%) and pregnancy complications (26%).

It is a daily pregnancy application that guides women, from the baby due date given, gives answers and prepares for baby's birth. The versions available are for smart phones- iPhone, iPod Touch and Android. This targets high-class and tech-savvy users who have the money to buy smart phones and pay for the data charges. My pregnancy app has other features like fetal development images- these are images developed by expert medical illustrators.

Rebekah Kates Lemke in her article says; after a baby is delivered, the app continues to track the child's development through his or her crucial first year of life. This keeps families in touch with the health system and gives timely care for mothers and newborns. Community health workers say the apps help them manage their workload as well, so they can focus on counseling families and communicating key health messages. Ming-Chuan Kuo denotes in terms of diary keeping, the apps can provide mother an easy and handy tool within her mobile phone to document her baby's health status and growth patterns [6]. She can make and keep baby's vaccination records with this app too. With regard to questions, she can first search the most frequently asked questions with answers. With help of apps mother can check with the growth trend of her baby and received a routine summary report from service center after the data were uploaded and managed by nurses under the supervision of physicians.

Tomlinson et al. says smart-phones enable more accurate and precise self-monitoring and tracking the infant development, for example, by prompting users to record an image, text, or audio clip immediately when a behavior occurs. Prompts in real time also allow automatic storing of geo-tagged and time-stamped entries in a personal database. Spatio-temporal traces of behaviors throughout a day, week, or month can tremendously increase an individual's self-understanding. In addition, these traces can increase clinician or supervisor knowledge of detailed behavioral patterns.

Rachel Peragallo points out that use of Internet-based behavioral programs may be an efficient, flexible method to enhance prenatal care and improve pregnancy outcomes. There are few data about access to, and use of, the Internet via mobile phones (apps) among pregnant

women. Marco explains smart phone (apps) use during pregnancy is a widespread phenomenon as the Internet offers the opportunity to share apprehensions and doubts with other women [20]. Medical information published on websites cannot be considered a substitute for informed medical advice, and patients should not take any action before consulting with a health care professional.

The key to a healthy pregnancy is proper nutrition. By eating healthy and maintaining an active lifestyle a number of complications, varying in intensity from anemia to miscarriage and stillbirth, can be avoided. Pregnancy applications and websites have provided a multitude of tools and a wealth of information on nutrition and supplements Evan Duderewiz [21].

Victoria indicates antenatal ladies refer Internet to find answers to their queries regularly than they would like, say Penn State researchers. Women reported using apps and other search engines because they had a lot of questions at the beginning of pregnancy, before their first doctor's appointment for treatment. Following the women's first visit to the obstetrician, many of them still turned to the Internet- in the form of both search engines and social media- to find answers to their questions on treatment, because they felt the literature the doctor's office gave them was insufficient.

More than two-thirds of mothers surveyed purchase products online and close to 70 percent plan to do so in the next 12 months. Online shopping for children is most popular with mothers in China (87 percent) and Korea (82 percent). Across the region, the study shows a variety of motivations for online shopping; mothers in Taiwan cited a benefit from the lack of sales pressure, while mothers in India found prices less expensive online, Asia Pacific.

Ayaz reports new mothers are 20% more likely use social media apps for shopping than the general population, and 91% now use social media regularly-a 20% increase since 2010, according to a study of moms' online social habits by Baby Center and Com Score. Moreover, moms expect others to be social as well. Moms were responsible for 32% of total online spending in the last quarter, despite making up only 18% of the total Internet audience. 78% of moms follow a brand for coupons and discounts.

Methodology

This investigation on the 'Usage of smart phone apps by women on their maternal life' entails understanding the choice of young women using mobile apps during maternal period. Hence, the researchers has to identify a cross section of pregnant young mothers in Tamil Nadu and know they used or using smart phone applications before, during and after maternity. It also becomes important to investigate how they use mobile phone before and during pregnancy.

In this process the researcher has to focus on identifying pregnant and young mothers in various hospitals and scan centers to collect data so as to have a representative sample. When the researcher embarked on this study, women both who were pregnant and new mothers were more enthusiastic in knowing their health and infant development. Hence the focus on this study is to know how they use smart phone application to collect various information which they are in need related to their health and their infants.

Demographic variables such as age, and monthly income of the respondents detailed were considered to be independent variables for the study and usage of smart phone applications (apps) was categorized

as dependent variables. On the data gathered through the survey method, statistical analyses were performed to find the relationships between the independent and dependent variables.

Research questions

As detailed earlier, the present study requires measuring the usage smart phone apps among the young mothers and pregnant women before and during their pregnancy period to know information related to their health and infant development. Hence, the following research questions are mooted in this study so as to understand how the young mothers and pregnant women use mobile apps and accordingly research questions are generated below.

