Understanding the Ideal Number of Children and Contraceptive Practices of Filipino Women through Generalized Linear Models

Isabella Benabaye, Patricia Rose Donato and John D. Eustaquio
School of Statistics
University of the Philippines Diliman

In making and assessing family planning policies and programs, it is vital to investigate fertility preference as it does not only reveal a woman's ideal number of children and the couple's consensus on it, but also captures information on unwanted and mistimed pregnancies. The theoretical relationships of a woman's ideal number of children with micro-level factors such as a woman's experience with child mortality, her level of household authority, and household family planning awareness were examined under two cases. First, among women who have achieved their fertility preference, and secondly, among women who have not achieved their fertility preference. This study also examined the factors affecting the contraceptive behavior of women who have not achieved their fertility preference, specifically for a) contraceptive users, b) non-users who intend to use contraceptives later, and c) non-users with no intention to use. The difference in the behavior of factors influencing the ideal number of children between women who have and have not met their fertility preference showed that instead of factors related to family planning, the ideal number of children for women with unmet fertility preference is decreased by factors that suggest lack of women's empowerment. On the other hand, analysis on contraceptive behavior found possible factors that can hinder the realization of women's intention to practice contraception.

Keywords: fertility preference, contraceptive behavior, poisson count model, binary regression

1. Introduction

Understanding fertility preference and contraceptive behavior among women is important in calibrating the rationale and priorities of family planning policies

and programs to ensure women's improved reproductive health and realization of reproductive rights (United Nations, 2015). Contraceptive use is of outmost importance in socioeconomic development, for it prevents not only mistimed and unwanted pregnancies but also unmet fertility goals (Gordon et al., 2011). According to Fayisetan and Casterline (2000), family planning programs that promotes contraceptive usage are heavily grounded on the demographic transition theory, which portrays fertility decline as a direct consequence of decreased ideal number of children (Notestein, 1953; Davis, 1963; Hirschman, 1994). However, the relevance of this hypothesis should be further investigated especially for developing countries. The complexity of understanding fertility preference and contraceptive behavior then calls for policies to consider more personal and social factors that examine women's position in her community (Casterline and Sinding, 2000).

While fertility preference can be a reasonable predictor of actual fertility behavior (Freedman and Blanc, 1992), a lot of economic and demographic factors can prevent this preference from translating into actual behavior (Adsera, 2005). Instead of dealing with macroeconomic conditions which are not policy-invariant and can be highly time-varying, this study explores the micro-foundations that influences individual behavior such as religious affiliation and decision-making behavior.

Factors characterizing women's fertility preference and contraceptive behavior behave differently in developing countries than in more economically developed ones (Fayisetan and Casterline; 2000) but there are still some common factors that potentially affect these behaviors, such as the woman's age, educational attainment, number of living children, and urban residence, along with more specific ones that take into account sociological and cultural contexts, such as her experience with child mortality, her level of household authority, and household family planning awareness and practices (Sarvestani, et al., 2017; Kang'oma, 2007; Westoff, 2010). According to the National Demographic and Health Survey (NDHS) report in 2013, while family planning programs in the Philippines--administered by Philippine Family Planning Program (PFPP)--recognizes the right of couples to decide their own family size, there is no sufficient literature that discuss the differences in dynamics among those who have achieved or have not achieved their desired family size. This study hypothesizes that there exists differences in the two cases' perception of ideal family size, and consequently, differences in their family planning needs. Hence, to better understand these women, the theoretical relationships of the mentioned factors with a woman's ideal number of children are examined under two cases: 1) among women who have achieved their fertility preference, and 2) among women who have not achieved their fertility preference.

As empirical evidences suggest that there is a presence of intention to use contraceptives among non-users, Fayisetan and Casterline (2000) argued that in

addition to the ideal number of children, the achievement or failure of this number must also be considered to comprehensively understand changes in contraceptive prevalence. In this light, this study further explores current fertility trends among Filipino women who have failed to achieve their fertility preference through the perspective of contraceptive behavior. It examines factors affecting the contraceptive behavior of these women under three cases: 1) among contraceptive users, 2) among non-users with unfulfilled intention to use contraceptives, and 3) among non-users with no intention to use at all. As contraceptive use provides the most widely accepted indicator of success of family planning programs (NDHS, 2013), this study aims to emphasize the call for family planning programs tailored to better meet the needs of Filipino women with unmet fertility preference.

For both objectives of this study, the 2013 NDHS is used. It is a survey that is conducted every five years by the Philippine Statistical Authority (PSA), it is a part of the worldwide Demographic and Health Surveys (DHS) Program and gathers information on fertility, family planning, and maternal and child health. The study aims to provide better understanding of the current fertility preference and contraceptive intention and practice of Filipino women not only vis-à-vis other countries, but with a more in-depth analysis of such perception and behavior across different cases.

2. Review of Related Literature

2.1 Factors Influencing Women's Fertility Preference and Contraceptive Behavior

Despite the evidence that **women's education** is one of the common factors associated with fertility preference, its effect still remains ambiguous as it is also interrelated with other factors (Berrington and Pattaro, 2014). Through the economic framework of labor market or **employment**, the negative association of higher education with desired number of children is materialized. By substitution and income effect, highly educated women, which is associated with higher earnings, would have higher opportunity costs of leaving the labor market, and would therefore intend to have fewer children (Becker, 1981). High level of education usually also means **postponement of cohabitation** as well as the willingness to wait until her career is established before wanting to bear a child, all of which reduce women's demand for children and increase their demand for contraceptive use (Gordon, et. al., 2011; Berrington and Pattaro, 2014; Liefbroer and Corijin 1999). The **husband's level of education** also influence a woman's preference, again through substitution and income effects. Couples with higher education and higher average combined earnings can afford to have a larger number of children, although the income effect might not be significant if they agree to have children with a higher quality of living (Becker and Lewis, 1973; Gordon, et. al., 2011). The husband's education is also associated with his wife's

contraceptive use, even more so than his wife's own educational attainment (Isiugo-Abanihe, 1994; Omondi, 1997), however its impact varies according to the sociopolitcal setting of the country (Isiugo-Abanihe, 1994; Omondi, 1997; Larrson and Stanfors, 2014).

It is important to note that even though some scholars said that working towards educating women would decline fertility, Rutstein (1998) argued that even women with no education would also want to have fewer children. However, some studies explained that Rutstein's belief only applies to uneducated women who live in communities where having fewer children has become the norm, such as in **urban settings**. It is not only that urban settings provide women with a clear advantage in terms of access to education and job opportunities, but family planning programs are also concentrated in these localities (Sarvestani, et. al., 2017; Mahmood and Ringheim, 1996). However, according to the results of the Demographic Health Survey (DHS) (2017), a large percentage of women with no education in most developing countries still live in rural areas, leaving them, especially those who belong in the economically **poor** sector, with an inadequate setting to both practice family planning or use contraceptives (Mahmood and Ringheim, 1996). According to the same report, these women are also likely to have **experiences with child mortality**, which is also positively associated with their ideal number of children and negatively associated with contraceptive use (DHS, 2017).

