Intergenerational relationships between fertility and empowerment: The Cebu Longitudinal Health and Nutrition Surveys (CLHNS)

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Abstract

The purpose of this study was to explore the intergenerational associations between maternal fertility and the reproductive outcomes of their adult children in the Philippines. We also examined some of the mechanisms explaining these associations, including maternal empowerment. Data for this analysis was obtained from the Cebu Longitudinal Health and Nutrition Survey (CLHNS), an ongoing study of a cohort of Filipino women and their index children. For sons, higher maternal fertility was associated with a lower likelihood of having sex by the age of 25 and a lower likelihood of using any method of contraception. For daughters, higher maternal fertility was associated with a higher likelihood of having sex and of getting married by the age of 25. There was also a positive association between maternal fertility and the number of pregnancies reported by daughters. Subsequent analyses will explore maternal status and empowerment as a possible mediator of these associations.

Introduction

The Philippines is an intermediate fertility country with a total fertility rate (TFR) of 3.3, according to the most recent Demographic and Health Survey [1]. As with most other countries in Southeast Asia, fertility has declined substantially in the Philippines over the past 40 years [2, 3]. In the 1960s, Filipino women had an average of 6-7 births during her reproductive life [3], compared with 3.3 children today. This decline has primarily been attributed to increases in contraceptive use, with smaller changes observed in average age of first marriage over this period [3]. Following the launch of the national population program in 1969, which included a focus on the provision of family planning services [1, 3], contraceptive use increased from 17% among married women in the early 1970s to 51% by 2008 [1].

In comparison to other countries in Southeast Asia however, the overall pace of the fertility decline has been slower in the Philippines and the total fertility rate remains high at 3.3 [3]. The TFR in neighboring countries is 1.3 in Singapore [4], 1.8 in Thailand [4], 1.9 in Vietnam [5], 2.6 in Indonesia [6], and 2.6 in Malaysia [4]. There is also significant geographic variation in fertility in the Philippines. Women living in rural areas have on average one more child compared with those living in urban areas (TFR=3.8 vs. 2.8) [1]. Larger regional differences in fertility are observed. The lowest fertility rate in the Philippines is found in the National Capital Region with near replacement level fertility (TFR=2.3) compared with a total fertility rate of 4.3 in the relatively less economically developed regions including MIMAROPA, Eastern Visayas, Caraga and ARMM [1].

Roughly one-third of Filipino women report having either a mistimed or unwanted pregnancy [1]. Currently, women are having one more child on average than their desired number and recent survey data suggests that unmet need for contraception has increased from 17% in 2003 to 22% in 2008 [1]. Some of the factors that have been identified as contributing to the slower decline in fertility in the Philippines is the central role of the Catholic church and its negative influence on government family planning services, the high proportion of Filipino women relying on less effective traditional methods of family planning, legal restrictions on abortion services, the decentralization of government family planning services, reduced donor support for family planning programs, and high rates of poverty [3].

Within this context, the current analysis examines the impact of maternal fertility and empowerment on the sexual and reproductive behavior of young Filipino adults. Specifically, we examine whether the children of lower parity mothers are more likely to delay sexual initiation, use contraception, use modern methods of contraception, delay marriage, and delay childbearing compared to the children of higher parity mothers. We will also explore whether there is a direct relationship between maternal empowerment and the sexual and reproductive health choices of their children as well as potential confounding or mediation between maternal fertility and the sexual and reproductive health choices of their children. The study will also examine gender differences in the association between mother's fertility and the reproductive outcomes of their children.

Data Source

The data for this analysis come from the Cebu Longitudinal Health and Nutrition Survey (CLHNS), which is an ongoing study of a cohort of women who were recruited in metro Cebu in 1983 while they were pregnant. Metro Cebu is located along the central eastern coast of Cebu province in the Central Visayas region and is the second most populous metropolitan area in the Philippines. Between May 1, 1983 and April 30, 1984, all pregnant women who were living in one of 33 randomly selected barangays (i.e., communities) in metro Cebu were invited to participate in the survey. Of the 3,327 pregnant women who were originally identified by a household census of the study area, 3,080 women with singleton livebirths were followed until the end of the first year of the study. The mean age of women in the original sample was 26 years (range 14-47) and mean parity was 2.2 (range 0-14) [7]. For 23% of the women, the index pregnancy was their first.

