
Abstract/Description

Introduction: Developments in information and communication technologies have enabled and supported the development and expansion of electronic health in the last decade. This has increased the possibility of self-management and care of health issues. Objectives: To assess the effectiveness of on maternal self-efficacy and mental wellbeing three months post-birth in a sample of mothers recruited during the antenatal period. In addition, to explore when, why and how mothers use the app and consider any benefits the app may offer them in relation to their parenting, health, relationships or communication with their child, friends, family members or health professionals. Design: A mixed methods approach, including a longitudinal cohort study, a qualitative study and detailed analysis and synthesis of data from the Baby Buddy app about the way in which mothers accessed and used the app content. Setting: The study was conducted in five geographically separate sites in England: Coventry, Lewisham, Bradford, Blackpool and Leicester. These areas were chosen as they were geographically, ethnically and socio-economically diverse and where the Baby Buddy app was reported to be well-embedded, both formally and informally, into the maternity and child health pathways by the relevant healthcare staff. Participants: Pregnant women who were aged 16 years and over, had no previous live child, were between 12-16 weeks and six days gestation and booked with the maternity services in each of the five study sites were invited to take part. Interventions: Self-reported use of the Baby Buddy app at one of the three data collection time-points: 12-16+6 weeks gestation, 35 weeks gestation and three months post-birth. Outcome measures: The primary outcome measure was parental self-efficacy at three months post-birth using the Tool to measure Parenting Self-Efficacy (TOPSE). The main secondary outcome was maternal mental well-being at three months post-birth using the Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS). Results: Recruitment took place between September 2016 and February 2017. A total of 488 participants provided valid data at baseline (12-16 weeks gestation), 296 participants also provided valid data at 3 months post-birth, 114 (38.5%) of whom reported that they had used the Baby Buddy app at one or more of the data collection time-points ('app user'). Seventeen first-time mothers participated in the qualitative arm via telephone interviews (n=9) and a focus group (n=8). Twenty healthcare professionals participated in interviews (n=5) and two focus groups (n=15). Consent was gained from 98 participants who gave permission for their in-app data to be made accessible but just 61 participants could be identified from the database provided, of whom 51 were included in the analyses. At recruitment there were no differences between Baby Buddy app users and non-app users in respect to: age, IMD, ethnicity, highest education, employment, relationship status. Baby Buddy app users were more likely to use pregnancy or parenting apps (80.7% vs 69.6%, p=.035), more likely to have been introduced to the app by a healthcare professional (p=.005) and have a lower median score for perceived social support (81 vs 83, p=.034) than non-app users. The Baby Buddy app did not illicit a statistically significant change in TOPSE scores from baseline to 3 months post-birth (adjusted OR 1.12, 95%CI 0.59 to 2.13, p=.730). Finding out about the Baby Buddy app from a healthcare professional appeared to grant no additional benefit to app users compared to all other participants in terms of self-efficacy at three months post-birth (adjusted OR 1.16, 95%CI 0.60 to 2.23, p=.666). Apps were popular; Baby Buddy app users were more likely to use other pregnancy-related apps than non-Baby Buddy users and the most frequent source from which Baby Buddy app users found out about the app...
