

Do higher status and more autonomous women have longer birth intervals? Results from Cebu, Philippines

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Abstract

We look at whether women's status and autonomy affect birth-to-conception intervals using data from the Cebu Longitudinal Health and Nutrition Survey (CLHNS) in the Philippines. We followed 1123 married, fecund women, aged 25–49, for up to 5 years. In a 1994–1995 survey, women were asked about the timing of their last birth. In 1998–2000, women were asked about any pregnancies since the 1994–1995 survey. Using these two surveys, we calculated birth to conception intervals. Women were censored if they reached their 50th birthday during follow-up. We measure autonomy based on whether the wife has the final say in 10 household decisions as measured in the 1994–1995 survey. Using Cox proportional hazards models we find that women with more decision-making autonomy have significantly longer birth-to-conception intervals in unadjusted models. After adjustment for age, wealth, education, other socio-economic variables, and women's status, decision-making autonomy remained a significant predictor in all models. This effect remains even after adjusting for contraceptive use, implying that autonomy influences birth-to-conception intervals through other mechanisms above and beyond increased contraceptive use. Additionally, few of the women's status variables were significantly associated with time to next conception. Women who had their first birth later in life were more likely to conceive during the observation period suggesting that they may be having shorter birth intervals in order to “catch up” with their peers. Maternal and child health-care efforts can help women achieve their desired spacing goals by supporting women's autonomy—in addition to ensuring they have accurate information and a range of contraceptive options.

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Introduction

Recent studies suggest that birth intervals of 3–5 years are healthiest for mothers and their babies (Conde-Agudelo & Belizan, 2000; Rutstein, 2002). These findings are particularly relevant in developing countries where risks of maternal and child morbidity and mortality are high. It is well established that such

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factors as son preference (Arnold, Choe, & Roy, 1998; Kishor, 1995; Larsen, Chung, & Das Gupta, 1998) and loss of a previous child (Gyimah, 2002; Prakasam, Sinha, Khan, & Reddy, 1993; Udjo, 1997; Zenger, 1993) are strong predictors of short birth intervals. The effect of women's status or autonomy on the length of birth intervals specifically is still unknown. The existing literature on women's status and demographic behavior in general, however, suggests that there may be an association between higher status and autonomy and longer birth intervals. This study sets out to understand whether this association holds true in a setting where women have relatively high autonomy (Mason, 1997).

Women's status/autonomy and birth intervals

Women with lower status, whether within the household or within society, and women who are not employed generally have shorter birth intervals than women of higher status or who are employed, according to Demographic and Health Survey data from 55 countries (Setty-Venugopal & Upadhyay, 2002). In some countries, women's labor force participation, which is a measure of women's status, has little or no effect on when women have their first child but influences when they have subsequent children (DeRose, 1993; Omer, 1994).

A study using 1988 Demographic and Health Survey data from Ghana found that birth intervals among working women were significantly longer than those among non-working women. Labor force participation lengthened birth intervals by about 20% per each additional child (DeRose, 1993). An Egyptian study found that increased maternal education, and labor force participation were among the primary socio-economic factors associated with longer birth intervals (Omer, 1994).

No studies to date have explored the relationship between women's decision-making autonomy and birth intervals. More research, however, has considered the role of women's status and autonomy in contraceptive use, a proximate determinant of birth intervals. Substantial research supports the association between women's higher status and increased use of contraceptives (Gwako, 1997; Jejeebhoy, 1995; Morgan & Niraula, 1995; Schuler, Hashemi, & Riley, 1997). Those who work outside the home, particularly urban women, are more likely to use contraceptives (Shapiro & Tambashe, 1997). In addition, demographers have shown that greater status and autonomy are associated with lower fertility (Balk, 1994; Dyson & Moore, 1983; Hindin, 2000). Some have suggested that women's autonomy may be a key pathway through which education influences fertility (Jejeebhoy, 1995; Mason, 1987).

In their pivotal study in India, Dyson and Moore (1983) found that variables related to women's status significantly explained variations in fertility. They conclude that female social status, as measured by education level and kinship structures, is probably the most important element in explaining the differences in fertility between villages in North and South India (Dyson & Moore, 1983).

The literature supporting the relationship between increased women's status and autonomy and lower fertility lends support to the hypothesis that they lead to longer birth intervals as well. Women's status and autonomy influence fertility through pathways involving age at marriage, contraceptive use, and other proximate determinants as described by Bongaarts (1978). As a component of fertility, birth intervals are likely to be influenced through similar pathways.

Birth intervals and health

Many studies have documented that infants spaced at least 2 years apart are more likely to survive and are healthier than those spaced more closely (Forste, 1994; Fuentes-Afflick & Hessol, 2000; Hobcraft, McDonald, & Rutstein, 1983; Miller, 1991; Park, Cabigon, Zafra, Kantner, & Jose, 1993). Newer evidence suggests, however, that intervals of 3–5 years may be healthier. For children, there are several reasons why birth spacing is related to better health. Analysis of Demographic and Health Survey data finds that when a mother spaces her child's birth 3–5 years after the previous birth, rather than less than 3 years, her infant is more likely to survive in each stage of development—the perinatal period, the early neonatal period, the neonatal period, from birth to 12 months, and to age five (Rutstein, 2002; Setty-Venugopal & Upadhyay, 2002). In addition, the preceding child is more likely to survive if birth intervals are longer due to reduced sibling rivalry and competition for resources (Whitworth & Stephenson, 2002).

For mothers, there are several studies that document the benefits of spacing births 3–5 years apart. A retrospective cross-sectional study with data from 456,889 Latin American women delivering singleton infants found that birth intervals of 3–5 years are healthier for mothers too. Women who have their babies 27–32 months after a previous birth are more likely to survive pregnancy and childbirth than women who give birth after very short intervals (9–14 months). Women with birth intervals of 27–32 months are less likely to experience third-trimester bleeding, premature rupture of the membranes, anemia, and puerperal endometriosis compared with women with very short birth intervals. This analysis adjusted for women's socio-demographic and socio-economic characteristics. The beneficial

effects of longer intervals remained even after stratifying by age (Conde-Agudelo & Belizan, 2000).