At present, nearly all the mothers in the sample have completed childbearing. The current analysis used data from the 2005 mother's survey to assess maternal fertility and other characteristics and data from the 2009 tracking survey to assess the outcomes related to the sexual and reproductive behavior of the index children. At the time of the 2009 survey, most of the children were 25 years of age. Of the original sample of 3,080 women, 2,080 were followed to the 2005 survey (68%) while 1,731 of the index children were followed to the 2009 tracking survey (56%) [8]. Survey attrition was mainly due to outmigration from the study area.

The primary independent variable is the fertility of the mothers. The first step in the analysis will be to explore the associations between mother's fertility and a range of sexual and reproductive health outcomes of their index children. The particular outcomes that will be explored include age at first sex, union formation patterns, contraceptive use, and pregnancy history. While these data have been used to examine women's empowerment, couple communication and intergenerational influences on a wide range of outcomes from schooling attainment to mental health [9-12], the pathway between completed maternal fertility and reproductive health outcomes in the children has yet to be explored.

Results

Characteristics of the sample

At the time of the 2005 survey, mothers were on average 48 years of age and had an average of five children who were still alive at the time of the survey (Table 1). Most women were legally married, half had completed primary schooling only, and over 70% were currently working. The vast majority of the mothers were Catholic and two-thirds of them attended church at least once per week. Most women lived in urban areas. Most of the index children were 25 years of age at the 2009 survey. Educational attainment of the index children was much higher compared with that of their mothers. Females outperformed males in educational attainment, with 79% of females completing high school or more

compared with 65% of males. However, males were more likely than female to be working (70% vs. 59%). While the vast majority of index children were Catholic, they were less likely than their mothers to attend church at least once a week. Half of females attended church at least once weekly compared with 31% of males. The majority of males and females lived in urban areas.

Table 2 describes the reproductive and sexual health outcomes of the index children. Males were significantly more likely than females to have had sexual intercourse by the age of 25 (92.5% vs. 79.5%, p<0.001). Sexual initiation also occurred on average one year sooner for males compared to females (18.4 years vs. 19.5 years). While the majority of index children had either married or lived with a partner by the age of 25, a large proportion of them reported never having married. Comparing those who never married with those in all other marital status groups, males were slightly more likely than females to report never having married (44.2% vs. 39.1%, p=0.042). Males were also slightly more likely than females to have cohabited without being legally married (31.2% vs. 26.7%, p=0.05), while females were more likely than males to have been legally married (29.5% vs. 21.2%, p<0.001).

Contraceptive use was relatively high among the index children, with 81% of males and 78% of females reporting having ever using some form of contraception. While use of at least one modern method of family planning was reported by a large proportion of respondents (males: 55%, females: 63%), many young adults only reported having ever used traditional methods (males: 34%, females: 23%). The majority of the index children reported at least one pregnancy, with females being more likely than males to report a pregnancy (males: 57.1%, females: 62.6%). Females also reported a slightly greater number of pregnancies compared to males (males: 1.1, females: 1.6).

Associations between maternal fertility and children's reproductive outcomes

Figure 1 shows the Kaplan-Meier curves for age at first sex for males and females by maternal fertility[1]. While the differences appear modest, the curves suggest that the likelihood of engaging in sexual intercourse over the follow-up period varies by the level of maternal fertility for both daughters and sons. The results of the log-rank test were statistically significant for both males (p=0.01) and females (p<0.001), providing statistical evidence of this association. The unadjusted Cox proportional hazards suggested that while maternal fertility was significantly associated with age at first sex for both male and female children, the direction of this association differed (Table 3). Whereas higher maternal fertility was associated with a lower likelihood that male children had sexual intercourse by the age of 25, it was associated with a higher likelihood that female children did. The magnitude of this effect was also stronger for females than for males. For males, each additional child the mother had decreased the risk of sexual intercourse by 3%. For females, each additional child increased the risk of sexual intercourse by 6%.

