

Has the Navrongo Project in northern Ghana been successful in altering fertility preferences?

Henry V Doctor, University of the Western Cape, Department of Statistics, Private Bag X17, Bellville 7535, South Africa

Ayaga A Bawah, Navrongo Health Research Centre, Ghana Health Service, P.O. Box 114, Navrongo, UE/R, Ghana

Paper prepared for presentation at the XXV International Conference for the Scientific Study of Population, Tours, France, 18–23 July 2005.

Has the Navrongo Project in northern Ghana been successful in altering fertility preferences?

Abstract

Has the Navrongo Community Health and Family Planning Project been successful in changing fertility preferences? Using linked data from panel surveys conducted in the Kassena-Nankana district of northern Ghana in 1995 and 2002, we compare reproductive behavior against prior fertility preferences and show the transition of women from wanting to not wanting more children. The acceptance of smaller family sizes reflects that the combination of mobilizing community volunteerism and retraining and redeploying nurses to village-based locations results in change in reproductive behavior.

Introduction

Results from the 2003 Ghana Demographic and Health Survey (GDHS) show that fertility in Ghana has declined rapidly from 6.4 births per woman in 1988 to 4.4 births per woman during the last five years, a 2-child drop in fertility over the last 15 years. This decline has been observed recently in every age group with fertility levels among women under age 35 declining by about 25 percent between 1988 and 1998 surveys (GSS, NMIMR and ORC Macro 2004; GSS and MI 1999). However, differences in fertility levels by place of residence are pronounced with rural women having 2.5 more children than their urban counterparts. Fertility is highest in the Northern Region with 7 births per woman and lowest in the Greater Accra Region with 2.9 births per woman.

There are several factors accounting for this dramatic fertility decline in Ghana. The 2003 GDHS reports an 5 percent decrease in the percent of women currently in union over the last five years from the survey—from 65 percent in 1998 to 62 percent in 2003. This decline has been most common in the youngest (15–29) and oldest (44–49) age groups. There is also a trend towards late entry into marriage and a decline in the proportion of women getting married by age 15 from 11 percent among women aged 40–44 to 3 percent among those currently aged 15–19 at the time of the survey. These changes are also consistent with results from other surveys that show a decline in recent sexual activity in Ghana compared with other African countries. For example, results from the 1998 GDHS show that about 40 percent of women were sexually active in the four weeks prior to the survey compared with, for example, 57 percent of women in Niger, 58 percent in Cameroon, and 63 percent in Senegal. Other factors include an increase in age at first birth, longer birth intervals—with half of all births occurring more than three years after a previous birth, and a narrowing of the gap between desired and achieved family size as evidenced by the mean ideal number of children which declined from 5.5 in 1988 to 4.8 in 2003 (GSS, NMIMR and ORC Macro 2004). Total fertility rate declined from 6.4 in 1988, to 5.2 in 1993, and stabilized at 4.4 in 1998 and 2003.

Knowledge of family planning is almost universal in Ghana, with 98 percent of currently married women having heard of at least one modern method of contraception and contraceptive prevalence rate was estimated at 25 percent in 2003. However, there are clearly other proximate determinants of fertility operating in Ghana that are beyond the scope of this paper.

The Ghanaian government and family planning officials are committed to the welfare of the people by ensuring that fertility levels remain at reasonable levels in all parts of Ghana. Despite the rapid decline of fertility in Ghana, particularly in the urban areas, fertility levels in rural Ghana are still high. Current strategies to reduce fertility in rural Ghana focus on making contraception available to individual women in their communities. This strategy is based on findings from survey data that have indicated that many women have more children than they desire and that contraception would be used if methods were readily available in their rural and impoverished communities (Adongo et al. 1997). Thus, it is assumed that inaccessibility of modern contraception to women is one of the barriers to use and subsequent high levels of fertility. This paper examines whether the availability of family planning and community health services programs can alter fertility preferences of rural women in Ghana. Research on the role of community health and its influence on demographic outcomes in rural Ghana is important and useful in providing benchmarks for program planning and development.

The reproductive practices among the Kassena-Nankana of northern Ghana reduce fertility through prolonged lactational amenorrhea and prolonged postpartum spousal separation. However, the calculus of conscious control through contraceptive use remains insufficient. One way to address this is to assess whether conscious control can be or has improved by the Community Health and Family Planning (CHFP) project in the Kassena-Nankana district of northern Ghana.

