Introduction

Since the last few decades successful efforts have been made to reduce maternal mortality worldwide by introducing different strategies and initiatives.\(^1\)–\(^5\) In spite of all these efforts, globally 292,982 women die every year, in addition large number of women suffer long-term disability due to preventable causes during pregnancy, delivery, and postpartum period. Around 23% of all these maternal deaths occur in India every year.\(^6\)–\(^7\) India lagged behind in reducing maternal mortality ratio (MMR) according to Millennium Development Goal 5,\(^8\) and with current level of MMR at 178.\(^9\) India has a huge challenge to address for achieving sustainable development goal 3 in reducing MMR to 70/100,000 live births.\(^9\)

In addition, 40% of all pregnant women give birth before age 18 every year in India.\(^10\) Evidence shows that adolescent girls have higher risk of complications related to pregnancy, delivery and postpartum period that contributes to maternal mortality.\(^11\)–\(^13\) As a result, 74% of maternal deaths were among women in the age group of 15–29 in India.\(^8\) Moreover, early pregnancy can affect the social, physiological, and intellectual development of adolescent girls (affecting ability to thrive).\(^11\)–\(^13\)

Abstract

Background: India contributes high broaden of maternal and child death globally. Over the past decade, there has been considerably improvement in maternal and child health indicator in India with intervention of national health mission. However, inequalities in basic health outcomes, lack of access and poor quality of medical care still exists. Marginalized, poor, and rural populations have noticeable low health indicators. Aim: The aim of this study is to describe the design, implementation, and baseline findings of “family centric safe motherhood approach among marginalized young married couples in rural India. Settings and Design: To establish a baseline, we completed 1347 interviews in 100 villages from two rural blocks (Balotra and Siwana) of Rajasthan, India. Methods: The progress of health outcomes is to be measured by set of indicators. Based on results, intervention package was developed. Statistical Analysis Used: The data were entered in SPSS 22 version. Bivariate analysis was performed. Results: Around two-fifth of couples (42.9%) used any temporary contraceptive method. Although the percentage of antenatal care (ANC) in the first trimester (77%) was high, but only 10% of them received three or more ANC check-up. Institutional delivery was reported to be 64.5%. Less than 10% of the women reported that they received quality of ANC (7.1%) and 32.7% was tetanus vaccination coverage in the study area. Aware of any contraceptive method was above 92.7% and 64.3% of respondents have an intention to use any family planning method in the next 12 months. Conclusions: These data provide a baseline of crucial information for evidence-based action on maternal and child health at rural inaccessible villages. Our baseline estimates will facilitate the evaluation of interventions and feasibility of scaling up of intervention.

Keywords: Family centric, safe motherhood, young couples

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There is consensus among global health community, that continuum of care provided before pregnancy, during pregnancy, delivery, postnatal period, infancy, childhood, adolescence, and adulthood is a key intervention in reducing maternal, infant, and child mortality worldwide. However, there is a concern that gap present in the current scenario of continuum of care, especially for adolescent girls and young married women, who most of the time do not or receive little health care from age 5 until their first pregnancy; besides antenatal care (ANC) is too late to minimize negative effect of risk factors and preexisting health problems on fetus. The evidence emerged recently shows that preconception care-care before pregnancy-increases the health outcome of women, couples and infant. A growing experience shows that preconception care delivered at the health facility level and at the community level targeting young married women, their families and front-line health functionaries is effective in improving health outcomes of mother and child.

Moreover, it was estimated that for every US$1 spent in providing modern contraceptive methods and good quality care for pregnant women and new born there is a return of an estimated US$120.

The MAMTA Health Institute for Mother and Child (MAMTA), with support from HDB—Financial Services Limited, launched a project “family centric safe motherhood approach among marginalized young married couples in rural India” with the primary aim to improve reproductive health of just married and first time pregnant couples. The concept of this intervention package is based on WHO’s continuum of care concept and on national RMNCH + A approach.

The main purpose of this article is to describe the design, implementation, and baseline findings of “family centric safe motherhood approach among marginalized young married couples in rural India” with the primary aim to improve reproductive health of just married and first time pregnant couples.