According to a study on developing countries done by by Bakht (2013), family planning programs have used various forms of mass media not only to promote awareness and positive attitude towards contraceptive use, but to also assure continuation of contraceptive use for current users. While some fertility preference studies measure **exposure to mass media** as an index of at least exposure to one form of media, contraceptive studies, on the other hand, usually only find significance in exposure to television and radio (Retherford and Mishra, 1997; Bakht et al., 2013). Effectiveness of these programs, however, can be deterred if the target population is in the first place not **knowledgeable of sources of family planning** (Alege et al., 2016).

Another intermediate factor influencing inability of women to practice family planning is the lapse in inter-spousal communication, which can be attributed to the **couple's age difference** (Acharya and Sureender, 1996). While difference in the age of the spouses is negatively associated with effective inter-spousal communication, the latter factor is positively associated with the woman's increased contraceptive use (Das et al., 2011). A study by Ross and Winfrey (2001) also believes that if a woman has given **birth in the last year** it creates non-intention, or worse, frustrated intention to use contraceptives, which exposes her to the risk of unplanned and unwanted childbearing.

In places with high fertility preference but with unmet need of family planning like in developing countries such as Malawi and Myanmar, a trend can

be found where woman's **age** increases gradually with both her actual and ideal number of children, with the age cohort 40-49 mostly wanting large family sizes (Kang'oma, 2007). While a woman's age has a linear relationship with her desired number of children, for most contraceptive behavior studies, age is found to have a non-linear relationship with contraceptive use (Mahmood and Ringheim, 1996; USAID, 2015). A woman's desire to limit childbearing and contraceptive use is also evident due to its expected positive association with her **realized number of children** (Satyavada and Adamchak, 2000).

Another feature of developing countries with high fertility preference is the significance of **religious affiliation** as a predictor of fertility behavior and contraceptive use. It is believed that several religious beliefs, including Islam and Roman Catholicism, have pronatalist ideology and therefore oppose the practice of contraceptive use (Mahmood and Ringheim, 1996; Alagarajan and Kulkarni 1998; Gandotra et al. 1998; Bhende et al. 1991; Das and Padhiyar 1991; Rajan and Rao 1991; Srivastava and Saksena 1989; Caldwell and Caldwell 1988; Das and Pandey 1985). It is argued, however, that high fertility and low contraceptive prevalence among Muslims can also be attributed to their low socioeconomic status (Iyer 2002; Mistry 1999; Shariff 1995; Sharma 1994; Johnson 1993; Ghosh and Das 1990; Singh 1988; Ranganekar et al. 1987).

Lastly, while **women empowerment** is a significant predictor and usually the largest contributor in explaining women's fertility preference (DHS, 2017), a study by Hameed et. al (2014) found that for contraceptive behavior in developing countries, the couple's consensus is a much stronger determinant than woman-only decision-making. For most studies, women empowerment is measured by two indices: one that reflects the level of authority a woman can exercise through personal and household decisions and one that reflects the level of self-esteem a woman has to oppose spousal violence (Basu, 2005). A study conducted in Togo suggests that women who are empowered are more likely to discuss and practice family planning and turn out to have lower actual fertility and improved reproductive health (Tuladhar et al., 2013; Gage, 1995; Kritz et al., 2000).

2.2 Sociocultural context in the Philippine setting

While the majority of Filipinos are Roman Catholic, a considerably large sector of the population have Muslim affiliation, which is mainly constituted by the people in southern Philippines. These two religious views play a major role in influencing population policy and programs to be pronatalist (Costelo and Casterline, 2009). Numerous policies in the Philippines favor large families over couples with only two children (the replacement level) incentives are provided for large families such as free primary and secondary education, and land reform and housing programs with no health insurance policy and inadequate social security coverage, which in turn directly influence Filipinos' fertility preference and contraceptive behavior (Costelo and Casterline, 2009). This shows how

cultural values and institutional factors in the Philippines influence and support the desire of Filipinos to have large numbers of children, with fertility preference above replacement level--the preference being 2.7 children in the mid-1990's and 2.3 even in the "ideal" setting of urban location and college-graduate women. Unwanted fertility rate among married women also increases throughout the years, with 15.9% in 1993, 18.2% in 1998, jumping to 29% in 2003 (Costelo and Casterline; Westoff, 2010), indicating high dissatisfaction of Filipino women with their current number of children.

3. Methodology

3.1 Dataset and Variables

The data for this study is from the 2013 National Development and Health Survey (NDHS) conducted by the Philippine Statistical Authority (PSA). All respondents were women aged 15 to 49, and only those currently in a union or living with a man are to be considered in this study.

Filipino women's ideal number of children was analyzed using Poisson regression models under the two scenarios:

1. Among women who have not achieved their ideal number of children
2. Among women who have achieved their ideal number of children

The explanatory variables of interest are those that pertain to women empowerment and family planning factors.

Women Empowerment Factors

* Person who usually decides:
  - How to spend respondent's earnings
  - What to do with money husband earns
  - On large household purchases
  - On household purchases for daily needs
  - On visits to family or relatives

* Beating justified if wife:
  - Goes out without telling husband
  - Neglects the children
  - Argues with husband
  - Refuses to have sex with husband
  - Burns the food

Family Planning (FP) Awareness Factors

* Discussed FP last 12 months with:
  - Husband/ partner
  - Mother
  - Father
  - Friend/Neighbors
* Read about FP online or from internet

All of the variables above are binary, where the participation variables equal 1 if the husband is the sole decider, and justification variables equal 1 if woman justifies spousal violence for that particular reason. Index of women authority and spousal violence justification, calculated as a sum of their corresponding binary variables, were also considered. FP awareness factors, on the other hand, are also binary variables equal to 1 if they have read family planning online, or if they have discussed family planning with a particular person.

Psychological and social factors were also considered, respectively, experience on child mortality and exposure to internet. Experience on child mortality was measured through the respondent's current number of pregnancy losses, while exposure to internet is a binary variable where it is equal to 1 if the respondent checks their email or surfs the internet at least once a week. The model also included additional factors which the researchers believe have a direct relation to the ideal number of children such as the postponement of cohabitation with their husband due to career priority, and consensus on ideal family size. Career priority is proxied by the age the respondent started living with their husband, while consensus is a binary variable where disagreement in ideal number of children is coded as 1. Lastly, just as most fertility studies, this study also took into consideration woman's characteristics which related literature mainly deem as commonly affecting the ideal number of children: age, type of residence (urban or rural), religious affiliation, and her husband's highest educational attainment. Educational attainment was coded as two dummy variables where the highest educational attainment of secondary school is the baseline. Those with no education and primary as their highest level of schooling were combined into one category while the attainment of anything higher than secondary is the second category.

For the analysis of contraceptive intention and practice of women who have not achieved their ideal number of children, three separate logistic regression models were used in predicting the following binary variables:

1. Contraceptive users
2. Contraceptive non-users with the intention to use later
3. Contraceptive non-user with no intention to use

For the logistic models, the same set of explanatory variables in the ideal number of children models was used, plus other variables based from the literature that were said to aid in predicting contraceptive use. The main explanatory variables of interest for the analysis of contraceptive behavior are the same as in the Poisson models, plus:

Additional Family Planning (FP) Variables

* Knowledge of a source of FP
* Exposure to mass media

- Watches TV at least once a week
- Listens to radio at least once a week
- Reads newspaper at least once a week

The new FP variable, knowledge of a source of family planning is equal to 1 if the woman knows any source, whether traditional or modern, of contraception and zero if she knows nothing at all. Three new quantitative fertility variables were also considered for the logistic models: woman's current number of living children, desire of having a son, and spousal age difference, along with the one new binary variable, which is whether she gave birth in the last year. The additional demographic factors, wealth index and employment status were also coded as dummy variables, with wealth index having those who belong to the rich and richest sectors of the community as baseline, and with employment status having unemployed as the baseline.