What do preferences mean in contemporary rural Ghana? Has the CHFP altered women's fertility preferences? Longitudinal surveys permit an assessment of the degree to which expressed intentions are consistent with subsequent behavior (Freedman, Hermalin, and Chang

1975). This article uses panel data containing linked records across two surveys conducted in Kassena-Nankana district of northern Ghana in 1995 and 2002¹ by comparing reproductive behaviors against prior fertility preferences and show when and where women change from wanting to not wanting more children. Specifically, we want to establish if there is variation in the fertility preferences of women in the four experimental cells of the CHFP. These surveys were conducted for the CHFP project “Navrongo Panel Surveys” in rural Ghana. The present study constitutes part of a more general investigation of the fertility impact of the CHFP in Kassena-Nankana district. After providing the reader with the study design and data used, the next section will turn to the four study settings (experimental cells), and then provide the results of the analysis. Finally we conclude with whether the CHFP has made an impact on the fertility preferences of the Kassena-Nankana women.

Study design and data

The Navrongo Health Research Centre (NHRC) is an institution of the Ghana Ministry of Health that has been mandated to research preventable causes of morbidity and mortality and related problems of high fertility in northern Ghana. The NHRC is located in the Kassena-Nankana district on the border with Burkina Faso. The social, ecological, and economic attributes of the study are more representative of the Sahel population to the north of Ghana than of cultures and attributes of the coastal West African cultures in the south of Ghana (Adongo et al. 1997). Navrongo town is the only settlement in the district with access to communication facilities, tarmac roads, and electricity. Briefly, Navrongo town is largely inhabited by rural, agrarian, and poor people. Poverty is widespread and stimulates out-migration. The largely wobbly agricultural production and increase in the population have compelled young adults to migrate to cities for temporary employment.

¹There have been annual surveys between 1995 and 2002 but we focus on these two years in order to assess fertility preferences for a cohort of women who age over time and assess whether in a 7-year interval, their preferences are consistent with prior fertility desires.

To address the need for practical field trials of community health services, the Government of Ghana launched the Navrongo CHFP in 1993 in order to test the demographic impact of different schemes for services being offered (Bawah 2002). The CHFP serves a broader, and international, need for a rigorous, controlled evaluation of organizational strategies for primary health service delivery in rural Ghana. The CHFP is a two armed community-randomized quasi-experiment that combines a program of community health and family planning services with an arm for mobilizing traditional leadership, communication and volunteerism. Four cells are implied because the arms are implemented independently, jointly, or not at all in four sub-district health centres (catchment areas) in three of the cells, with the fourth cell serving as a control and offers the usual government services at Ministry of Health (MOH) service points. The three interventions were designed through consultations with MOH officials and village elders and groups. The *zurugelu*² cell seeks to increase community involvement in health decisions by involving local people and volunteers in health planning and delivery of health activities and services. The MOH mobilization cell tests the effectiveness of improving access to health services by relocating community health officers (CHO) from fixed clinics to village residences and assigning them doorstep service delivery responsibilities. The combined cell uses both approaches and establishes close collaboration between the CHOs and the community leaders and volunteers. A comparison cell receives services according to standard MOH guidelines (Pence et al. 2001).

The CHFP has been longitudinally monitoring demographic dynamics in a population of about 143,000 since July 1993, with interventions beginning in 1995. The Navrongo panel surveys consist of a longitudinal follow-up of a random sample of women of reproductive age and their husbands. The initial sample for the panel survey was drawn from the Navrongo Demographic Surveillance System in 1993. Prior to 1993, a census of Kassena-Nankana district

²In the local dialect, the translation for “zurugelu” is *Alag gube ndekengo*, which means “cooperating together is strength” or “community togetherness.” This term is roughly equivalent to the Swahili word referring to the *harambee* spirit, used in Kenya to describe community activities requiring solidarity and volunteerism (Binka et al. 1995).

was conducted and each resident was assigned a unique identification number. A re-canvass of the population was done in July 1993 and since then the population has been monitored every 90 days in order to record demographic events taking place such as in- and out-migration, births, deaths, marriages, and other events (Binka et al. 1995). The 1993 survey instrument was modeled after the 1993 GDHS. The core questionnaire gathered information on respondent's background, contraceptive use, reproductive histories, pregnancy, breastfeeding, and fertility preferences. The survey targets women and their husbands.

