EXTENDED ABSTRACT

Ideation, perceived cost of children and contraceptive adoption among women in Southern rural Ghana: a longitudinal study

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Introduction and Significance

Ghana is one of the few sub-Saharan African countries that have experienced substantial advances in its fertility transition. The total fertility rate (TFR) went from 6.4 to 4.4 according the Ghana Demographic and Health Surveys (DHS) of 1988 and 1998. The 2003 DHS estimated it at also 4.4 indicating a stall in the past five years. The decline is faster in urban areas than rural area. In urban the TFR declined by more than two children from 5.3 to 3.1 on the period 1988 to 2003. In rural areas it went from 7.0 to 5.6 on the same period. Over this same period, dramatic increase in the use of modern

contraceptives is observed. The modern contraceptive prevalence among married women went from a low level of 4.2% to 18.7%. Similar increases are observed in both rural and urban areas. The prevalence rate went from 3.1% to 14.9% and 6.6% to 24.2% respectively in rural and urban area.

Compared to other countries with similar TFR, Ghana has an expected lower modern contraceptive prevalence. For example in Kenya, the TFR was estimated at 4.9 with a modern contraceptive prevalence rate of 31.5% by the 2003 DHS. In Zimbabwe the TFR was estimated at 4.0 and the modern contraceptive rate at 50.4%. Thus if Ghana were to make more effort in increasing its contraceptive prevalence, we would have seen a lower TFR.

This paper uses longitudinal data collected from approximately 1300 rural women in six rural communities in southern Ghana to assess the effects of perceived cost of having a/another child, ideation and social interaction regarding family planning on the adoption of a modern contraceptive method, adjusting for socio-economic status.

The literature presents two main factors that determine contraceptive use beside the fear of side effects: The socio-economic factors and the ideation factors. The former includes socio-economic status and level of education of individuals and the former is related to knowledge of contraceptive methods, attitudes toward family planning and interpersonal discussion regarding family planning. These latter factors are often difficult to ascertain because of their endogenous effects on contraceptive use itself. More and more evaluation studies show the positive and significance effects of ideation factors but they are cross sectional and thus limited. Longitudinal data have unique advantage of allowing elimination of the endogeneous effects and the establishment of causal relationships. With longitudinal data, it is possible to test the effects of ideation factors and compare their effects with socio-economic factors. This is particularly useful for family planning programs and interventions which most of the time have direct effects on ideation factors. This research represents another piece of evidence of positive effects of ideational factors on contraceptive use and ultimately on fertility above and beyond socio-economic factors.

Data and Methods

This work uses data from a longitudinal survey conducted by the Population Council and the University of Cape Coast in six communities in Southern Ghana. The survey, which was titled "Diffusion of fertility behavior" randomly selected and interviewed approximately 1300 women and 700 men. It was a panel survey with 8 rounds spaced by approximately 6 months from October 1998 to February 2004.

The survey questionnaire has several sections including background characteristics, childbearing and post-partum behaviors, fertility attitudes, contraception, social interaction, and HIV/AIDS. In addition to these, information was collected on community associations, health and family planning services. The specific sections, of interest to the present work are those of family planning and contraceptive use, social network regarding reproductive matters, fertility attitudes, and background characteristics.