3.2 The generalized linear model

The respondent's desired number of children is the first dependent variable to be studied. Since it is a count variable, the Poisson generalized linear model (GLM) was used. The second group of dependent variables pertaining to contraceptive use are binary variables, thus the logistic regression model was used to model these dependent variables.

Generalized linear models have three components, the first one is the random component which the response variable which must come from a distribution belonging to the natural exponential family. Next, the systematic component specifies the relationship of the explanatory variables to the response variable. The third component is the link function, $g(\cdot)$, a function for the mean of the response variable that connects the random and systematic component by specifying the functional form of the relationship between the response and explanatory variables.

3.2.1 Poisson regression model

Although the identity link may also be used to model a nonnegative mean, the log link that models the log of the mean count is more commonly used. The Poisson loglinear model with p explanatory variables x is given by:

$$\log [\mu (x)] = \alpha + \beta_1 x_1 + \beta_2 x_{2+} ... + \beta_p x_p \quad (1)$$

Then the mean has the exponential relationship,

$$\mu(x) = \exp \{\alpha + \beta_1 x_1 + \beta_2 x_{2+} ... + \beta_p x_{p,} \quad (2)$$

If the response variable is overdispersed even after accounting for all the explanatory variables, the Poisson MLE standard errors may be wrong and

the negative binomial GLM is a more appropriate model since it accounts for overdispersion.[1]

3.2.2 Logistic regression model

The logistic regression model has a binomial response variable and a logit (log odds transformation) link function. For the binary responses, a "success" is represented by 1 and a "failure" by 0. Where $\pi(x) = P(Y = 1)$ = the probability that the response is 1, the model with p explanatory variables is

$$logit\left[\pi(x)\right] = \log\left[\frac{\pi(x)}{1-\pi(x)}\right] = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p \qquad (3)$$

The probability that the response is 1 [$\pi(x = 1)$] has the relationship,

$$\pi(x) = \frac{\exp\left\{\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p\right\}}{1 + \exp\left\{\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p\right\}} \qquad (4)$$

4. Results

4.1 Descriptive statistics

Between the qualification of current marriage or union status and the removal of observations with missing values for any variable under consideration, a total of 7861 observations were used in the analysis of the ideal number of children. Before going to the models, the characteristics of the sample is examined first. Below are the summary measures of all the quantitative variables considered for the Poisson models.

Table 1. Summary Statistics for the Dependent Variable and Quantitative Explanatory Variables of Women Currently in a Union

Variable	Mean	Std Dev	Minimum	Maximum
Desired number of children	3.161684	1.588024	0	16
Number of living children	2.908154	2.209904	0	18
Age in years	33.97481	8.45734	15	49
Age first started living with partner	20.99962	4.611097	9	47
Number of pregnancy losses	.2514947	.5612367	0	5

1 The response variable was not found to be overdispersed, therefore the negative binomial model was not considered and will not be discussed here.

The respondents' ages range from 15 to 49 years old, with the average being about 34 years old. This indicates that a good representation of Filipino women of all ages is achieved, with each age from 23 to 48 years old nearly equally making up the majority of the data. While the youngest age observed for the age of woman when she started living with her partner is 9 years old, upon inspection of the data, it turns out there are 136 women total who claimed they started living with their partners from the ages of 9 to 13, 72% of them coming from rural areas. Around half of these women also have a spousal age difference of at least 5 years, wherein many of them are above 10 years. On the average, women considered in this study were about 21 years old when they first started living with their partner, and 80% never had a pregnancy loss.

Looking at the summary measures for the whole dataset, it can be seen that the average number of living children is slightly lower than the average desired number of children. Figure 1 shows an increasing trend in the average ideal number of children when displayed across age groups. When plotted against women grouped by the number of living children they have (Figure 2), it is the

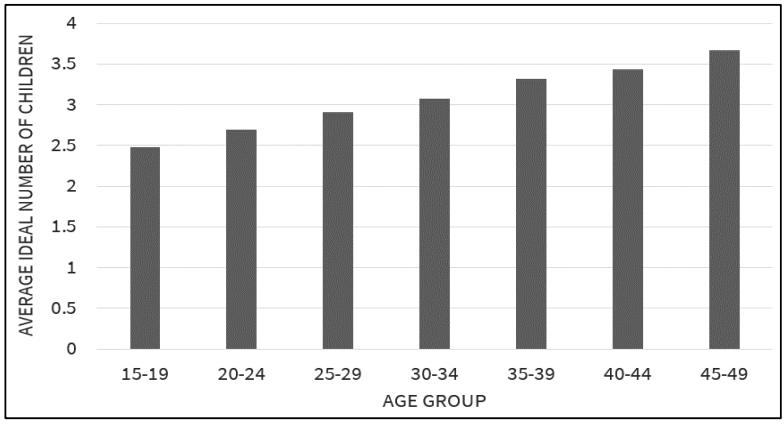

Figure 1. Average Ideal Number of Children by Age Group

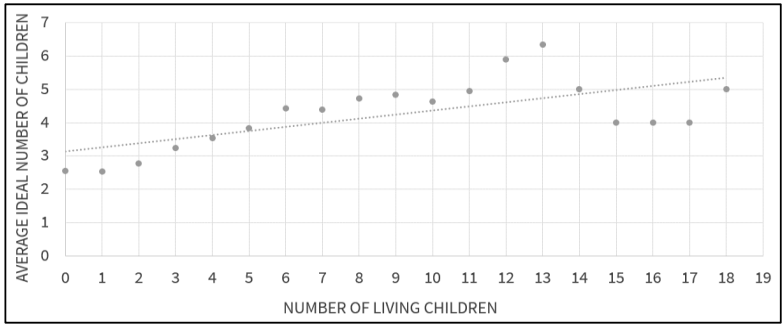

Figure 2. Average Ideal Number of Children of Women Grouped by the Number of Living Children They Have

same case. Filipino women's desire for children is higher for those in the older age group.

Grouping the respondents by region, for ARMM, a rural region with the lowest socioeconomic status and with the highest number of Filipinos professing Muslim affiliation in the country (Costelo and Casterline, 2002) has a much higher mean ideal number of children compared to other regions at 5.58, while NCR has the lowest at 2.62. While this can be attributed to the idea that women in rural areas tend to have higher desired number of children than those in the urban areas, it is found that the average ideal number of children is nearly equal regardless of employment status (Table 2). To examine the difference between the effects of the factors in cases where the ideal number is achieved or not, the researchers divided the observations into two groups: the first containing the responses of women whose ideal number is the same as the number of children they have and the other containing those where they are not the same, each having 2119 and 5742 observations respectively.

Table 2. Percentage and Average Ideal Number of Children by Type of Residence and Employment Status

Type of Residence	Employment Status	Percentage	Average Ideal Number of Children
Rural	Employed	34.98%	3.30
	Unemployed	23.41%	3.50
Urban	Employed	25.14%	2.88
	Unemployed	16.47%	2.81

Descriptive statistics are obtained for the differences of factor behaviors between the two scenarios. Comparing the percentages, 87.13% of the women who have achieved their fertility preference said that they strictly want no more children, while only 8.04% of them said that they are fine with having more. This condition is not evident for the group where their ideal number of children is currently not achieved. In fact, in this group, the proportion of women who desire to limit childbearing is almost equal for those who desire more children.

