Half the Sky Movement
Multimedia Communication Initiative:

An Evaluation of the 9 Minutes
Mobile Game and Video

December 2012
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Acronyms

ANC  Antenatal Care
ANM  Auxiliary Nurse Midwife
C-Change  Communication for Change
CMS  Centre for Media Studies
FGD  Focus Group Discussion
IFA  Iron Folic Acid
IRB  Internal Review Board
MDG  Millennium Development Goal
NGO  Nongovernmental Organization
PSU  Primary Sampling Unit
SBCC  Social and Behavior Change Communication
SEC  Socioeconomic Classification
TT  Tetanus Toxoid
Executive Summary

India has made remarkable achievements in reducing maternal and child mortality over the past few decades. Despite these accomplishments, the rates are still high—with one maternal death every ten minutes and a global burden of nearly 25 percent of the world’s under-five deaths (Dhar 2012; UNICEF, WHO, World Bank, UN 2012). In Asia, the primary causes of maternal and neonatal death could be averted through increased demand for appropriate services. Through funding made possible by the United States Agency for International Development (USAID), the FHI 360-managed C-Change project supported the development of the 9-Minutes mobile game and video on the topics of safe pregnancy and delivery in India. These products were part of the Half the Sky Movement, a multi-donor, multimedia initiative inspired by and in collaboration with Nicholas Kristof and Sheryl WuDunn, authors of the best-selling book, Half the Sky: Turning Oppression into Opportunity for Women Worldwide.

Today, little data exist on the effectiveness of mobile games as channels for social and behavior change communication—and in particular on their effectiveness in addressing health issues in developing countries. This study sought to contribute to the evidence base on the effectiveness of mobile games for these purposes and to look specifically at the effect of the intervention package on outcomes such as knowledge, attitudes, perceptions, and intentions to act. The evaluation also sought to examine the products’ relevance, likability, and attractiveness as a channel among audiences.

The study utilized a mixed-methods design with quantitative pre-/post-tests combined with qualitative focus group discussions (FGDs). All participants were exposed to the 9-Minutes intervention package in the context of the evaluation as distribution of the products had not yet begun in India. The study’s target populations included married women (aged 18–44) who were pregnant or intended to become pregnant within the next year and husbands of women of reproductive age who were pregnant or intended to conceive within the next year. A total of 608 women and 308 men participated in the study. Participants were randomly assigned to one of two intervention groups. Group A participants were exposed only to the 9-Minutes game while Group B participants played the game, watched the video, and participated in a brief facilitated small group discussion (intervention package). Ethical approval for the study was received in India and the United States.

The findings showed that exposure to the 9-Minutes intervention package resulted in measurable shifts in knowledge, attitudes, and behavioral intentions toward promoted safe pregnancy and delivery actions. It also found that the multimedia products were considered acceptable and well-liked among study participants. Participants recalled a range of promoted messages and actions gleaned as a result of their exposure to the intervention package and expressed desire to share what they had learned with others. Significant increases in knowledge-related items were found—most notably around correct knowledge of the number of optimal antenatal care (ANC) visits and key 9-Minutes-promoted pregnancy “dos” and “don’ts.”

The findings also revealed significant shifts in key outcomes correlated with behavior change. Specifically, those exposed to the 9-Minutes intervention package demonstrated as it related to 9-Minutes’ promoted actions:
• Increased perceptions of susceptibility to and severity of pregnancy/delivery complications in the absence of appropriate ANC or institutional delivery
• Increased perceptions of benefits
• Decreased perceptions of barriers
• Increased perceptions of supportive community norms around pregnancy/delivery and gender
• Increased self-efficacy
• Increased intentions to act related to the 9-Minutes topics

Overall the 9-Minutes evaluation demonstrated post-intervention increases across outcomes consistent with behavioral theory, suggesting that the intervention package may be associated with an increased likelihood of behavior change and may be effective in driving demand for promoted pre and postnatal services as well as contributing to efforts aimed at driving normative change. It is recommended that distribution of these products be paired with ongoing evaluation in order to gauge their effectiveness in “real world” settings. As the use of mobile games and new media become more widespread as social and behavior change communication tools, it is important to caution overemphasis of these communication channels in the absence of additional reinforcing communication channels, including interpersonal communication as SBCC aims to have synergistic effects across multiple strategies and channels to generate a supportive environment for change. It will also be important to look at the impact of these types of products across demographic groups and health and development issues.
**Introduction**

Between 1990 and 2015, the Millennium Development Goals (MDGs) numbers four and five aim to reduce child and maternal deaths by two-thirds and three-quarters, respectively. It is believed that most of the world’s countries, including India, are not on track for meeting these objectives (World Vision and The Nossal Institute for Global Health 2008). Over the past two decades, India has made great strides in lowering women’s risk of death during pregnancy and childbirth. The maternal mortality rate has declined substantially from 600 maternal deaths per 100,000 live births in 1990 to 200 deaths per 100,000 live births in 2010 (UNFPA, UNICEF, WHO, World Bank 2012). Despite these achievements, the rates are still extremely high. An Indian woman has a 1:170 lifetime risk of maternal death—with one woman dying every ten minutes (UNFPA, UNICEF, WHO, World Bank 2010; Dhar 2012).

Though also declining, India’s under-five child, infant, and neonatal mortality rates are still among the world’s highest. India bears the burden of 24 percent of under-five deaths and almost 30 percent of the world’s neonatal deaths. This amounts to an under-five mortality rate of 61, infant mortality rate of 47, and neonatal mortality rate of 32 deaths per 1,000 live births. In 2011, India’s 1,655,000 deaths of children under the age of five were borne disproportionately by females—with 64 female deaths per 1,000 live births as compared with 59 male deaths (UNICEF, WHO, World Bank, UN 2012).

In Asia, the primary causes of neonatal death include low birth weight, poor maternal health, delivery complications, maternal death, sex-selective abortion, poverty, and low health care coverage. The primary causes of maternal death are obstetric hemorrhage, anemia, sepsis/infection, obstructed labor, hypertensive disorders, and unsafe abortion, which are affected by factors related to the timing/spacing of births, nutrition, prenatal support, and access to emergency treatment in case of complications, among other factors (World Vision and The Nossal Institute for Global Health 2008). Key to reducing these factors is driving demand for appropriate services.

Through United States Agency for International Development (USAID) funding, the FHI 360-managed C-Change project supported the development of three mobile phone games and 18 short educational and advocacy videos to increase global awareness and bring about social change for critical health and gender equality and empowerment topics. The games and videos were developed by Show of Force (with game partner Games for Change and its consortium—Mudlark and E-Line Media) as part of the Half the Sky Movement, a multi-donor, multimedia initiative inspired by and in collaboration with Nicholas Kristof and Sheryl WuDunn, authors of the best-selling book *Half the Sky: Turning Oppression into Opportunity for Women Worldwide*.

The 9-Minutes mobile game and video were among the products produced under this collaboration. They focus on the topics of safe pregnancy and delivery and were developed for use in India. In the 9-Minutes game, which compresses nine months’ of pregnancy into nine minutes, users play out the adventure of pregnancy and are rewarded for keeping both the mother-to-be and the baby inside of her happy and healthy. Throughout the game, players learn the principles and stages of managing a healthy and successful pregnancy. Accompanying the mobile game is a short video that also highlights key actions (“pregnancy dos”) that women and
their families can take to ensure a happy pregnancy and birth. Regular antenatal care (ANC) visits, institutional delivery, nutrition, and increased family support are among the promoted actions. A brief facilitated discussion guide, related to the products, for use with small groups was also part of the larger developed media package.

Today, little data exist on the effectiveness of mobile games, or “serious games”¹ as a channel for social and behavior change—and in particular on their effectiveness related to health issues in developing countries. It has been suggested that social impact games utilize principles consistent with social learning theory, which asserts that people learn by observing the behavior and behavioral outcomes of others.