Not all questions were systematically asked at each round, and also not everybody was surveyed at each round. However effort were made to track those lost to follow-up and also new entry to the sample came from new husbands or new wives of individuals already in the sample. To reach our objective we use two strategies. Firstly, all our independent variables are selected from information collected in the first three rounds and the dependent variables are created from round 4 to round 7. This procedure is possible because same individuals are interviewed at each round. Such set up adds strength to our analysis by avoiding cross-sectional analyses which are often associated with reverse causation or endogeneity. Our analyses have the unique advantage of establishing causal relationship. Secondly we use two types of dependent variables: current use of modern contraceptive (which we refer to as time point prevalence analysis) and adoption of modern contraceptive anytime between round 3 and round 7 (refer to as period prevalence analysis), which corresponds to approximately 18 months period. Ideation and social interaction are dynamic processes from which an individual enters a process ranging from knowledge of methods to adoption of particular methods. Thus limiting the analyses to current use of contraception may underestimate the effects of important independent variables by not considering potential contraceptive user. By considering the use of modern contraception anytime on from round 4 to round 7, we capture potential contraceptive users who for some reason were not using contraception at round 4. Question on use of contraception is asked only to married women. This has some implications on the selection of the analysis sample. Thus for the time point prevalence analysis, we select women interviewed from round 1 to round 4 who reported being married at round 4. The current use of modern contraception refers to the use of any modern contraception at the moment of round 4 survey. The sample size for this analysis is 874 married women, after exclusion of unmarried women, women lost to follow-up and women who joined the sample later but have missing information on the earlier rounds. For the period prevalence we select all women interviewed from round 1 to round 7 who reported being married on the period covering round 4 to round 7. The adoption of modern contraception refers to this latter period. The number of women included in this analysis is 765. We do not consider the round 8 survey because when added, it reduces our sample size since we consider only women who were in the sample from the first round.

The independent variables are variables related to ideation and social interaction, socio-economic status, education, fertility intentions, mass media exposure, age and religion. Regarding ideation and social interaction variables, three indexes are created using principal component analysis. The index of ideation is created from variables related to the number of contraceptive methods known spontaneously, number of contraceptive methods approved, and attitudes toward contraception (table 1). The second index is that of perceived cost/benefit of having another child. Respondents were asked to score on a scale of 1 to 10, the cost or benefits that another childbearing would bring in terms of feeding and clothing, education, mother's health, labor contribution and support in old ages (1 is low cost/high benefit and 10 if high cost/low benefit). From the answers we create a summary index that we refer to as the perceived cost/benefit of having another child (table 2). The third index is the index of social interaction. It summarizes answers to

questions regarding discussion about family planning and cost/benefit of children with others (table 3).

In addition to these three indexes other ideational and social interaction variables are considered. They are the ideal family size, the size of social network for family planning discussion, and membership in community associations. For simplicity, we refer to all these variables including the three indexes as ideational variables.

Regarding socio-economic status, we create an asset index using also principal component analysis (table 4).

We hypothesize that socio-economic status and ideational variables are positively associated with current contraceptive use and adoption of modern contraception of the 18 month follow-up period, after adjusting for fertility intention, religion, age and mass medi exposure. However, ideational factors explain larger variance in the contraceptive use than socio-economic factors.

Descriptive and multivariate analyses are conducted. For multivariate analyses, we perform random effect logit regression of the dependent variables correcting for the fact that individuals in the same communities may share more resemblance or unobservable variables than individuals in different communities.

Summary of preliminary findings

Overall 17.5% of married were using any modern contraceptive at round 4 (current use) while one third used contraception at sometime between round 4 and round 7 (adoption during 18 months follow-up period, see table 5). At bivariate level, most of ideation and social interaction variables were significantly and positively associated with both the current use and the adoption during the 18 months follow-up period (table 5 and 6). This is reflected in the ideational indexes presented in table 8. The index of ideation is highly significant and the higher is the score the higher are the odds of using contraception currently or during the 18 months period. The odds increase by four times when one compares the low ideation group to the high group. Similarly when women perceive high cost of having another child, they are more likely to adopt modern contraception. Compared to those who perceive low cost and high benefit, women who perceive high cost and low benefit are 60% more likely to adopt contraception during the 18 months period. The relationship is however not significant for the current use of contraception. Social interaction is also significantly associated with contraceptive use or adoption anytime during the 18 months period.

The unexpected result comes from the index of socio-economic status operationalized here by the asset index. No significant bivariate association is observable either for current use or for the adoption during the 18 months period. However women's education and their husbands' education are significantly associated with contraceptive use and adoption at bivariate level.

Table 9 and 11 show the results of multivariate analyses respectively for the current use of contraception and the adoption during the 18 months follow-up period. Four models are fitted and log-likelihood ratio tests are performed to compare nested models (table 10 and 12). Model 1 included only the control variables and model 2 adds socio-economic variables to model 1. Model 3 includes control variables and ideational variables and model 4 is the full model that contains all the independent variables.