**Subjects and Methods**

The project is being implemented from November 2016 to November 2017 in Siwana and Balotra rural blocks of Barmer district of Rajasthan state. Besides, the willingness of the government leadership, high MMR (262) was considered for the selection of intervention sites.

**Baseline data collection**

**Study design**

The cross-sectional quantitative studies were conducted to collect baseline information during January-March, 2017.

**Study settings**

The baseline data were collected from all 100 intervention villages in two blocks. The total number of population in two blocks is 117,314 in Siwana and 125,227 in Balotra. Before baseline data collection was initiated a village mapping and line listing of eligible respondents within each village was prepared with the help of frontline health functionaries.

**Sample size**

The required sample size to detect any significant changes for each group of young (15–24) married couple who had a child in the last 1 year and recently married couple was 519 and 169 respectively. The following parameters were taken into account for sample size calculation: current institutional delivery percentage, expected institutional delivery as a result of our intervention, nonresponse rate, type 1 and type 2 errors and design effect.

**Sampling**

A simple random sampling technique was utilized for selecting eligible respondents according to inclusion and exclusion criteria within each intervention village. The inclusion criteria were as follows: (a) for young married couple – couples who got married in the last 2 years but have no child; (b) for recent parents – parents who had a child in the last one year; and (c) for family members—mother-in-law of young married women and recently delivered women. Line listing of eligible respondents was used as a sampling frame for the baseline study.

**Questionnaire for data collection**

A pretested questionnaire prepared by in-house group of researcher in consultation with programer and validated by the organizational review committee used to collect the information on: reproductive history and recent pregnancy (applicable for recently delivered women), knowledge about family planning, current use of family planning, reason for not using, and interaction with community health worker and fertility preferences, experience with receiving care in the health facility, reasons for not going to the facility, in facility delivery, perception about family planning, understanding of preconception care, perceptions about receiving preconception, antenatal, delivery, and postnatal care.

**Data collection procedure**

The data were collected using a computer-assisted personal interview (CAPI) technique by locally hired data collectors who are trained and supervised by senior researcher at MAMTA and supported by program head. CAPI was programed using Open Data Kit (ODK) Collect (https://play.google.com/store/apps/details?id=org.odk.collect.android and hl=en) – Android-based application for data collection. ODK is a suite of tools that allows data collection using mobile devices and data submission to an online server, even without an Internet connection or mobile carrier service at the time of data collection. ODK was installed to tablets, which allowed data collectors to collect and upload data in real time. The data were verified on daily basis by team supervisor and 10% sample quality check was conducted.

Before proceeding to the questionnaire the study, participants were explained the purpose of the study and also the potential
benefits that it may result in their community. The respondents were also informed that the participation is completely voluntary, anonymous, and their names or addresses will not be disclosed and all information provided will be pulled for further analysis. Besides, they were explained that they have a right to interrupt the interview or not to participate in the study at any stage. Then, a written informed consent for participation in the study was obtained.

Statistical analysis
During data collection, data were constantly checked and monitored for quality assurance purpose by senior researcher. The data were entered in Excel sheet and converted to SPSS software. Further, analysis of data was done by a group of researchers at MAMTA office. Data analysis was conducted using various statistical techniques using SPSS version 22.0.

Ethical consideration
The study protocol, informed consent form, and baseline questionnaires were approved by the MAMTA Ethics Review Board.

Design of intervention
Project-related planning, protocols, MIS formats, reporting documents, handouts, information, education and communication, behavior change communication (BCC) materials were developed based on Indian RMNCH + A guideline. Briefly, the following activities were conducted; group counseling for young couples, positive modeling, formation of safe-motherhood action group among pregnant women for uptake of ANC services, involving skilled birth attendants and one-to-one counseling, facilitation of family participation through supportive family groups for training them to recognize serious complications of pregnancy and delivery and obstructed labor, sensitization meetings with mother-in-laws, sensitization meetings for husbands/heads of households and BCC activities such as street plays, posters, and visual aids using print and electronic media and for creating enabling environment. Furthermore, emphasis was given to sensitization of the community stakeholders and frontline health functionaries.