Table 3. Summary Statistics of Quantitative Variables for Women who Achieved their Ideal Number Children and Those Women Who Unequal Number of Actual and Ideal Number of Children

Variable	Mean	
	Actual = Ideal	Actual ≠ Ideal
Desired number of children	2.929212	3.247475
Number of living children	2.929212	2.900383
Age in years	35.10571	33.55747
Age first started living with partner	21.05616	20.97875
Number of pregnancy losses	.2076451	.2676768

Aside from the mean ideal number of children being lower and the mean age being a little older by two years for women who have achieved their fertility preference, the means for the rest of the variables are nearly the same (Table 3). Furthermore, it was found that the percentages of respondents based on the highest educational attainment--none, primary, secondary, and higher--are almost the same for the two groups. The same is also true for religious affiliation. In both groups, the majority (70-80%) of the respondents are Roman Catholic with Islam as the second largest religion making up 5.47% in the equal group and 9.79% in the unequal group. The average ideal number of children for those in each religion are shown in Figure 3. The trend that Muslims tend to have high ideal family size is evident here. Respondents with no religion were taken out of the figure as there is an outlier of 12 children among them.

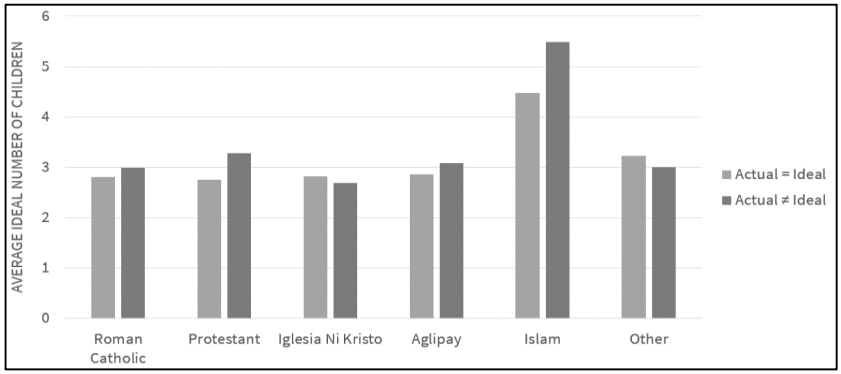

Figure 3. Comparing the Average Ideal Number of Children per Subgroup by Religion

With this, it is interesting to note that for the two factors highest educational attainment and religious affiliation, while the distribution of the sample across all their levels is almost the same, the average ideal number of children tends to be consistently lower for the group who has achieved their fertility preference. This indicates that in general, even when looking per factor, women whose ideal number of children has been realized tend to desire a fewer number of children compared to women who whose preference is not achieved.

Further exploring the fertility trends among Filipino women, this study examined factors associated with women who have failed to achieve their fertility preference through the perspective of contraceptive behavior. To predict contraceptive intention and practice using logistic models, the sample used is a subset of the Actual ≠ Ideal dataset, since observations containing missing values of the added explanatory variables had to be taken out. From the original 5742, 5708 observations remained.

Table 4. Contraceptive Use and Intention of Women Grouped by Their Achievement of Fertility Preference

	Contraceptive Use and Intention	Percent
Actual = Ideal (n=2113)	Contraceptive user	63.89%
	Non-user, has intention to use later	14.10%
	Non-user, has no intention to use	22.01%
Actual ≠ Ideal (n=5708)	Contraceptive user	48.34%
	Non-user, has intention to use later	21.57%
	Non-user, has no intention to use	30.09%

Knowledge of a source of family planning is widespread among the Filipino women considered in the study regardless if they have their ideal number of children or not (76.81% and 72.69%, respectively), however their contraceptive behavior appears to be very different. Even though majority of the women whose actual ≠ ideal know a source of family planning, only a little less than half of them use contraceptives (Table 4). Further exploring possible determinants of contraceptive behavior for women who have not achieved their fertility preference, Table 5 shows that the percent of women who know any source of family planning is almost the same regardless if they belong to the poor or rich sector of the country. However, 25.71% of the poor end up being non-users despite their knowledge of source of family planning, which is slightly higher than for those who are rich and knowledgeable, with 22.86% who end up being non-users.

Table 5. Percent of Women in Actual ≠ Ideal with the Knowledge of a Family Planning Source Based on Wealth Index

Wealth Index	Knows any source of family planning	Percent
Poor or poorest	Yes	33.57
	No	14.31
Middle, rich or richer	Yes	39.12
	No	13.00

The age of women who use contraceptives clearly shows a parabolic relationship with their contraceptive behavior, as also found in several contraceptive studies (Mahmood and Ringheim, 1996). Looking at Figure 4, the frequency of women using contraceptives starts to decrease for ages around 30 years and above. This relationship, however, is not the case for non-users, especially for those who do not intend to use, whose age exhibits a clear linear relationship with their contraceptive non-usage.

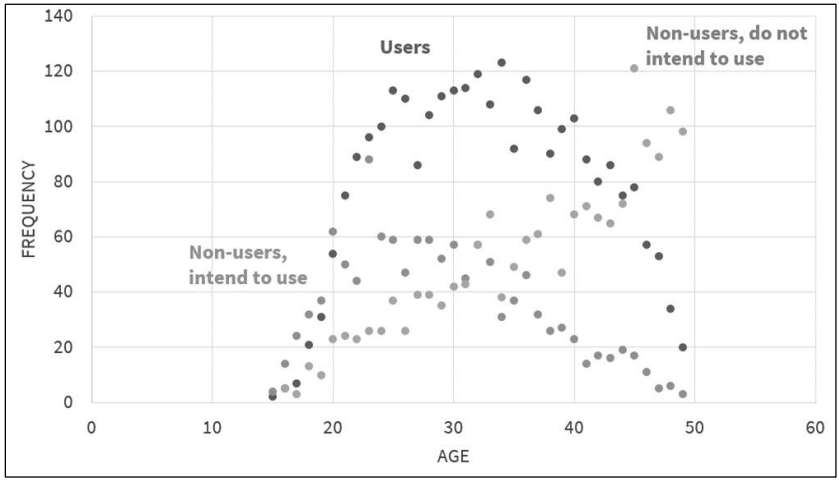

Figure 4. Frequency of Contraceptive Users and Types of Non-Users per Age

4.2. Discussion of Ideal Number of Children

The following models to be presented have a sufficient good fit. The $\frac{Deviance}{DF}$ for each of the following models indicate no presence of overdispersion and thus the Poisson loglinear models were used. Furthermore, there are no problems of multicollinearity for the explanatory variables based on the variance inflation factors. The presence of outliers was also checked using the standardized Pearson residuals and none were found to be significant.

The explanatory variables in the final models were kept under the consideration of 10% level of significance. The model for the women who have not achieved their fertility preference is presented first. The estimated multiplicative effect on the mean ideal number of children of a unit increase in each explanatory variable is displayed in the "Exponentiated Estimate" column in Table 6 and 7.