The Philippines has an infant mortality rate of 29 per 1000 live births, an under-5 mortality rate of 38 per 1000 live births, and a maternal mortality ratio of 170 women per 100,000 live births, based on 2002 data (UNICEF, 2003). With over one-third of Filipina women having intervals shorter than 24 months in 1998 (National Center for Health Statistics, 1999), encouraging intervals between 3–5 years could mean a reduction of thousands of infant deaths, and help babies and their mothers remain healthy.

Women's status and autonomy

Women's status and autonomy are often used interchangeably despite the subtle difference in meaning. Safilos-Rothschild (1982) distinguishes women's power from women's status. She states that women's status 'refers to women's overall position in the society while power refers to women's ability to influence and control at the interpersonal level.... Thus, female power can be defined as women's ability to control or change other women's and men's behaviors and the ability to determine important events in their lives...' (Safilos-Rothschild, 1982).

Women's status usually encompasses several socio-demographic variables, such as level of education, whether she works for pay, and how much she contributes financially to the household (Hindin, 2000; Jejeebhoy, 1991; Schuler & Hashemi, 1994). It may also include characteristics that represent power differentials, such as age and educational differences between wife and husband (Beegle, Frankenberg, & Thomas, 2001; Malhotra, Schuler, & Boender, 2002). Women's autonomy refers to their influence over interpersonal issues, and usually encompasses the ability to formulate strategic choices, control resources and participate in decision-making. Malhotra and colleagues refer to this as "agency" (Malhotra, Schuler, & Boender, 2002). While higher status is more often studied in demography, some argue that it is the level of personal autonomy that appears to influence demographic behavior (Hindin, 2000; Jejeebhoy, 1991; Safilos-Rothschild, 1982).

Women's status and household decision-making in marriage in the Philippines

Individual status is strongly shaped by forces operating at the household, community, and national level (Mason, 1997). In the Philippines, social norms allocate a high degree of power in household decisions to women. Filipina women have greater autonomy than women in the rest of Asia and elsewhere in the developing world (Mason, 1997), a position held since

the pre-Spanish era when customary laws gave women the right to be equal to men, to own and inherit property, or to engage in trade (Alcantara, 1994; Medina, 2001).

Today, while men retain formal authority, most decision-making is joint where husband and wife share in the process (David, 1994; Medina, 2001). Wives usually take care of the economics of the household, including handling the family budget, and have significant influence over their husbands in household decisions (Medina, 2001). In a study on household decision-making, David (1994) finds that Filipina women with more education have more influence in the financial and family planning realm, while men with more education are more involved in the household budget. Most decisions are made jointly, except for family planning matters. Here, the wishes of the husbands emerge as more dominant.

In addition to traditional roles of bearing and rearing children, making a home, and rendering domestic services, women's roles have expanded to the more public spheres as well. Women are becoming economically and psychologically independent as co-breadwinners and co-managers of the household (Alcantara, 1994; Medina, 2001). Filipina women are known for their creativity, business acumen, and entrepreneurial skills. Many wives have become equal partners to their husbands in supporting the family economically by engaging in cottage industries and other small-scale business (Medina, 2001).

In the Philippines, median age at first birth (23.3 in 1998) and the proportion of women employed (55% in 1998) are relatively high (National Center for Health Statistics, 1999). Women enjoy high status and autonomy and therefore we hypothesize that in such a setting, women will want longer birth intervals. We expect that women who have a higher level of autonomy and higher status are more likely to want to delay their next birth and use contraception to achieve longer birth intervals.

Methods

Study setting and sample

The Cebu Longitudinal Health and Nutrition Survey (CLHNS) followed all pregnant women in 17 urban and 16 rural barangays (communities) of Metro Cebu. The survey began in 1983–1984 as a community-based multipurpose survey among 3327 pregnant women and follow-up surveys were conducted in 1991–1992, 1994–1995, and 1998–2000. The CLHNS follow-up surveys (1991–1992, 1994–1995, and 1998–2000) retain a dual focus on mothers and index children. The data is

being used to study the long-term effects of childbearing and rearing on health and nutritional status as well as social status, work, and earnings. (See Akin et al., 1992; Cebu Study Team, 1991 for further details of the study design and sample.) The data in this study use the 1994–1995 and 1998–2000 surveys. The 1994–1995 surveys included 2279 women (68% of the original participants) with much of the loss to follow-up occurring in the early years of the CLHNS due to outmigration, refusal, and non-singleton, non-live birth pregnancy outcomes (Cebu Study Team, 1989). The proportion living in urban settings increased significantly due to rapid urbanization in Cebu.

Lost to follow-up between the 1994–1995 survey and 1998–2000 also led to a reduction in sample size, with 1959 women interviewed in both surveys. Limiting the sample to those women for whom we had data in 1998–2000 did not alter the distribution of any of the socio-demographic indicators, including socio-economic status or age significantly. Of these women, 1313 were married, fecund (not sterilized or reported to have reached menopause) and not older than age 49 at baseline. After excluding those women missing on baseline characteristics (assets, well-kept index, whether the husband turns over his income, and whether the wife wants another child) the sample is reduced to 1244. After the exclusion of women who were missing on any of the decision-making questions, the final sample consisted of 1123 married, fecund women of reproductive age. Finally, all women were censored out of the sample on their 50th birthday, which does not affect the overall sample size, but reduces the amount of total observation time.

Instruments

Interviews were conducted in the homes of respondents by highly trained and experienced interviewers. Many of the staff have worked on the CLHNS since its inception. All rounds of the survey include modules on household composition, income and assets, environment, patterns of work and time allocation and income, pregnancy history and family planning, and a wide range of maternal and child health outcomes. The 1994–1995 CLHNS included an additional module with questions about household decision-making and women's status. All surveys were conducted as approved by the University of North Carolina School of Public Health Institutional Review Board for research involving human subjects.

Definition of main outcome variable

The main outcome variable is the birth-to-conception interval, defined as the period between a live birth

and the next known conception. Unlike birth-to-birth intervals, this measure of birth spacing allows the inclusion of conceptions that resulted in stillborns and miscarriages and of current pregnancies at the time of the 1998–2000 interviews. Of interest in this study are the processes that occur just before and up to conception, when women's status and autonomy are most likely to play a role.