Results
A total 1347 interviews with young married couples and recent parents were conducted from January 2017 to March 2017. Table 1 summarizes sociodemographic characteristics of the respondents surveyed in the baseline data collection.

The analysis of selected health indicators along continuum of care approach showed that current prevalence of any temporary contraceptive method by women or her partner was observed to be 42.9%. First ANC visit was done by more than three-fourth of the women but only 10% of them went for four ANC visits [Figure 1].

Quality of ANC is defined as percentage of women who received ANC, at least four times and received at least once the following check-ups: weighed, BP measured, urine and blood analysis, abdomen examined, ultrasound was received by 7.1% of the women. As a result, only 32.7% of women has got two doses of tetanus toxoid vaccination during their last pregnancy or got tetanus vaccination within 2 years before last pregnancy. Although almost three-fourth of the women took at least 100 tablets of iron-folic acid (IFA), delivered in the facility and had postnatal check-up within 2 days after delivery.

Our study also revealed that only 18.5% and 2.6% women received counseling about pregnancy complications and counseling about delivery, postpartum, and newborn care during the last trimester respectively.

Majority of women ANC check-ups were conducted by nurse/midwife (76.8%), doctor (41.1%), and traditional birth attendant (16.6%). More than 92% of institutional deliveries happened in government facilities while 8% happened in private settings. It was reported to be high because pregnant female get incentive on having institutional delivery under Pradhan Mantri Janani Suraksha Yojana. The main reasons for not delivering in facility were as follows: not necessary (57.7%), too far/no transportation (21.2%), cost too much (17.3%), husband or family member do not want (9.6%), no female provider at the facility (7.7%), and facility not open (5.8%). Respondents have mentioned the following reasons for not using any family planning method: want to become pregnant (53.3%), embarrassed to get method (46.1%), and fear of side effects (41.7%).

Almost all respondents were knowledgeable about at least one method of contraception, and this indicator is consistent in two blocks [Figure 2]. On the other hand, slightly more recent parents discussed about family planning choices/uses with their partners compare to recently married young couples [Figure 3]. Furthermore, 64.3% of respondents have an intention to use any family planning method in the next 12 months.

To the best of our knowledge, this is the first comprehensive study conducted in two blocks of Barmer districts in Rajasthan state with the aim to study care seeking behavior during pregnancy, delivery, postpartum, home based new born care, knowledge, and utilization of family planning methods. These findings provide the baseline for our interventions and enable the local health authorities to effectively target to the group of recently married young couples, and recent young parents. Our baseline data allowed us to better understand the reproductive health situation of the population under study.

Substantial differences were observed between our estimates of key health indicators and estimates obtained from previous Barmer district and Rajasthan state level surveys [Table 2].

This study finding revealed that most of following indicators were higher comparing to NFHS 3 (Rajasthan state data) and NFHS
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4 (Barmer district data)\(^4\) ANC in 1\(^{st}\) trimester, consumption of IFA tablets, institutional delivery, and PNC. On the other hand, our estimation for the following indicators were lower compare to NFHS 3 and NFHS 4 estimates: current contraceptive use, ANC visit, quality ANC, and tetanus vaccination coverage. It should be emphasized that our estimates showed higher institutional delivery compare to the district and state level estimates; this can be attributed to the fact that Government of India if promoting institutional delivery by introducing various conditional cash transfer schemes.\(^3\),\(^2\) In spite of these cash transfer schemes for promoting institutional delivery, in our study still few respondents mentioned high cost as main barrier for not delivering in the facility.

However, this comparison should be interpreted with caution because of the following reasons: (1) our baseline data collection targeted only couples in 15–24 age group, while district level estimates included all women of reproductive age; (2) this study collected the information from recently married (last 2 years) and recent parents (last 1 year) while NFHS 3 and NFHS 4 uses all women of reproductive age; (3) our data covers only 100 villages in Barmer district while NFHS 3 provides state level estimates.