It appears overall in table 9, that education – whether the woman's or the husband's – is not significantly associated with contraceptive use after adjusting for fertility intentions, religion, age and mass media exposure. Curiously the asset index became significant (model 2 and 4) but in the opposite of the expected direction. This may indicate that asset index does not represent a good proxy for socio-economic status in rural areas. Regarding the adoption of contraception over the 18 months follow-up period, neither education nor the asset index is significant in the models (model 2 and 4 in table 11).

The ideational variables such as the index of ideation, perceived cost/benefits of having another child, membership in community associations, and the size of social network for family planning discussion are significantly associated with contraceptive use and adoption after adjusting for fertility intentions, religion, age and mass media exposure. In the model 4 of table 9, the odds of using contraception triple between the low ideation group and the high ideation group after adjusting for the control variables and socio-economic status. In the same model, there are significantly higher odds of using contraception for women with larger size of social network for family planning discussion. Ideation and the size of social network for family planning discussion are also determinant for contraceptive adoption over the 18 months follow-up period. However the perceived cost/benefit of children is only significant for this latter outcome.

Table 10 and 12 which present the results of the log-likelihood ratio tests lead to the same conclusion. They show that model 4 which is the full model improves the fit better that model 2 but is not significantly different from model 3. Since model 3 includes the control variables and the ideational variables and model 2 includes the same control variables and the socio-economic status variables, we can conclude that ideational variables explain larger variance in the data than socio-economic status variables. In order words in the rural communities surveyed, ideational variables are more determinant for contraceptive adoption among married women.

Table 1: Factor loadings, score coefficients and percent of each ideation variable across the ideation index tertiles.

Variable	Mean	Std. Dev.	Loading	Scoring coefficient	Mean across 3 quintile groups: Lowest	Medium	Highest
Number of contraceptive methods known spontaneously	2.53	1.5935	0.3647	0.1723	1.33	2.39	3.98
Number of contraceptive methods approved	3.76	2.0941	0.4293	0.2028	1.90	3.86	5.63
Approve use of family planning	0.90	0.2956	0.9549	0.0000	0.71	1.00	1.00
Does not approve use of family planning	0.08	0.2728	-0.8719	-0.8283	0.24	0.00	0.00
No opinion about use of family planning	0.02	0.1246	-0.3567	-0.3587	0.05	0.00	0.00

Table 2: Factor loadings, score coefficients and percent of each variable across the perceived cost/benefit of another child index tertiles.

Variable	Mean	Std. Dev.	Loading	Scoring coefficient	Mean across 3 quintile groups: High cost/low benefit	Medium	Low cost/High benefits
Costs/benefits of feeding and clothing another child	4.98	2.9574	-0.2541	-0.0928	5.55	5.16	4.25
Costs/benefits of educating another child	5.61	3.1111	-0.1916	-0.0700	5.89	5.87	5.07
Costs/benefits of another child on mother's health	4.26	3.3499	-0.2456	-0.0897	4.97	4.33	3.46
Labor contribution of a boy	5.78	2.9165	0.7795	0.2847	3.38	5.63	8.32
Labor contribution of a girl	6.84	2.7983	0.8030	0.2933	4.26	7.09	9.18
Another child boy as support in old ages	6.62	2.8544	0.8176	0.2987	4.00	6.71	9.14
Another child girl as support in old ages	7.15	2.7534	0.8094	0.2957	4.61	7.42	9.42

Table 3: Factor loadings, score coefficients and percent of each social interaction variable across the social interaction index tertiles.

Variables	Mean	Std. Dev.	Loading	Scoring coefficient	Mean across 3 quintile groups		
					No/low	Medium	High
Talked with someone who encouraged her to use family planning	0.46	0.4983	0.6029	0.2269	0.123	0.578	0.727
Talked with someone who discouraged her to use family planning	0.22	0.4127	0.4217	0.1587	0.011	0.258	0.419
Discussed family planning message read in newspaper with someone	0.11	0.3160	0.4904	0.1845	0.000	0.052	0.299
Discussed family planning message heard on radio with someone	0.42	0.4931	0.6641	0.2499	0.132	0.352	0.805
Discussed family planning message heard on TV with someone	0.32	0.4656	0.6812	0.2563	0.000	0.254	0.744
Discussed costs and benefits of children with relatives	0.32	0.4665	0.6385	0.2403	0.000	0.300	0.708
Discussed costs and benefits of children with friends	0.39	0.4870	0.7503	0.2824	0.000	0.345	0.870

Table 4: Factor loadings, score coefficients and percent of each asset variables across the asset index tertiles.