1) Is there any perceptual difference among young mothers and pregnant women in general on using smart phones before and during pregnancy?

2) Whether young mothers and pregnant women differ in their perception in using mobile apps?

3) Is there any difference in perception in using mobile apps among young mothers and pregnant women according to their occupation?

In order to answer the above research questions and to understand those intricacies the researcher developed an attitude scale so as to measure those factors which are taken from the study.

The researcher collected a total sample from 371 respondents. After careful scrutiny it was found that some of the respondents did not answer some of the questions and some of the items were incomplete. After removing those incomplete samples, the final tally of respondents included in the study is 334.

Sample characteristics

In the above Table 1, it is observed that 136 respondents who are in the age group of 21 to 25 have monthly income as (Up to 10000=8 (18.2%), 10001 to 20000=80 (47.6%), 20001 and above=48 (39.3%), 114 (Up to 10000=16 (36.4%), 10001 to 20000=50 (29.8%), 20001 and above=48 (39.3%)) respondents belongs to the age group of 26 to 30 and 84 (Up to 10000=20 (45.4%), 10001 to 20000=38 (22.6%), 20001 and above=26 (21.3%)) respondents belongs to 31 years and above.

Findings

Tables 2a and 2b shows the result of paired sample 'T' test on the comparison between the usages of internet through smart phone among pregnant women during the pregnancy and before which indicates there is no significance. Table 3a reveals the results of ANOVA for all the nine statements (Table 3b).

Statement 1: The result of one way analysis of variance reveals that there is a significant difference towards accessing pregnancy related apps. The Respondents with a monthly income of 10001 to 20000 have a higher mean value of $m=3.55$.

Statement 2: The table of one way analysis of variance reveals the age of the respondents in terms of getting tips for getting pregnant through apps is not significant.

Age	up to 10000	10001-20000	20001 and above	Total
21 to 25	8 (18.2%)	80 (47.6%)	48 (39.3%)	136 (40.7%)
26 to 30	16 (36.4%)	50 (29.8%)	48 (39.3%)	114 (34.1%)
31 and above	20 (45.4%)	38 (22.6%)	26 (21.3%)	84 (25.1%)
Total	44 (100%)	168 (100%)	122 (100%)	334 (100%)

Table 1: Age * Monthly income cross tabulation.

		T	df	Sig. (2-tailed)
Pair 1	How long do you use smart phone to access Internet	1.157	333	.248

Table 2a: Paired samples test.

		Mean	N	Std. Dvt
Pair 1	How long do you use smart phone to access Internet (Before)	1.8503	334	1.05483
	How long do you use smart phone to access Internet (During)	1.7844	334	.86729

Table 2b: Paired samples statistics–Internet usage before and during.

		N	Mean	Std. Dvt
1. Do you access pregnancy related apps	up to 10000	44	2.6136	1.38456
	10001-20000	168	3.5536	1.38321
	20001 and above	122	3.3115	1.01299
	Total	334	3.3413	1.29342
2. Do you get tips for on pregnant through apps	up to 10000	44	3.3409	1.32846
	10001-20000	168	3.6250	1.34337
	20001 and above	122	3.3934	.71069
	Total	334	3.5030	1.15405
3. Do you use the apps for knowing information related to pregnancy	up to 10000	44	3.2273	1.70994
	10001-20000	168	3.2024	1.58420
	20001 and above	122	3.5246	.61943
	Total	334	3.3234	1.34128
4. Do you surf information on fetal development through apps	up to 10000	44	2.0682	1.20845
	10001-20000	168	3.5000	1.41844
	20001 and above	122	3.2295	.89799
	Total	334	3.2126	1.30592
5. Do you check information related to food/ nutrition during pregnancy	up to 10000	44	1.1364	.34714
	10001-20000	168	1.0893	.28601
	20001 and above	122	1.2623	.68999
	Total	334	1.1587	.48580
4. Do you seek for information on treatment	up to 10000	44	2.3182	1.27175
	10001-20000	168	3.3155	1.38053
	20001 and above	122	2.4508	.92801
	Total	334	2.8683	1.29703
5. Do you share pregnancy experience with other friends through mobile apps	up to 10000	44	3.2955	1.13259
	10001-20000	168	3.2560	1.22351
	20001 and above	122	2.8197	.78220
	Total	334	3.1018	1.08849
6. Do you check every week to track your infant's development	up to 10000	44	2.3182	1.19637
	10001-20000	168	3.5119	1.37553
	20001 and above	122	3.4918	.60638
	Total	334	3.3473	1.19523
7. Do you purchase products for your children from those apps	up to 10000	44	2.9091	1.42760
	10001-20000	168	3.7500	1.62226
	20001 and above	122	3.4590	1.01352
	Total	334	3.5329	1.42599

Table 3a: One way analysis for 9 statements in terms of monthly income.