The analysis is conducted using event history methods that allow the incorporation of time into regression modeling. For each woman, the time from the last birth prior to the 1994–1995 interview was calculated based on self-report. Then the time to the next conception after the 1994 interview was calculated. This method of calculation allows us to take full advantage of the longitudinal data by using a prospective design. Conception dates were calculated assuming a 9 month pregnancy for births and the reported number of months pregnant for women who reported being pregnant during the 1998–2000 interview. Women who reported no pregnancies between the 1994–1995 and 1998–2000 surveys were right censored as non-pregnant at the time of the last survey.

Measures of independent variables

The independent variables that we consider all come from the 1994–1995 survey. The variables include women's autonomy, socio-economic status, women's status and contraceptive use as measured in the 1994–1995 CLHNS.

In this paper, we define autonomy as having the final say in household decisions. The decision module of the survey asks who in the household decides about 10 household decisions: (1) major purchases, (2) whether the wife works outside the home, (3) wife traveling outside Cebu, (4) family planning use, (5) which family planning method to use, (6) buying wife's shoes, (7) buying children's clothes, (8) children's schooling, (9) taking children to the doctor, and (10) giving gifts to relatives. The module also asked about who has the final say in decisions about buying or selling land and hiring household help, but these two variables were dropped from the analysis since few households had hired help or owned land. For each decision, women were asked (1) Do you consult with someone when you have to decide on this matter? If yes, whom do you consult? (2) Whose will prevails on this matter? Most decisions involved husbands and/or wives having the final say, with only a small minority involving other household members. Since we are interested in women's autonomy, we focus on the one category of response where women have the final say in the decision.

Initially, we considered defining autonomy as having any say in household decisions, whereby we would

include decisions in which couples make decisions jointly or women alone have the final say in household decisions. After looking at frequencies, we found little variation in the responses. Out of the ten household decisions, over 90% of women had at least some say in seven of them. For the remaining 3 household decisions, at least 70% of women had some say in the decision. Given women's high status in the Philippines, and that women commonly have some say in most household decisions, we decided to define autonomy more conservatively, as having final say in household decisions.

In our analysis, we constructed an index by adding the number of decisions in which the wife has the final say among 10 different decisions, forming a summed index ranging from 0 to 10. If respondents were missing on any one question, we coded them as missing for the index. The 10 item index was highly reliable (Cronbach's alpha of 0.74). We then created a dichotomized index dividing the sample into two categories: low and high autonomy.

Socio-economic status was measured through several variables: a wealth index based on Filmer and Pritchett's asset index (Filmer & Pritchett, 1998) which consists of the number of 12 selected items in households: iron, black and white TV, color TV, VCR, refrigerator, electric fan, bicycle, living room set, air conditioner, bed, bed with mattress, and electricity, age of wife (26–49), number of children still alive (1–14), residence (rural or urban), and whether the husband works for pay (yes or no). The number of children still alive is a useful socio-demographic variable that takes into account the number of children that a family must support (financially and with other resources). It is expected that this will influence a couple's decisions about whether to have another child and how soon.

Women's status variables were grouped separately to assess women's positions in society and in the household. The measures we use to assess this construct are: who is head of the household (wife, husband or other), number of grades wife completed in school (0–19), number of years more schooling wives have compared to their husbands (–13–11), number of years of age wives are older than their husbands (–34–11), women's age at first birth (13–37), whether wife works for pay (yes or no), wife's contribution to the household ($\leq 50\%$ or $> 50\%$), and whether the wife thinks her husband earns enough (yes or no). We also included an interviewer-defined level of status (whether the child, woman and household are well-kept). This question was developed in response to findings from qualitative interviews, in which Filipina women explained that they define status in terms of how well-kept women kept their children, themselves, and their households. In addition, because one of the socially defined roles of the Filipina woman is to manage the household, how well she lives up to this role reflects her status as a woman. As

Alcantara (1994) explains "It is through the woman's household management skills...that the family achieves social and economic mobility." While extremely subjective, this measure provides a locally defined perspective of women's status. In quantitative surveys, interviewers coded how "well-kept" they perceived the children, the woman, and the households were. The responses were combined and formed into an index.

Data analysis

The statistical analysis was done in five parts. First, we describe the characteristics of the study population, considering the time to next conception by socio-demographics, women's status and the women's autonomy index. Second, we show the distributions of household decision-making and the median time to next conception for each group. Third, we use one-way analysis of variance to show the factors associated with higher scores on the autonomy index, and relied on Bonferroni statistics to assess statistical differences between groups. Fourth, we use Cox proportional hazards models to predict factors associated with having another conception in the interval. Finally, the fifth component of the analysis plan also uses Cox proportional hazards for additional sub-analyses of age and contraceptive use, based on the review of the literature and initial findings.

Cox proportional hazards methods are useful to model time to an event particularly in longitudinal studies because it allows for the censoring of cases that have dropped out between surveys (Cox, 1972). In this case, Cox proportional hazards models allow us to censor out women who have reached age 50. These methods allow us to use the time participants contribute to the analysis between their previous birth up to the time they are censored or have a birth.

In part four, we use a block modeling strategy whereby each group of variables is entered into a model separately, resulting in four different multivariate models. (1) A model that examines whether the dichotomous autonomy measure alone is significantly associated with birth-to-conception intervals; (2) a model in which the SES variables are added to see if the association remains after adjusting for possible confounders; (3) a model in which women's status variables are added to determine whether the association is explained by women's status; and (4) a model in which the proximate variable, contraceptive use, is added to the model because women who want to delay their next pregnancy will probably use contraception to do so. If after adding it to the model the autonomy variable changes, it will indicate that contraception is a mediator in the relationship between autonomy and birth-to-conception intervals.

In part five, further exploration was done to understand the possible interaction between age and birth-to-conception intervals, and the mediating effect of contraceptive use on birth-to-conception intervals. We conducted an age-stratified analysis to see if the relationships still held. We then conducted another analysis stratified by type of contraceptive use (supply and clinical methods, fertility awareness-based methods, and no method) All standard errors in the analysis are adjusted for clustering at the barangay level. All analyses were conducted using STATA release 8 (Stata Corporation, 2003).