Because some of the questions in the 1995 panel survey³ are repeated every year, the impact of fertility preferences as reported in the baseline survey can be compared with preferences or reproductive behavior in 2002. Although the panel surveys are conducted annually, we examine the 1995 and 2002 panels in order to assess the changes in fertility preferences for a cohort of women over a reasonable long period of time. This is important because we observe intentions of a cohort of women in 1995 and follow them in 2002. The sample is restricted to women aged 15–42 in 1995 who move into the age group 22–49 in 2002.⁴ Observing women in annual surveys, for the purposes of this study, has got the disadvantage of censoring. We want to follow women for a period we think is substantial to influence the reproductive behavior of women.⁵ The baseline survey yielded a sample of 5,288 women aged 15–49 and 6,312 women were surveyed in 2002. The 2002 sample is roughly 19 percent greater than the 1995 sample because urban Navrongo which was not part of the 1995 sample was included beginning from the 1996 round. However, our sample for the present study is restricted to 3,676 currently married and ever-married women of reproductive age (i.e., 15–42) from the 1995 survey of whom we are most confident that linkages for only 1,402 women in 2002 have

³Hereafter the 1995 panel survey will be used interchangeably with “the baseline survey”.

⁴This assumes that age reporting in the sample is perfect.

⁵For example, we consider women who were aged 15 in 1995 and are now aged 22 in 2002. Their fertility behavior may be very sensitive to social changes such as the experiment compared with women who were aged 42 in 1995 and are now aged 49 in 2002.

been done correctly—about 38 percent of the original sample.⁶

The four experimental cells

The CHFP cells are: 1] Cell 1 or YZ area—for the *zurugelu*; 2] Cell 2 or CHO area; 3] Cell 3 or the CHO +YZ area (aka “combined”); and 4] Cell 4 or the comparison area. The YZ area is largely comprised of the Kassena people and specifically involves traditional social institutions in health delivery and planning. Village health committees, termed *Yezura Nakwa* (YN), were established in collaboration with chiefs, elders, and other key groups. The YN are responsible for supervising a group of largely male volunteers called *Yezura Zenna* (YZ), or health aides, who form the backbone of the *zurugelu* approach. The principal objective of the YZs is to legitimize the CHFP in the communities, particularly among men who make decisions about women’s mobility. In this part of rural Ghana, young women are generally not free to leave the household. One of the goals of the YZ intervention is to make it acceptable in the community for women to take their children to the YZ and/or the clinic for health care. The YZs receive two weeks of initial training and quarterly refresher workshops. Their household visits involve talks about hygiene, child and adult health, and to alert the community of their presence in terms of service delivery and providing referrals. The YZs are equipped with significant first aid resources, including paracetamol for febrile illnesses, chloroquine for malaria, aludrox for abdominal pains, and multivitamins, but they do not have antibiotics or vaccines (Pence et al. 2001). Instead, they provide referrals to the clinics and help maintain records for the district-wide Management Information System, an MOH database which tracks immunization status and other health information. Another important component of the *zurugelu* intervention is the community gatherings, aka *durbars*, which are traditionally used by chiefs to mobilize community action on

⁶We believe that this is a right linkage which is consistent with Bawah’s (2002) study linking women from the 1995 survey to those interviewed in 1997 where he was able to link about 65 percent of the original sample. The age restriction ensures that all cohorts represented in the baseline survey were also represented in the follow-up survey. We focus on ever-married women because they have been exposed to the risk of childbearing and thus are able to exercise or contemplate on various reproductive preferences either directly or indirectly.

pertinent issues of community concern. The *durbars* provide an effective means of communication between the CHFP's activities and the community.

The CHO area is also largely inhabited by the Kassena and the MOH mobilization intervention tests the effectiveness of improving access to primary health care services. All the 16 community health nurses in Cells 2 and 3 were reassigned from sub-district clinics to village residences built by the community and given door-to-door service delivery responsibilities, and redesignated as CHOs to emphasize their new role in the intervention. The CHO provides ambulatory care at her residence and visits all compounds in the community in 90-day cycles for health education, follow-up, and diagnosis. She uses a motorbike for community liaison work and given responsibility for visiting compound heads, organizing immunizations, and maintaining the district management information systems.

