Result Report | Improving Utilisation of Antenatal Care (ANC) Contacts During Pregnancy

In this experiment, we tested different message-framing interventions to improve the attendance of 4 ANC contacts by measuring intentionality to avail ANC contacts and the value perception of ANC services. We hypothesised that this could be achieved by increasing the value perception of ANC.

We ran Ordered Logistic Regression for ordered categorical variables, logit regression for categorical variables, and Ordinary Least Squares for numeric variables.
For every outcome measure, we used two models, with and without controlling for demographic information. We repeated this for each of the six treatment groups.

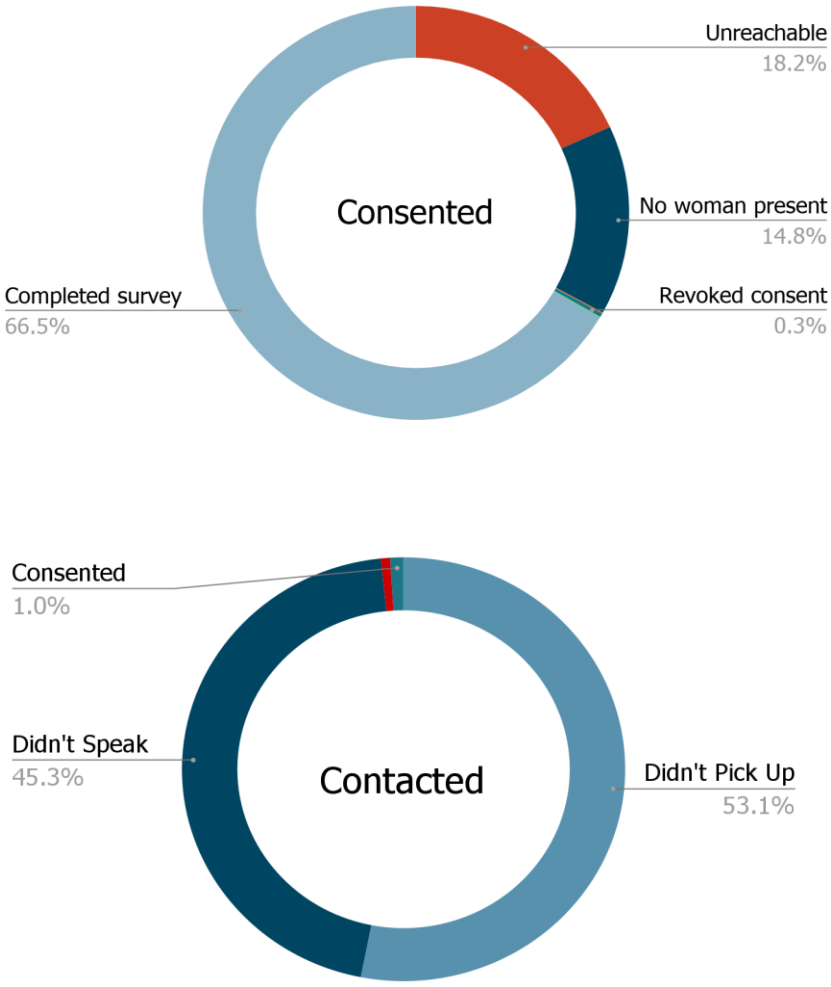
M1: Y ~ treatment_assignment + error
M2: Y ~ treatment_assignment + demographic_covariates + error

While we planned to use some screening variables as strata, our sample did not have enough numbers in each stratum, and thus using stratified models was not possible. Demographic variables used were marital status, the highest level of education, the number of people in the household, monthly household income, religion & caste, employment, and time to travel to the health centre.

Recruitment

Women between the ages of 18 to 45 years, registered with the Govindbhai C Patel Foundation from two districts in Uttar Pradesh – Fatehpur and Sonbhadra, were contacted via IVRS (Interactive Voice Response System) asking for their consent to participate in this study. Along with the informed consent, they also answered four screening questions (age, pregnancy, number of children, and primary source of pregnancy-related healthcare).
One thousand three hundred thirty women were contacted, and 855 completed the survey (Figure 1).

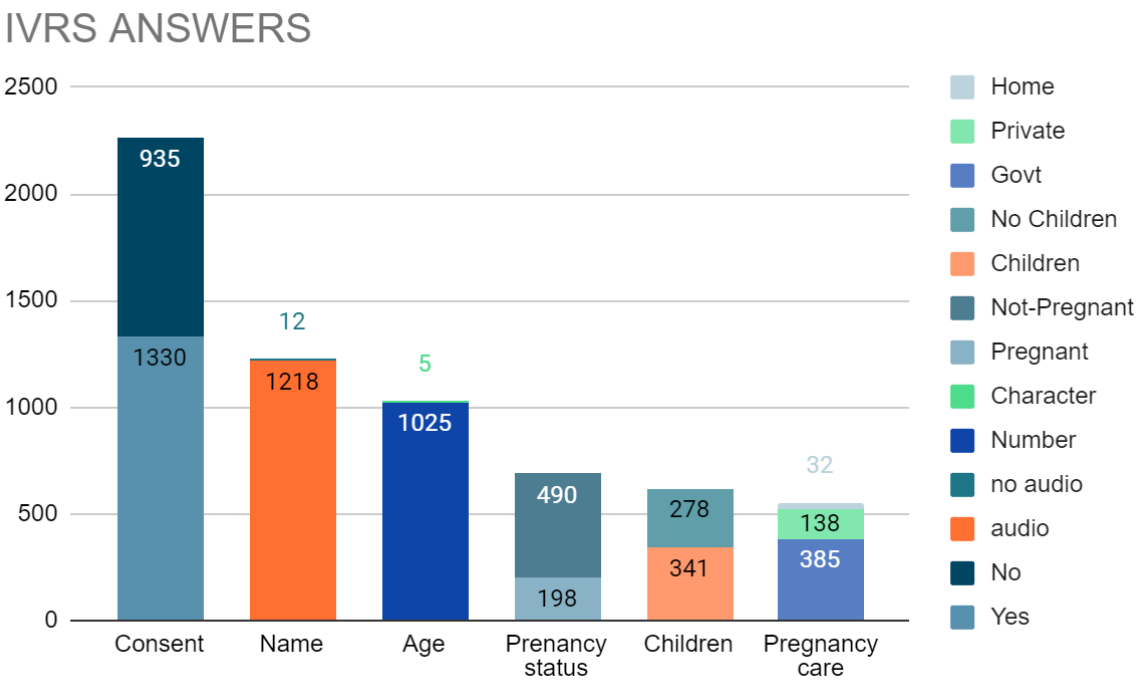
Figure 1: Participant recruitment and consent