Results

Characteristics of the study population

The women were followed for a median of 3.7 years (0.01–5.3 years) and almost one-third (29%) of them became pregnant during the interval. Among those who had another conception, median time to next conception was 1.28 years.

Table 1 shows the major characteristics of women in the sample at baseline in 1994–1995. Women live in households with a mean of 4.4 major assets out of the 12 that were asked about and respondents' mean age is 37 years, ranging from ages 26–49. The women have a mean of 5.0 children still alive, ranging from 1 to 14, and primarily live in urban areas. They had a mean of 7.2 years of education. The mean interspousal education difference was 0 years, and on average women were almost 3 years younger than their spouses. Women's mean age at first birth is 20.6 and ranges from 13 to 37 years. The majority (70%) were working for pay in the 1994–1995 survey. Over half (53%) were using some form of contraception with half of women reporting use of a fertility awareness-based method (i.e. calendar, rhythm, etc.) and half using a supply or clinical method (i.e. pills, condoms, IUDs, etc.) at baseline in 1994–1995. A great majority of the women (89%) said they wanted no more children and the median time to next conception did not differ significantly between those who wanted more and those who did not want any more children.

Before adjusting for other variables, we found that women in households with more than 6 assets ($p = 0.004$) and women who are older than age 35 ($p \leq 0.001$) were less likely to have another conception in the interval. Among the women's status variables, women who are older than their spouses ($p = 0.001$), who had their first birth over age 20 ($p = 0.001$), who work for pay ($p = 0.05$), or who keep themselves, their children, and their household well-kept ($p = 0.01$) were significantly less likely to have a conception. Contrary to

expectations, education was not associated with having a conception in the interval. Because education was non-linear we tried including it as a dichotomized variable. Splitting education at 11 years is a logical cut-off point since education is high in the Philippines, however this variable also remained insignificant in bivariate models. Among the variables that directly influence birth-to-conception intervals (proximate variables), women using a supply or clinical method of contraception were also significantly less likely to have another conception during the interval ($p = 0.01$) Women with high autonomy were also significantly less likely to have had a conception in the interval than women with low autonomy ($p = 0.004$) (see Table 1).

Analysis of each of the 10 household decision-making questions individually showed that few were associated with longer birth intervals on their own. Risk of conceiving in the interval was significantly lower only among women who had final say over giving gifts to relatives (Hazard Ratio (HR) = 0.75, $p = 0.04$) and among women who had final say over whether to use contraception (HR = 0.84, $p = 0.04$) (see Table 2). When individual household decisions were taken together however, the relationship between decision-making autonomy and birth-to-conception intervals became stronger. Because of substantial non-linearities in the associations with the linear index, the index was dichotomized into high- and low-levels autonomy. Much of the remainder of the analysis relies on the dichotomous variable created from the index.

Women with low autonomy had a median time to next conception of 2.96 (confidence interval (CI) = 1.98–4.40) years while women with higher autonomy had a median time to next conception of 5.07 (CI = 3.07–6.90) years before adjusting for possible confounders (see Fig. 1). Further exploration of these data reveal that age is an important factor in the observed relationship between women's autonomy and time to next conception (data not shown). After adjusting for age the relationship between autonomy and risk of having a conception becomes stronger (HR = 0.80, $p = 0.004$).

Factors related to women's autonomy

We used one-way analysis of variance to look at the characteristics that are related to scoring higher on the 10-item decision-making autonomy index (See Table 3). Among the socio-demographic characteristics, women with fewer children still alive ($p = 0.04$) and women who live in urban areas ($p = 0.02$) score significantly higher on the autonomy index.

Among the women's status variables, women whose husbands do not turn over all of their income to them, which is a cultural norm, score significantly higher on

Table 1
Sample characteristics and median time from last birth to the next conception

| | Frequency or mean | Median time to next conception (years) | Hazard ratio | 95% Confidence interval |
|---|----------------------|--|-----------------|-------------------------|
| Overall | 100.00 | 3.73 | | |
| <i>Socio-demographics</i> | | | | |
| Number of assets (\bar{x} , items) (0–12) | 3.73 | | | |
| Low (0–2 items) (reference) | 34.37 | 2.49 | 1.00 | — |
| Medium (3–5 items) | 30.63 | 2.49 | 0.99 | 0.74–1.33 |
| High (6–12 items) | 35.00 | 7.56 | 0.68** | 0.53–0.88 |
| Age of mother (\bar{x} , years) (26–49) | 36.54 | | | |
| ≤ 35 years | 46.48 | 2.56 | 1.00 | — |
| > 35 years | 53.52 | 6.98 | 0.50*** | 0.42–0.59 |
| Number of children still alive (\bar{x} , children) (1–14) | 5.02 | | | |
| ≤ 3 | 26.36 | 9.65 | 1.00 | — |
| > 3 | 73.64 | 3.05 | 1.15 | 0.84–1.56 |
| Residence | | | | |
| Rural | 28.94 | 3.55 | 1.00 | — |
| Urban | 71.06 | 3.90 | 1.00 | 0.80–1.25 |
| Husband works for pay (%) | | | | |
| No | 5.61 | 2.48 | 1.00 | — |
| Yes | 94.39 | 3.90 | 0.89 | 0.50–1.57 |
| <i>Women's status</i> | | | | |
| Head of house | | | | |
| Husband or other | 99.11 | 3.73 | 1.00 | — |
| Wife | 0.89 | 0.56 | 1.10 | 0.27–4.44 |
| Women's education (\bar{x} , grades) (0–19) | 7.19 | | | |
| ≤ 11 grades completed | 58.59 | 3.40 | 1.00 | — |
| > 11 grades completed | 41.41 | 4.41 | 0.97 | 0.73–1.29 |
| Grade difference (\bar{x} , grades) (–13–11) | –0.38 | | | |
| Wife has less education (reference) | 34.91 | 4.56 | 1.00 | — |
| Wife has same education (difference of –1–1) | 37.22 | 3.57 | 0.91 | 0.73–1.14 |
| Wife has more education | 27.87 | 2.98 | 0.94 | 0.74–1.20 |
| Age difference (\bar{x} , years) (–34–11) | –2.70 | | | |
| Wife is younger (reference) | 58.59 | 2.65 | 1.00 | — |
| Wife is same age (difference of –1–1) | 29.47 | 4.05 | 0.98 | 0.80–1.21 |
| Wife is older | 11.93 | N/A | 0.46** | 0.29–0.73 |
| Age at first birth (\bar{x} , years) (13–37) | 20.58 | | | |
| ≤ 20 years | 56.46 | 2.98 | 1.00 | — |
| > 20 years | 43.54 | 6.88 | 0.64*** | 0.50–0.83 |
| Wife works for pay (%) | | | | |
| No | 29.65 | 5.07 | 1.00 | — |
| Yes | 70.35 | 3.15 | 1.27* | 1.00–1.62 |
| Index of well-kept (\bar{x} , domains) (0–3) | 0.80 | | | |
| None (score of 0) | 62.96 | 3.06 | 1.00 | — |
| Some (score of 1–3) | 37.04 | 6.07 | 0.70** | 0.54–0.93 |
| Wife contributes over 50% (%) | | | | |
| No | 84.06 | 3.73 | 1.00 | — |
| Yes | 15.94 | 3.96 | 1.19 | 0.87–1.61 |