Engagement, modeling, reinforcement, and goal-setting, among others, are key constructs found in edutainment games and can provide an exploratory and personalized way for users to receive feedback and reinforcement (both positive and negative) as well as to be challenged and have fun (Spectre and Prensky n.d.). Koo, B. and Seider, S. (n.d.) describe three frameworks found in games that help to describe their theoretical approach—moral education, which builds upon the theory of moral development, character education, which relies on modeling and practice, and care ethics, which focuses on establishing conditions likely to encourage the desired outcome. Theories, such as the Theory of Planned Behavior, have also been used to predict individuals’ use of technology, such as social media sites (Pelling and White 2009) and text messaging services (Pedersen and Nysveen n.d.).

A video game meta-analysis demonstrated that these types of media have been shown to affect positive health-related changes through their use of stories and fantasy, interactivity, tailored messages, goal-setting, modeling, and through learning a game’s moral (Baranowski, Buday, Thompson, and Baranowski 2008). Another review of 86 published articles on eHealth interventions specific to physical activity and dietary behavior change found mixed results and called for more rigorous evaluation of these types of interventions (Norman, Zabinski, Adams, Rosenberg, Yaroch, and Atienza 2007).

This study sought to contribute to the evidence base around the effectiveness of mobile games for social and behavior change communication (SBCC) through evaluation of the 9-Minutes game and related video/discussion. It also sought to look specifically at the effect of the media package on outcomes such as knowledge, attitudes, subjective norms, and intention to act. Since components of the media package may be used together or separately, distributed through small group NGO activities or via mass media approaches, this evaluation looked at the game and video/discussion together and separately.

¹ Games intended for educational purposes.
Methods

Study Objectives
The overall aim of the study was to assess the effect of the 9-Minutes mobile game and video/discussion on knowledge, attitudes, perceptions, and intentions to act. Specific research questions/topics to be addressed included:

1. An exploration of how well the issue of safe pregnancy and delivery were known to the intended audience.
2. To determine whether or not the audience understood the issues and actions presented in the media package.
3. To examine whether or not the audience gained new or more information on the game/video’s topics.
4. To explore audience members’ perceptions of the acceptability and likeability of the game and video/discussion.
5. To explore whether exposure to the game and video/discussion resulted in increased favorable attitudes toward the safe pregnancy/delivery actions promoted.
6. To explore whether exposure to the game and video/discussion resulted in increased favorable intentions to act related to the safe pregnancy/delivery actions promoted.

Hypotheses
Participant exposure to the 9-Minutes intervention will result in measurable shift in knowledge, attitudes, and behavioral intentions toward promoted safe pregnancy and delivery actions.

Study Design
The study utilized a mixed-methods design with quantitative pre-/post-tests combined with qualitative focus group discussions (FGDs). The pre/post surveys aimed to assess the magnitude of change before and after exposure to the 9-Minutes media products and between audiences. The post-tests also explored participants’ perceptions of the products’ acceptability. The FGDs allowed for further exploration of the meaning and understanding of issues raised through the products and allow for greater inclusion of audience perspectives.

All participants were exposed to the 9-Minutes intervention in the context of the evaluation as distribution of the products had not yet begun for evaluation in a “real world” or program context.

Ethical Clearance
Ethical clearance was obtained from FHI 360 Internal Review Board (IRB) in Washington, DC, and from CMS’ India-based IRB.

Study Participants
Target populations for inclusion in this study included:

- Currently married women of reproductive age (aged 18–44 years old), including:
  - Currently pregnant women
  - Women who intended to become pregnant within the next year
- Husbands of women of reproductive age, including:
- Husbands of pregnant women
- Husbands of women who intend to become pregnant within the next year

Respondents represented socioeconomic categories (SEC) B, C, and D.²

**Instruments**

C-Change developed a set of instruments to be used for this evaluation. The quantitative survey tools were developed to measure a pre- and post-changes around a set of outcomes consistent with several behavioral theories, such as the Theory of Planned Behavior, which asserts that behavior is a factor of an individual’s perceived behavioral control, subjective norms, attitudes toward the behavior, and intention to act (Ajzen 1991). FGD guides and a detailed listing sheet were also developed and used. All instruments were developed in English and then translated into Hindi for administration. The tools were pre-tested and finalized in India.

**Data Collection Team and Training**

CMS trained moderators and interviewers with experience in development communication studies to carry out data collection. The study employed teams of recruiters (consisting of nine individuals), 18 investigators (who conducted the surveys), six moderators (who conducted post-video discussions and FGDs), and supervisors. The investigators and moderators were gender-matched with respondents.

Data collection teams were trained over three days where they were briefed on the selection and screening of respondents, the survey instruments, and discussion guidelines. Study teams were also trained in conducting interviews, with practice sessions, as well as on ethics, including informed consent procedures and maintaining confidentiality.

**Sample Size Justification**

The study employed a two-stage sampling design with a design effect³ of 1.75 magnitude (calculated using PINT software for statistical power 0.80, alpha of 0.05, and ±5 percent margin of error). The study estimated that 68.6 percent of women in Delhi, India, had an institutional delivery (Ministry of Health 2007). This yielded a confidence interval for the coverage estimate of 64–74 percent. With a design effect of 1.75 magnitude and by adding factors to account for a 10% “no response,” the resulting sample yielded 585 currently married women of reproductive age (aged 18–44). For men, the secondary target audience, sample was halved (Text Box 1).

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² SEC groups urban Indian households on the basis of education and occupation of the chief wage earner into five segments—A, B, C, D, E. This classification is more stable than one based on income alone and since it’s a reflection of lifestyle, it is more relevant to the examination of consumption behavior. High SECs refer to A and B. Mid-SEC refers to C, and low SEC refers to D and E.

³ A design effect of 1.75 has been used for any moderate two-stage sampling.
**Text Box 1. Sample Size Calculation**

The sample size calculating formula is: 

\[ n = \frac{3.84 \cdot p \cdot (1-p) \cdot f \cdot (1.1)}{d^2} \]

where,

- \( n \) = Required sample size
- 3.84 = Factor to achieve the 95% level of confidence
- \( p \) = Prevalence of the indicator
- \( d \) = Margin of error to be tolerated
- \( f \) = Design effect
- 1.1 = Factor necessary to raise the sample size by 10% for non-response

Considering 68.6% as the proportion of women in Delhi practicing institutional delivery, with a margin of error of ± 5% (i.e., the confidence interval for the coverage estimate is 64–74 percent) and with a design effect of 1.75 magnitude, the sample will be as follows:

\[ p = \text{Prevalence rate} = 68.6\% = 0.686 \]
\[ d = \text{Margin of error} = 5\% = 0.05 \]
\[ f = \text{Design effect} = 1.75 \]

Therefore: \( n \approx 585 \) women aged 18–44 years (Rounded up to 600 to account for drop outs.)

With this sample design the total sample and the intervention design was developed (Table 1).

<table>
<thead>
<tr>
<th>Participant Groups</th>
<th>N</th>
<th>Pre-Test</th>
<th>Game Instruction</th>
<th>Game Session I</th>
<th>Video &amp; Discussion</th>
<th>Break</th>
<th>Game Session II</th>
<th>Post-Test</th>
<th>FGD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women A</td>
<td>300</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Women B</td>
<td>300</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Men A</td>
<td>150</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td>Men B</td>
<td>150</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>450</strong></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

**Sampling**

To obtain the study sample, the following steps were undertaken:

1. Identification of locations or primary sampling units (PSU) across the city of Delhi and its suburbs that were representative of localities where participants from the required SEC groups resided
2. House-to-house visits to list, screen, and select respondents from the PSUs
3. Selection of respondents

A listing exercise was conducted to facilitate development of the study’s sampling frame using a detailed listing/screening sheet developed for the purpose, which captured key determinants of eligibility. In order to identify eligible respondents (600 women and 300 men) a total of 5,936 households were listed. Among them, 3,962 households were for women and 1,974 were for men.
Household listing was done to identify eligible households in the PSU and contained the questions on the following study inclusion criteria:

- Married women (18–44 years)
- Accessibility to a mobile phone
- Currently pregnant
- Intends to become pregnant within the next year

A separate listing was conducted for men and the eligibility criteria were as follows:

- Married (21+ years)
- Accessibility to a mobile phone
- Wife is currently pregnant
- Wife intends to become pregnant within the next year

After the listing was completed per location and category, eligible candidates were given a serial number using systematic random sampling method. To assist with identification of pregnant women, health facilities in the study’s localities, auxiliary nurse midwives (ANM), and anganwadi workers, who provide supplementary nutrition to pregnant women, also assisted.