The combined area is a mixture of the two main ethnic groups in Kassena-Nankana District (i.e., the Kassena and Nankana) and the Builsa which is a minority group (Nyarko et al. 2001). In the combined intervention area, the approaches are pursued simultaneously. The objective is to test the hypothesis that the *zurugelu* and MOH mobilization interventions are complementary and synergistic, combining the implicit accountability and sustainability of the former with the relative advantages of professionalism in the latter. In the combined area, there is close collaborative between the YZs and the CHOs. The controlled area largely consists of the Nankana.

Results

Basic characteristics of respondents are presented in Table A1 which compares characteristics of all women interviewed in the 1995 panel survey with those who were interviewed in both the 1995 and 2002. Except for minor differences in age and parity, respondents are comparable for

all variables.⁷ Table A1 shows that majority of the respondents were younger than those interviewed in 1995 suggesting some form of out-migration, a common behavior among the Kassena-Nankana. About three out of every four women in both years were married, more than two-thirds of women were illiterate, and fertility is high with more women in the high-parity category. In addition, when asked about their future fertility intentions, at least 70 percent of women say that they want more kids.

Measurement of fertility preferences

Both the baseline survey and the follow-up survey included the question: “Now I have some questions about the future. Would you like to have (a/another) child or would you prefer not to have (any/more) children?” This question was asked to non-pregnant women at the time of the survey. Possible answers were “have a/another child”, “no more/none”, and “infecund”, and “undecided/don’t know”. Analysis focuses on the first two and last response categories which are denoted as “yes”, “no”, and “undecided”. Table 1 shows the distribution of respondent’s desire about wanting any more kids by experimental cell and survey (Baseline or Follow-up survey). In the baseline survey, and among the women in the YZ catchment area, 32 percent of women whose actual number of children was greater than the ideal number of children wanted more kids whereas in the follow-up survey the percentages are significantly lower at roughly 28 percent. In general, the percentages in all the categories decline between the baseline and follow-up survey. The percentage of women who indicated that they did not want any more children also increased between the surveys. For example, women whose actual number of children was greater than the ideal number increased from roughly 5 percent to 7 percent. The undecided category did not change a great deal during the period.

Table 1 about here

⁷This comparability has also been established by Bawah (2002) in his analysis of the effect of spousal communication on contraceptive use. He found that the characteristics of women who were interviewed in 1995 and those who were interviewed in both the 1995 and 1997 were highly comparable.

In the CHO area, the trend is similar to the YZ area except that the magnitude of the decrease in percent is greater in the CHO area than the YZ area. For example, about 58 percent of women wanted more children despite their actual number exceeding the ideal number in the baseline survey whereas in the follow-up survey this percentage declined by about 18 points. Similar trends are also observed for the “no” and “undecided” categories. Therefore, comparing column one (“yes”) versus the YZ and the CHO areas, one sees that the decline in percentage is huge for the CHO area.

We then turn to the combined area which shows a difference of about seven points for the first (actual \geq ideal) category between the two surveys. The percentage change in the comparison cell (regular) is very small compared to the three cells. This suggests that the CHO only approach has an impact on fertility preferences between the surveys compared with the other approaches. This part of the analysis provides evidence that relocating trained nurses to village residences where they are easily accessible to the community can dramatically affect fertility preferences related to desire for wanting more kids based on the number of children which the woman already has.

Women with at least one child in the baseline survey

About half of the women in the baseline survey were aged between 15 and 31 years and they are thus highly likely to have another pregnancy, regardless of the desires they hold toward their current number of children. In Table 2, therefore, we restrict our analysis to those women in the baseline survey who had had at least one child at the time of the interview. This excludes women who were pregnant at the time of the baseline survey. We also exclude women who in 1995 were just about entering the menopausal period. The response variable is now whether the respondent began a pregnancy by the follow-up survey as reported in the latter. We acknowledge that this approach may bias the estimates considering that some women might have started their pregnancy anytime between the baseline and the follow-up survey. In addition, women who were

much older in 1995 may not have started another pregnancy after seven years from the previous survey. Nevertheless, assuming constant rates of starting another pregnancy between the baseline and follow-up survey, this exercise is representative of the reproductive behavior of these women.