Table 1 (continued)

| | Frequency or mean | Median time to next conception (years) | Hazard ratio | 95% Confidence interval |
|--|----------------------|--|-----------------|-------------------------|
| Husband turns over all of his income (%) | | | | |
| No | 24.04 | 4.71 | 1.00 | — |
| Yes | 75.96 | 3.49 | 1.07 | 0.79–1.44 |
| Wife thinks husband earns enough (%) | | | | |
| No | 56.10 | 3.65 | 1.00 | — |
| Yes | 43.90 | 3.87 | 0.97 | 0.74–1.27 |
| <i>Proximate determinants</i> | | | | |
| Contraceptive use (%) | | | | |
| None (reference) | 47.20 | 2.65 | 1.00 | — |
| Fertility awareness-based | 26.54 | 4.88 | 0.85 | 0.67–1.07 |
| Supply method | 26.27 | 11.32 | 0.69** | 0.52–0.92 |
| Wants another child (%) | | | | |
| No | 89.23 | 3.63 | 1.00 | — |
| Yes | 10.77 | 3.40 | 1.30 | 0.89–1.90 |
| <i>Autonomy scales</i> | | | | |
| Continuous scale (\bar{x} , decisions) (0–10) | | | | |
| Number of all decisions made by wife | 4.14 | | | |
| Dichotomous scale | | | | |
| Low autonomy (0–1 decisions) | 43.37 | 2.96 | 1.00 | — |
| High autonomy (2–10 decisions) | 56.63 | 5.07 | 0.82** | 0.71–0.94 |

Note: N = 1123.*** $P \leq 0.001$; ** $P \leq 0.01$; * $P \leq 0.05$.

the autonomy index ($p \leq 0.001$). This may be explained in that husbands turning over their income to their wives are normative in Cebu. Couples who move away from this tradition live less by cultural norms and probably have more egalitarian relationships. Women who are heads of the households also score significantly higher on the autonomy index than women whose husbands are the head of the household ($p \leq 0.001$) or than women who live in households where someone else is the head of the household ($p = 0.05$); however, this may be due to small cells, since only 10 wives were heads of their households. Educational differences were also significantly associated with autonomy (overall $p = 0.03$). Women who have more education than their husbands also score significantly higher on the autonomy index compared with those who have less education than their husbands, based on a Bonferroni comparison test for significance ($p = 0.03$). Finally, contraceptive use was also significantly associated with autonomy (overall $p = 0.03$). Women using supply or clinical contraceptive methods score significantly higher on the autonomy index than women who use fertility awareness-based methods using a Bonferroni comparison test for significance ($p = 0.04$). Supply and clinical method users also scored higher on the autonomy index than women

not using any contraception although this difference was not statistically significant.

Multivariate analysis of factors that predict time to next conception

After confirming that the proportionality assumption was met using Kaplan Meier plots, hazards models were run to assess the factors associated with the risk of conceiving in the interval. Table 4 shows the results of four hazards models, using block modeling. The first demonstrates the simple association between autonomy and birth-to-conception intervals, the second adjusts for socio-demographic characteristics, the third assesses the effect of the addition of women's status variables, and the fourth shows the effect contraceptive use on the association of autonomy and birth-to-conception intervals.

Autonomy is significantly associated with time until next conception (HR = 0.82, $p = 0.004$) (Model 1) with more autonomous women being less likely to conceive during the observation period. When adjusted for socio-demographic variables, the relationship still holds (HR = 0.77, $p = 0.003$) (Model 2). Having a greater

Table 2
Distribution of household decision-making and time to next conception

| | Frequency | Median time to next conception (years) | Hazard ratio | 95% Confidence interval |
|--|-----------|--|--------------|-------------------------|
| Wife has final say about buying shoes | | | | |
| No | 14.40 | 3.49 | 1.21 | 0.85–1.72 |
| Yes | 85.60 | 3.73 | | |
| Wife has final say about buying children's clothes | | | | |
| No | 24.49 | 3.06 | 1.07 | 0.82–1.40 |
| Yes | 75.51 | 3.96 | | |
| Wife has final say about children's schooling | | | | |
| No | 82.46 | 3.55 | 0.78 | 0.58–1.03 |
| Yes | 17.54 | 4.71 | | |
| Wife has final say about taking children to the doctor | | | | |
| No | 49.07 | 3.96 | 0.94 | 0.77–1.14 |
| Yes | 50.93 | 3.57 | | |
| Wife has final say about giving gifts to relatives | | | | |
| No | 55.57 | 2.57 | 0.75* | 0.56–0.99 |
| Yes | 44.43 | 5.56 | | |
| Wife has final say about major purchases | | | | |
| No | 90.38 | 3.87 | 0.99 | 0.66–1.48 |
| Yes | 9.62 | 2.48 | | |
| Wife has final say about whether wife works outside the home | | | | |
| No | 54.67 | 3.63 | 1.01 | 0.78–1.31 |
| Yes | 45.33 | 3.90 | | |
| Wife has final say about the wife traveling outside Cebu | | | | |
| No | 74.27 | 3.90 | 1.05 | 0.82–1.33 |
| Yes | 25.73 | 3.40 | | |
| Wife has final say over family planning use | | | | |
| No | 70.26 | 3.00 | 0.84* | 0.71–0.99 |
| Yes | 29.74 | 5.63 | | |
| Wife has final say over the family planning method | | | | |
| No | 69.99 | 3.15 | 0.89 | 0.74–1.07 |
| Yes | 30.01 | 5.23 | | |
| <i>Autonomy scales</i> | | | | |
| All decisions scale (10 items) | | | | |
| Low (0–1 decisions) | 43.37 | 2.96 | 0.82** | 0.71–0.94 |
| High (2–10 decisions) | 56.63 | 5.07 | | |