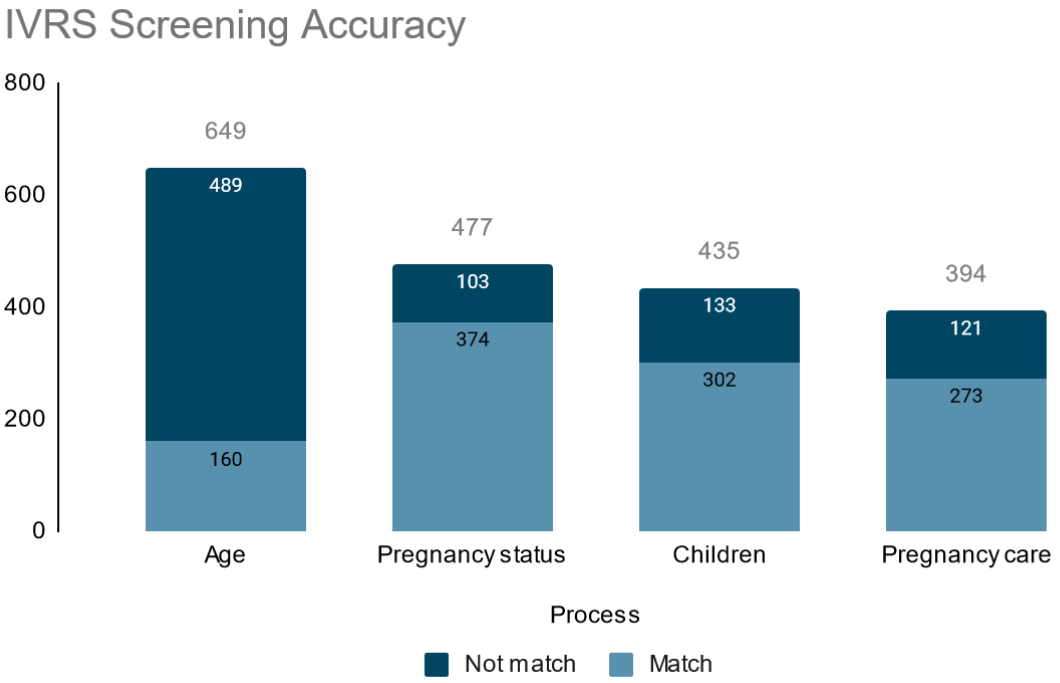
Participants were first contacted via IVRS, and Figure 2A describes the number of respondents who answered each screening question. The questions were presented in the same sequential order; therefore, a participant that answered the last question would have necessarily answered all the questions before it. Respondents were asked the same questions during the phone survey, and the two sets of answers were matched to investigate data accuracy collected via IVRS. Figure 2B shows the match between the IVRS answers (answers given through button presses to the IVRS questions) and the answers to the same questions asked in the survey.

Figure 2: IVRS Screening Process and Accuracy

A)



B)



Balance Check

All the baseline indicators were balanced between the 7 (6 treatment and one control) groups (Table1). There was no significant difference between the groups.

Table 1: Balance check between indicators

	Control	Gain Frame	Loss Frame	Rename	Testimonial	Non-pecuniary	Registration	F-value	p_value
mean_age	27.9	30.0	29.0	29.3	28.3	28.7	28.7	1.145	0.334
prop_married	88.46%	94.92%	90.35%	85.48%	84.91%	87.07%	83.93%	1.583	0.149
prop_pregnant_status	10.77%	12.71%	8.77%	8.06%	12.26%	12.07%	9.82%	0.405	0.876
prop_have_children	76.15%	85.59%	81.58%	77.42%	78.30%	81.03%	79.46%	0.742	0.616
prop_govt_healthcare	78.46%	76.27%	78.95%	81.45%	78.30%	83.62%	78.57%	0.599	0.732
prop_pvt_healthcare	19.23%	17.80%	19.30%	15.32%	20.75%	14.66%	18.75%	0.599	0.732
prop_no_school	6.92%	14.41%	10.53%	8.87%	11.32%	9.48%	8.04%	0.030	1.000
prop_primary_school	14.62%	5.93%	9.65%	15.32%	8.49%	12.93%	10.71%	0.030	1.000
prop_secondary_school	40.00%	38.14%	37.72%	33.06%	39.62%	33.62%	40.18%	0.030	1.000
prop_graduate	32.31%	30.51%	33.33%	34.68%	33.02%	36.21%	34.82%	0.030	1.000
prop_postgraduate	6.15%	11.02%	8.77%	8.06%	7.55%	7.76%	6.25%	0.030	1.000

	Control	Gain Frame	Loss Frame	Rename	Testimonial	Non-pecuniary	Registration	F-value	p_value
prop_ration_card_apl	39.23%	37.29%	47.37%	33.87%	38.68%	42.24%	33.04%	1.525	0.167
prop_ration_card_aay	16.15%	10.17%	6.14%	9.68%	9.43%	10.34%	8.93%	1.525	0.167
prop_ration_card_nocard	12.31%	16.95%	18.42%	22.58%	20.75%	12.07%	25.00%	1.525	0.167
prop_hindu_gen	22.31%	21.19%	17.54%	20.97%	24.53%	16.38%	24.11%	0.557	0.764
prop_hindu_obc	46.15%	50.85%	50.00%	46.77%	51.89%	58.62%	52.68%	0.557	0.764
prop_hindu_sc	23.85%	19.49%	21.93%	21.77%	12.26%	20.69%	14.29%	0.557	0.764
prop_ration_card_bpl	32.31%	35.59%	28.07%	33.87%	31.13%	35.34%	33.04%	1.525	0.167
prop_hindu_st	3.08%	2.54%	3.51%	4.84%	5.66%	1.72%	5.36%	0.557	0.764
prop_hindu_NA	0.00%	0.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.557	0.764
prop_muslim_gen	2.31%	1.69%	3.51%	3.23%	1.89%	0.86%	0.89%	0.557	0.764
prop_muslim_obc	1.54%	3.39%	2.63%	2.42%	2.83%	1.72%	1.79%	0.557	0.764
prop_muslim_sc	0.77%	0.00%	0.88%	0.00%	0.94%	0.00%	0.89%	0.557	0.764
prop_healthcenter_lessthan5min	0.77%	0.85%	0.00%	0.81%	0.94%	0.00%	3.57%	1.921	0.075
prop_healthcenter_5to10min	5.38%	6.78%	7.02%	7.26%	4.72%	6.03%	10.71%	1.921	0.075
prop_healthcenter_morethan10min	93.85%	92.37%	92.98%	91.94%	94.34%	93.97%	85.71%	1.921	0.075
prop_employed	10.77%	11.02%	12.28%	12.90%	10.38%	12.07%	6.25%	0.570	0.754
mean_monthy_income_member	1,203.48	1,274.37	1,507.61	1,236.04	950.39	1,275.33	1,203.53	0.816	0.557

Primary Outcomes

Table 2 describes the primary outcome for all the treatment groups with respect to the control. All the odd ratio values from the table are nearly 1.00. Thus, the data suggest no significant difference between the treatment and the control. None of the interventions showed improvements in ANC's early registration, adherence, and value perception. Intent to send an SMS for monetary incentives was lower in the gain frame than control (0.29 times).