Respondents were invited to come to a convenient location for the survey on a convenient day. In each location, the eligible respondents were randomly selected for either a mobile game-only group (Group A) or a mobile game plus video group (Group B). Group B also participated in a facilitated post-video discussion. Informed consent was taken from each respondent before entering the research study location. After post-test, a subset of participants from Group A and Group B also participated in a FGD.

**Data Collection**

Trained household recruiters obtained participants’ consents at the time of screening. Prior to participation, participants were randomly assigned to Group A (game only) or Group B (game plus video and group discussion). Separate groups/times were planned for each group. All respondents also provided consent prior to entering the study location. At the venue, interviewers administered a brief survey to capture demographic and other background information and the pre-test instrument.

After brief instruction on how to play the game, participants were asked to play 9-Minutes up to six times. On average, participants tried the game for two-to-three times to become oriented with the icons, joystick, and the process of playing the game. They then completed the game for an average of three times. Despite encouragement to play the game for additional times, most respondents did not and reported saturation. Participants from Group B also viewed a video on a related topic and attended a smaller related group discussion after viewing the video. Two groups from each intervention group (men A, men B, women A, women B) were randomly selected to participate in an additional FGD after the post-test.

**Data Quality**

The study’s monitors and CMS’ senior field manager observed interviews during data collection, spot checked screening, and reviewed pre and post tools for completion and consistency throughout the data collection period to ensure data quality and compliance with the study’s
protocol. They also were onsite throughout data collection to directly supervise investigators and to troubleshoot any problems that arose.

**Data Management and Storage**
All survey data were de-identified and stored on password-protected computers. Statistical analyses of the survey results were carried out in several steps. All analyses were performed using SPSS version 17. The post-video discussions were observed and extensive notes were taken to understand the groups’ reactions to the video and game. The FGDs were tape-recorded and transcribed in English. Completed survey data forms, field notes, and audiotapes were transferred to the CMS Office for data entry.

**Data Analysis**
Variable names, labels, and values were assigned for each variable. The data were then cleaned and a codebook was produced, listing all of the study variables, values, and labels. Given the need to compare pre- and post-intervention data, the data were entered using the same variables and values as assigned in the pre and post. A vertical dataset was created combining the pre and post data. The vertical dataset included a variable titled time (pre and post). Those variables that were common to the pre and post were entered in the same columns. Discrete variables were reflected as missing for the pre or post as appropriate.

Univariate analyses (descriptive, frequencies, cross-tabulations) and bivariate analyses, including statistical tests for assessing significance (paired samples t-test, chi square, McNemar’s test [for comparing proportions with paired data]) and for analyzing pre- and post-test changes were completed. For each outcome contained within the pre/post instruments there was a set of three-to-six attitudinal statements with responses that included a range from strongly agree to strongly disagree and very confident to not at all confident using five-point scales. These items were recoded to range from the most positive to the most negative attitudes. Then, a factor analysis with varimax rotation on the items was performed. Individual item factor loadings on the factors with an Eigen value of one or more were considered for further analysis. A reliability test (Cronbach’s alpha) was carried out to find out whether the scales (consisting of items with factor loadings of .3 or more) were reliable.

Subsequently, an additive index was created by adding the individual attitudinal items together. Then, a single composite, three-point attitudinal scale corresponding to positive attitudes (2), neutral attitudes (1), and negative attitudes (0) or high confidence (2), medium confidence (1), and low confidence (0) was created. For instance, if four attitudinal statements were selected, the index ran from 0-16. A new variable was then created by collapsing the additive index into three categories based on the frequency distribution of the index, negative (0−5 score), neither positive nor negative (6−10 score), or positive (11−16 score).

**Study Limitations**
The evaluation of the 9-Minutes media was conducted in a restricted and controlled environment and not in the context of an ongoing intervention. It was also conducted only in the Delhi region and so the findings may not be translatable to other Indian locations. The time between intervention and evaluation was limited, with recall measures conducted immediately post gameplay. The protocol also called for game play of at least six times. Participants, however, only played the game for an average of three times during the evaluation period. For any comparisons
presented between Group A and Group B, the data represent only descriptive differences in proportions at end-line. Differences in differences’ statistical testing was not completed.
Findings

The findings presented in this section detail participants’ profiles, impressions of the intervention, and pre/post-test changes as a result of exposure to the intervention by gender and intervention group.

Participant Profile

Socio-Demographic Characteristics
Study participants ranged in age from 18 to over 36 years old. The mean participant age was 27.5 with little difference in the sample by gender (Table 2). Hindi was the primary participant language (98.0 percent) and Hindu was the primary religion (85.9 percent). The majority of participants had achieved education beyond the 8th standard (67.3 percent) and had an average 9.7 years of schooling for women and 10.1 for men. Nearly all female respondents were non-employed or classified themselves as housewives. Male respondents represented a variety of employment statuses, with over a third classified as artisans/skilled workers (36.7 percent).

Table 2. Participant Socio-Demographic Characteristics

<table>
<thead>
<tr>
<th>Age</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–21</td>
<td>6.9</td>
<td>1.9</td>
<td>5.2</td>
<td>0.0</td>
<td>2.3</td>
<td>0.8</td>
</tr>
<tr>
<td>22–25</td>
<td>31.6</td>
<td>27.6</td>
<td>30.2</td>
<td>35.2</td>
<td>25.3</td>
<td>31.9</td>
</tr>
<tr>
<td>26–30</td>
<td>43.3</td>
<td>41.2</td>
<td>42.6</td>
<td>56.9</td>
<td>58.8</td>
<td>57.5</td>
</tr>
<tr>
<td>31–35</td>
<td>18.1</td>
<td>24.7</td>
<td>20.3</td>
<td>7.9</td>
<td>13.6</td>
<td>9.8</td>
</tr>
<tr>
<td>36+</td>
<td>0.2</td>
<td>4.5</td>
<td>1.6</td>
<td>9.7</td>
<td>10.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Mean</td>
<td>27.1</td>
<td>28.2</td>
<td>27.5</td>
<td></td>
<td></td>
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Education

<table>
<thead>
<tr>
<th>Education</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
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<tr>
<td>1–4 standard</td>
<td>0.0</td>
<td>2.3</td>
<td>0.8</td>
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<td>5–8 standard</td>
<td>35.2</td>
<td>25.3</td>
<td>31.9</td>
</tr>
<tr>
<td>9–higher secondary (HS)</td>
<td>56.9</td>
<td>58.8</td>
<td>57.5</td>
</tr>
<tr>
<td>Above HS</td>
<td>7.9</td>
<td>13.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Average years of school</td>
<td>9.7</td>
<td>10.1</td>
<td>9.9</td>
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Language

<table>
<thead>
<tr>
<th>Language</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
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<td>Bengali</td>
<td>0.3</td>
<td>1.0</td>
<td>0.5</td>
</tr>
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<td>Gujarati</td>
<td>0.0</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Hindi</td>
<td>98.2</td>
<td>97.7</td>
<td>98.0</td>
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<tr>
<td>Punjabi</td>
<td>1.5</td>
<td>1.0</td>
<td>1.3</td>
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Religion

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<tr>
<th>Religion</th>
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<th>Men (N=308)</th>
<th>Total (N=916)</th>
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<tbody>
<tr>
<td>Hindu</td>
<td>87.7</td>
<td>82.5</td>
<td>85.9</td>
</tr>
<tr>
<td>Muslim</td>
<td>8.9</td>
<td>16.2</td>
<td>11.4</td>
</tr>
<tr>
<td>Sikh</td>
<td>2.8</td>
<td>1.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Christian</td>
<td>0.7</td>
<td>0.0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Employment Status

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonagricultural labor</td>
<td>0.8</td>
<td>2.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Artisan/skilled worker</td>
<td>0.7</td>
<td>36.7</td>
<td>12.8</td>
</tr>
<tr>
<td>Petty shop/small business</td>
<td>0.3</td>
<td>16.2</td>
<td>5.7</td>
</tr>
<tr>
<td>Medium shop/business</td>
<td>0.2</td>
<td>18.5</td>
<td>6.3</td>
</tr>
<tr>
<td>Clerical/sales</td>
<td>1.0</td>
<td>18.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Supervisory level</td>
<td>0.5</td>
<td>7.5</td>
<td>2.8</td>
</tr>
<tr>
<td>Non-employed/housewife</td>
<td>96.5</td>
<td>0.0</td>
<td>64.1</td>
</tr>
</tbody>
</table>

Socioeconomic Classification
Nearly a third of study participants represented socioeconomic classification (SEC) group B (9.4 percent B1, 22.4 percent B2), SEC C (35.3 percent), and SEC D (33.0 percent) (Table 3) respectively. Little variation between the distribution of male and female respondents existed by SEC.