* $P \leq 0.05$; ** $P \leq 0.01$. Note: $N = 1123$; Relative hazards are adjusted for clustering by barangay.

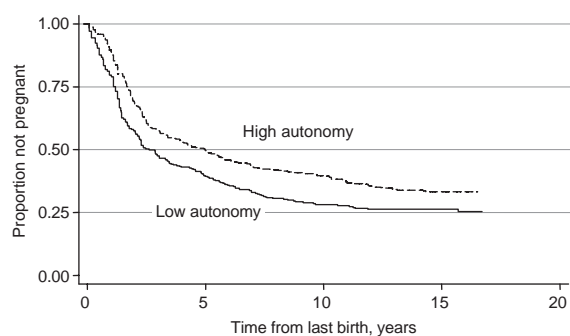


Fig. 1. Kaplan-Meier survival estimates from last birth to next conception in years, by high and low autonomy.

number of assets is associated with a reduced risk of having another conception ($HR = 0.93$, $p \leq 0.001$). As expected, older age ($HR = 0.87$, $p \leq 0.001$) and more children still alive ($HR = 0.77$, $p \leq 0.001$) are also significantly associated with a reduced risk of conceiving during the observed time period. The magnitude and significance level of these three variables are retained as women's status and contraceptive use are added to the model.

Adding women's status variables to the model does not alter the effect of women's autonomy in the model (Model 3). Characteristics typically used to represent women's status, including education, and interspousal education and age differences were not statistically

Table 3
Mean number of decision where the woman has the final say by socio-demographics and women's status

| | Number of all decisions (Out of 10) | SD | Overall <i>P</i> -value |
|--|-------------------------------------|------|-------------------------|
| <i>Socio-demographics</i> | | | |
| Number of assets (mean) | | | |
| Low (0–2 items) (reference) | 4.13 | 2.52 | 0.63 |
| Medium (3–5 items) | 4.06 | 2.24 | |
| High (6–12 items) | 4.23 | 2.34 | |
| Age of mother (mean) | | | |
| ≤ 35 years | 4.13 | 2.27 | 0.85 |
| > 35 years | 4.16 | 2.46 | |
| Number of children still alive | | | |
| ≤ 3 | 4.39 | 2.25 | 0.04 |
| > 3 | 4.06 | 2.40 | |
| Residence | | | |
| Rural | 3.90 | 2.34 | 0.02 |
| Urban | 4.25 | 2.37 | |
| Husband works for pay | | | |
| No | 4.51 | 2.35 | 0.21 |
| Yes | 4.12 | 2.37 | |
| <i>Women's status</i> | | | |
| Head of house | | | |
| Wife (reference) | 7.10 | 2.28 | 0.001 |
| Husband | 4.09 | 2.33 | |
| Other | 5.06 | 2.80 | |
| Women's education level | | | |
| ≤ 11 grades completed | 4.05 | 2.40 | 0.11 |
| > 11 grades completed | 4.28 | 2.32 | |
| Grade difference | | | |
| Wife has less education (reference) | 3.90 | 2.44 | 0.03 |
| Wife has about same education (difference of –1–1) | 4.21 | 2.36 | |
| Wife has more education | 4.36 | 2.27 | |
| Age difference | | | |
| Wife is younger (reference) | 4.19 | 2.41 | 0.62 |
| Wife is same age (difference of –1–1) | 4.13 | 2.27 | |
| Wife is older | 3.97 | 2.42 | |
| Age at first birth | | | |
| ≤ 20 years | 4.18 | 2.34 | 0.55 |
| > 20 years | 4.10 | 2.40 | |
| Wife works for pay | | | |
| No | 4.01 | 2.27 | 0.22 |
| Yes | 4.20 | 2.41 | |
| Scale of well-kept | | | |
| None (score of 0) | 4.11 | 2.39 | 0.50 |
| Some (score of 1–3) | 4.21 | 2.34 | |
| Wife contributes over 50% | | | |
| No | 4.10 | 2.36 | 0.14 |
| Yes | 4.39 | 2.41 | |
| Husband turns over all of his income | | | |
| No | 4.93 | 2.41 | 0.001 |
| Yes | 3.89 | 2.30 | |
| Wife thinks husband earns enough | | | |
| No | 4.21 | 2.42 | 0.27 |
| Yes | 4.06 | 2.30 | |
| <i>Other Variables</i> | | | |
| Contraceptive use | | | |
| None (reference) | 4.21 | 2.45 | 0.03 |
| Fertility awareness-based | 3.85 | 2.24 | |
| Supply method | 4.33 | 2.32 | |
| Wants another child | | | |
| No | 4.10 | 2.35 | 0.08 |
| Yes | 4.50 | 2.49 | |

Note: *N* = 1123.