						% across 3 tertiles groups		
	Variable	Percent	Std. Dev.	Loading	Scoring coefficient	Lowest	Medium	Highest
Main source of water	Piped if household	0.02	0.1363	0.1060	0.0444	0.0	1.3	4.5
	Public tap / neighbor's house	0.36	0.4800	-0.0149	0.0538	30.9	40.3	36.6
	Well in house, yard, compound	0.02	0.1246	-0.0310	0.0068	2.2	1.6	1.0
	Public well outside house, yard, compound	0.13	0.3368	0.0727	0.0597	6.9	20.1	12.1
	Borehole	0.15	0.3533	-0.4732	-0.0826	39.1	4.4	0.0
	Surface water (spring, river, stream, pond, lake, dam, dugout, rainwater)	0.19	0.3951	-0.1796	0.0000	20.9	30.8	6.1
	Tanker truck	0.14	0.3436	0.6119	0.2031	0.0	1.6	39.8
Type of toilet facility	Flush toilet (own wc)	0.01	0.0855	0.1523	0.0368	0.0	0.0	2.2
	Share WC	0.01	0.0968	-0.0605	-0.0200	1.3	1.6	0.0
	Pit toilet / traditional pit latrine	0.21	0.4098	-0.2880	-0.0930	36.6	18.9	8.3
	Ventilated improved pit latrine	0.34	0.4737	0.1534	0.0211	32.8	27.0	42.0
	No facility (bush/field)	0.43	0.4954	0.0771	0.0000	29.4	52.5	47.5
Main cook fuel	Wood	0.69	0.4644	-0.7796	0.0000	0.0	89.6	15.3
	Charcoal	0.30	0.4582	0.7508	0.4018	0.0	9.8	80.9
	Kerosene	0.00	0.0561	0.0557	0.0396	0.0	0.0	1.0
	Gas	0.01	0.1069	0.1392	0.0843	0.0	0.6	2.9
Main material of the wall	Palm/wood	0.02	0.1470	-0.0492	-0.0700	3.1	1.9	1.6
	mud/clay	0.31	0.4635	-0.4908	-0.3095	56.6	31.5	5.1
	Landcrete	0.12	0.3285	-0.4004	-0.2332	32.5	3.8	0.3
	Burnt brick	0.02	0.1470	-0.0006	-0.0571	0.6	4.7	1.3
	Cement	0.52	0.4998	0.7330	0.0000	7.2	58.2	91.7
Electricity	Has electicity	0.80	0.3983	0.2861	0.0756	63.8	86.8	90.5
Radio	Has radio	0.63	0.4818	0.3681	0.0973	40.0	70.8	79.9
TV	Has TV	0.31	0.4609	0.3661	0.0968	8.4	36.5	47.1
VCR	Has VCR	0.05	0.2168	0.2329	0.0616	0.0	5.7	9.2
Bicycle	Has bicycle	0.19	0.3909	0.0421	0.0111	10.6	29.9	15.9
Truck	Has truck	0.02	0.1399	0.1430	0.0378	0.3	1.9	3.8
Motorcycle	Has motorcycle	0.01	0.0855	0.0381	0.0101	0.3	0.9	1.0
Vehicle	Has vehicle	0.05	0.2274	0.2444	0.0646	0.3	5.7	10.5
Sofa	Has sofa or chair with foam pads	0.63	0.4830	0.4033	0.1066	38.4	71.1	79.9
Bed	Bed with foam mattress	0.74	0.4374	0.4568	0.1208	49.1	81.1	93.0

Table 5: Percent of married women currently using modern contraception and percent who adopted modern contraception anytime during the 18 months follow-up by ideation variables.