Table 3. Participant SEC Group

<table>
<thead>
<tr>
<th>SEC Group</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>10.0</td>
<td>8.1</td>
<td>9.4</td>
</tr>
<tr>
<td>B2</td>
<td>21.4</td>
<td>24.4</td>
<td>22.4</td>
</tr>
<tr>
<td>C</td>
<td>35.0</td>
<td>35.7</td>
<td>35.3</td>
</tr>
<tr>
<td>D</td>
<td>33.6</td>
<td>31.8</td>
<td>33.0</td>
</tr>
</tbody>
</table>
Family Status
Just over one-third of female participants were pregnant at the time of the study (37.5 percent, n=228). A similar proportion of male respondents (31.8 percent, n=98) were married to a currently pregnant woman. The remainder of participants were married (with or without existing children) and planned to conceive within the next year. Of those who had existing children, the majority had just one child (90.7 percent, n=483).

ANC Attendance
Of the 228 participants who were pregnant women, 90.8 percent had attended ANC. A higher proportion of men (with pregnant wives) reported their wives had attended ANC (96.9 percent). Among men and women who had children, almost all (99.6 percent, n=481) reported they had (or their wives had) attended ANC during their last pregnancy. Of women who attended ANC during their last or current pregnancy, the majority (84.2 percent, n=347) reported they were accompanied by their husbands at least once. Ninety percent (89.6 percent, n=164) of men reported they had gone with their wives to ANC at least once.

Delivery Location of Last Child
Over 80 percent (82.9 percent, n=438) of participants already with a child reported their last child was delivered in a government health facility. Almost one-in-five (17.0 percent, n=82) delivered (or their wife delivered) at home.

Future Birth Planning
The majority of expecting participants reported that they had a plan in place for their baby’s delivery (87.7 percent, n=286). Of those without a plan, 65.0 percent (n=26) reported an intention to plan for their child’s delivery in the near future. For those currently pregnant or planning to have a baby, nearly all (98.2 percent, n=858) said they planned to deliver in an institutional facility.

Media Habits
The study sought to understand the media habits and exposure of respondents to a variety of communication channels and safe pregnancy and motherhood messages. The majority of participants (90.8 percent, n=832) watched television almost every day. Only a few participants watched television less than once a week (1.7 percent, n=16). Three out of ten (29.6 percent, n=271) viewed movies in the theater at least once per month.

Most participants reported access to and use of mobile games. Almost a quarter (23.1 percent) reported mobile game play on a daily basis and 41.6 percent played at least once per week (Table 4). Only 5.5 percent of respondents played mobile games less than once per month. Male respondents reported mobile game play with higher frequency than female respondents.
Table 4. Mobile Game Play Frequency

<table>
<thead>
<tr>
<th></th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost everyday</td>
<td>15.8</td>
<td>37.7</td>
<td>23.1</td>
</tr>
<tr>
<td>At least once a week</td>
<td>45.1</td>
<td>34.7</td>
<td>41.6</td>
</tr>
<tr>
<td>At least once a month</td>
<td>32.2</td>
<td>25.0</td>
<td>29.8</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>6.9</td>
<td>2.6</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Prior Exposure to Safe Pregnancy Topics
Most participants reported past exposure to messages around safe pregnancy (97.7 percent, n=895) (Table 5). Of those who had been exposed, over half (53.0 percent) recalled nutrition in pregnancy-related messages. This was followed by promotion of tetanus toxoid (TT) injections (47.9 percent), rest during pregnancy (42.2 percent), and ANC (29.7 percent) promotions. Television was the number one source of recalled safe pregnancy messages (95.2 percent), followed by wall paintings (21.2 percent) and posters (19.2 percent) (Table 6).

Table 5. Safe Pregnancy-Related Message Exposure

<table>
<thead>
<tr>
<th>Safe Pregnancy-Related Message</th>
<th>Women (N=596)</th>
<th>Men (N=299)</th>
<th>Total (N=895)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition for pregnant women</td>
<td>53.0</td>
<td>52.8</td>
<td>53.0</td>
</tr>
<tr>
<td>Getting tetanus toxoid (TT) injection</td>
<td>50.0</td>
<td>43.8</td>
<td>47.9</td>
</tr>
<tr>
<td>Rest during pregnancy</td>
<td>46.5</td>
<td>33.8</td>
<td>42.2</td>
</tr>
<tr>
<td>Antenatal care (ANC) promotion</td>
<td>30.5</td>
<td>28.1</td>
<td>29.7</td>
</tr>
<tr>
<td>Consuming iron-folic acid (IFA) tablets</td>
<td>19.5</td>
<td>6.7</td>
<td>15.2</td>
</tr>
<tr>
<td>Institutional delivery</td>
<td>11.2</td>
<td>16.1</td>
<td>12.8</td>
</tr>
<tr>
<td>Male involvement in pregnancies</td>
<td>4.5</td>
<td>8.7</td>
<td>5.9</td>
</tr>
<tr>
<td>Family planning</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Other</td>
<td>1.3</td>
<td>0.3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Table 6: Source of Safe Pregnancy Messages

<table>
<thead>
<tr>
<th>Communication Channel</th>
<th>Women (N=596)</th>
<th>Men (N=299)</th>
<th>Total (N=895)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>95.3</td>
<td>95.0</td>
<td>95.2</td>
</tr>
<tr>
<td>Wall painting</td>
<td>22.5</td>
<td>18.7</td>
<td>21.2</td>
</tr>
<tr>
<td>Poster</td>
<td>20.3</td>
<td>17.1</td>
<td>19.2</td>
</tr>
<tr>
<td>Newspaper</td>
<td>7.6</td>
<td>8.4</td>
<td>7.8</td>
</tr>
<tr>
<td>Banner</td>
<td>6.2</td>
<td>7.4</td>
<td>6.6</td>
</tr>
<tr>
<td>Radio</td>
<td>4.7</td>
<td>5.4</td>
<td>4.9</td>
</tr>
<tr>
<td>Other</td>
<td>11.4</td>
<td>6.3</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Participant’s Feedback on the Intervention (9-Minutes game, video, discussion)
As part of the evaluation, participants were asked for their feedback on the intervention components to which they had been exposed. This section details these findings.
Enjoyment
Almost all participants reported that they liked playing the 9-Minutes mobile game, watching the video, and participating in the related small group discussion. Women were slightly more likely to report enjoying the intervention than men. Of participants who both viewed the video and played the mobile game (Group B), the majority reported they preferred the game though both media products were viewed favorably.

**Game:** Participants liked the fact that the 9-Minutes game, in comparison with other mobile games they had played, provided them with information in an entertaining format. According to one male participant from intervention Group A: “We enjoyed playing the mobile game and would love to play it again if given a chance. Other games are time pass only but this game is information with entertainment.” This sentiment was also echoed in women’s FGDs.