Gender differences were also observed for the association between maternal fertility and union formation patterns of children. The Kaplan-Meier curves show virtually no difference in the likelihood that males got married or lived with a partner over the follow-up period across maternal fertility subgroups. The log-rank test and Cox proportional hazards model support this observation, suggesting no significant association between maternal fertility and marital status for males (Table 4). However, higher maternal fertility was significantly associated with a higher likelihood of marriage or cohabitation for female children. The log-rank test for females comparing the survival curves of the fertility subgroups was highly significant (p<0.001). The results of the proportional hazards model suggests that each additional child the mother had increased the likelihood that daughters got married over the follow-up period by 8%.

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[1] All regression analyses use maternal fertility as a continuous variable. The Kaplan-Meier curves grouped maternal fertility into lower (1-5 children) vs. higher (6-15 children) fertility for illustration purposes

With respect to contraceptive use, no association was found between level of maternal fertility and the likelihood that daughters had ever used a method of family planning (Table 5). However, there was a strong negative association between maternal fertility and family planning use for sons. Each additional child the mother had was associated with 13% lower odds that sons had ever used a method of family planning. Further analyses revealed a stronger negative effect of maternal fertility on use of modern methods of contraception than for use of traditional methods only (Table 6).

Finally, there was generally no association between maternal fertility and the odds that either males reported having gotten a woman pregnant or the odds that females reported a pregnancy over the follow-up period (Table 7). However, there was a significant positive association between maternal fertility and the *number* of pregnancies reported by daughters (Table 8). That is, daughters tended to have more children if their mothers had more children. No such association was found for sons.

The next step in the analysis will be to explore some of the mechanisms that might explain the associations found between maternal fertility and the reproductive health and sexual behavior of children, controlling for potentially confounding variables. Maternal empowerment will be central to this exploration. The CLHNS has a rich array of prospective information with which to explore women's status and empowerment including educational attainment, work history, household economic power, and household decision-making.

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Table 1. Characteristics of the sample, Cebu Longitudinal Health and Nutrition Survey

	Males (n=801)		Females (n=742)		p-value
Mother's characteristics	n	%	n	%	
Age					
Mean (SD)	47.8	(6.1)	48.0	(6.1)	0.62
Median	47		47		
Range	36-67		35-69		
Number of children born who are still alive					
Mean (SD)	5.3	(2.5)	5.4	(2.5)	0.57
Median	5		5		
Range	1-15		1-15		
Marital status					
Legally married	652	(81.4)	600	(80.9)	0.97
Cohabiting	46	(5.7)	48	(6.5)	
Widowed	70	(8.7)	66	(8.9)	
Separated	30	(3.8)	25	(3.4)	
Never married	3	(0.4)	3	(0.4)	
Highest level of education					
Some elementary school	256	(32.0)	231	(31.1)	0.66
Completed elementary school	184	(23.0)	193	(26.0)	
Some high school	162	(20.2)	150	(20.2)	
Completed high school	86	(10.7)	70	(9.4)	
Some/completed college/vocational school	113	(14.1)	98	(13.2)	
Years of schooling					
Mean (SD)	7.0	(3.4)	6.9	(3.4)	0.70
Median	6		6		
Range	0-17		0-18		
Works outside the home					
No	211	(26.3)	209	(28.2)	0.42
Yes	590	(73.7)	533	(71.8)	
Household wealth					
Low-medium (lower 3 quartiles)	484	(60.4)	441	(59.4)	0.69
High (upper 2 quartiles)	317	(39.6)	301	(40.6)	
Religion					
Catholic	758	(94.6)	703	(94.7)	0.92
Other	43	(5.4)	39	(5.3)	
Frequency of church attendance					
Less than once per week	260	(32.5)	262	(35.4)	0.23
Once per week or more	541	(67.5)	479	(64.6)	
Area of residence					
Rural	207	(25.8)	198	(26.7)	0.71
Urban	594	(74.2)	544	(73.3)	
Index child's characteristics					
Age					
Mean (SD)	25.5	0.50	25.0	0.23	<0.001
Median	25		25		
Range	25-26		24-26		
Highest level of education					
Completed elementary school or less	118	(14.7)	66	(8.9)	<0.001
Some high school	165	(20.6)	88	(11.9)	
Completed high school	187	(23.4)	278	(37.5)	
Some college	139	(17.4)	104	(14.0)	
Completed college/vocational school	192	(24.0)	206	(27.8)	
Works outside the home					