was a midwife. A post-hoc analysis found that Baby Buddy app users were more likely to breastfeed than non-Baby Buddy app users. This was a consistent pattern for both exclusive breastfeeding and any breastfeeding: there was a 9% increase in exclusive breastfeeding at any time up to 3 months post-birth in Baby Buddy app users and a 12% increase in any breastfeeding up to three months post-birth, compared to non-app users. Whilst this is an important finding, this needs to be used with care due to the post-hoc element of the analysis. First-time mothers who participated in the qualitative arm of the study found that the Baby Buddy app worked well due to its accessibility and that the information was concise and easy to find. They liked that it followed the progress of pregnancy with appropriately-timed information and that different aspects could be accessed as and when needed. The app was designed to be an adjunct to service delivery not a replacement for healthcare. The importance of this was demonstrated by many first-time mothers reporting that they preferred in-practice support from a healthcare professional. The qualitative data indicated that the four preconditions of normalisation process theory: implementation, adoption, translation and stabilisation were met in regard to healthcare professionals’ use of the Baby Buddy app. This suggests that the healthcare professionals were actively integrating the Baby Buddy app into clinical practice with other professionals and first-time mothers, therefore embedding the Baby Buddy app into their service delivery. The in-app data from the sub-sample of participants (n=51) suggest that there was a difference in the amount of time participants spent accessing elements of the app; the median time spent using the app per session was 8.3 minutes (SD 5.8 minutes). The most popular features that 5 were used were ‘Today's Information’, videos, ‘Bump/Baby Booth’, ‘Ask Me’ and ‘What does that mean?’. Participants used the app most often between 9-10am with another peak in the evening around 8-9pm. There were also a broad range of topics and issues that the participants searched for, of which the most searched words included: ‘labour’, ‘form’, ‘birth’, ‘pregnant’ and ‘developing’. In the sub-sample for whom we had in-app data, there was a large range for the number of times the app was used, from 0-593 times. The median number of times the app was opened was 146.5 but the data were positively skewed (LQ 52.5 – UQ 329). This indicates that the data are bunched towards the smaller number of times opened. Within this sub-sample, 21.6% of the engaged type of user used the app up to 25 times and 47% of this type of user used the app more than 100 times. This contrasts with the highly engaged type of user where 43% used the app 25 or less times and just 9.8% of this proactive type of user used it more than 100 times. We found no statistically significant difference in the TOPSE or the WEMWB5 scores between the type of user who was engaged with the app and non-app users (adjusted OR 0.69, 95%CI 0.22 to 2.16, p=.519 and adjusted OR 1.54, 95%CI 0.57 to 4.16, p=.329, respectively). Similarly, we found no statistically significant difference between the type of users who were highly engaged users and non-app users (TOPSE: adjusted OR 0.48, 95%CI 0.14 to 1.68, p=.251; WEMWB5: adjusted OR 1.40, 95%CI 0.52 to 3.76, p=.509). Strengths and limitations: The primary objective was to explore the impact of the Baby Buddy app on parental self-efficacy and the Tool for Parenting Self-Efficacy (TOPSE website, Kendall, Bloomfield and Nash 2009), a validated measure, was selected to measure the primary outcome. The retention rate of 60.7% from baseline to three months post-birth demonstrates the difficulty of engaging new mothers during this demanding period of their lives. Nevertheless, in the initial and final samples, app users and non-users remained generally comparable and relevant confounders were adjusted for. Mothers were invited to take part in interviews and/or focus groups, the latter of which were held in a baby-friendly, welcoming environment for women and babies. Telephone interviews were offered for greater convenience for the women. Analysing the in-app data, we were able to compare outcomes for both the high versus low or non-user app groups and for those mothers who were the type of highly engaged users versus those who were a less engaged type. This was for a relatively small number of mothers but was a new method of analysing the in-app data. The Baby Buddy app was publicly available, meaning randomisation was not possible and therefore participants were only asked about their specific use of the app after the 35 weeks gestation data collection point to avoid directed app use. The participants were a self-selected group, especially those for whom we had in-app data and this is reflected in the higher than the national average for women who were degree holders (58.6% in final sample versus 42% nationally). The overall TOPSE scores were high at baseline which meant there was little room for improvement. Nevertheless, there was no difference between the Baby Buddy app users and those participants who did not use the app. Conclusions: First-time mothers in the study found the app accessible and the information concise. The quantitative results, including those from the in-app data, found no evidence of impact from the Baby Buddy app on the primary outcome of parental self-efficacy or mental well-being (secondary outcome) at three months post-birth. The participant mothers had lower social support scale scores, which might suggest that the app attracted mothers who had a smaller social support network. Both mothers and healthcare professionals valued the fact that the Baby Buddy app was professionally endorsed which encouraged the women to trust the contents and the healthcare professionals to use it in their everyday practice. The most frequent source from which Baby Buddy app users found out about the app was a midwife, which suggests that the embedding of the app into service delivery by Best Beginnings was beneficial. A post-hoc finding was that women who used the Baby Buddy app were significantly more likely to exclusively breastfeed, or ever breastfeed, than those not using the app. The Baby Buddy app has gone some way to help to ‘Make Every Contact Count’ for both first-time mothers and healthcare professionals.
While Baby Buddy has been designed for parents to use on their own, it can also be used in appointments with healthcare professionals, thus reinforcing the importance of accessing health services. Best Beginnings is looking for feedback from both groups ahead of the official launch in mid-November. Users can give 'in-app' feedback and any comments or suggestions for improvement or additional content e.g. new FAQs for the ‘Ask me’ function, can also be emailed to hpapps@bestbeginnings.org.uk.

Midwives in particular are encouraged to download and use the app to understand its