I don’t play mobile games, only two-to-three times I have had played the snake game. But if this game is there in my mobile, I will play it repeatedly as it will be informing along with entertaining me. (FGD participant, Female, Group B)

Participants specifically liked the information on safe pregnancy (74.8 percent, n=335), the Hindi language (12.5 percent, n=56), and the pictorial depictions (11.6 percent, n=52) from the 9-Minutes mobile game. Also mentioned was unbroken phone connectivity, achieving high scores, being able to go back and repeat a step, and the information on nutrition. Said one participant, “[I liked] the way messages were displayed along with a photograph in the mobile game” (FGD participant, Male, Group B). Most participants (93.9 percent, n=420) reported that they disliked nothing about the game. Of the few that did, the small pictures and font were referenced. Almost all participants believed that men and women alike would play the game if it were available.

The game was very good and quite informative. The game should reach all and for that it should be inserted in the handset even before we buy a mobile. That way it would reach all and everybody will have an access to all information that is given in the mobile game. (FGD participant, Male, Group B).

**Video:** Participants from Group B (game plus video and discussion) found the video to be comprehensive and informative. According to one woman, “The best thing was that the video was giving the information in our own language. I understood the matter instantly” (FGD participant, Woman, Group B). Some preferred this format over the mobile game.

In our house all of us watch TV together. So I liked the video more because the message can be given to all at the same time. Like my mother-in-law is illiterate, so she can’t play mobile game, but after watching the video, she can easily understand all the messages. (FGD participant, Female, Group B)

Most participants who watched the 9-Minutes video reported that they best liked the information that it provided (90.4 percent, n=423), followed by the manner in which the doctor in the video described things (5.3 percent, n=25), and Hindi language (3.8 percent, n=18). According to one participant, “When Doctor said that we need to take care and we should have green vegetables...”
and should not lift heavy items, I really liked the information very much. Doctor herself was giving all the information in a very good manner” (FGD participant, Female, Group B).

Most participants (98.7 percent, n=462) reported there was nothing that they did not like about the video. Of those with dislikes, a reason cited was the speech in the video was too fast or in another dialect, affecting comprehension. One participant believed the doctor was rude.

**Messages Recall**
Participants were asked to spontaneously recall the top three messages they remembered from the 9-Minutes intervention. The top messages recalled were similar for both the game and the video, but with different emphasis (Table 7). From the game, participants were most likely to recall the need to save money for emergencies (56.0 percent, n=251), get a TT injection (40.6 percent, n=182), and to go to ANC (37.5 percent, n=168). The top three messages recalled from the video were to go to ANC (51.3 percent, n=230), get a TT injection (50.2 percent, n=225), and to take iron folic acid tablets (48.3 percent, n=217).

**Table 7: Mobile Game and Video Messages Recalled by Intervention Group**

<table>
<thead>
<tr>
<th>Message</th>
<th>Group A (Game) (N=448)</th>
<th>Group B (Video) (N=449)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save money</td>
<td>56.0</td>
<td>26.7</td>
</tr>
<tr>
<td>TT injection</td>
<td>40.6</td>
<td>50.2</td>
</tr>
<tr>
<td>ANC</td>
<td>37.5</td>
<td>51.3</td>
</tr>
<tr>
<td>Iron folic acid tablets</td>
<td>36.6</td>
<td>48.3</td>
</tr>
<tr>
<td>Learn pregnancy danger signs</td>
<td>35.3</td>
<td>30.6</td>
</tr>
<tr>
<td>Contact blood donors</td>
<td>30.1</td>
<td>27.8</td>
</tr>
<tr>
<td>Visit ASHA worker</td>
<td>16.7</td>
<td>23.5</td>
</tr>
<tr>
<td>Learn danger signs after birth</td>
<td>10.9</td>
<td>10.7</td>
</tr>
<tr>
<td>HIV test</td>
<td>7.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Institutional delivery</td>
<td>6.5</td>
<td>11.3</td>
</tr>
<tr>
<td>Other</td>
<td>17.0</td>
<td>13.4</td>
</tr>
</tbody>
</table>

**Intention to Share Experience with Others**
All participants wanted to share their experiences playing the game and video and discussion with others, primarily their spouse, friends, family members, and doctors/health care providers. According to one participant, “I will talk about the game with my wife, brother, in my office, and especially to men whose family is expecting a baby” (FGD participant, Men, Group A). What participants wanted to share differed by relationship type. Separate from wanting others to play the game or watch the video, top discussion areas included the topics of institutional delivery, development of a birth plan, nutrition, financial savings, family planning/birth spacing, and male involvement in pregnancy, among others (Table 8).

I’m newly married and my mother-in-law often cracks joke that now as her son is married her last wish is to see her grandson playing on the verandah of the house. But, now it won’t happen. I’m only 20 and now I will discuss it with my husband that we will not go for baby at least for another two–three years. (FGD participant, Women, Group B)
Table 8: Top Three Discussion Topics/Information to Share with Others by Person and Intervention Group

<table>
<thead>
<tr>
<th></th>
<th>Spouse</th>
<th>Health Care Provider</th>
<th>Friend</th>
<th>Mother-in-Law</th>
<th>Other Family Members</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A</strong></td>
<td>1) Institutional delivery</td>
<td>1) Institutional delivery</td>
<td>1) Institutional delivery</td>
<td>1) Institutional delivery</td>
<td>1) Institutional delivery</td>
</tr>
<tr>
<td></td>
<td>2) Birth plan</td>
<td>2) Birth plan</td>
<td>2) Institutional delivery</td>
<td>2) Institutional delivery</td>
<td>2) Saving money</td>
</tr>
<tr>
<td></td>
<td>3) Family planning/birth spacing</td>
<td>3) Family planning/birth spacing</td>
<td>3) Saving money</td>
<td>3) Saving money</td>
<td>3) Family planning/birth spacing</td>
</tr>
<tr>
<td><strong>Group B</strong></td>
<td>1) Birth plan</td>
<td>1) Institutional delivery</td>
<td>1) Institutional delivery</td>
<td>1) Male involvement</td>
<td>1) Institutional delivery</td>
</tr>
<tr>
<td></td>
<td>2) Institutional delivery</td>
<td>2) Saving money</td>
<td>2) Institutional delivery</td>
<td>2) Male involvement</td>
<td>2) Saving money</td>
</tr>
<tr>
<td></td>
<td>3) Family planning/birth spacing</td>
<td>3) Birth plan</td>
<td>3) Family planning/birth spacing</td>
<td>3) Male involvement</td>
<td>3) Male involvement</td>
</tr>
</tbody>
</table>

Knowledge

Participants were asked knowledge-related questions through both open-ended and specific questions to ascertain gains in knowledge as a result of their exposure to the 9-Minutes intervention.

General

The majority of respondents (93.5 percent, n=418) reported gaining new information as a result of playing the mobile game (with men reporting new knowledge in higher proportion than women [98.6 percent, n=141 versus 91.1 percent, n=278]).

There were so many things of which I have had no idea. But after playing the game I have come to know about all those. Like the delivery should only happen in the hospital. The regular check up of pregnant women is very important. We should not smoke. And, we should not let them pick up heavy things. And many others. (FGD participant, Male, Group A)

HIV testing, financial savings, nutrition, finding blood donors, and going to ANC four times were among the top five new pieces of information cited by those who played the game only (Group A) (Figure 1). Those who played the game, watched the video, and participated in the discussion (Group B) reported they gained new knowledge related to visiting ANC four times, taking folic acid, the importance of having a small family and spacing their children, and having an institutional delivery.
ANC Visits
In India, ANC is provided by a doctor, an ANM, or other health professional. The 9-Minutes mobile game promotes at least four ANC visits in accordance with Government of India policy. When asked generally about new knowledge gained as a result of exposure to the various intervention activities, those who watched the video (24.3 percent, n=109) more often cited going to ANC four times/on time as new knowledge they gained from their participation in the intervention compared to those who only played the game (Group A) (9.3 percent, n=39) (Figure 1).