Table 2 about here

In the YZ area, for example, there were nine women who started another pregnancy by 2002 out of those who said they wanted more children in 1995. Only one woman thought that she did not want any more children in 1995 but had started another pregnancy by 2002. In the CHO area, 20 percent of women wanting more children in 1995 started another pregnancy by 2002 and this is less by about 16 points compared with women from the combined cell. About 31 percent of women from the comparison area started a pregnancy by the follow-up survey. The desire of women to want more children seems to be consistent with the experimental effect. We observe that few women from the YZ area and the CHO area really started another pregnancy by the follow-up survey.

In the third column of Table 2, the percent of women who said they did not want more children in the baseline survey but started another pregnancy by the follow-up survey is lowest in the YZ area at roughly 6 percent followed by the CHO area at 17 percent with high percentages observed in the combined cell and comparison cell a roughly 47 percent and 29 percent respectively. Although the cell frequencies of women in the “undecided” category are very small, we see that two-thirds of the women in the comparison cell had started another pregnancy. Table 2 makes it clear that reproductive behavior in Kassena-Nankana responds to the implementation of the CHFP.

Shifts toward acceptance of small family sizes

In contemporary societies, lower fertility is the desired goal of most people and one way in the present study to measure the impact of the CHFP is to assess shifts in the acceptance of small

family sizes between the two surveys. Table 3 presents this information in which women with living children were asked the following question: “If you could go back to the time when you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be? Women with no living children were asked: “If you could choose exactly the number of children to have in your whole life how many would that be?” In both surveys, very few women (less than 3 percent in 1995 and less than 1 percent in 2002) were childless. These childless women have been excluded from the analysis. The results in Table 3 show that between 1995 and 2002 there has been a significant increase in the number of women accepting small (1–3) family sizes. For example, in the YZ area 9 percent of women in 1995 wanted small family sizes whereas in 2002 this percentage more than doubled at 20 percent. Similar increases are observed for the CHO (from 10 percent to 15 percent), the combined cell (from 9 percent to 15 percent), and the comparison cell (from 3 percent to 12 percent).

Table 3 about here

Corresponding to the increase in the percent of women wanting small family sizes, we see that there has been a decline in the percent of women wanting big family sizes (4–6). In the YZ area, the percentage of women wanting big family sizes declined by three points from 64 percent to 61 percent whereas the CHO decreased from 69 percent to 65 percent. The combined cell decreased from 67 percent to 62 percent. However, the controlled cell registered an increase from about 54 percent to 61 percent between the surveys. Looking at this trend, one sees a decline in the number of women wanting big family sizes but still the majority of women are concentrated in the 4–6 category and a substantial number of women still wanting 7 or more children. This is a sign that despite the efforts of the CHFP in promoting family planning and general health of individuals, fertility is still on the higher side.

Multivariate analysis of intention to have children in the future

We employ multinomial logistic regression to analyze the effect of selected baseline covariates on

women's intention to have children in the future. Intention to have children in the future is coded as a trichotomous variable, with the comparison category being intending to have children in the future. Table 4 presents regression results from modeling the dependent variable using the CHFP cell, family size (actual vs desired), ethnicity, husband's schooling, respondent's schooling, age group, type of marital union (polygamous or not), and religion.

Table 4 about here

The odds ratios (OR) for Model 1 shows that women in the combined cell are almost twice (OR=1.95) more likely to report no intention of having children than those in the YZ cell. Similarly (same Model 1), the odds of being undecided about having more children or not in the future are higher (OR=2.47) among women in the combined cell than those in the YZ cell. After controlling for family size in Model 2, the results are almost similar in magnitude and direction as those reported in Model 1. However, when we control for ethnicity, husbands' and respondents' schooling in Model 3, the results are different from those observed in Models 1 and 2. First, we find that the odds of reporting no intention to have children in the future almost triples (OR=2.60) for women in the combined cell than those in the YZ cell. Second, we do not observe any significant relationship among undecided women and also for family size, ethnicity, and schooling variables.