4.2.1 Among women who have not achieved their ideal number of children

The following are the effects of each variable on the mean ideal number of children controlling for all other factors:

For every 10 years added to the age, the mean ideal number of children increases by 11%. Islamic affiliation, on the other hand, has the most effect on a woman's mean ideal number of children, constituting to an up to 72.48% increase if she is Muslim. If the woman is from an urban area, where there are more education and employment opportunities than in rural areas, the mean ideal number of children decreases by 7.85%. In this study, ARMM (Autonomous Region of Muslims in Mindanao) has the largest desired family size of up to at least five children,

Table 6. Poisson Loglinear Model of Ideal Number of Children for Women Whose Fertility Preference Is Not Achieved

Parameter		Estimate	Exponentiated Estimate	Standard Error	P-value
Intercept		0.9551	2.5989	0.0446	<.0001
Age in Years		0.0110	1.0111	0.0009	<.0001
Type of Residence (Rural as baseline)		-0.0818	0.9215	0.0162	<.0001
Islamic Affiliation (Non-Muslim as baseline)		0.5451	1.7248	0.0209	<.0001
For Respondent:	No Education and Primary Education (Secondary as baseline)	0.0572	1.0589	0.0197	0.0037
	Higher Education (Secondary as baseline)	0.0093	1.0093	0.0217	0.6691
For Husband:	No Education and Primary Education (Secondary as baseline)	0.0652	1.0674	0.0192	0.0007
	Higher Education (Secondary as baseline)	0.0498	1.0511	0.0213	0.0196
Number of Pregnancy Losses		0.0354	1.0360	0.0122	0.0038
Age in Years of First Cohabitation with Husband		-0.0103	0.9898	0.0018	<.0001
Consensus on Ideal Number of Children (Both want the same as baseline)		-0.0311	0.9694	0.0159	0.0498
Person who Makes Decisions on Visits to Family or Relatives (Woman participates in decision-making as baseline)		-0.0578	0.9438	0.0318	0.0690
Discussed Family Planning in the last 12 Months with Neighbor (Does not discuss as baseline)		-0.0286	0.9718	0.0150	0.0568
Checks Email or Surfs the Internet at Least Once a Week (<0 a week as baseline)		-0.0400	0.9608	0.0204	0.0501

suggesting that the large positive and significant effect of Islamic affiliation to the preferred number of children can also be inflated due to the fact that a large sector of the Philippine population professing Muslim affiliation reside in the region with the lowest socioeconomic status in the country. Looking at the effect of a woman's experience on child mortality, her mean ideal number of children has a slight increase of 3.6% if she has lost one pregnancy. It is important to note, however, that child mortality rate is associated with rural settings. According to the Philippine National Demographic Health Survey (NDHS) in 2013, neonatal, infant, and under-5 mortality rate are all about twice as high in rural areas than in urban areas, suggesting consistency in the effect of urban settings.

It can also be seen that both the educational attainment of the respondent and her husband have a positive effect on the average desired number of children when

Table 7. Poisson Loglinear Model of Ideal Number of Children for Women Who Achieved Their Fertility Preference

Parameter		Estimate	Exponentiated Estimate	Standard Error	P-value
Intercept		0.7337	2.0828	0.0838	<.0001
Age in Years		0.0269	1.0273	0.0018	<.0001
Type of Residence (Rural as baseline)		-0.0669	0.9353	0.0276	0.0155
Islamic Affiliation (Non-Muslim as baseline)		0.3521	1.4221	0.0469	<.0001
Age in Years of First Cohabitation with Husband		-0.0314	0.9691	0.0034	<.0001
For Respondent: Higher Education (Secondary as baseline	No Education and Primary Education (Secondary as baseline)	0.0719	1.0745	0.0333	0.0311
	Higher Education (Secondary as baseline)	-0.0246	0.9757	0.0379	0.5163
For Husband: Higher Education (Secondary as baseline	No Education and Primary Education (Secondary as baseline)	0.0730	1.0757	0.0324	0.0240
	Higher Education (Secondary as baseline)	-0.0092	0.9908	0.0368	0.8033
Discussed Family Planning in the last 12 Months with Husband (Does not discuss as baseline)		0.0685	1.0709	0.0439	0.1191
Discussed Family Planning in the last 12 Months with Neighbor (Does not discuss as baseline)		0.0489	1.0501	0.0258	0.0577
Checks Email or Surfs the Internet at Least Once a Week (<0 a week as baseline)		-0.1007	0.9042	0.0357	0.0048

their highest level attained is either primary or higher education, as compared to if their highest educational attainment were high school (the baseline). In other words, no matter what the combination of the couple's highest educational attainment is, as long as they are from either primary or higher education, women would tend to want more children than they have now (in the case for those whose desired number of children is not achieved). Interestingly, unlike other studies which already consider educational level irrelevant due to the hypothesis that many women with lower levels of education also live in urban areas, and consequently are learning the norms and ways of those educated women around them (Rutstein, 1998), the case of the Philippines is different. Majority (70%) of women who have not achieved their fertility preference and whose highest level of education is at most primary education still actually live in rural areas. Further analyzing the results, a woman who starts living with her husband at an age 5 years older than another woman is to have an estimated mean ideal number of children 5.1% less than that of the other woman.

As much as the study aims to explore the relationship of women's empowerment variables with fertility preference, this study confirmed the claim of NDHS Philippines report in 2013, indicating that decision-making authority, measured by an index[2], is actually not found to significantly influence Filipino women's fertility preference. When the variables included in the index were considered as individual covariates, it was found that the decision with regards to family visits is significant. That is, there is a decrease of 5.62% in the woman's mean number of children desired, if her husband is the one who chooses when she can visit her family.

As for the remaining significant factors, the disagreement between the wife and the husband's ideal family size has a negative effect on the wife's ideal number, with a 3.06% decrease. In other words, if there is no consensus found between the couple, it is more likely that that the wife would want less children. Lastly, whether the woman has recently discussed family planning with her friends and neighbors and if she checks her email or surfs the internet once a week independently decrease the mean desired number of children by 2.82% and 3.92% respectively.

4.2.2 Among women who have achieved their ideal number of children

The following are the effects of each variable on the mean ideal number of children controlling for all other factors, now for the model for women whose ideal number was not met:

> for every 10 years added to the age, the mean ideal number of children has a higher increase of 27.3%. Islamic affiliation still has a relatively large effect of a 42.21% increase if she is Muslim, and women living in urban areas an effect of a 6.47% decrease.

As compared to the previous model where all four educational attainment variables for the man and woman were positive, this model's indicators for the highest attainment being higher than the baseline are negatively associated with the mean ideal number. The cases where the respondent and her husband's highest educational attainment are both primary have nearly the same significant positive effects of around 7% on the mean. The effects if either of them have an educational attainment higher than high school are not significant and have negative effects of a 2.43% and 0.92% decrease in the mean ideal number of children. This implies that if both the wife and the husband have higher education, it can lead to a further decrease in the woman's ideal family size. This is contrary to the previous scenario for women whose fertility preference is not achieved wherein both having higher

2 The index of decision-making is the sum of five items on who has the final say on decisions regarding health care, daily and major household purchases, family meals, and visits to her relatives, each dichotomized with a score of one if it is the husband alone and zero for all other responses (Basu, 2005).

education leads to around 2% increase. For this scenario, Becker and Lewis (1973) argued that even though couple with higher education can afford to want a large number of children, this may no longer be the case for couples who want to provide their children with a high quality of living.