Across both intervention groups, at pre-test, 13.3 percent (n=122) of participants correctly answered the minimum number of times a woman should attend ANC when specifically asked (Figure 2). At post-test, the proportion who answered correctly rose exponentially to 46.3 percent (n=424). The difference between pre- and post-test was significant at the p≤.001 level. Little variation in knowledge pre- or post-test was found by gender. At post-test, a higher proportion of respondents from Group B (game plus video and discussion) reported the correct number of visits than those in Group A (game exposure only) (52.6 percent, n=246 versus 39.7 percent, n=178) (Figure 3). This was consistent with the findings reported above when participants were asked about new knowledge more generally.

**Figure 1. Areas of Knowledge Gain by Intervention Component**

**Figure 2. Correct Knowledge of Optimal Number of ANC Visits (Both Groups A and B)**

**Figure 3. Correct Knowledge of Optimal Number of ANC Visits by Intervention Group**

***The difference between the total pre- and post-test correct responses was significant at the p≤.001 level.
ANC Interventions

The 9-Minutes intervention highlighted the provision of TT injections and iron folic acid (IFA) pills during ANC. When asked what medicines were provided to women through ANC, the proportion who responded TT or IFA significantly increased ($p \leq .001$) from pre- to post-test across both intervention groups (Table 9). Reports of calcium provision decreased pre-/post-test perhaps as calcium was not promoted as part of the intervention. At post-test, a higher proportion of respondents from Group A reported that iron pills were available at ANC than those in Group B.

Table 9: Medicines Reported as Provided at ANC (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
</tr>
<tr>
<td>Iron pills***</td>
<td>88.8</td>
<td>85.4</td>
</tr>
<tr>
<td>Folic acid***</td>
<td>15.3</td>
<td>10.7</td>
</tr>
<tr>
<td>TT***</td>
<td>32.4</td>
<td>31.2</td>
</tr>
<tr>
<td>Calcium***</td>
<td>21.5</td>
<td>20.1</td>
</tr>
<tr>
<td>Other</td>
<td>1.7</td>
<td>2.6</td>
</tr>
</tbody>
</table>

$^a$Promoted as part of the intervention

***The difference between pre- and post-test correct responses was significant at the $p \leq .001$ level.

Activities to Avoid during Pregnancy (Pregnancy “Don’ts”)

Participants’ knowledge of activities one should avoid during pregnancy (“pregnancy don’ts”) increased from pre to post-intervention test for both intervention groups. The differences were significant ($p \leq .001$) for avoidance of hard work, carrying heavy items, tobacco, alcohol, and cooking in a smoky environment (Table 10). Each of these activities was promoted as something to avoid during pregnancy in the 9-Minutes intervention. A minority of respondents also mentioned avoidance of certain types of food, sleeping on one’s stomach, tension, and intercourse. These items were not part of the intervention and, therefore, as expected, no significant increases were found pre-/post-test.

Table 10: Activities to Avoid During Pregnancy (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
</tr>
<tr>
<td>Hard work$^a$***</td>
<td>82.9</td>
<td>76.6</td>
</tr>
<tr>
<td>Alcohol$^a$***</td>
<td>1.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Tobacco$^a$***</td>
<td>3.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Heavy items$^a$***</td>
<td>28.8</td>
<td>28.2</td>
</tr>
<tr>
<td>Cooking in smoky room$^a$***</td>
<td>0.2</td>
<td>0.1</td>
</tr>
</tbody>
</table>

$^a$Promoted as part of the intervention

$^b$The intervention promoted having a reduced workload, which may correlate with this item.

***The difference between pre- and post-test correct responses was significant at the $p \leq .001$ level.
Positive Activities during Pregnancy (“Pregnancy Dos”)
Participants were asked to name activities considered beneficial for pregnant women to do ("pregnancy dos"). The top 14 items listed by participants were promoted in the 9-Minutes intervention (Table 11). For all listed actions, significant increases were found from pre- to post-intervention at the \( p \leq .001 \) level. Of note, almost all participants reported that pregnant women should receive a TT injection (92.6 percent, \( n=848 \)) and eat nutritious foods (91.6 percent, \( n=839 \)) post-intervention.

<table>
<thead>
<tr>
<th>Table 11: Beneficial Activities for Pregnant Women (Both Groups A and B)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-test</strong></td>
</tr>
<tr>
<td><strong>Women (N=608)</strong></td>
</tr>
<tr>
<td>TT injection***</td>
</tr>
<tr>
<td>Eat nutritious foods***</td>
</tr>
<tr>
<td>Take IFA tablets***</td>
</tr>
<tr>
<td>Rest***</td>
</tr>
<tr>
<td>Drink water***</td>
</tr>
<tr>
<td>Save money***</td>
</tr>
<tr>
<td>Visit ANC***</td>
</tr>
<tr>
<td>Contact possible blood donors***</td>
</tr>
<tr>
<td>Enlist family support***</td>
</tr>
<tr>
<td>Learn pregnancy danger signs***</td>
</tr>
<tr>
<td>Visit ASHA worker***</td>
</tr>
<tr>
<td>Plan for institutional delivery***</td>
</tr>
<tr>
<td>Learn danger signs after birth***</td>
</tr>
<tr>
<td>Test for HIV***</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

*a Promoted as part of the intervention
***The difference between pre and post-test correct responses was significant at the \( p \leq .001 \) level.

At post-test, participants from Group B (game plus video and discussion) reported in higher proportion certain “pregnancy dos,” such as eating nutritious foods, rest, and financial savings than participants from Group A (Table 12). A reverse trend was found among participants related to institutional delivery. Those from Group A at post-test reported in higher proportion than those in Group B that this was a “pregnancy do.”

<table>
<thead>
<tr>
<th>Table 12: Optimal Activities for Pregnant Women by Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A (Game Only)</strong></td>
</tr>
<tr>
<td><strong>Women (N=305)</strong></td>
</tr>
<tr>
<td>Eat nutritious foods*</td>
</tr>
<tr>
<td>Rest*</td>
</tr>
<tr>
<td>Save money*</td>
</tr>
<tr>
<td>Plan for institutional delivery*</td>
</tr>
</tbody>
</table>

* Promoted as part of the intervention

Birth Spacing
At pre-test, 79.4 percent (\( n=727 \)) of participants believed the optimal timing between births was three or more years. This interval is what was also promoted by the 9-Minutes intervention. At
post-test, an interval of three or more years was reported by 91.0 percent (n=834), a significant increase at the p≤.001 level.

**Attitudes, Motivations, and Norms**

Questions used in this evaluation centered on outcomes common among behavioral theories, such as the Health Belief Model and Theory of Planned Behavior. Findings are presented by key outcome below.

**Perceptions of Susceptibility and Severity**

All participants were asked a series of questions around their perceptions of susceptibility to complications during pregnancy and delivery and their related severity. Specifically, this section enquired about the link between not attending ANC and giving birth at home and pregnancy/delivery-related complications. Response categories for these attitudinal statements ranged from “strongly agree” to “strongly disagree.” The three statements were re-coded to range from the most positive to negative attitudes. Those who reported they “did not know” or did not respond were re-coded as “neither agree nor disagree.”

A factor analysis with varimax rotation on the items was performed. The analysis yielded one factor solution (Eigen value = 2.05). An additive index was then created by adding the three individual attitudinal items together. Reliability analysis using Cronbach’s alpha revealed the three-item scale was reliable (α=0.764). A single composite three-point attitudinal scale measure was then created; corresponding with high (2), medium (1), and low (0) perceived susceptibility/severity.

The results from this additive index demonstrated that the intervention was associated with increased participants’ perception of susceptibility/severity as it related to not going to ANC or delivering at home (Table 13). For example, 62.0 percent (n=568) of participants reported high perceived susceptibility/severity at pre-test as compared with 91.4 percent post-test (p≤.001).