No	236	(29.5)	303	(40.8)	<0.001
Yes	565	(70.5)	439	(59.2)	
Religion					
Catholic	751	(93.8)	704	(94.9)	<0.34
Other	50	(6.2)	38	(5.1)	
Frequency of church attendance					
Less than once per week	546	(68.2)	363	(48.9)	<0.001
Once per week or more	255	(31.8)	379	(51.1)	
Area of residence					
Rural	222	(27.7)	192	(25.9)	0.42
Urban	579	(72.3)	550	(74.1)	

Table 2. Reproductive and sexual health outcomes for males and females, Cebu Longitudinal Health and Nutrition Survey

	Males (n=801)		Females (n=742)		p-value
	n	%	n	%	
Ever had sexual intercourse					
No	60	(7.5)	152	(20.5)	
Yes	740	(92.5)	589	(79.5)	<0.001
Age at first sex*					
Mean (SD)	18.4	(2.9)	19.5	(2.7)	<0.001
Median	18		19		
Range	10-26		11-25		
Marital status					
Legally married	170	(21.2)	219	(29.5)	<0.001
Cohabiting	250	(31.2)	198	(26.7)	
Widowed	0	(0.0)	3	(0.4)	
Separated/widowed	27	(3.4)	32	(4.3)	
Never married	354	(44.2)	290	(39.1)	
Age at first marriage[†]					
Mean (SD)	22.2	(2.4)	20.5	(2.8)	<0.001
Median	22		21		
Range	15-26		14-26		
Ever used family planning*					
Never used	138	(18.6)	131	(22.2)	<0.001
Traditional methods only	231	(31.2)	121	(20.5)	
Modern method(s)	371	(50.1)	337	(57.2)	
Ever used family planning[‡]					
Never used	69	(10.3)	77	(14.4)	<0.001
Traditional methods only	231	(34.4)	121	(22.6)	
Modern method(s)	371	(55.3)	337	(63.0)	
Currently using family planning§					
No	143	(26.3)	173	(39.4)	<0.001
Traditional methods only	212	(39.0)	115	(26.2)	
Modern method(s)	189	(34.7)	151	(34.4)	
Ever been pregnant/gotten a woman pregnant					
No/never had sex	342	(42.9)	276	(37.4)	0.03
Yes	456	(57.1)	463	(62.6)	
Ever been pregnant/gotten a woman pregnant*					
No	282	(38.2)	124	(21.1)	<0.001
Yes	456	(61.8)	463	(78.9)	
Number of times pregnant/gotten a woman pregnant*					
Mean (SD)	1.1	(1.1)	1.6	(1.4)	<0.001
Median	1		1		
Range	0-7		0-8		

* Restricted to those who have had sexual intercourse

† Restricted to those who were currently/previously married/cohabiting

‡ Excludes those who never used family planning because they report wanting to have children and those who never had sexual intercourse

§ Excludes those who never used family planning because they wanted to have children, those who never had sexual intercourse, and those who were currently pregnant

Figure 1. Kaplan-Meier curves for age at first marriage for males (left) and females (right) by mother's fertility
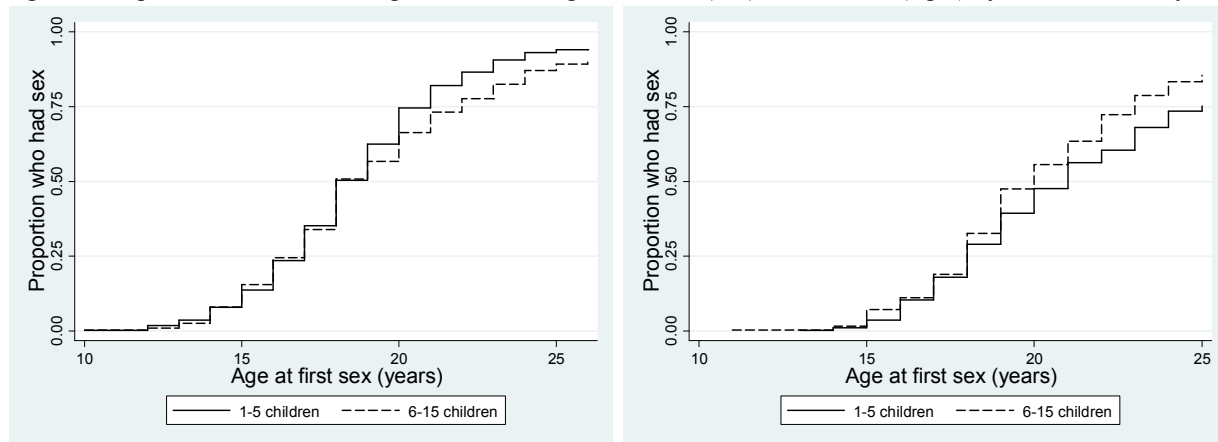