Table 4
Multivariate hazard models predicting risk of next conception by socio-demographics and women's status

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|--|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|--------------|-------------------------|
| | Hazard ratio | 95% Confidence interval | Hazard ratio | 95% Confidence interval | Hazard ratio | 95% Confidence interval | Hazard ratio | 95% Confidence interval |
| Autonomy | | | | | | | | |
| Dichotomous autonomy scale | 0.82** | 0.71–0.94 | 0.77** | 0.65–0.92 | 0.76** | 0.63–0.90 | 0.77** | 0.64–0.93 |
| Socio-demographics | | | | | | | | |
| Number of assets | | | 0.93*** | 0.90–0.97 | 0.94*** | 0.91–0.97 | 0.94*** | 0.91–0.97 |
| Age of mother | | | 0.87*** | 0.84–0.89 | 0.83*** | 0.80–0.86 | 0.81*** | 0.78–0.85 |
| Number of children still alive | | | 1.16*** | 1.08–1.24 | 1.23*** | 1.14–1.34 | 1.25*** | 1.15–1.35 |
| Residence | | | 1.15 | 0.93–1.43 | 1.15 | 0.92–1.43 | 1.18 | 0.94–1.47 |
| Husband works for pay | | | 0.80 | 0.46–1.40 | 0.86 | 0.50–1.49 | 0.78 | 0.45–1.37 |
| Women's Status | | | | | | | | |
| Women's education level | | | | | 1.10 | 0.78–1.56 | 1.06 | 0.74–1.51 |
| Grade difference | | | | | 1.00 | 0.97–1.03 | 1.01 | 0.98–1.03 |
| Age difference | | | | | 1.00 | 0.98–1.02 | 1.00 | 0.98–1.02 |
| Age at first birth | | | | | 1.09** | 1.03–1.15 | 1.10** | 1.04–1.16 |
| Whether wife works for pay | | | | | 1.28† | 0.99–1.64 | 1.29* | 1.00–1.66 |
| Scale of well-kept | | | | | 0.89† | 0.79–1.01 | 0.89† | 0.79–1.01 |
| Whether wife contributes over 50 | | | | | 1.14 | 0.81–1.60 | 1.17 | 0.84–1.63 |
| Husband turns over all of his income | | | | | 1.01 | 0.76–1.35 | 0.98 | 0.74–1.31 |
| Wife thinks husband earns enough | | | | | 1.02 | 0.81–1.30 | 1.02 | 0.81–1.28 |
| Contraceptive use | | | | | | | | |
| None (reference) | | | | | | | | |
| Fertility awareness-based | | | | | | | 0.79† | 0.61–1.03 |
| Supply method | | | | | | | 0.47*** | 0.34–0.66 |
| -Log Likelihood (d.f.) | -1828.51 | | -1774.34 | | -1764.61 | | -1752.35 | |
| Chi square from log-likelihood ratio test (d.f) ^a | — | | 108.34*** | | 19.46* | | 24.51*** | |

*** $P \leq 0.001$; ** $P \leq 0.01$; * $P \leq 0.05$; † $P \leq 0.10$. Note: $N = 1123$; All models adjusted for clustering by barangay.

^aCompared with the previous model.

significant at the $p < 0.05$ level, even after including several variations of them. This is not surprising given the lack of significance in the bivariate models (see Table 1).

Of the women's status variables, only older age at first birth is significantly associated with increased risk of having another conception after adjustment for the socio-demographic characteristics (HR = 1.09, $p = 0.003$). Women who work for pay are more likely to have a conception (HR = 1.28, $p = 0.06$), while women who the interviewer described as having high status (the woman, her children and the household were well-kept) are less likely to have a conception (HR = 0.89, $p = 0.06$), although these results should be interpreted with caution since they did not attain a $p < 0.05$ significance level. The inclusion of women's status variables does not cause a change in the autonomy variable, signifying that autonomy explains risk of having another conception independently of the women's status variables.

The final model is adjusted for the same socio-demographic and women's status characteristics but also includes a variable for contraceptive use. Higher levels of autonomy remain significantly associated with reduced risk of becoming pregnant again by the 1998–2000 survey, after adjustment for socio-demographic characteristics, women's status and contraceptive use (HR = 0.77, $p = 0.005$) (Model 4). Contraceptive use was significant in the model. Women using supply or clinical contraceptive methods were significantly less likely to have a conception in the interval compared with women using no contraception (HR = 0.47, $p \leq 0.001$). Users of fertility awareness-based methods were also less likely to have a conception (HR = 0.79, $p = 0.08$), although this finding did not reach significance at the $p \leq 0.05$ level.

Age-stratified analysis

To further understand how age modifies the effect of autonomy on time to next conception, we conducted an age-stratified analysis. We modeled socio-economic variables, women's status variables and the dichotomized autonomy index among young women (ages 26–34) and older women (ages 35–49) separately. It became clear that the relationship no longer holds among older women. While low autonomy was still an important predictor of conceiving during the interval among younger women (HR = 0.71, $p = 0.02$), low autonomy was not associated with conceiving among older women, although the hazard ratio was in the anticipated direction (HR = 0.80, $p = 0.27$). This difference by age is likely explained by reduced fecundity in the older ages and the reduction in sample size due to stratification.

Contraceptive use sub-analysis

The relationship among contraceptive use, autonomy, and time to next conception demanded additional analyses, and therefore we looked at three groups according to their contraceptive use (non-users of contraception, users of fertility awareness-based methods, and users of supply or clinical methods) in 1994–1995. While it is possible that women changed their contraceptive or discontinued use over the study period, contraceptive use at the time of the previous survey is an early indicator of the women's desire to control their fertility.

First, we tested for interaction between autonomy and contraceptive use and found none. Then, we conducted a stratified analysis, modeling autonomy on birth-to-conception interval for each group of contraceptive users (data not shown). We found that among non-users of contraception and supply or clinical method users, autonomy was unrelated to time to next conception. Among users of fertility awareness-based methods, however, more autonomous women were significantly less likely to conceive during the observation period. (HR = 0.74, $p = 0.05$).

These results are not surprising given the direct relationships between non-use of contraception and conceiving and between supply and clinical methods and not conceiving (as shown in Table 1). It is only among the fertility awareness-based method users where the effect of autonomy becomes more clear. Fertility awareness-based methods require greater negotiation and communication; thus, women with greater autonomy can probably use these methods more effectively. In this sample, users of fertility awareness-based methods are the least autonomous among the three groups (see Table 3). Use of these methods may signify a desire to limit childbearing yet an inability to decide and act upon obtaining a supply or clinical method.