	F	Sig
1. Do you access pregnancy related apps	9.744	.000
2. Do you get tips for getting pregnant through apps	1.933	.146
3. Do you use the apps for knowing information related to pregnancy	2.185	.114
4. Do you surf information on fetal development through apps	23.852	.000
5. Do you check information related to food/ nutrition during pregnancy	4.634	.010
6. Do you seek for information on treatment	22.931	.000
7. Do you share pregnancy experience with other friends through mobile apps	6.701	.001
8. Do you check every week to track your Infant's development	21.059	.000
9. Do you purchase products for your children from those apps	6.531	.002

Table 3b: Table of mean for 9 statements in terms of monthly Income.

Statement 3: The table of one way analysis of variance reveals that there is no significant difference in knowing information related to pregnancy.

Statement 4: From the results of the table of one way analysis of variance, it may be understood that the income of the respondents in terms of surfing information on fetal development is significant. The table of means shows that respondents who earns from 10001 to 20000 have a higher mean value of $m=3.50$.

Statement 5: The results of the one way analysis of variance show that there is significance in terms of checking information related to food/nutrition during pregnancy. The table of mean explains that respondents with up to salary of 10000 have the highest mean value of $m= 1.36$.

Statement 6: The table of one way analysis of variance reveals that the educational qualification of the respondents with reference to the statement 'Do you seek for information on treatment' is significant. The table of means shows respondents with the salary of 10001 to 20000 have the higher mean value of $m=3.31$.

Statement 7: The results of one way analysis of variance there is significance in sharing pregnancy experience with other friends through mobile apps. The table of mean details that the respondents with salary up to 10000 having a mean value of $m=3.29$ are influenced by the statement.

Statement 8: From the results of the table of one way analysis of variance, it may be understood that the income of the respondents in terms of tracking the developments on infants is significant. The table of means shows that respondents who have monthly income of 10001 to 20000 have a higher mean value of $m=3.51$.

Statement 9: The table of one way analysis of variance reveals that there is significant difference in purchasing products for your children through mobile apps. The table of means shows respondents with income of 10001 to 20000 have higher mean value of $m=3.75$.

Discussion and Conclusion

Our findings reveal that the Paired 'T' test indicates that there is no significant difference in using smart phones. This indicates that the level of usage of smart phones among women remains the same before and during pregnancy. Oglivy Action observes that women appear to be taking the lead when it comes to smart phone technology (ST) phone use, with 56 percent owning a smart phone compared with 51% men [5]. This also translates when it comes to using health applications (apps) with around 69% women more likely to use these smart phones both before and during pregnancy.

The results of ANOVA test reveals that there is a significant difference in accessing pregnancy related apps among ladies. Women with the family income of 10001 to 20000 are using the apps more frequently while the others use them less. Petrie found that 94% of women reported that smart phone had changed their life for better, with 65 percent reporting that they had downloaded pregnancy apps, with an average of three being downloaded during the gestation period [7]. Rotheram-Borus in low- and middle-income countries smart phones also provide an excellent platform to support and improve the quality of healthcare systems for women [8]. But there is no difference in knowing information related to pregnancy on pregnancy.

In gathering information on fetal development women in the middle class family use smart phone apps more frequently than the others and women who have income less than 10000 use it for checking

information related to food/ nutrition during pregnancy. According to the research conducted by Lagan it was suggested that the most sought-after topics on the smart phone apps by pregnant women were fetal development (57%), nutrition during pregnancy (56%) and pregnancy complications (26%). Mostly women in the middle class family use the mobile apps more frequently than others for seeking information on treatment during pregnancy. Women who have lesser income are more willing to share their experience with others through mobile apps. According to Marco smart phone (apps) use during pregnancy is a widespread phenomenon as the Internet offers the opportunity to share experience and doubts with other women.

Again women in the middle class family use the mobile phone more frequently in tracking infant's development and for online shopping on mobile apps. Asia Pacific concludes in the research that more than two-thirds of mothers surveyed purchase products online and close to 70% plan to do so in the next 12 months [22]. Online shopping for children is most popular with mothers in China 87% and Korea 82%. The overall result of the study reveals that the women in the middle class and lower middle class families use smart phone and its applications more frequently during their pregnancy period for various reasons when comparing to the women in the upper middle class and higher income women.

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