Table 3. Hazard ratios (standard errors) obtained from Cox proportional hazard models for age at first sex for males and females

	Males (n=801)	Females (n=742)
	Unadjusted	Unadjusted
Mother's characteristics		
Number of children born who are still alive	0.97 (0.01)*	1.06 (0.02)***
Age (years)	0.99 (0.01)*	0.98 (0.01)
Years of schooling	1.01 (0.01)	0.95 (0.01)***
Works outside the home	1.07 (0.09)	0.94 (0.09)
High household wealth	1.05 (0.08)	0.61 (0.05)***
Urban residence	1.40 (0.12)***	0.95 (0.09)
Mother attends church once a week or more	1.03 (0.08)	0.77 (0.07)**

† p<.10, * p<.05, ** p<.01, *** p<.001

Figure 2. Kaplan-Meier curves for age at first marriage/cohabitation for males (left) and females (right) by mother's fertility
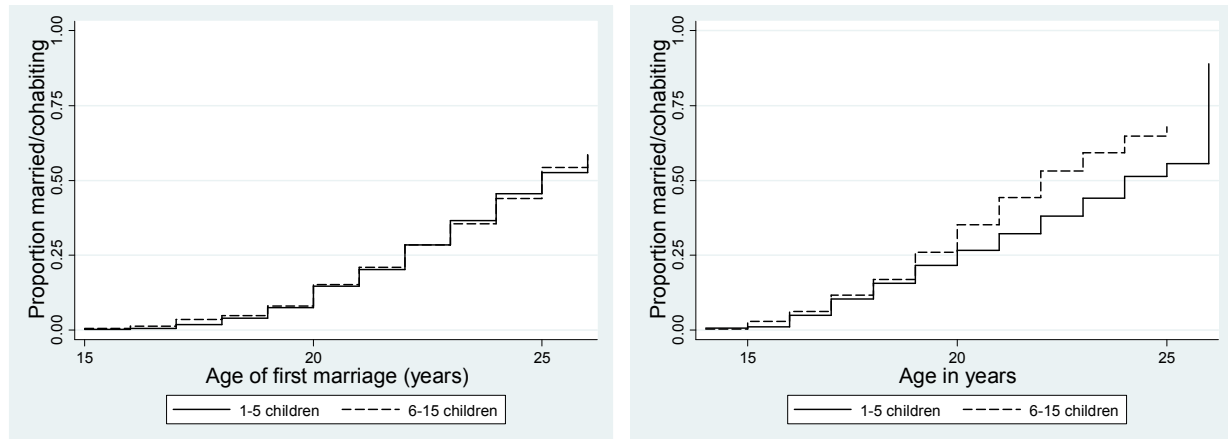

Table 4. Hazard ratios (standard errors) obtained from Cox proportional hazard models for age at first marriage/cohabitation for males and females

	Males (n=801)	Females (n=742)
	Unadjusted	Unadjusted
Mother's characteristics		
Number of children born who are still alive	0.99 (0.02)	1.08 (0.02)***
Age (years)	0.99 (0.01)†	0.98 (0.01)*
Years of schooling	0.95 (0.01)***	0.93 (0.01)***
Works outside the home	1.08 (0.12)	0.97 (0.10)
High household wealth	0.76 (0.08)**	0.44 (0.05)***
Urban residence	1.02 (0.11)	0.76 (0.08)**
Mother attends church once a week or more	0.90 (0.09)	0.74 (0.07)**