Variables	Current use		Adoption during 18 months period	
	%	N	%	N
IDEATION VARIABLES				
Knowledge and attitude toward family planning				
Number of contraceptive methods known spontaneously	(0.0001)		(0.0001)	
0-1	7.1	198	18.2	170
2-3	18.0	444	33.7	386
4 or more	25.3	237	49.3	209
Number of contraceptive methods approved	(0.0001)		(0.0001)	
0-1	6.9	131	12.1	116
2-3	14.22	232	31.7	205
4 or more	21.7	516	41.7	444
Number of contraceptive methods approved by husband	(0.0001)		(0.0001)	
0-1	8.1	321	21.9	274
2-3	19.4	206	40.6	187
4 or more	25.0	352	42.1	304
Attitude toward couples practicing family planning	(0.0090)		(0.0080)	
Approve	18.8	800	36.2	697
Disapprove	4.4	69	16.8	60
Don't know	10.0	10	25.0	8
Husband's attitude toward couples practicing family planning	(0.0020)		(0.0010)	
Approve	20.5	673	37.5	595
Disapprove	10.7	84	25.4	71
Don't know	7.8	90	17.6	74
Non-numeric answer to ideal family size	(0.0640)		(0.0010)	
No	18.3	792	36.3	691
Yes	10.3	87	17.6	74
Total	17.5	879	34.5	765

Note: chi-squared probability are in parentheses.

Table 6: Percent of married women currently using modern contraception and percent who adopted modern contraception anytime during the 18 months follow-up by social interaction variables.

Variables	Current use		Adoption during 18 months period	
	%	N	%	N
SOCIAL INTERACTION				
Regarding family planning				
Discussed means to space birth or avoid pregnancy with spouse	(0.0001)		(0.00010	
No	9.2	359	17.6	307
Yes	24.8	488	46.2	433
Have been encouraged to use any methods to space birth or avoid pregnancy	(0.0001)		(0.0001)	
No	11.8	457	24.4	390
Yes	23.7	422	45.1	375
Have been discouraged from using any method to space birth or avoid pregnancy	(0.9980)		(0.7290)	
No	17.5	685	34.2	588
Yes	17.5	194	35.6	177
Member in association where family planning matters have been discussed	(0.0060)		(0.0001)	
No association	14.6	513	28.1	442
Association does not discuss family planning issues	26.4	129	52.3	107
Association discusses family planning issues	19.0	237	38.9	216
Size of network for family planning discussion	(0.0001)		(0.0001)	
'0	8.1	209	16.9	178
'1-2	18.9	476	35.9	418
'3 or more	24.2	194	49.7	169
Regarding costs and benefits of children				
Discussed the costs and benefits of having a child with husband/partner	(0.1920)		(0.0040)	
No	16.1	342	28.1	295
Yes	19.6	505	38.4	445
Discussed the costs and benefits of having another child with other relatives	(0.0790)		(0.0010)	
No	16.0	595	30.4	517
Yes	20.8	284	43.2	248
Discussed the costs and benefits of having another child with other friends	(0.0950)		(0.0020)	
No	15.8	532	30.3	465
Yes	20.2	347	41.0	300
Read family planning message in newspaper recently	(0.0020)		(0.0150)	
No	16.7	844	33.6	734
Yes	37.1	35	54.8	31

Table 6 continued

Heard family planning message on radio recently	(0.0020)		(0.0160)	
No	12.0	300	28.6	255
Yes	20.4	579	37.5	510
Heard family planning message on TV recently	(0.0010)		(0.0001)	
No	13.3	460	27.9	398
Yes	22.2	419	41.7	367
Discussed family planning message read in newspaper with anyone	(0.0050)		(0.0900)	
No	16.2	777	33.4	673
Yes	27.5	102	42.4	92
Discussed family planning message heard on radio with anyone	(0.0130)		(0.3020)	
No	14.8	507	33.0	431
Yes	21.2	372	36.5	334
Discussed family planning message heard on TV with anyone	(0.0080)		(0.0180)	
No	15.1	588	31.6	512
Yes	22.3	291	40.3	253

Note: chi-squared probability are in parentheses.

Table 7: Percent of married women currently using modern contraception and percent who adopted modern contraception anytime during the 18 months follow-up by selected independent characteristics.