Table 2: Primary outcome odd ratio

Primary Outcomes	Registration	Gain frame	Loss frame	Renaming	Testimonial	Non-pecuniary
Intent to Register in their 1st Trimester	0.9	0.84	0.98	1.00	0.91	1.2
Intent to Adhere to ANC Schedule	1.14	0.96	0.86	1.36	0.89	0.83
Intent to Send SMS 1 (ANC Benefits, Services)	1.16	1.11	0.94	1.03	0.81	0.82
Intent to Send SMS 2 (Monetary Incentives for ANC)	0.75	0.29*	0.61	0.6	0.64	0.9
Price Willing to Pay for one ANC Contact	-11.64	-8.22	0.48	-8.49	-1.1	-6.35

All results were statistically insignificant except those marked * (uncorrected $p<0.05$)

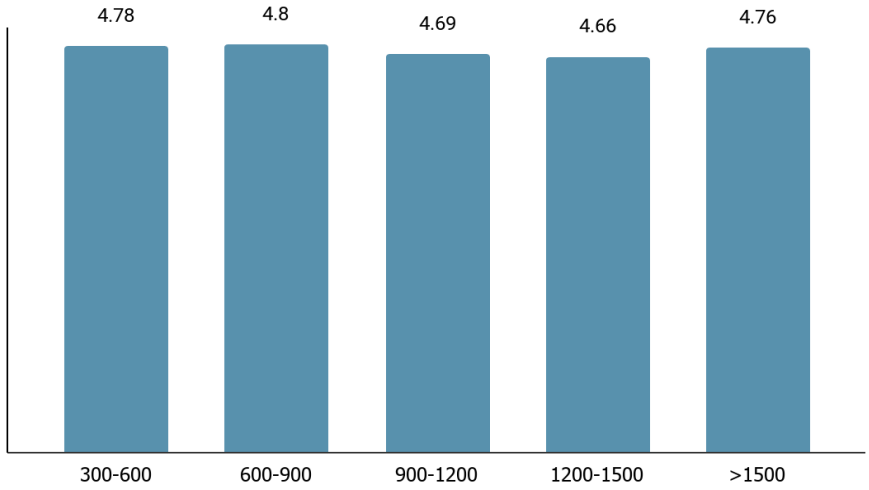
Intentionality

The Intentionality score included two likelihood rating (1-5) questions where the respondents were asked about their intention for early registration and adherence to ANC. None of the treatment groups showed significant differences from the control.
Some key demographic characteristics impacted the intentionality score (Figure 4). Women with no card are more likely to choose a higher rating for intent towards early registration than women with AYY (Antyodaya Anna Yojana) cards ($P_{(AYY/No\ card)}= 0.04$; $p= 0.05$).

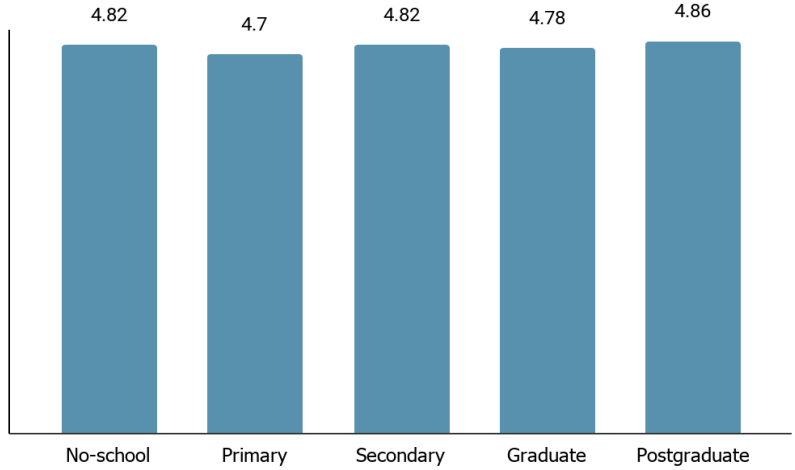
Married women are almost twice as likely to choose a higher rating of intent to register within the first trimester by one unit than unmarried women ($P_{(married/unmarried)} = 1.94$, $p = 0.05$). Education showed a significant impact on the intention to adhere to the ANC schedule ($P_{(graduate/postgraduate)} = 0.36$; $p = 0.03$, $P_{(primary/postgraduate)} = 0.27$; $p = 0.02$), whereas income showed no significant impact ($P_{(unit\ change\ in\ monthly\ income)} = 1$; $p = 0.02$).

Figure 4: Demographic variables and intentionality score

Adherence to ANC Schedule, by Income (Scale of 1-5)



Adherence to ANC Schedule, by Education (Scale of 1-5)