As for the rest of the significant variables, a woman that is only a year older compared another woman when she first live-in with her partner has an estimated 3.09% decrease in her expected ideal number of children as compared to the other woman. Whether the woman has recently discussed family planning with her friends and neighbors now has a larger and positive effect of a 5.01% increase in the mean ideal number, rather than a negative effect as seen in the previous scenario. The version of this question where she instead discussed it with her husband is now much closer to being significant compared to the previous model where it hardly has any effect. Its positive effect is also higher than when a woman recently discussed family planning instead with a neighbor, with a 7.09% increase in the mean ideal number. It is interesting to note that even if the proportion of women who have discussed family planning is almost exactly the same for both groups of women who have and have not achieved their ideal number of children (around 10% of the women), the effect of these family planning awareness variables are much more significant for women who have achieved their fertility preference. However, while more family planning-related variables are significant in this scenario, their effects are rather contrary to what is expected. Lastly, if the respondent checks her email or searches the internet at least once a week is still significant except now with a larger negative effect of a 9.58% decrease in the mean ideal number of children.

4.3 Discussion of contraceptive intention and practice

Presented below is the summary of the resulting Akaike Criterion (AIC) and Schwarz criterion (SC) values when the logit, probit, and complementary log-log (CLL) links were used for each model.

Table 8. Comparison of the Use of Different Links per Model

	Users			Non-users, intention to use			Non-users, no intention to use		
	Logit	Probit	CLL	Logit	Probit	CLL	Logit	Probit	CLL
AIC	7168.02	7170.578	7184.79	4293.44	4310.30	4316.87	5082.12	5094.14	5091.25
SC	7307.66	7310.220	7324.44	4379.88	4396.75	4403.31	5195.17	5207.18	5204.29

Lower values of the AIC and SC indicate a better model fit, and it can be observed from Table 8 that for each model the ones using the logit link were superior compared to the other two links. The following are the multiplicative effects of each covariate, kept at 10% level of significance, on the estimated odds of a Filipino woman being a contraceptive user, non-user with intention to use

later, or non-user with no intention to use. While the effects of each variable to the estimated odds seem to be relatively small, it is important to note that this study does not aim to establish any causal relationship among these factors with fertility preference, but rather to explore and examine which variables are significant or not across cases, and how the contrast in dynamics between the scenarios give a clearer picture of the current condition of Philippines with regards to the contraceptive behavior of Filipino women who have not achieved their fertility preference.

Table 9. Analysis of Maximum Likelihood Estimates

Parameter Exponentiated Estimate		Users		Non-users, intention to use		Non-users, no intention to use	
		Pr > ChiSq	Exponentiated Estimate	Pr > ChiSq	Exponentiated Estimate	Pr > ChiSq	Pr > ChiSq
Intercept		0.0269	<.0001	15.2585	<.0001	0.0214	<.0001
*Age in Years		1.3307	<.0001	0.8700	<.0001	1.1483	<.0001
Age in Years2		0.9951	<.0001				
Islamic Affiliation		0.2605	<.0001	0.4453	<.0001	6.8305	<.0001
For respondent:	No Education and Primary Education	0.7829	0.0026			1.3938	0.0004
	Higher Education	0.9057	0.2082			1.1932	0.0442
For Husband:	No Education and Primary Education	0.8036	0.004				
	Higher Education	0.8232	0.0129				
*Number of Pregnancy Losses		0.9057	0.0505				
Age in Year of First Cohabitation with Husband		0.9606	<.0001	1.0997	<.0001		
*Ideal Number of Sons		0.9183	0.0095	0.8352	0.0001	1.2065	<.0001
*Discussed FP in the last 12 Months with	Husband	1.9425	<.0001			0.5248	<.0001
	Mother			1.3490	0.0435		
	Neighbor	1.3824	<.0001	1.3856	<.0001	0.5046	<.0001
Knows of any source of FP				0.0764	<.0001	0.2081	<.0001
Women Empowerment Index		1.0688	0.0903	0.9117	0.0506		
Beating justified if wife	goes out without telling husband	0.7687	0.0718			1.7372	0.0025
	neglects the children	1.1932	0.0686			0.6966	0.0043
	refuses to have sex with husband			1.8401	0.0198		
	argues with husband					0.5968	0.0184
*Number of living children		1.2141	<.0001	1.0807	0.006	0.7512	<.0001
*Gave birth in the last year		0.6707	<.0001	2.1289	<.0001	0.5569	<.0001
Difference in age between the couple		0.9752	0.0001			1.0361	<.0001
Wealth Index: Poor or poorest				1.3623	0.0003	0.8544	0.0789
Employed		1.1917	0.0039				
Watches TV at least once a week		1.2976	0.0002			0.7723	0.0038

The model for contraceptive users is found to have the highest number of significant factors among the three scenarios, while for the non-user, being much harder to capture, have fewer variables, wherein even main factors such as the woman's and her husband's educational attainment were removed. In the case of the Philippines, a parabolic relationship was found between the woman's age and the odds of her being a contraceptive user, but not with the odds of her being a non-user. Interestingly, while the type of residence was a significant determinant of a woman's ideal number of children, it was found to be largely insignificant in explaining her contraceptive behavior. Instead, a wealth quintile which was binned as poor or non-poor, was found to better explain a woman's non-usage. For exposure to media, only exposure to television was found to be significant. The main variables of interest, i.e. the women empowerment, spousal violence justification, and family planning awareness variables were now significant and found to have much higher effects on a woman's contraceptive usage than on her desired number of children. The significance and effects of these variables vary between the three cases.

4.3.1 Contraceptive user

Looking at the behavior of contraceptive users, a woman has higher odds of being a user only until the age of 29, when from then on she is more likely to be a non-user. For a woman that has only reached the primary level or has not received any schooling at all, the odds of her being a user is 0.78 times the odds of that of a woman who has reached the secondary level. Being a Muslim would have a large decrease of 73.95% in the estimated odds. Whether a woman's husband has no education, had reached only primary level, or had a higher education, the estimated odds of the her being a contraceptive user is less than that of a woman whose husband's educational attainment is at the secondary level. Whether she is employed or if she watches television at least once a week both have positive effects on the odds of her being a user. For a woman who started living with her husband at an age a year older compared to another woman, the estimated odds of her being a contraceptive user is 3.94% less than the odds of the other woman being a contraceptive user. A larger difference in the ages of a woman and her partner would negatively affect the odds of her using contraceptives. The experience of child mortality was also found to be significant in explaining the behavior of contraceptive users, with each increase in the number of losses decreasing the estimated odds of being a contraceptive user by 9.43%. Two other factors that are negatively associated with the odds of a woman being contraceptive user are her son preference and if she has given birth in the last year. As for family planning awareness, if the woman has discussed family planning with her husband the estimated odds of her being a user is almost two times more than the case if she had never discussed it. Talking to her neighbors about it also has a positive effect

on the odds of her being a user. The more empowered a woman is, the higher the estimated odds of her being a contraceptive user. Justifying being beat for going out without telling her husband, however, has a negative effect on the estimated odds.