Discussion

We followed 1123 women in the Philippines immediately following a birth for up to 5 years to observe the time to their next conception and measure their birth-to-conception intervals. Our analyses find that women with higher autonomy (as defined as having the final say in a greater number of household decisions) were less likely to have a conception and had longer birth-to-conception intervals than women with lower autonomy. While contraceptive use is associated with both more autonomy and lower risk of having another conception, women's autonomy predicts the risk of having another conception above and beyond contraceptive use.

While previous studies have found that in the Philippines, husbands' wishes related to family planning are usually more dominant than their wives' wishes, these results suggest that when wives have more say in the marital relationship, their wishes related to family planning prevail. It has been hypothesized that women who are empowered have greater ability to make reproductive health decisions (Jejeebhoy, 1995; Schuler & Hashemi, 1994), and our study finds that women who have more autonomy in decisions around contraception are having longer birth-to-conception intervals.

In addition, we find that women who have autonomy in smaller decisions, such as buying gifts for relatives also have longer birth-to-conception intervals. Even though these appear to be less important decisions, the ability to make smaller household decisions is linked to the ability to make strategic life choices. The results also indicate that autonomy may be a more important a factor in having longer birth-to-conception intervals among young women than among older women. This is likely because of reduced fecundity in the older ages, which dilutes the effect of autonomy on birth-to-conception intervals among older women.

Despite being comprised of many older women, almost one-third of the sample had a conception in the interval and among those who conceived, the interval was very short—with the median interval less than 18 months. These intervals are much shorter than the healthiest intervals of 3–5 years. Also, while most of the women who had conceptions are under 35, there are still many older women in our sample having short birth-to-conception intervals. There are tradeoffs between promoting longer intervals and protecting the safety of the mother and baby if women continue to bear children later in life. Efforts to lengthen birth intervals among this population will need to be balanced with the increased risk of having birth intervals that are too long (Conde-Agudelo & Belizan, 2000), because pregnancy at older ages carries greater risks (Ross & Frankenberg, 1993; Royston & Lopez, 1987; van Katwijk & Peeters, 1998).

The analysis does not make a distinction between women who are having long birth intervals and women who have completed childbearing. It assumes that women who have not yet had another birth by 1998 are having long birth-to-conception intervals, while they may just have completed childbearing altogether or may no longer be fecund. Given the context, there is no way to make a distinction, for even the women themselves do not know whether they have become infecund or have completed childbearing. Even though the majority (almost 90%) of the women say they want no more children, in a setting where religion limits the use of supply and clinical methods of contraception and fertility is high, wanting no more children does not necessarily mean the end of childbearing, as long as the women are

still fecund. In our analysis, autonomy seemed to be a better predictor of birth-to-conception intervals than whether or not a woman wanted another child.

Contraceptive use also affects the relationship between autonomy and birth-to-conception intervals. We use contraceptive use in 1994–1995 as a proxy for contraceptive use and fertility intentions at the time of conception. We found that among fertility awareness-based method users, autonomy is associated with birth interval lengths. Among non-users and supply or clinical method users, the effect of autonomy on birth interval lengths disappears. Non-users of contraception have little control over their birth intervals; regardless of their level of autonomy, they are more likely to have short birth intervals. Therefore this result is not surprising. Because users of supply or clinical methods have little risk of becoming pregnant, autonomy was not associated with the length of the birth-to-conception interval in this group either.

We found that the relationship between women's status and women's autonomy was weaker than expected. The only women's status measures that were associated with high women's autonomy were whether the woman was head of the household, interspousal grade difference, and whether the husband turns over all of his income to his wife. The women's autonomy index was a better predictor of time until next conception than any of the women's status variables. When socio-demographic variables and women's status variables were added to the models, the significance levels of women's autonomy did not change substantially, indicating that the autonomy variable explains more of the risk of conceiving than the women's status variables do.

Additionally, among the women's status variables, only age at first birth remained significantly associated with having a conception in the interval in all models. Interestingly, women who had their first birth later in life were more likely to conceive in the interval suggesting that they may be having shorter birth intervals in order to "catch up" with their peers in childbearing.

Our measure of autonomy does not attempt to quantify all power dynamics within a married relationship. Married relationships are complex, ever-changing, and multi-faceted. There are nuances in a relationship that our autonomy index does not capture. There are many domains within the partnership and all factor into the power dynamics in the household. For instance, previous analyses have shown that women who report being beaten their spouses have more autonomy (Hindin & Adair, 2002) as do women whose husbands do not turn over all of their income (a norm in the Philippines), as found in our analysis. Having final say in household decisions and having greater autonomy may have its costs in other aspects of the relationship.

These findings have several limitations mostly related to generalizability. The data do not represent the reproductive lifespan as the women in the sample had a birth in 1984, and therefore they are more reproductively mature than the general population of women of reproductive age. The data are reflective of a population of women who are 25 and older and can be generalized only to women these ages. Younger, lower parity women are known to have significantly shorter birth intervals, so it is likely that average birth intervals for all women in Cebu are shorter than those found in our sample.

Also affecting generalizability are dropout and missing data. About 300 women were lost to follow-up between 1994–1995 and 1998–2000 surveys, and about 100 women had incomplete data in the 1994–1995 surveys and therefore were left out of the analysis. It is unlikely that women who dropped out are systematically different from the general sample in terms of time to next conception. The major cause for dropout is movement out of the study area, which is unlikely to be associated with the outcome of time to conception. It may be argued that women who are more autonomous may be more likely to move out of the sample area, due to upward mobility, however. Women for whom we did not have complete data due to missing items were also dropped from the analysis, which may influence the results slightly. For example, those who opted out of answering questions on household decision-making may be less autonomous than those who responded to all of the decision-making questions.

With the distinctive gender norms of the Philippines, generalizing beyond this setting may be unreliable. Another limitation is the reliance of only one set of measures to assess women's autonomy. The index we created is not a fully comprehensive measure and only measures final say in 10 household decisions.

Despite limitations, this study has important implications. When women have greater autonomy they tend to choose to delay conception. Thus, supporting women's decision-making abilities in the household can have positive implications for health. Maternal and child health care efforts can help women achieve their desired spacing goals by supporting women's autonomy—in addition to ensuring they have accurate information and a range of contraceptive options.

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