Variables	Current use		Adoption during 18 months period	
	%	N	%	N
Fertility intention	(0.0001)		(0.0001)	
Want a/nother child now (within two years)	2.7	151	11.4	123
Want a/nother child later (more than two years)	24.7	227	47.2	199
Want a/nother child but don't know timing	19.1	42	28.2	39
Want no more child	18.7	369	37.9	322
Undecided	15.7	51	31.8	44
Cannot get pregnant	29.0	31	31.0	29
Don't know	0.0	8	0.0	9
Mass-media exposure				
Read newspaper at least once a week	(0.0030)		(0.0180)	
No	17	864	34	751
Yes	46.7	15	64.3	14
Listen to radio at least one a week	(0.0190)		(0.0280)	
No	13.4	306	29.3	263
Yes	19.7	573	37.3	502
Watch television at least once a week	(0.0370)		(0.1330)	
No	14.3	363	31.4	318
Yes	19.8	516	36.7	447
Religion	(0.1370)		(0.0020)	
Christian	18.3	606	33.1	523
Muslim	18.3	197	43.4	182
None/Traditional/other	9.2	76	20.0	60
Education	(0.0200)		(0.0220)	
No education	14.5	339	29.1	295
Primary	15.5	226	35.2	202
Secondary	22.3	314	40.1	267
Husband education	(0.0430)		(0.0020)	
No education	14.1	199	33.5	179
Primary	18.6	59	46.9	49
Secondary	20.6	470	37.6	407
Don’t know	11.9	151	21.5	130

Note: chi-squared probability are in parentheses.

Table 8: Odds ratio of current modern contraceptive and modern contraception adoption anytime during the 18 months follow-up by the three ideational indexes and the index of socio-economic status (asset index).

	Current use		Adoption during 18 months period	
Variables	Odds ratio	CI	Odds ratio	CI
INDEX OF SOCIO-ECONOMIC STATUS				
Poor	Ref.		Ref.	
Medium	0.8	(0.5, 1.3)	1.2	(0.7, 1.8)
Rich	0.9	(0.5, 1.6)	1.2	(0.7, 2.1)
INDEX OF IDEATION				
Low	Ref.		Ref.	
Medium	3.2***	(1.8, 5.6)	2.5***	(1.7, 3.9)
High	4.4***	(2.5, 7.5)	4.0***	(2.6, 6.2)
INDEX OF PERCEIVED COST/BENEFIT OF ANOTHER CHILD				
Low cost/high benefit	Ref.		Ref.	
Medium	0.9	(0.6, 1.4)	1.0	(0.7, 1.5)
High cost/low benefit	1.1	(0.7, 1.7)	1.6**	(1.1, 2.3)
INDEX OF SOCIAL INTERACTION				
Low	Ref.		Ref.	
Medium	0.9	(0.6, 1.5)	1.1	(0.7, 1.6)
High	1.6**	(1.0, 2.6)	1.6**	(1.1, 2.4)

Table 9: Odds ratios and confidence intervals from random effect logit regression of current contraceptive use on independent variables