Table 1: Selected sociodemographic characteristics of the respondents

| Background characteristics | Young recently delivered women (519) | Husband of recently delivered women (516) | Young married women (166) | Husband of young married women (146) |
|----------------------------|--------------------------------------|------------------------------------------|--------------------------|-------------------------------------|
| Age, n (%)                 |                                      |                                          |                          |                                     |
| ≤20 years                  | 111 (21)                             | 4 (0.6)                                  | 77 (46.4)                | 18 (12.3)                           |
| 21-25                      | 408 (79)                             | 251 (48.6)                               | 35 (31.1)                | 81.5 (119)                          |
| Above 25                   | 0                                    | 262 (50.8)                               | 0                        | 6.2 (9)                             |
| Education, n (%)           |                                      |                                          |                          |                                     |
| Illiterate                 | 247 (47.5)                           | 98 (19)                                  | 44 (26.5)                | 13 (8.9)                            |
| Informal education         | 33 (6.4)                             | 18 (3.5)                                 | 9 (5.4)                  | 1 (0.7)                             |
| Primary                    | 143 (27.6)                           | 166 (32.2)                               | 57 (34.3)                | 39 (26.7)                           |
| Middle                     | 68 (13.1)                            | 148 (28.7)                               | 36 (21.7)                | 48 (32.9)                           |
| Secondary                  | 11 (2.1)                             | 42 (8.1)                                 | 12 (7.2)                 | 12 (8.2)                            |
| Senior secondary           | 9 (1.7)                              | 13 (2.5)                                 | 4 (2.4)                  | 14 (9.6)                            |
| Graduate and above         | 8 (1.6)                              | 31 (6.1)                                 | 4 (2.4)                  | 0                                   |
| Religion, n (%)            |                                      |                                          |                          |                                     |
| Hindu                      | 504 (98.0)                           | 1 (0.6)                                  | 159 (95.8)               | 141 (96.6)                          |
| Muslim                     | 15 (2.0)                             | 0                                        | 7 (4.2)                  | 5 (3.4)                             |
| Caste, n (%)               |                                      |                                          |                          |                                     |
| General                    | 84 (16.2)                            | 71 (13.8)                                | 21 (12.7)                | 15 (10.3)                           |
| OBC                        | 165 (31.8)                           | 175 (33.9)                               | 67 (40.4)                | 57 (39.0)                           |
| SC                         | 173 (33.3)                           | 183 (35.5)                               | 52 (31.3)                | 48 (32.9)                           |
| ST                         | 95 (18.5)                            | 84 (16.3)                                | 19 (11.4)                | 20 (13.7)                           |
| Others                     | 84 (16.2)                            | 71 (13.8)                                | 7 (4.2)                  | 6 (4.6)                             |
| Age at marriage, n (%)     |                                      |                                          |                          |                                     |
| 15-17                      | 96 (18.5)                            | 6 (1.4)                                  | 21 (12.7)                | 2 (1.4)                             |
| 18-20                      | 393 (75.7)                           | 144 (28.1)                               | 126 (75.9)               | 46 (31.5)                           |
| 21 and above               | 30 (5.8)                             | 364 (70.5)                               | 19 (11.4)                | 89 (130)                            |
| Main source of income for the household, n (%) |                                      |                                          |                          |                                     |
| Agriculture                | 203 (39.1)                           | 180 (34.9)                               | 180 (34.9)               | 33 (22.6)                           |
| Business                   | 41 (7.9)                             | 42 (8.1)                                 | 42 (8.1)                 | 20 (13.7)                           |
| Daily wage earner          | 239 (46.1)                           | 261 (50.6)                               | 261 (50.6)               | 74 (50.7)                           |
| Government service         | 5 (1.0)                              | 6 (1.2)                                  | 6 (1.2)                  | 1 (0.7)                             |
| Private service            | 8 (1.5)                              | 24 (4.7)                                 | 24 (4.7)                 | 8 (5.5)                             |
| Cooperative services       | 2 (0.4)                              | 1 (0.1)                                  | 1 (0.2)                  | 1 (0.7)                             |
| Unemployed                 | 3 (0.6)                              | 1 (0.1)                                  | 1 (0.2)                  | 7 (4.8)                             |
| Others                     | 18 (3.5)                             | 1 (0.1)                                  | 1 (0.2)                  | 2 (1.4)                             |