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
</tr>
<tr>
<td>High***</td>
<td>63.3</td>
<td>59.4</td>
</tr>
<tr>
<td>Medium***</td>
<td>33.4</td>
<td>37.3</td>
</tr>
<tr>
<td>Low**</td>
<td>3.3</td>
<td>3.2</td>
</tr>
</tbody>
</table>

**The difference between pre- and post-test correct responses was significant at the p≤.01 level.***

**The difference between pre- and post-test correct responses was significant at the p≤.001 level.***

**Perceived Benefits**

Participants were also asked questions about their perception of benefits of adopting pregnancy and delivery-related practices that were promoted as part of the 9-Minutes intervention. These

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4 1) Women who don’t go to all ANC visits have a greater risk of experiencing complications during pregnancy; 2) Pregnancy complications can be more severe for women who do not go to all their ANC visits; 3) Women who give birth at home are at higher risk of having problems delivering their babies than women who give birth at a health facility.
included items such as going to ANC, institutional delivery, husbands’ involvement in pregnancies, use of family planning, and breastfeeding. A scale was created following the previously described process. For perceived benefits, the scale consisted of six items. Factor analysis on the scale yielded one factor solution (Eigen value = 2.545). Reliability analysis on the additive index using Cronbach’s alpha revealed the six-item scale was reliable (α=0.71).

The findings revealed a significant increase (p≤.001) in participants’ perceived benefits in adopting promoted pregnancy/delivery actions from pre to post 9-Minutes intervention (Table 14). Those who participated in Group A (game only) reported in higher proportion greater perceptions of the promoted actions’ benefits than those in Group B (game plus video and discussion) (Table 15). For example, 95.1 percent (n=426) of those who were exposed only to the game reported high perceptions of benefits toward the promoted actions as compared with 87.0 percent (n=407) of those who had played the game, viewed the video, and participated in a small group discussion. Across both groups, however, increases overall were reported.

Table 14: Perceived Benefits (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td></td>
<td>(N=608)</td>
<td>(N=308)</td>
</tr>
<tr>
<td>High***</td>
<td>81.3</td>
<td>76.0</td>
</tr>
<tr>
<td>Medium***</td>
<td>18.8</td>
<td>24.0</td>
</tr>
<tr>
<td>Low</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

***The difference between pre- and post-test correct responses was significant at the p≤.001 level.

Table 15: Perceived Benefits by Intervention Group

<table>
<thead>
<tr>
<th></th>
<th>Group A (Game Only)</th>
<th>Group B (Game Plus Video and Discussion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=305)</td>
<td>Men (N=143)</td>
</tr>
<tr>
<td></td>
<td>Total (N=448)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>95.1</td>
<td>95.1</td>
</tr>
<tr>
<td>Medium</td>
<td>4.9</td>
<td>4.9</td>
</tr>
<tr>
<td>Low</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Perceived Barriers
The study also examined perceived barriers related to the intervention’s promoted pregnancy/delivery practices. The data related to perceived barriers were analyzed in accordance with the previous scales’ development descriptions. For this outcome, the scale consisted of four items that related to difficulty in attending all ANC visits, giving birth in a health facility, nutrition, and related to community support of male involvement. Factor analysis on the scale

5 1) Going to all ANC visits can help women have healthier babies; 2) In case a woman experiences complications during delivery, she is more likely to get the help she needs at a health facility than if she gives birth at home; 3) Families are more prepared for having babies if husbands are involved in their wives pregnancies; 4) Families who use family planning to space their pregnancies have a better future than families who do not use family planning to space their pregnancies; 5) Delivering a baby is less stressful for women when their husbands accompany them to the health facility for delivery; 6) Breastfeeding is beneficial to babies health.

6 1) It is difficult for pregnant women to go for all ANC visits; 2) It is difficult for women to be able to give birth in a health facility; 3) My community wouldn’t think it is appropriate for husbands to be involved in their wives pregnancies; 4) It is difficult for pregnant women to access healthy food.
yielded one factor solution (Eigen value = 2.240). Reliability analysis on the additive index using Cronbach’s alpha revealed the four-item scale was reliable (α=0.72).

After participating in the intervention, participants’ perceptions of barriers related to the promoted pregnancy/delivery actions decreased (Table 16). For example, 40.6 percent (n=372) of participants pre-intervention reported medium levels of perceived barriers as compared with a lower proportion of participants post-intervention (28.5 percent, n=261).

Table 16: Perceived Barriers (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre Test</th>
<th></th>
<th></th>
<th>Post Test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
<td>Total (N=916)</td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
<td>Total (N=916)</td>
</tr>
<tr>
<td>High</td>
<td>2.3</td>
<td>1.3</td>
<td>2.0</td>
<td>1.5</td>
<td>2.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Medium</td>
<td>41.8</td>
<td>38.3</td>
<td>40.6</td>
<td>29.8</td>
<td>26.0</td>
<td>28.5</td>
</tr>
<tr>
<td>Low</td>
<td>55.9</td>
<td>60.4</td>
<td>57.4</td>
<td>68.8</td>
<td>71.4</td>
<td>69.7</td>
</tr>
</tbody>
</table>

***The difference between pre- and post-test correct responses was significant at the p≤.001 level.

Self-Efficacy
The fourth outcome examined was self-efficacy. This component consisted of four items focusing on participants’ ability to discuss birth plans with their spouse, accompany or have spousal accompaniment to ANC, and ability to save money in preparation for a birth (Table 17). Using the methodology previously described, the four questions were calibrated into a single-composite, three-point attitudinal scale. The Eigen value for the factor analysis performed for this scale was 2.007. Cronbach’s alpha revealed the scale was reliable (α=0.66).

The findings revealed that exposure to the 9-Minutes intervention was positively associated with increased reported self-efficacy. The proportion of respondents who reported high levels of self-efficacy related to executing the promoted pregnancy/delivery actions at pre-test was 59.0 percent (n=540). This proportion increased significantly (p≤.001) at post-test to 90.5 percent (n=829) of participants. Women reported slightly higher levels of self-efficacy around these measures than men.

Table 17: Self-Efficacy (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th></th>
<th></th>
<th>Post-test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
<td>Total (N=916)</td>
<td>Women (N=608)</td>
<td>Men (N=308)</td>
<td>Total (N=916)</td>
</tr>
<tr>
<td>High</td>
<td>65.0</td>
<td>47.1</td>
<td>59.0</td>
<td>93.3</td>
<td>87.0</td>
<td>90.5</td>
</tr>
<tr>
<td>Medium</td>
<td>35.0</td>
<td>52.9</td>
<td>41.0</td>
<td>7.7</td>
<td>13.0</td>
<td>9.5</td>
</tr>
<tr>
<td>Low</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

***The difference between pre and post-test correct responses was significant at the p≤.001 level.

Subjective Norms

7) I feel confident that I can enlist my family’s support for me to go to ANC; 2) I feel confident discussing a birth plan with my partner; 3) I feel confident asking my husband to accompany me to ANC; 4) I feel confident that I can save money to support my family in case of an emergency during pregnancy or delivery.
Subjective norms were another outcome examined in this study. This component consisted of a set of four statements related to others in the community and their participation or support for 9-Minutes promoted pregnancy/delivery actions, such as male involvement in pregnancy and general community support of pregnant women. Using the methodology previously described, the four questions were calibrated into a single-composite, three-point attitudinal scale. The Eigen value for the factor analysis performed for this scale was 2.421. Cronbach’s alpha revealed the scale was reliable (α=0.78).

Participants’ perceptions of others’ involvement or support increased after exposure to the intervention in both Groups A and B (Table 18). Pre-intervention, just under half of respondents (48.1 percent, n=441) reported positive subjective norms around these topics whereas post-intervention, this proportion increased to 84.1 percent (n=770) (p≤.001). The increase in positive subjective norms reported by men was slightly higher than that which was reported among women participants.

Table 18: Subjective Norms (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Pre-test</th>
<th></th>
<th>Post-test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men</td>
<td>Total</td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td>(N=608)</td>
<td>(N=308)</td>
<td>(N=916)</td>
<td>(N=608)</td>
</tr>
<tr>
<td>Positive***</td>
<td>50.0</td>
<td>44.5</td>
<td>48.1</td>
<td>83.9</td>
</tr>
<tr>
<td>Neutral***</td>
<td>49.7</td>
<td>54.5</td>
<td>51.3</td>
<td>16.1</td>
</tr>
<tr>
<td>Negative</td>
<td>0.3</td>
<td>1.0</td>
<td>0.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

***The difference between pre- and post-test correct responses was significant at the p≤.001 level.

Intention to Act

The last outcome examined in this study was participants’ intention to act. For this component, participants were asked a series of five questions, which were then calibrated into a single-composite, three-point attitudinal scale similar to the process described previously. For this outcome, there was one statement that men did not respond to. This was coded as “neither agree nor disagree.” The questions enquired about participants’ feelings related to having a baby, and intention to go to ANC, breastfeed, and use a family planning method post-partum. The Eigen value for the factor analysis performed for this scale was 1.727. Cronbach’s alpha revealed the scale was reliable (α=0.507).