Controlling for age, type of marital union, and religion in the final model shows that being in the combined cell is associated with higher odds (OR=2.51) of reporting no intention of having children in the future than for women in the YZ cell. Attainment of some schooling bears a significant relation to expressing no intention of having more children in the future (OR=1.62). Women aged 25–34 are about 18 times more likely to report no intention than women aged 24 and younger whereas those aged 35 and over have the highest odds (OR=79.42) of expressing no intention than the youngest women. We find no significant effect between the CHFP experimental cell and reports of being undecided about having children among women. The only significant relationship among undecided women is observed in the middle age group (i.e., 25–

34) and among older women with odds that are 8.60 and 26.36 respectively. Women in polygamous unions are less likely (OR=0.50) to be undecided about having children in the future than those in monogamous unions. To a large extent, the regression results demonstrate the evidence that the combined cell has an impact on women's reproductive preferences among the Kassena-Nankana.

Conclusion

When the women in the panel surveys were asked to indicate their desires about wanting any more children, they responded consistently with the experiences of their communities. That is, the expected change in the reproductive preferences due to the presence of volunteers and CHOs providing health service delivery in the communities. Fertility behavior between the surveys was largely a function of the Navrongo CHFP project. In the YZ, CHO, and CHO + YZ areas, where there is intervention, women seem to show that their fertility preferences are in line with the objectives of the CHFP project. In general, women are shifting towards small family sizes although the fertility levels are still high.

These results must be placed in the context of the literature we reviewed earlier. The decline in fertility is still comparatively modest. Levels of education are slowly increasing, economic activities are still challenging, and the needs of the traditional system in which the needs of the extended family outweighs the significance of individual behavior are still daunting.

The Navrongo panel data analyzed here derive from an experimental study in the liberalization of choice regarding family planning and health. These results are at least suggestive of where the Ghanaian government may want to scale up its community health service delivery and what approaches it should take. This is a generalization based on ideal types of fertility preference. There is no statistical warrant for generalizing our four experimental cells to all rural areas in northern Ghana, much less to all of Ghana. To some extent, our study is in accord with the generalization that door-to-door service delivery in Kassena-Nankana district indicate that

more women have “gotten the message” of good health and family planning.

References

- Adongo, P.H., J.F. Phillips, B. Kajihara, C. Fayorsey, C. Debpuur, and F.N. Binka. 1997. "Cultural Factors Constraining the Introduction of Family Planning among the Kassena-Nankana of Northern Ghana." *Social Science and Medicine* 45(12): 1789–1804.
- Bawah, A.A. 2002. "Spousal Communication and Family Planning Behavior in Navrongo: A Longitudinal Assessment." *Studies in Family Planning* 33(2): 185–194.
- Binka, F.N., A. Nazzar, and J.F. Phillips. 1995 "The Navrongo Community Health and Family Planning Project." *Studies in Family Planning* 26(3): 121–139.
- Freedman, R., A. Hermalin, and M. Chang. 1975. "Do Statements About Desired Family Size Predict Fertility? The Case of Taiwan, 1967–1970." *Demography* 12: 407–416.
- Ghana Statistical Service (GSS), Noguchi Memorial Institute for Medical Research (NMIMR), and ORC Macro. 2004. *Ghana Demographic and Health Survey 2003*. Calverton, Maryland: GSS, NMIMR, and ORC Macro.
- Ghana Statistical Service (GSS) and Macro International Inc. (MI). 1999. *Ghana Demographic and Health Survey 1998*. Calverton, Maryland: GSS and MI.
- Nyarko, P., P. Wontuo, G. Wak, D. Chirawurah, P. Welaga, S. Nchor, A. Hodgson, and F. Binka. 2001. *The Navrongo Demographic Surveillance System 2001 Report to the Rockefeller Foundation*. Community Health and Family Planning Project Documentation Note Number 45. Navrongo, Ghana: Navrongo Health Research Centre.
- Pence, B., P. Nyarko, F.N. Binka, J.F. Phillips, and C. Debpuur. 2001. "The Impact of the Navrongo Community Health and Family Planning Project on Child Mortality, 1993–2000." Paper presented at the Global Conference of the International Union for the Scientific Study of Population, Salvador, Brazil, August.