4.3.2 Non-user, intention to use later

As for the behavior of non-users of contraceptives who intend to use later, demographic and income-related factors such as the woman's and her husband's education and her employment status are no longer significant, but postponement of cohabitation with husband remains to be so, with one year of postponement contributing to a 10% increase in the odds of a woman being a non-user who intends to use later. This possibly corresponds to the hypothesis that women who postpone cohabitation with their partner are less likely to be sexually active until their career is established (Liefbroer and Corijin, 1999). Should a woman belong to the poor sector of her community, the odds of her being a non-user but with intention to use increases by around 36.23%. Increase in age and family size, however, decreases these odds by 13% and 8%, respectively. The estimated odds of a woman being a non-user who intends to use is around two times the odds of that of a woman who has not given birth in the last year. Son preference of women also decreases the odds of them being non-users with intention by 16.48%. Women who have an Islamic affiliation are half as likely to be non-users with intention to use than those who are not Muslims. With regards to the family planning awareness factors, while exposure to television is not significant, the discussion of family planning with neighbors and the respondent's mother is significant, both increasing the odds by around 40%. Despite being non-users of contraceptives, knowledge of a source of family planning remains to be significant in explaining their behavior, but with a largely negative multiplicative effect on the estimated odds of 0.08. Interestingly, the effect of the justification of sexual abuse is significant only in this case, with the estimated odds being twice as likely as the odds of those who do not justify it. In addition, women who are empowered are also less likely to belong in this category with as much as 8.83% decrease in the odds per unit increase in the index.

4.3.3 Non-user, no intention

Like in the model for contraceptive users, age has a positive effect on the estimated odds of the woman being a non-user who does not intend to use. The woman's education is now significant, however her husband's remains to be insignificant. The estimated odds of the woman having no intention if she has reached primary level at most is 1.39 times that of a woman who reached the secondary level. If she has a higher education, the odds of her having no intention to use is also higher than if she had only reached the secondary level.

Interestingly, the factor that has the greatest influence for this case is a woman's Islamic affiliation. The odds of having no intention to use at all for a Muslim woman is six times that of if she were not Muslim. Further increasing a woman's odds to be a non-user with no intention to use is if she belongs to the poor or poorest sector or if she watches television at least once a week. Likewise, the more sons a woman desires and the larger the age difference between her and her partner, the higher the estimated odds that she has no intention to use. On the other hand, factors negatively affecting the odds of her being a non-user are if she gave birth in the last year and her current family size. Women who have not discussed family planning with either their husband or neighbors have two times the estimated odds of having no intention to use contraceptives than women who have. Knowing of a source of family planning decreases the odds by as much as 79.19%. For this case, despite the women empowerment index no longer being a factor, more spousal violence variables are significant. If a woman justifies beating for going out, the estimated odds have a large increase of 73.72%, however, if she justifies beating for neglecting her children or arguing with her husband, the effect on the odds is negative.

5. Conclusions and Recommendations

The factors influencing the ideal number of children for women who have not met their fertility preference and for those who have are found to be different. The factors from related literature such as age, Islam affiliation, and type of residence have all proven to be significant in both cases, however with effects of different magnitude. Out of these factors, Islamic affiliation has the most effect on a woman's mean ideal number of children regardless of whether she has achieved her fertility preference or not--constituting to as much as a 70% increase if she has unmet fertility preference.

Distinct factors found to be influencing ideal number of children of Filipino women who have not achieved their fertility preference include her experience with child mortality, whether the couple agrees on the ideal family size or not, and the decision maker for visits to the family. In general, the ideal number of children of women with achieved fertility preference is more affected by her age, career priority, family planning awareness, and exposure to internet. On the other hand, for the case of the women with unmet fertility preference, her ideal number of children is mainly affected by her Islam affiliation, experience with child mortality, disagreement with her husband on family size, and spousal violence justification. Instead of factors related to family planning, the ideal number of children for women who have unmet fertility preference is decreased by undesirable factors that suggest lack of women's empowerment (despite the women authority index being insignificant for both cases). It is suggested that for this particular set of women who have a more urgent need of family planning,

family planning programs should promote projects that help women cope with the emotional impact of pregnancy losses, and that help them hold the same sense of entitlement as their husband.

The effect of education for women who have achieved their fertility preference is also more consistent with literature: that if both the husband and wife have educational attainment higher than high school, the wife would want a lot fewer. This suggests difference in dynamics among couples who can afford a large family size (substitution effect by Becker, 1981) such that women who have achieved their fertility preference choose to limit childbearing, but women who have not achieved their fertility preference choose to desire more children. Furthermore, common factors in both cases that negatively influence mean ideal number of children, such as career priority and exposure to internet, have a much more negative effect in the ideal condition where women have achieved fertility preference. As in the National Health Demographic Survey (NDHS) report in 2013, this study did not find any influence of women authority index on the ideal number of children of Filipino women.

Contrary to the results when investigating the ideal number of children, family planning awareness, women empowerment, and justification of spousal violence were found to be significant factors in explaining contraceptive behavior. This study found that the range of factors that significantly characterize contraceptive use is more broad than that of non-use, which is arguably more difficult to capture. By comparing the results of the variables in each of the cases, interesting dynamics among some of the variables were observed.

In the case of the Philippine setting, a parabolic relationship was found between the woman's age and the odds of her being a contraceptive user, but not with the odds of her being a non-user, which portrayed a linear relationship. Furthermore, while the type of residence was a significant determinant of a woman's ideal number of children, it was found to be largely insignificant in explaining her contraceptive behavior. Instead, the division between poor and non-poor seem to better discriminate the contraceptive practice and intention of Filipino women with unmet fertility preference. In addition, contradictory to some related literature wherein the husband's education has larger influence on a woman's contraceptive practice, in the case of the Philippines, both the woman and her husband's education were found to have an almost equal significant effect on the odds of the woman being a contraceptive user.

Results also indicate that the more children a woman currently has, the more likely she is to be a current contraceptive user or a non-user with an intention to use. On the other hand, whether these women have given birth in the past year is negatively associated both in the odds of them being a contraceptive user and being a non-user with no intention to use, but is positively associated in the odds of them being a non-user with an intention to use. This suggests that Filipino women who do not have their ideal number of children are aware of

their limitations in childbearing and are not completely non-contraceptive users. There could be some factors hindering the realization of these women's intention to use contraceptives that they still end up being non-users. Results indicate that women belonging to the poor or poorest sector have the highest odds of being someone who have intention to use contraceptives but are non-users, suggesting that economic status indeed plays a large role in realizing women's intention to use contraceptives.

This study also gives insight into possible preconditions for women to use contraceptives. Discussion of family planning and exposure to television have positive effects on the estimated odds of a woman being a contraceptive user and a negative effect on the odds of her being a non-user. Knowledge of source of family planning also further decreases the odds of a woman to become a non-user of contraceptives.

The positive association between women's contraceptive use and the belief that one should be beaten for neglecting their child suggests that one of the intentions of women to use contraceptives and limit childbearing can be due to their desire to provide their children with a high quality of living (Becker and Lewis, 1983). On the other hand, the variable indicating the justification of spousal abuse due to the refusal of sex's positive association with the estimated odds of a woman with intention to use contraceptives suggests a relationship could exist between a woman's perception or experience of sexual abuse and her unfulfilled desire to use contraceptives.

The results from the study of the ideal number of children used alongside the additional insights provided by the examination of the contraceptive behavior of women whose fertility preference is not achieved can be used to better understand the current trends in fertility behavior of Filipino women. With these results, policy-makers may be able to create fertility behavior-related policies from an individual behavior point of view, and to implement family planning programs better tailored to meet the needs of the Filipino women, especially those who have unmet fertility preferences who may need them the most.