The findings showed a significant (p≤.05) increase in participants’ reported intentions to act from pre- to post-test (Table 19). High intentions to act for example were 90.5 percent (n=829) at pre-

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8 1) Men in my community go to ANC with their wives; 2) Men in my community accompany their wives during their delivery at health facilities; 3) People in my community are supportive to pregnant women; 4) Men in my community are involved in their wives pregnancies.

9 1) I am excited to have a baby/to become a father; 2) I intend to go to all my future ANC visits; 3) I intend to ask my husband to accompany me to my next ANC visit; 4) I intend to breastfeed my baby after I give birth; 4) I intend to use a family planning method to space my next pregnancy.
test as compared with 93.0 percent (n=852) post-test. Correspondingly, those reporting medium levels of intentions to act decreased. Said one woman FGD participant, “We knew about the care but never discussed it with our husbands. Now I will definitely tell him...what all I need to eat and he should come along with me to hospital for check ups.”

Table 19: Intention to Act (Both Groups A and B)

<table>
<thead>
<tr>
<th></th>
<th>Women (n=608)</th>
<th>Men (n=308)</th>
<th>Total (n=916)</th>
<th>Women (N=608)</th>
<th>Men (N=308)</th>
<th>Total (N=916)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High*</td>
<td>92.3</td>
<td>87.0</td>
<td>90.5</td>
<td>96.4</td>
<td>86.4</td>
<td>93.0</td>
</tr>
<tr>
<td>Medium*</td>
<td>7.7</td>
<td>13.0</td>
<td>9.5</td>
<td>3.5</td>
<td>13.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Low</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>0.0</td>
<td>0.1</td>
</tr>
</tbody>
</table>

***The difference between pre- and post-test correct responses was significant at the p≤0.05 level.

In addition to the additive index findings related to general intentions to act, nearly three-quarters of Group A respondents (72.3 percent, n=324) at post-test indicated they had something specific they intended to do in the future as a result of playing the game. The primary action reported was going to all ANC visits/accompanying wife to all ANC visits (18.8 percent, n=61), followed by considering a HIV test (12.0 percent, n=39), and saving money in case of an emergency during pregnancy or delivery (10.2 percent, n=33). Seventy-eight percent (78.2 percent, n=350) of those in Group B also indicated that they intended to do something as a result of their exposure to the intervention. As with Group A, timely ANC check up was the number one action reported (21.0 percent, n=77), followed by family planning (18.9 percent, n=69), and having an institutional delivery (16.4 percent, n=60).
Concluding Discussion

The 9-Minutes evaluation examined the effects of a mobile game, video, and a facilitated discussion package on knowledge, attitudes, and intention to act among currently married men and women who were expecting a child or who intended to conceive within the next year. The 9-Minutes products aimed to equip men and women with the information they needed to have a healthy pregnancy and delivery and to affect attitudes and community norms related to these topics toward a greater enabling environment. Findings from the evaluation indicated that the study’s primary hypothesis was met: participant exposure to the 9-Minutes mobile game resulted in measurable shifts in knowledge, attitudes, and behavioral intentions toward promoted safe pregnancy and delivery actions. The evaluation also found that the intervention package was culturally acceptable and well-liked.

Participants recalled a range of promoted messages and actions as a result of their exposure to the 9-Minutes intervention and desired to share what they had learned with others, including their spouse, family members, and doctor/health care professional, among others. Exposure to the intervention resulted in measureable shifts in participant knowledge. This included significant \((p \leq .001)\) increases in knowledge related to the minimum number of times a pregnant woman should attend ANC, medications/vaccinations to take through ANC (e.g. IFA, TT), and a number of other key pregnancy “dos” (e.g., nutrition, rest, drink water, save money) and “don’ts” (e.g., alcohol, tobacco, lifting heavy items).

Some of the evaluation’s most interesting findings related to social and behavior change were around shifts in participants’ attitudes and perceptions of their communities around them as a result of their exposure to the 9-Minutes intervention. Three-point attitudinal scales were developed across a range of statements for several key outcomes—perceived susceptibility/severity, perceived benefits, perceived barriers, self-efficacy, subjective norms, and intention to act. Across all, significant\((p \leq .001)\) changes were found in the desired direction.

As a result of exposure, participants’ beliefs related to their susceptibility to, and severity of, pregnancy complications due to not attending ANC or having an institutional birth increased from medium to high. Perceptions of benefits to adopting the 9-Minutes’ promoted pregnancy/delivery-related actions increased and, correspondingly, perceived barriers decreased. Men and women who participated in the study were more likely to report positive community norms around safe pregnancy/delivery and gender and also reported greater levels of self-efficacy related to the promoted actions post-exposure. The last outcome the evaluation examined was intention to act; again, a significant increase was found from baseline. When asked about specific actions that participants intended to take, ANC attendance, institutional delivery, family planning, HIV testing, and financial savings were among the top actions noted.

While significance in difference testing was not performed, some proportional differences were seen at post-test between Group A and Group B participants. Participants across groups reported similar knowledge gains and recall, but with varying degrees of emphasis and importance placed. For instance, those who had watched the video and played the game (Group B) reported in
higher frequency at post-test four ANC visits as new knowledge gained and reported in higher proportion the correct answer for the number of times a pregnant woman should attend ANC than those who only played the game. Family planning and a desire to space children were also mentioned in higher proportion at post-test by participants in intervention Group B. Conversely, participants in Group A (game only) reported the availability of iron pills at ANC, institutional delivery as a pregnancy “do,” and associated high perceived levels of benefit in higher proportion at post-intervention than those in Group B. Although the video and the game complemented one another, it is important to note that they did not relay the exact messages and content with the same emphasis.

Across both intervention groups, highly significant changes in the desired direction were found across all study components. The outcomes examined in this study support several well-known theories of behavior change, including the Health Belief Model, as well as the Theory of Planned Behavior, (Figure 4) which explains behavior as dependent on an individual’s intention to perform the behavior. This is further influenced by individuals’ attitudes toward a behavior, beliefs about what others think, and self-efficacy (Ajzen 1991). Findings from the 9-Minutes evaluation demonstrated increases across all outcomes consistent with this theory, suggesting that the 9-Minutes intervention may be associated with an increased likelihood of behavior change.

![Figure 4. Theory of Planned Behavior](image)

Study participants, furthermore, expressed interest in continued exposure to the game and desired others in their lives to also play the game or view the video. Specifically, participants liked the fact that the game integrated information that was new to them in a format that was entertaining. Participants also believed the video was comprehensive and informative, and it was suggested that it would allow others, for whom the game might not be appropriate, accessibility to the intervention.

The findings from this study suggest that the 9-Minutes mobile game intervention package may be effective at influencing outcomes critical for driving demand for services, ensuring that women and their families seek care during pregnancy and delivery, and that they access this care through appropriate providers—all essential factors toward reducing India’s high maternal and neonatal mortality rates. It may also contribute to efforts aimed at driving normative change around male involvement and community support for pregnant women.
It is recommended that distribution of these products be paired with ongoing evaluation in order to gauge their effectiveness in “real world” settings as well as in supportive program contexts and so that product saturation, use, and other behavioral determinants and outcomes can be evaluated over time. As the use of mobile games and new media become more widespread as social and behavior change communication tools, it is important to caution overemphasis of these communication channels in the absence of additional reinforcing communication channels, including interpersonal communication as SBCC aims to have synergistic effects across multiple strategies and channels to generate a supportive environment for change. It will also be important to look at the impact of these types of products across demographic groups and health and development issues.
References