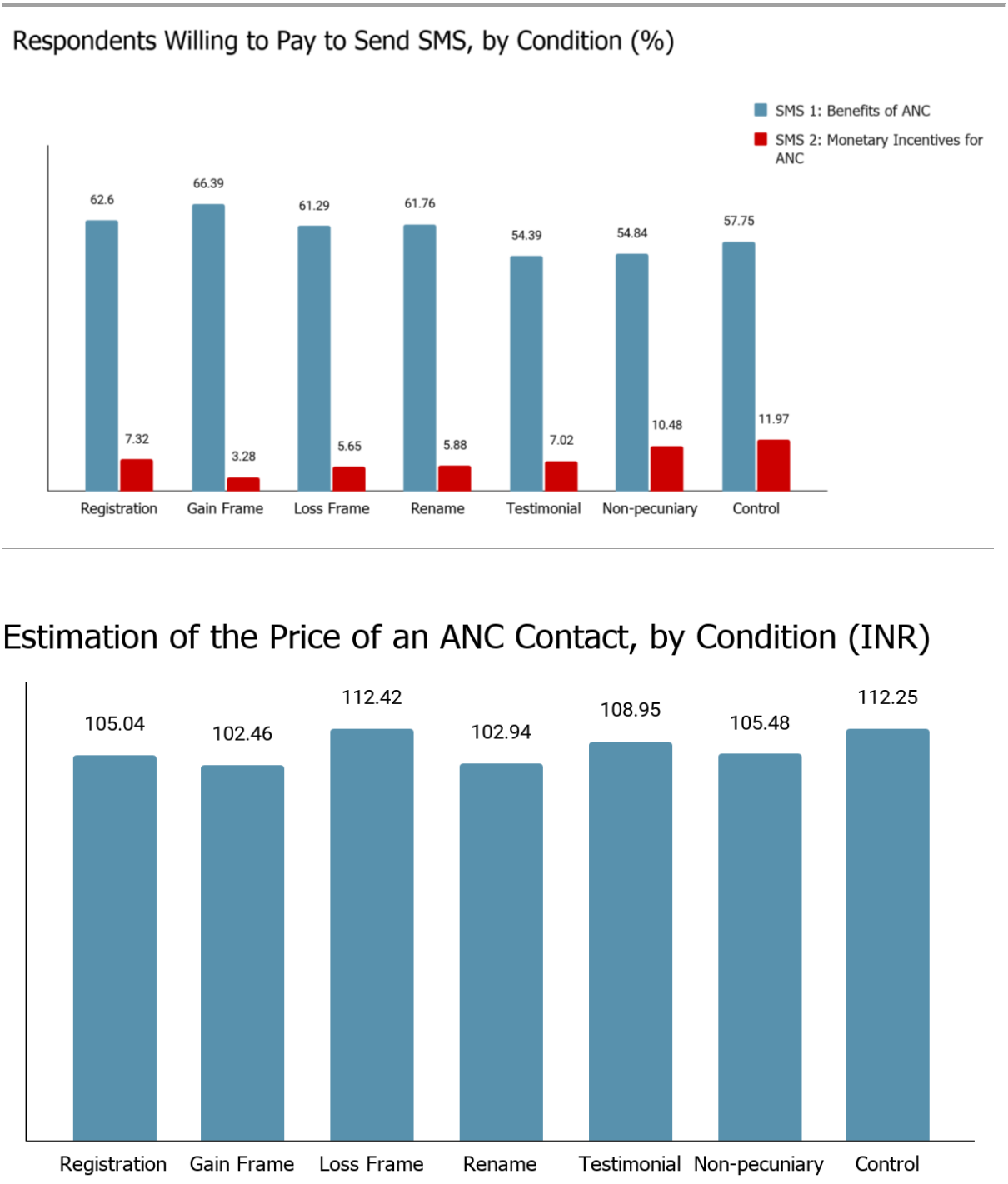


Value Perception

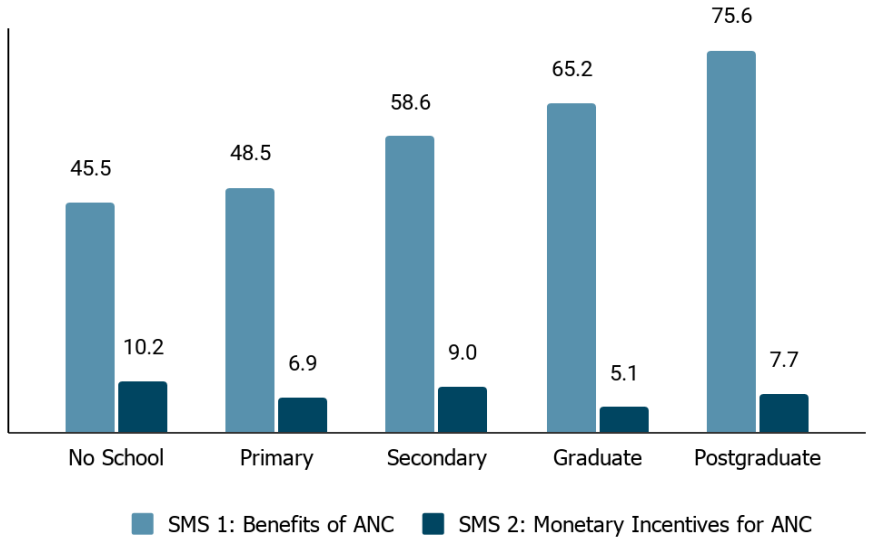
These revealed measures determined the preference for getting substantive information on ANC (between health benefits, monetary incentive, or no message) and willingness to pay for one ANC contact (if they were not provided free by the government). Respondents were given another 50 INR mobile recharge, where they chose to either use 20 INR to send ANC-related information to two of their contacts or keep the entire 50 INR. One set of messages gave them comprehensive information on health benefits and services provided during ANC visits. The second set of messages included information on the financial incentives linked to ANC services and how to avail of them. The odds of sending message one versus not sending a message are equal in different income groups; however, the odds of sending message two versus no message are higher in control than in the gain frame (P(gain fame/control) = 0.29, p = 0.05). The intent of sending a message is higher for postgraduates than all other education levels (SMS 1: P(no-school/postgraduate) = 0.24 p =0.00, P(primary/postgraduate) = 0.26, p = 0.00, P(secondary/postgraduate) = 0.43, p = 0.03), and than

most other levels (SMS 2: P(primary/postgraduate) = 0.22 p =0.04, P(graduate/postgraduate) = 0.31, p = 0.06).
None of the treatments is significantly different from the control with regard to price estimation. Approximately 8% chose not to pay at all (Figure 5).

Figure 5: Demographic variables and value perception



Respondents Willing to Pay to Send SMS, by Education Level (%)



Secondary Outcomes

As the odds ratio values (Table 3) are close to 1.00, none of the treatment groups shows any significant difference from the control group. The interventions did not improve any of the secondary outcomes.

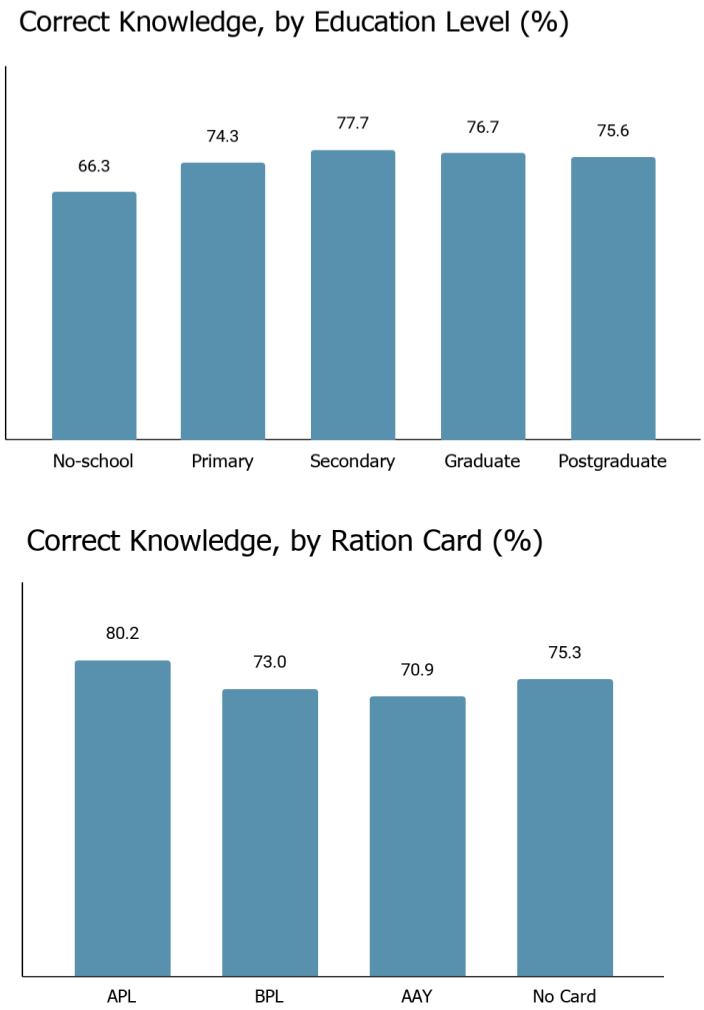
Table 3: Secondary outcome odds ratio

Secondary outcomes	Registration	Gain frame	Loss frame	Renaming	Testimonial	Non-pecuniary
Knowledge	1.07	1.04	1.03	1.04	1.00	0.99
Risk perception	1.01	1.01	1.00	1.00	1.00	1.01
Perceived norm	1.03	0.94	1.06	0.98	0.92	1.01
Self-efficacy	0.99	1.00	1.00	0.99	1.00	0.98
Trust-efficacy	0.99	1.00	0.99	0.99	1.00	0.99
Past Behaviour	0.98	1.02	1.02	0.97	0.91	0.88

Knowledge

Knowledge score is a constructed variable describing how many of the seven knowledge questions were correctly answered regarding ANC schedule, registration, and monetary benefits. The results were calculated as per cent correct, and none of the treatment groups was found to be significantly different from the control. However, the per cent correct knowledge increased with respect to Education (Education level: $F = 2.53$, $p = 0.04$) and Ration Card status (Ration Card: $F = 5.17$, $p = 0.00$). Respondents with secondary-level education exhibit greater knowledge about ANC contacts than those without schooling ($t_{382} = 3.53$, $p = 0.0152$). Similarly, respondents with APL show higher knowledge than AAY ($t_{400} = 3.26$, $p = 0.0078$) (Figure 6).