Table 1. Joint percentage distribution of desire about wanting any more children in the future, Kassena-Nankana district, northern Ghana

Family size: Actual vs. Desired	Desire about wanting any more kids			
	Yes	No	Undecided	Total
YZ area (<i>n</i> = 232)				
<i>1995 Survey</i>				
Actual ≥ ideal	32.3	4.5	0.6	37.4
Actual < ideal	19.9	1.5	0.9	22.3
Undecided	30.8	6.6	2.4	39.8
Total	83.0	12.6	3.9	99.5 ^a
<i>Follow-up survey</i>				
Actual ≥ ideal	27.5	7.3	1.5	36.3
Actual < ideal	15.4	2.7	0.3	18.4
Undecided	28.1	15.4	1.2	44.7
Total	71.0	25.4	3.0	99.4 ^a
CHO only (<i>n</i> = 198)				
<i>1995 Survey</i>				
Actual ≥ ideal	57.8	8.8	2.9	69.5
Actual < ideal	0.0	0.0	0.0	0.0
Undecided	24.0	3.2	2.9	30.1
Total	81.8	11.5	5.7	99.6 ^a
<i>Follow-up survey</i>				
Actual ≥ ideal	39.9	9.5	1.0	50.4
Actual < ideal	2.7	0.3	0.3	3.3
Undecided	23.0	11.8	10.5	45.3
Total	65.6	21.6	11.8	99.0 ^a
CHO + YZ (<i>n</i> = 508)				
<i>1995 Survey</i>				
Actual ≥ ideal	42.7	9.7	2.5	54.9
Actual < ideal	11.9	3.7	1.5	17.1
Undecided	20.5	4.7	2.5	27.7
Total	75.1	18.1	6.1	99.7 ^a
<i>Follow-up survey</i>				
Actual ≥ ideal	36.1	6.8	1.0	43.9
Actual < ideal	14.0	3.8	2.4	20.2
Undecided	19.7	12.3	3.8	35.8
Total	69.8	22.9	7.2	99.9 ^a
Regular (<i>n</i> = 464)				
<i>1995 Survey</i>				
Actual ≥ ideal	26.2	4.3	1.9	32.4
Actual < ideal	25.1	4.2	2.8	32.1
Undecided	26.9	4.8	2.8	34.5
Total	78.2	13.3	7.5	99.0 ^a
<i>Follow-up survey</i>				
Actual ≥ ideal	28.3	11.4	1.4	41.1
Actual < ideal	18.0	5.0	1.6	24.6
Undecided	22.7	9.0	2.2	33.9
Total	69.0	25.4	5.2	99.6 ^a

Notes: “Actual” is the number of the women’s surviving children whereas “ideal” is the desired number of family size. Distribution excludes infecund women and the “not applicable” category. ^aTotal does not sum to 100.0 because of rounding.

Table 2. Percentage of parity ≥ 1 women starting another pregnancy by 2002, by their desire about wanting any more children in 1995 and experimental cell, northern Ghana

Experimental Cell	Percent starting another pregnancy by 2002		
	Percent wanting more children in 1995	Percent not wanting more children in 1995	Percent undecided about wanting more children
YZ area	12.9 (9)	5.9 (1)	0.0 (0)
CHO only	20.0 (14)	17.7 (3)	0.0 (0)
CHO + YZ	35.7 (25)	47.1 (8)	40.0 (2)
Regular	31.4 (22)	29.4 (5)	60 (3)
Total	100.0 (70)	100 (17)	100 (5)

Note: The numbers in parentheses are the cell sizes. Excludes women who in 1995 were just about entering menopausal period.

Table 3. Joint percentage distribution of the comparison between women's reports of desired family size, by experimental cell and survey year, northern Ghana

Experimental Cell	Desired family size				Total
	0	1-3	4-6	7+	
YZ area					
1995 Survey ($n = 223$)	2.2	9.4	64.1	24.2	100.0
Follow-up survey ($n = 193$)	0.0	20.2	60.6	19.2	100.0
CHO only					
1995 Survey ($n = 226$)	9.3	10.2	69.0	11.5	100.0
Follow-up survey ($n = 176$)	0.0	15.3	65.3	19.3	100.0
CHO + YZ					
1995 Survey ($n = 635$)	3.8	9.0	67.4	19.8	100.0
Follow-up survey ($n = 546$)	0.0	14.6	61.7	23.7	100.0
Regular					
1995 Survey ($n = 492$)	1.6	3.3	53.5	41.7	100.0
Follow-up survey ($n = 454$)	0.2	12.3	60.6	26.9	100.0

Notes: Excludes "Up to God" (no cases in 1995; 0.1 percent in 2002) and "Other responses" (32.8 percent in 1995 and 35.2 percent in 2002). Cell differences in 1995 are significant ($p=0.000$) and not significant in 2002 ($p=0.149$).