† p<.10, * p<.05, ** p<.01, *** p<.001

Table 5. Odds ratios (standard errors) obtained from logistic regression analysis for ever use of family planning for males and females

	Males (n=671)	Females (n=535)
	Unadjusted	Unadjusted
Mother's characteristics		
Number of children born who are still alive	0.87 (0.04)**	0.95 (0.04)
Age (years)	0.97 (0.02)	1.00 (0.02)
Years of schooling	1.10 (0.04)*	1.06 (0.04)
Works outside the home	1.05 (0.30)	0.68 (0.20)
High household wealth	2.42 (0.72)**	1.30 (0.34)
Urban residence	1.39 (0.39)	1.32 (0.35)
Mother attends church once a week or more	1.04 (0.28)	0.97 (0.25)

† $p<.10$, * $p<.05$, ** $p<.01$, *** $p<.001$

Table 6. Odds ratios (standard errors) obtained from multinomial logistic regression analysis for ever use of family planning for males and females

	Males (n=671)	Females (n=535)
Mother's characteristics	Unadjusted	Unadjusted
Number of children born who are still alive		
Never used (reference category)	1.00	1.00
Traditional methods only	0.91 (0.05)†	0.97 (0.05)
Modern method(s)	0.85 (0.04)***	0.94 (0.05)
Age (years)		
Never used (reference category)	1.00	1.00
Traditional methods only	0.98 (0.02)	1.00 (0.02)
Modern method(s)	0.97 (0.02)	1.00 (0.02)
Years of schooling		
Never used (reference category)	1.00	1.00
Traditional methods only	1.08 (0.04)†	1.04 (0.05)
Modern method(s)	1.11 (0.05)*	1.06 (0.04)
Works outside the home		
Never used (reference category)	1.00	1.00
Traditional methods only	1.01 (0.31)	0.76 (0.26)
Modern method(s)	1.07 (0.32)	0.65 (0.19)
High household wealth		
Never used (reference category)	1.00	1.00
Traditional methods only	2.31 (0.73)**	1.66 (0.51)
Modern method(s)	2.48 (0.76)**	1.19 (0.32)
Urban residence		
Never used (reference category)	1.00	1.00
Traditional methods only	1.34 (0.41)	1.37 (0.44)
Modern method(s)	1.42 (0.42)	1.30 (0.36)
Mother attends church once a week or more		
Never used (reference category)	1.00	1.00
Traditional methods only	1.04 (0.30)	1.02 (0.31)
Modern method(s)	1.05 (0.29)	0.96 (0.25)

$\dagger$ p<.10, * p<.05, ** p<.01, *** p<.001

Table 7. Odds ratios (standard errors) obtained from logistic regression analysis for ever been pregnant/gotten someone pregnant for males and females

	Males (n=738)	Females (n=587)
	Unadjusted	Unadjusted
Mother's characteristics		
Number of children born who are still alive	1.01 (0.03)	1.08 (0.04)[†]
Age (years)	1.00 (0.01)	0.99 (0.02)
Years of schooling	0.96 (0.02)[*]	0.92 (0.03)[**]
Works outside the home	1.25 (0.21)	0.93 (0.21)
High household wealth	0.69 (0.11)[*]	0.27 (0.06)[***]
Urban residence	0.77 (0.14)	0.36 (0.10)[***]
Mother attends church once a week or more	0.74 (0.12)[†]	0.67 (0.15)[†]

† p<.10, * p<.05, ** p<.01, *** p<.001

Table 8. Odds ratios (standard errors) obtained from ordinal logistic regression analysis for number of pregnancies (0, 1, 2, 3+) for males and females

	Males (n=738)	Females (n=587)
	Unadjusted	Unadjusted
Mother's characteristics		
Number of children born who are still alive	1.02 (0.03)	1.10 (0.03)***
Age (years)	1.00 (0.01)	0.98 (0.02)†
Years of schooling	0.94 (0.02)**	0.88 (0.02)***
Works outside the home	1.17 (0.18)	0.90 (0.15)
High household wealth	0.62 (0.09)***	0.31 (0.05)***
Urban residence	0.91 (0.14)	0.62 (0.10)**
Mother attends church once a week or more	0.80 (0.11)	0.71 (0.11)*

† p<.10, * p<.05, ** p<.01, *** p<.001