Figure 6: Secondary outcome: Knowledge

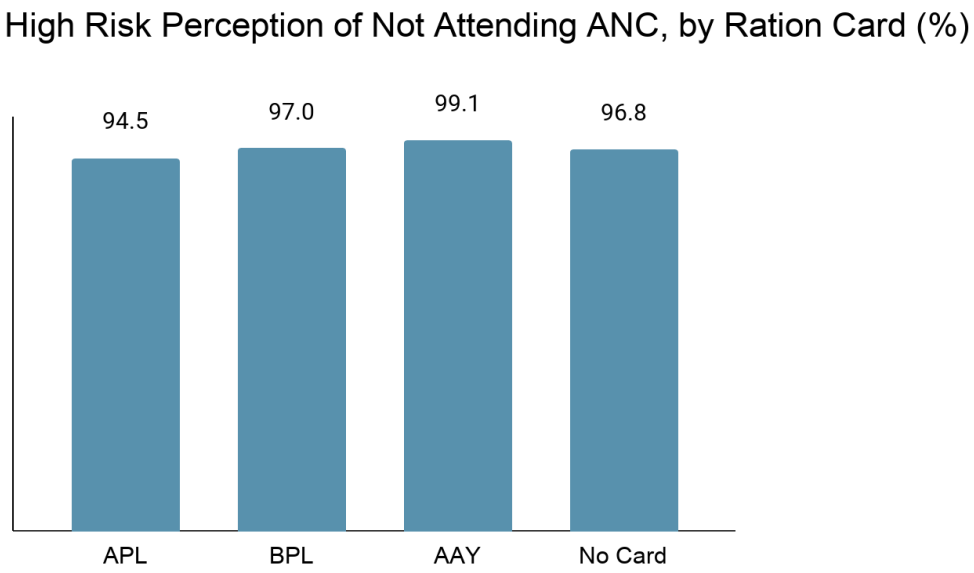


Risk perception

Risk perception was inferred from four questions (two Likert scales and two yes/no types) regarding the perceived harm due to late registration and non-compliance with the ANC

schedule. The treatment groups did not show any increased risk perception as compared to the control group. Lower poverty (i.e. the ownership of APL ration cards as opposed to BPL or AAY cards) lowers the risk perception of not attending ANC contacts, as opposed to the effect of increasing the highest level of education, which increased risk perception (Figure 7).

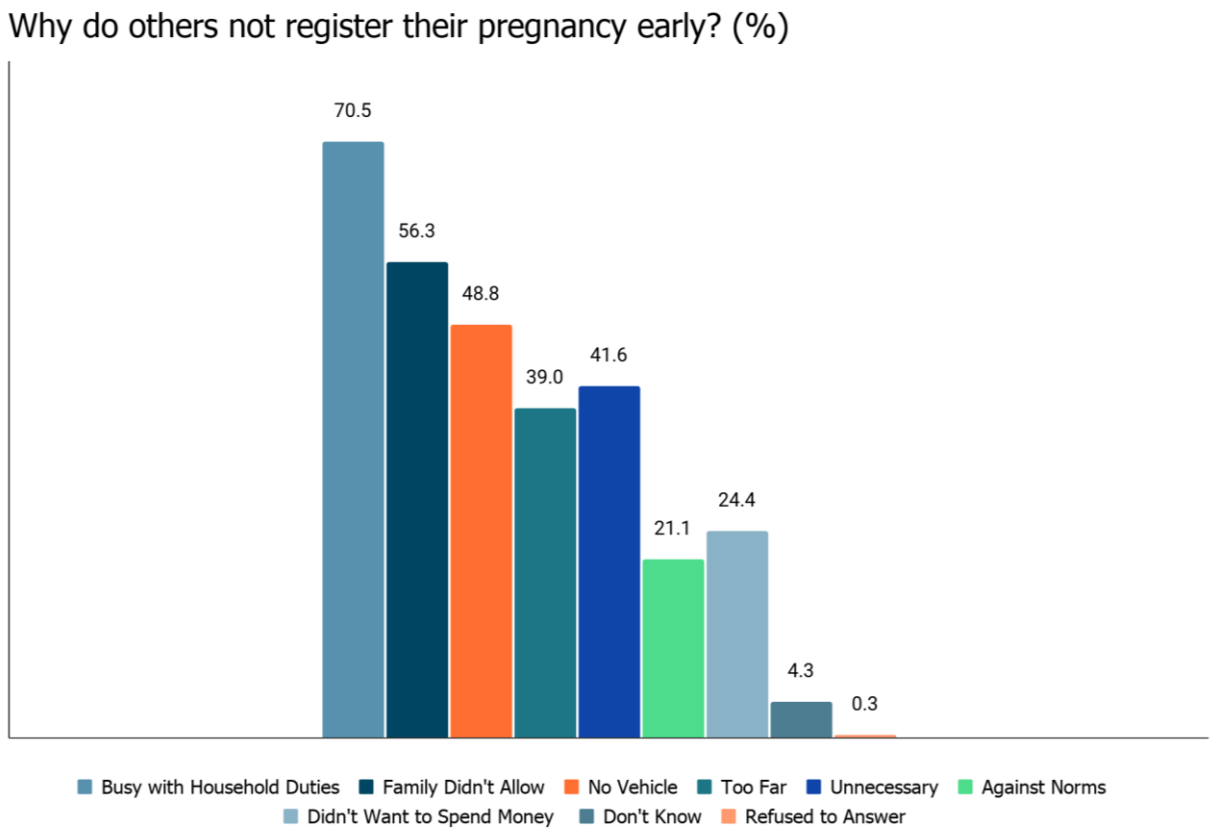
Figure 7: Secondary variable: Risk perception

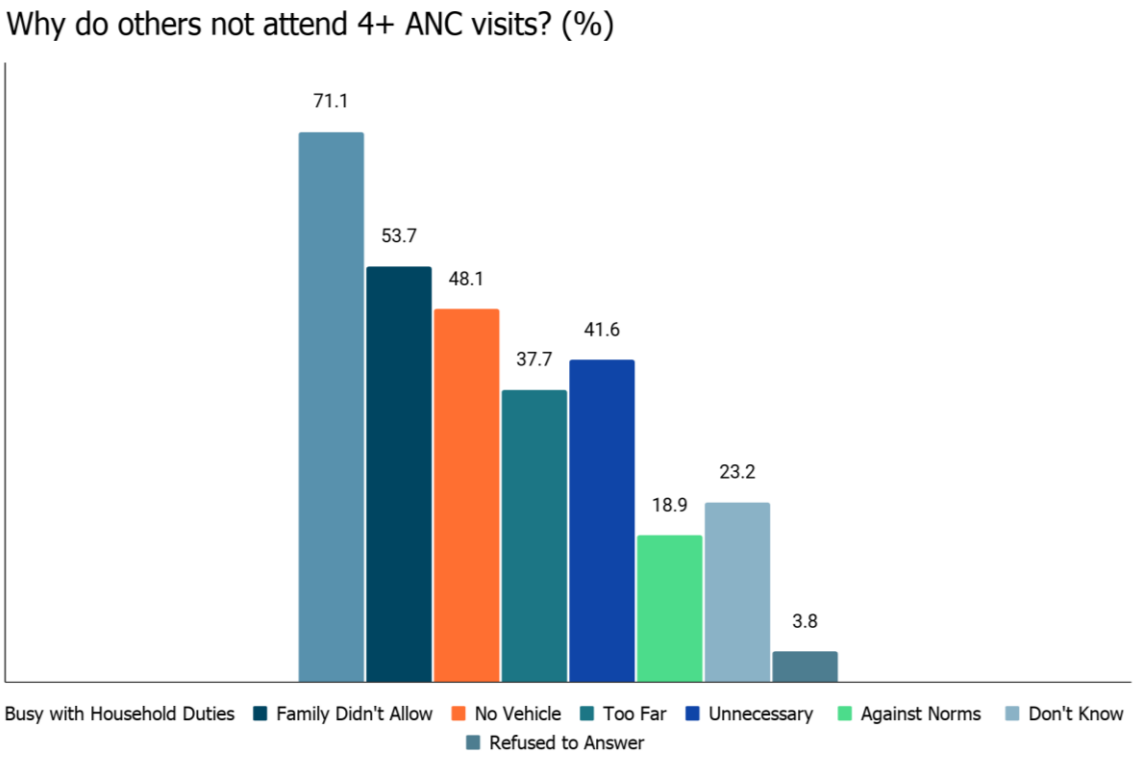


Perceived norm

The perceived norms regarding registration and adherence for other women were assessed through 2 questions. Respondents answered why other women fail to adhere to ANC contacts and register early. None of the treatments is different from the control. Figure 8 shows the common reasons for non-adherence and late registration for ANC. Respondents stated that being busy with household duties is the primary reason for other women not registering their pregnancy early and non-adherence to the ANC contacts.