Table 2: Comparison of selected indicators to Barmer district estimates

| #  | Name of the indicator | Our survey estimates | NFHS 3 estimates* | NFHS 4 estimates* |
|----|-----------------------|----------------------|-------------------|-------------------|
| 1  | Current any contraceptive use | 42.9 | 47.0 | 45.1 |
| 2  | ANC in 1st trimester   | 77.0 | 34.0 | 46.5 |
| 3  | 4 ANC                 | 10.0 | 41.0* | 16.2 |
| 4  | Quality ANC**         | 7.1 | N/A | N/A |
| 5  | Tetanus vaccination coverage | 38.4 | 66.0 | 68.8 |
| 6  | Consumption of 100 IFA tablets | 74.8 | 13.0 | 10.6 |
| 7  | Institutional delivery | 64.5 | 30.0 | 60.3 |
| 8  | PNC                   | 74.0 | 29.0 | 41.3 |

*Rajasthan state level data; \(^1\)Barmer district level data; \(^2\)Three or more times; \(^3\)Quality of ANC is defined as percentage of women who received ANC, at least four times and received at least once the following check-ups: Weighed, BP measured, urine and blood analysis, abdomen examined, ultrasound. N/A: Not available; ANC: Antenatal care; BP: Blood pressure; PNC: Postnatal care; IFA: Iron-folic acid
and NFHS 4 Barmer district estimates. However, our estimates have enough sample size to give a light into current maternal and child health situation of population residing in two blocks of Barmer district.

It is disturbing that, four and more ANC visits, quality of ANC and tetanus vaccination coverage among pregnant women is low. Low 4 ANC coverage should be considered as missed opportunity for effective coverage of evidence-based intervention which can be provided through ANC. Further research is required to understand reasons of such a low coverage of four and more ANC visits, quality of ANC and tetanus vaccination coverage.

It is important to note that the majority of respondents (65.7%) heard about any family planning method and 14.5% of them were using any method currently. However, majority of couple still feel embarrassed to get contraception or fear for side effects of family planning method. This shows importance of providing family planning education to young and recently married couples.

Discussion

“Unmet need of contraception” and ‘Safe motherhood’, these two are largely ignored areas in public health care delivery practices in rural India for which regular audit by policy makers and feedback from stakeholders are not collected.

In India still issues related to child birth is considered handled culturally and by in-laws. Culturally endorsed gender role to be obedient and submissive wife/daughter-in-law makes it difficult to use condom for safer sex. Limited access of resources to women compels them in many ways dependent on men, jeopardizing their decision making power, and sexual and reproductive negotiation. Our study revealed alarmingly low level of ANC coverages for reproductive health of just married couples and recent parents along with the quality of ANC received. 1st ANC visit itself delay very much leaving no scope of further ANC for the women. Our estimates showed higher institutional delivery compare to the district and state level estimates; this can be attributed to the fact that the Government of India if promoting institutional delivery by introducing various conditional cash transfer schemes. In spite of these cash transfer schemes for promoting institutional delivery, in our study, still few respondents mentioned high cost as main barrier for not delivering in the facility. In the background like Rajasthan which is considered to be culturally rooted in social norms, addressing these issues and meeting the aim and goals set by the project will be no easy task. However, documentation of baseline figures and issues at an early stage of project implementation is a great step toward achieving project aim and goal. All further project activities and implementation plan were based on baseline findings. We expect that this study will
be helpful for programmers, researchers, and policy maker for while designing their plan and intervention for rural Rajasthan.

**Conclusions**

These data provide a baseline of crucial information for evidence-based action on maternal and child health at rural inaccessible villages. Our baseline estimates will facilitate the evaluation of interventions and feasibility of scaling up of intervention.

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**Conflicts of interest**

There are no conflicts of interest.

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