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
CONTROL VARIABLES								
Fertility intention								
Wants another child soon	Ref.		Ref.		Ref.		Ref.	
Wants another child later (>2years)	4.71***	(2.36;9.40)	4.55***	(2.29; 9.06)	4.02***	(1.97; 8.19)	3.86***	(1.94; 8.07)
Wants no more child	3.57***	(1.86; 6.87)	3.28***	(1.72; 6.27)	2.88***	(1.47; 5.67)	2.71***	(1.38; 5.30)
Others (Undecided, wants but unsure timing, don't know)	3.16***	(1.4; 7.16)	2.8**	(1.26; 6.35)	3.00**	(1.30; 6.94)	2.81**	(1.22; 6.48)
Religion								
Christian	Ref.		Ref.		Ref.		Ref.	
Muslims	1.42	(0.73; 2.76)	1.26	(0.80; 1.99)	1.26	(0.67; 2.38)	1.16	(0.71; 1.89)
Others	0.52	(0.22; 1.18)	0.53	(0.23; 1.23)	0.60	(0.26; 1.41)	0.58	(0.25; 1.38)
Listen to radio at least once a week	1.41	(0.93; 2.16)	1.42	(0.92; 2.18)	1.16	(0.75; 1.80)	1.19	(0.76; 1.87)
Watch TV at least once a week	1.33	(0.89; 1.99)	1.29	(0.87; 1.93)	1.20	(0.79; 1.82)	1.19	(0.80; 1.81)
Read newspaper at least once a week	5.05***	(1.67; 15.28)	4.90***	(1.57; 15.30)	3.91**	(1.23; 12.38)	4.25**	(1.31; 13.76)
Age	1.01		1.01	(0.99; 1.04)	1.01	(0.98; 1.04)	1.01	(0.98; 1.04)
SOCIO-ECONOMIC STATUS VARIABLES								
Education								
None			Ref.				Ref.	
Primary			1.07	(0.65; 1.77)			0.98	(0.58; 1.64)
Secondary or higher			1.27	(0.80; 2.04)			1.04	(0.63; 1.72)
Husband's Education								
None			Ref.					
Primary			1.19	(0.54; 2.64)			1.16	(0.51; 2.67)
Secondary or higher			1.36	(0.81; 2.28)			1.24	(0.72; 2.12)
Don't know			0.91	(0.47; 1.77)			1.04	(0.52; 2.06)

Table 9 continued

Wealth index						
Poor	Ref.				Ref.	
Medium	0.63*				0.66*	(0.41; 1.05)
Rich	0.58**				0.60**	(0.37; 0.96)
IDEATION VARIABLES						
Ideation index						
Low			Ref.		Ref.	
Medium			2.75***	(1.55; 4.88)	2.72***	(1.53; 4.84)
High			3.04***	(1.70; 5.44)	3.01***	(1.69; 5.36)
Ideal family size			1.05	(0.94; 1.17)	1.04	(0.93; 1.17)
Ideal family size (non-numeric answer)			0.77	(0.36; 1.66)	0.77	(0.36; 1.67)
Index of perceived costs/benefits of another child						
Low cost/high benefit			Ref.		Ref.	
Medium			0.70	(0.44; 1.12)	0.72	(0.45; 1.13)
High cost/low benefit			0.96	(0.60; 1.54)	0.96	(0.60; 1.53)
Index of social interaction						
Low			Ref.		Ref.	
Medium			0.71	(0.43; 1.18)	0.71	(0.43; 1.17)
High			0.96	(0.56; 1.62)	0.96	(0.57; 1.61)
Association membership						
None			Ref.		Ref.	
Member of an association which never discussed family planning			1.71**	(1.04; 2.82)	1.68**	(1.02; 2.80)
Member of an association where family planning is discussed			1.09	(0.69; 1.72)	1.04	(0.66; 1.63)
Size of social network for family planning discussion						
0			Ref.			
1-2			1.99**	(1.10; 3.62)	2.06**	(1.13; 3.73)
3 or more			2.09**	(1.04; 4.18)	2.18**	(1.10; 4.35)
Log-likelihood	-381.5	-379.8	-362.6		-360.5	
N	879	879	879		879	

*** p<0.01; ** 0.01<p<0.05; * 0.05<p<0.10

Table 10: Chi-square value and corresponding p-value from log-likelihood ratio test comparing models in table 8.

	Model 2	Model 3	Model 4
Model 1	3.61 (0.7292)	37.90 (0.0002)	42.16 (0.0017)
Model 2			38.55 (0.0002)
Model 3			4.25 (0.7500)

p-values are in parentheses.

Table 11: Odds ratios and confidence intervals from random effect logit regression of contraceptive adoption anytime during 18 months period on independent variables