Figure 8: Secondary outcome: Perceived norm

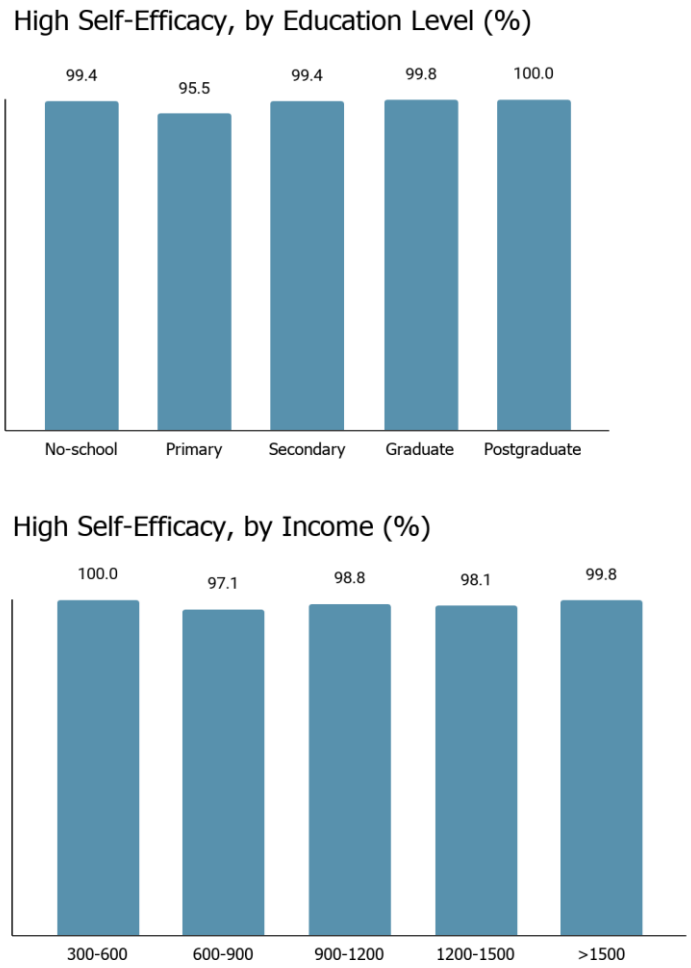


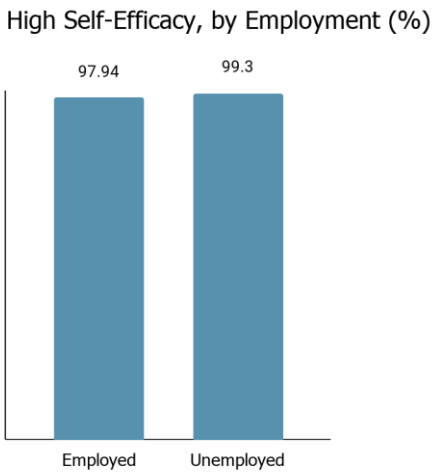


Self-efficacy

2 Likert scale questions measured self-efficacy. The respondents rated their confidence in their ability to register within the first trimester and follow the ANC schedule. Income (F = 1.87 p = 0.00) showed an effect with regard to self-efficacy, although it was mixed across levels (Figure 9). Respondents with only primary education have lower self-efficacy than those with all other levels (F = 5.61 p = 0.00). Unemployed respondents showed greater self-efficacy than the employed (F =5.81 p = 0.02).

Figure 9: Secondary outcomes: Self-efficacy





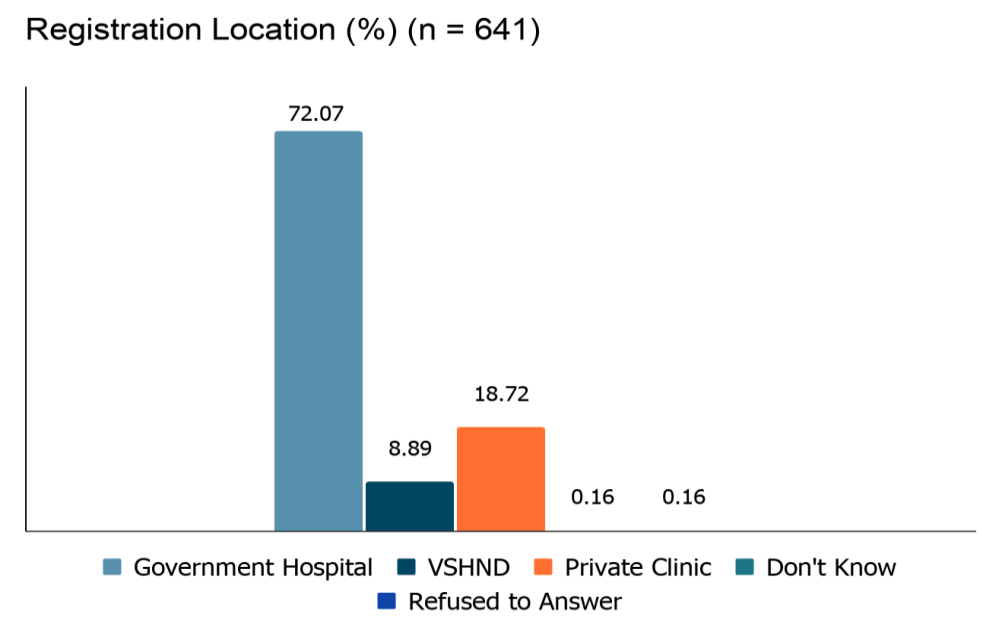
Trust efficacy

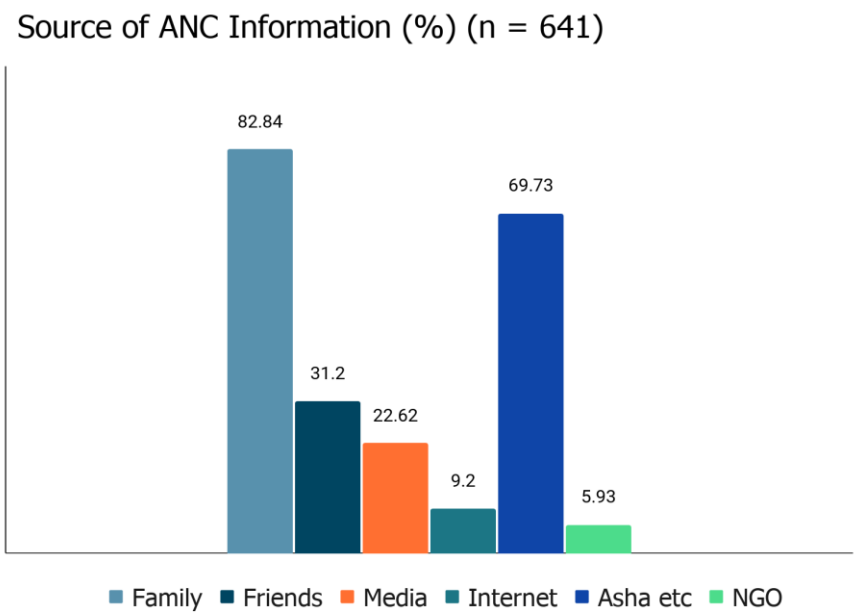
Trust efficacy included 2 Likert scale questions. The respondents rated their trust in government services and this survey. The results showed high trust value in government functionalities and the survey; however, there was no significant difference between any treatment and control group.