Table 4. Multinomial logistic regression results (odds ratios) of selected baseline covariates on intention to have children in the future, women (1995–2002)

Covariates	Model 1		Model 2		Model 3		Model 4	
	No intention (intends to have omitted)	Undecided (intends to have omitted)	No intention (intends to have omitted)	Undecided (intends to have omitted)	No intention (intends to have omitted)	Undecided (intends to have omitted)	No intention (intends to have omitted)	Undecided (intends to have omitted)
CHFP experimental cell								
YZ area (r)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
CHO only	0.521	0.868	0.507	0.843	0.761	0.906	0.551	0.561
CHO + YZ	1.952*	2.471*	1.931*	2.506*	2.599**	2.221	2.512**	1.359
Regular	1.078	2.567	1.080	2.330	1.497	1.734	1.417	1.173
Family size: Actual vs Desired								
Actual ≥ ideal (r)			1.000	1.000	1.000	1.000	1.000	1.000
Actual < ideal			0.843	0.728	0.947	0.739	0.956	0.633
Undecided			0.847	1.039	0.910	1.121	0.960	1.216
Ethnicity								
Kassena (r)					1.000	1.000	1.000	1.000
Nankana					0.870	1.193	0.890	1.446
Bulsa					nc	0.698	nc	0.685
Other					nc	1.146	nc	1.618
Husband schooling								
None (r)					1.000	1.000	1.000	1.000
Some schooling					0.826	0.893	0.915	0.985
Respondent schooling								
None (r)					1.000	1.000	1.000	1.000
Some schooling					1.342	1.070	1.621*	1.031
Age group								
16–24 (r)							1.000	1.000
25–34							17.829**	8.597*
35–42							79.418***	26.358***
In polygamous union?								
No							1.000	1.000
Yes							0.940	0.502*
Religion†								
Traditional (r)							1.000	1.000
Christianity							1.565	1.619
Islam							0.933	nc
Number of women	1,254		1,251		1,186		1,164	
Log-likelihood	-703.18		-701.65		-649.46		-558.76	
LR chi² (degrees of freedom)	30.46		32.35		52.06		198.67	
Prob > chi²	0.0000		0.0004		0.001		0.0000	
Pseudo R²	0.0212		0.0225		0.0385		0.1509	

Notes: *Significant at $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; †“Other” religion dropped due to few number ($n=6$) of cases representing less than one-half percent. Estimates were not obtained for this category of religion; “nc” – not computed.

Table A1. Percentage distribution of all women interviewed in 1995 and those interviewed in both 1995 and 2002, by selected characteristics, Navrongo Project Panel Surveys, Kassena-Nankana district, northern Ghana

Characteristic	All women interviewed in 1995	Women interviewed in both 1995 and 2002
Marital status		
Never Married	13.8	7.9
Married/Living together	74.2	74.5
Widowed	7.9	12.4
Divorced/Separated	4.1	5.2
Education		
None	69.3	72.1
Primary	19.1	18.6
Secondary+	11.5	9.1
Ethnicity		
Kassim	52.2	52.6
Nankam	41.5	41.8
Builli	4.5	4.5
Other	1.8	1.1
Age		
15–19	12.9	6.7
20–24	14.7	12.3
25–29	17.7	20.2
30–34	15.6	22.4
35–39	14.4	19.5
40–44	12.7	13.0
45–49	12.1	5.9
Parity		
0	16.8	9.1
1–3	33.9	35.6
4–6	35.3	44.4
7+	14.0	11.0
Want any more children		
Yes	73.3	70.1
No	15.9	23.2
Infecund	5.0	1.4
Undecided	4.8	4.9
Desired interval*		
Within a year	12.5	20.2
Within two years	26.9	12.0
Within three years	20.6	14.2
After three years	40.0	53.6
CHFP cell		
YZ only	18.0	16.2
CHO only	14.0	14.2
CHO + YZ	36.4	37.5
Regular	31.6	32.2
(N)	5,288	1,402

Note: *Excludes infecund women.