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
CONTROL VARIABLES								
Fertility intention								
Wants another child soon	Ref.		Ref.		Ref.		Ref.	
Wants another child later (>2years)	4.59***	(2.61; 8.10)	4.52***	(2.55; 8.00)	3.71***	(2.05; 6.73)	3.44***	(1.91; 6.21)
Wants no more child	5.41***	(3.12; 9.39)	5.29***	(3.04; 9.20)	4.15***	(2.33; 7.38)	3.79***	(2.15; 6.67)
Others (Undecided, wants but unsure timing, don't know)	2.26**		2.22**	(1.12; 4.40)	2.11**	(1.04; 4.28)	1.95*	(0.96; 3.94)
Religion								
Christian	Ref.		Ref.		Ref.		Ref.	
Muslims	1.67**	(1.03; 2.73)	1.58*	(0.93; 2.66)	1.84**	(1.06; 3.18)	1.63**	(1.05; 2.53)
Others	0.56*	(0.28; 1.12)	0.57	(0.27; 1.15)	0.73	(0.35; 1.54)	0.73	(0.34; 1.55)
Listen to radio at least once a week	1.46**	(1.01; 2.10)	1.39*	(0.95; 2.03)	1.12	(0.75; 1.66)	1.12	(0.75; 1.69)
Watch TV at least once a week	1.15	(0.81; 1.63)	1.13	(0.79; 1.61)	1.00	(0.69; 1.46)	0.97	(0.67; 1.41)
Read newspaper at least once a week	4.89***	(1.47; 16.25)	5.45***	(1.56; 19.05)	3.79**	(1.06; 13.57)	4.80**	(1.24; 18.45)
Age	0.96***	(0.94; 0.98)	0.96***	(0.94; 0.98)	0.95**	(0.92; 0.98)	0.95***	(0.92; 0.98)
SOCIO-ECONOMIC STATUS VARIABLES								
Education								
None			Ref.				Ref.	
Primary			1.11	(0.72; 1.71)			1.16	(0.74; 1.84)
Secondary or higher			1.07	(0.69; 1.65)			0.95	(0.60; 1.50)
Husband's education								
None			Ref.				Ref.	
Primary			1.29	(0.64; 2.60)			1.84	(0.87; 3.90)
Secondary or higher			0.93	(0.59; 1.45)			1.07	(0.67; 1.71)
Don’t know			0.52**	(0.30; 0.92)			0.65	(0.35; 1.19)

Table 11 continued

Wealth index						
Poor	Ref.				Ref.	
Medium	1.06	(0.66; 1.69)			0.79	(0.51; 1.22)
Rich	0.86	(0.49; 1.52)			0.65	(0.41; 1.01)
IDEATION VARIABLES						
Ideation index						
Low			Ref.		Ref.	
Medium			2.20***	(1.39; 3.50)	1.46	(1.46; 3.69)
High			3.26***	(2.00; 5.29)	2.21	(2.21; 5.82)
Ideal family size			1.02	(0.91; 1.15)	1.04	(0.92, 1.16)
Ideal family size (non-numeric answer)			0.56	(0.27; 1.15)	0.54	(0.27, 1.10)
Index of perceived costs/benefits of another child						
Low cost/high benefit			Ref.		Ref.	
Medium			0.83	(0.53; 1.29)	0.92	(0.60; 1.42)
High cost/low benefit			1.71**	(1.11; 2.65)	1.70**	(1.11; 2.62)
Index of social interaction						
Low			Ref.		Ref.	
Medium			0.77	(0.49; 1.21)	0.79	(0.51; 1.24)
High			0.85	(0.51; 1.41)	0.91	(0.56; 1.49)
Association membership						
None			Ref.		Ref.	
Member of an association which never discussed family planning			2.43***	(1.48; 4.00)	2.59	(1.57; 4.26)
Member of an association where family planning is discussed			1.44*	(0.96; 2.17)	1.38	(0.92; 2.07)
Size of social network for family planning discussion						
0			Ref.		Ref.	
1-2			2.15***	(1.30; 3.58)	2.22	(1.33; 3.69)
3 or more			2.75***	(1.51; 5.02)	3.05	(1.67; 5.55)
Log-likelihood	-441.3	-437.3	-403.6		-400.5	
N	765	765	765		765	

*** p<0.01; ** 0.01<p<0.05; * 0.05<p<0.10

Table 12: Chi-square value and corresponding p-value from log-likelihood ratio test comparing models in table 10.

	Model 2	Model 3	Model 4
Model 1	8.04 (0.3287)	75.55 (0.0001)	81.61 (0.0001)
Model 2			73.57 (0.0001)
Model 3			6.06 (0.4142)

p-values are in parentheses.