Past Behaviour

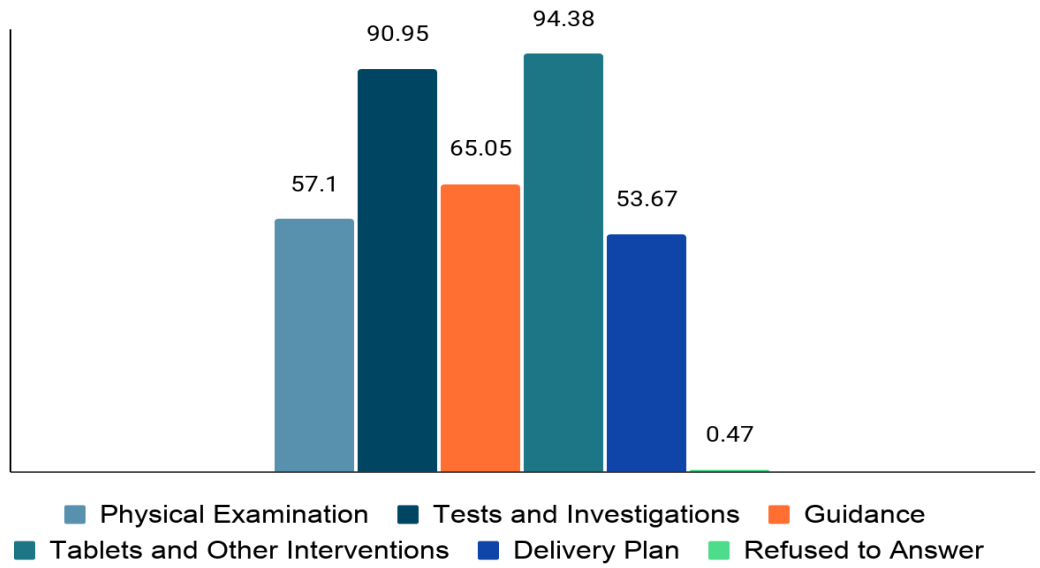
This section included questions about their last pregnancy registration and ANC visits. The treatment groups did not show any significant difference from the control.
About 72% of the sample stated that they had registered their last pregnancy at a government hospital, indicating that our intervention targeted the desired population. Most women relied on or trusted their family members for healthcare information during pregnancy than ASHAs and other healthcare functionaries. IFA tablets followed by blood and urine tests were the most common interventions received during past ANC visits. Nearly half of all respondents said that the reason for registering late in their last pregnancy was that they were unaware of being pregnant at such an early stage. 'Busy with household duties' was the primary reason for not adhering to ANC visits (Figure 10).

Figure 10: Secondary outcome: Past Behaviour

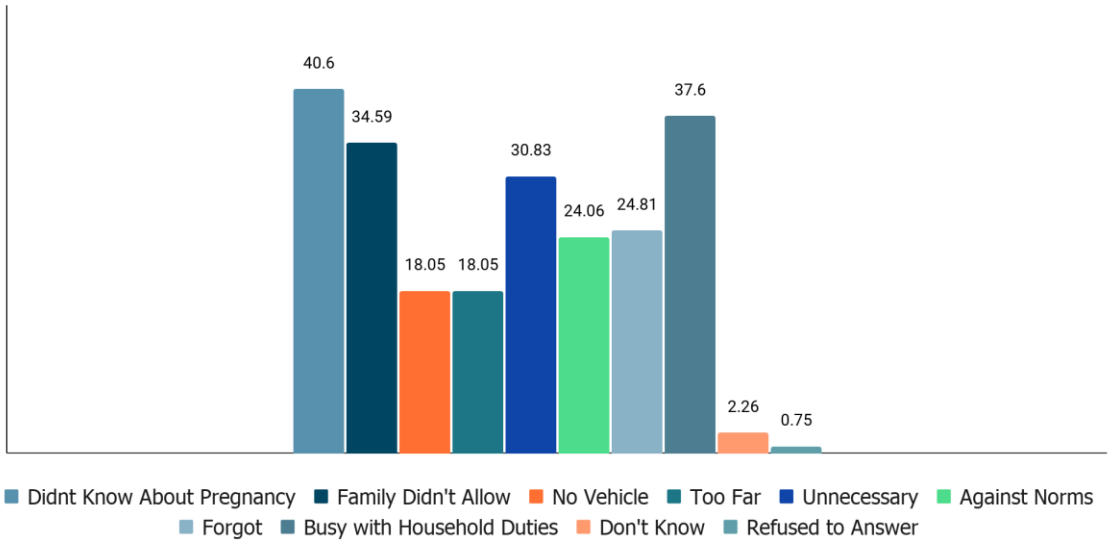


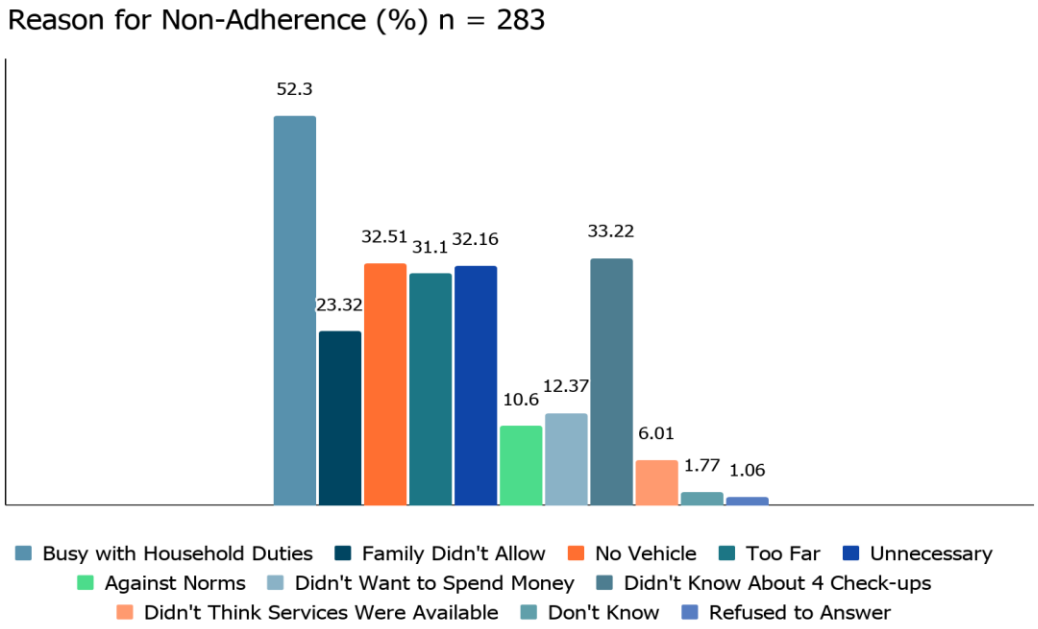


Services Availed (%) (n = 641)



Reasons for Late Registration (%) (n = 133)

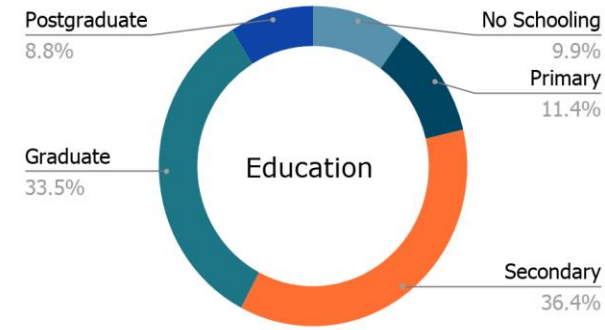


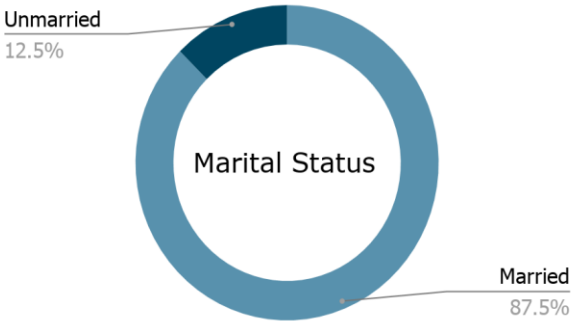


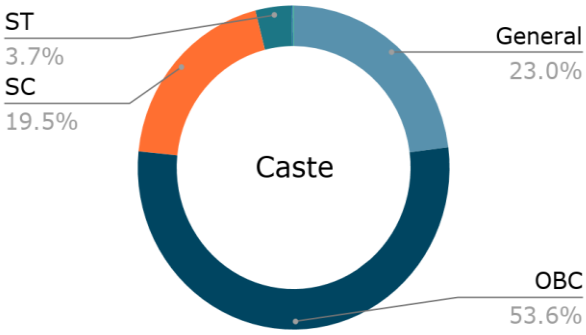
Demographic Characteristics

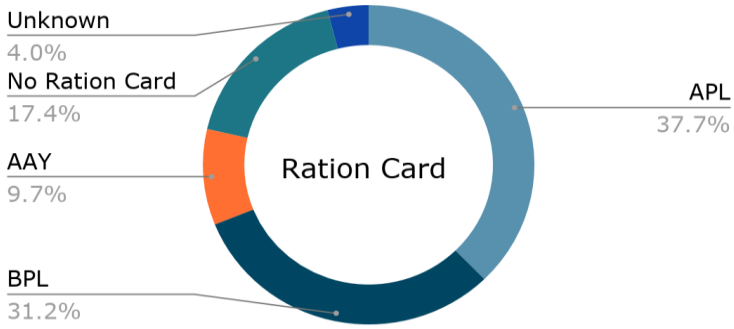
Respondents were women in the age range of 18-45 years (reproductive age). 87.5% of our sample were married women. Most respondents had received some education, and only 9.9% of the sample received no schooling. 89% of women were unemployed. Mean respondent age, percentage of pregnant respondents, and percentage of respondents with children were balanced across treatments and control groups (Figure 11).

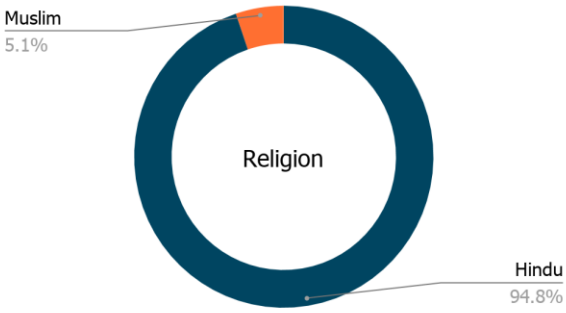
Figure 11: Sample Characteristics

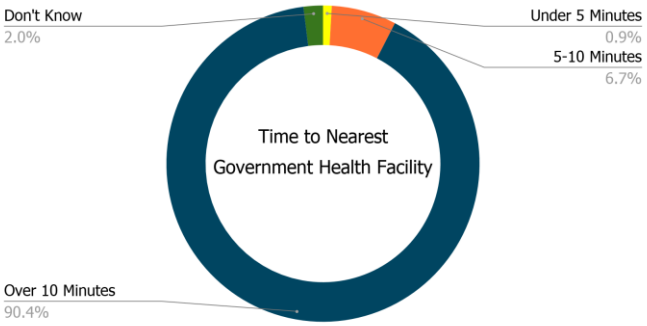


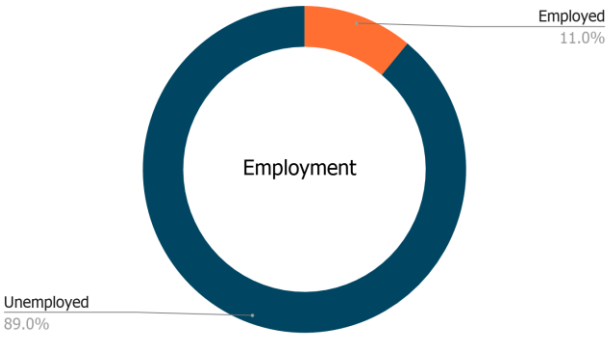





Unknown
4.0%
No Ration Card
17.4%
AAY
9.7%
BPL
31.2%
APL
37.7%
Ration Card


Muslim
5.1%
Religion
Hindu
94.8%


Don't Know
2.0%
Under 5 Minutes
0.9%
5-10 Minutes
6.7%
Time to Nearest
Government Health Facility
Over 10 Minutes
90.4%


Employed
11.0%
Employment
Unemployed
89.0%

Discussion

The interventions did not show improvements in stated (early registration, adherence to ANC schedule) or revealed preference measures (increased interest in knowing about ANC, increased value perception of ANC).
Respondents showed a high knowledge of IFA pills, and basic tests (blood and urine tests) offered at ANC contacts; however, there is less awareness of other services like counselling and birth planning. More women said they would advise their friends to save money to buy nutritious food instead of attending ANC and utilising the monetary incentives. This was consistent between the non-pecuniary framing treatment group compared to other groups. Even though women are mainly aware of the health risks for the mother and child for not attending ANC contacts, it is due to the lack of knowledge of the services and monetary assistance ANC provides that they do not advise or avail of these services.

The most critical barrier identified via norm perception and past behaviour against early registration and ANC adherence is lack of time due to household responsibilities. Respondents also indicated that they trusted their family members for healthcare information during pregnancy than ASHAs and other healthcare functionaries; hence, permission from family was another barrier observed from the data. Being unaware of the pregnancy early was another critical reason for late registration.

The lack of a pure control group and no baseline data were significant limitations of our study. As the audio messages were played on speaker mode through a second device, the inconsistency in the clip being audible and background noise may have affected the message comprehension. Description of ANC was provided across messages for all groups, which may have led to confusion among respondents about the key elements of the message they listened to, distorting the representativeness of responses.