REFERENCES

ACHARYA, R. and SUREENDER, S., 1996, Inter-spouse communication, contraceptive use and family size: relationship examined in Bihar and Tamil Nadu. *The Journal of Family Welfare*, 42(4): 5-11.

ADSERA, A., 2005, Vanishing Children: From High Unemployment to Low Fertility in Developed Countries, *American Economic Review*, 95(2): 189-193.

ALAGARAJAN, M. and KULKARNI, P., 1998, Fertility differentials by religion in Kerala: A period parity progression ratio analysis, *Demography India*, 27(1): 213−227.

ALEGE, S.G., MATOVU, J., SSENSALIRE, S., and NABIWEMBA, E., 2016, Knowledge, sources and use of family planning methods among women aged 15-49 years in Uganda: a cross-sectional study, *The Pan African Medical Journal*, 24:39.

BAKHT, M. B., ARIF, Z., ZAFAR, S., and NAWAZ, M. A., 2013, Influence of Media on Contraceptive Use: A Cross-Sectional Study in Four Asian Countries, *Journal of Ayub Medical College Abbottabad*, 25(3-4), 3-8.

BASU, A.M., and KOOLWAL, G.B., 2005, Two Concepts of Female Empowerment: Some Leads from DHS Data on Women's Status and Reproductive Health, in Kishor, S., ed., *Calverton A Focus on Gender: Collected Papers on Gender Using DHS Data*, Calverton, Maryland: ORC Macro, pp. 15-54.

BECKER, G., and LEWIS, H., 1973, On the interaction between the quantity and quality of children. *Journal of Political Economy*, 81(2): 279–288.

BERRINGTON, A., and PATTARO, S., 2014, Educational differences in fertility desires, intentions and behaviour: A life course perspective, *Advances in Life Course Research*, 21: 10–27.

BHENDE, A.A., CHOE, M.K., RELE, J.R., and PALMORE, J.A., 1991, Determinants of contraceptive method choice in an industrial city of India, *Asia-Pacific Population Journal*, 6(3):41−66.

CALDWELL, J.C. and CALDWELL, P., 1987, The cultural context of high fertility in sub-Saharan Africa. *Population and Development Review*, 13(3): 409−437.

CASTERLINE, J. B. and SINDING, S. W., 2000, Unmet Need for Family Planning in Developing Countries and Implications for Population Policy, *Population and Development Review*, 26: 691–723.

DAS, N.P. and PADHIYAR, A.C., 1991, A model to study socio-cultural determinants of fertility: An extension of Bongaarts model, *Journal of Family Welfare*, 37(1): 30−41.

DAS, N.P. and PANDEY, D., 1985, Fertility differentials by religion in India: An analysis of 1971 census fertility data, *Canadian Journal of Population*, 12(2): 119−136.

DAS, K. C., GAUTAM, V., DAS, K., and TRIPATHY, P. K., 2011, Influence of age gap between couples on contraception and fertility, *The Journal of Family Welfare*, 57(2): 30-38.

DAVIS, K., 1963, The Theory of Change and Response in Modern Demographic History, *Population Index*, 29: 345-366.

FAYISETAN, B., and CASTERLINE, J. B., 2000, Fertility preferences and contraceptive change in developing countries, *International Family Planning Perspectives*, 100-109.

FREEDMAN, R. and BLANC A., 1992, Fertility Transition: An Update, *International Family Planning Perspectives*, 18: 44-50.

GAGE, A.J., 1995, Women's Socioeconomic Position and Contraceptive Behaviour in Togo, *Studies in Family Planning*, 26(5): 264-277.

GANDOTRA, M.M., RETHERFORD, R.D., PANDEY, A., LUTHER, N.Y., and MISHRA, V.K., 1998, Fertility in India, National Family Health Survey Subject Reports No. 9, Mumbai: International Institute for Population Sciences; and Honolulu: East-West Center.

GHOSH, A.K., and DAS, N.K., 1990, Fertility and adoption of family planning among the Muslims of 24 Paraganas West Bengal. *Journal of Family Welfare*, 36(1): 32−42.

GORDON, C., SABATES, R., BOND, R., and WUBSHET, T., 2011, Women's education and modern contraceptive use in Ethiopia, *International Journal of Education*, 3(1): 1948–5476.

HAMEED, W., AZMAT, S. K., ALI, M., SHEIKH, M.I., ABBAS, G., and TEMMERMAN, M., 2014, Women's Empowerment and Contraceptive Use: The Role of Independent versus Couples' Decision-Making, from a Lower Middle Income Country Perspective, PLoS ONE, 9(8): e104633.

HIRSCHMAN, C., 1994, Why Fertility Changes, *Annual Review of Sociology*, 20: 203-233.

IYER, S., 2002, Religion and the Decision to Use Contraception in India, *Journal for the Scientific Study of Religion*, 41(4): 711-722.

ISIUGO-ABANIHE, U., 1994, The socio-cultural context of high fertility among Igbo women. *International Sociology*. 9(2): 237-58.

JOHNSON, N.E., 1993, Hindu and Christian fertility in India: A test of three hypotheses, *Social Biology*, 40(1−2): 87−105

KANG'OMA, S., 2004, Fertility Preferences and Unmet Need for Family Planning, in National Statistical Office - NSO/Malawi and ORC Macro, Malawi Demographic and Health Survey 2004, Calverton, Maryland: NSO/Malawi and ORC Macro, pp. 109-121.

KRITZ, M., MAKINWA, P., and GURAK, D., 2000, Wife's Empowerment and Reproduction in Nigeria, in Presser, H., and Sen, G., eds., *Female Empowerment and Demographic Processes: Moving Beyond Cairo*, London: Oxford University Press, pp. 239-260.

LARSSON, C., and STANFORS, M., 2014, Women's education, empowerment, and contraceptive use in sub-Saharan Africa: findings from recent demographic and health surveys, *Etude de la Population Africaine*, 28(2): 1022-1034.

LIEFBROER, A., and CORIJIN, M., 1999, Who, what, and when? Specifying the impact of educational attainment and labour force participation on family formation, *European Journal of Population*, 15(1): 45–75.

MAHMOOD, N., and RINGHEIM, K., 1996, Factors affecting contraceptive use in Pakistan, *The Pakistan Development Review*, 35(1): 1-22.

MISTRY, M., 1999, Role of religion in fertility and family planning among Muslims in India, *Indian Journal of Secularism*, 3(2): 1-33.

NOTESTEIN, F., 1953, Economic problems of population change, Proceedings of the International Conference of Agricultural Economists, London: Oxford University Press: 13-31.

OMONDI-ODHIAMBO, 1997, Men's participation in family planning decisions in Kenya, *Population Studies*, 51(1): 29-40.

PARABRICA-COSTELLO, M., and CASTERLINE, J.B., 2009, Fertility decline in the Philippines: Current status, future prospects, in Completing the fertility transition, United Nations New York: Population Bulletin of the United Nations Nos. 48/49, pp. 479-486.

RANGANEKAR, G., SAPRE, S., and SINGH, H., 1987, K.A.P. survey of contraception in Bhopal and surrounding villages, *Indian Journal of Medical Sciences*, 41(6):119−123.

RETHERFORD, R. D., and MISHRA, V. K., 1997, Media exposure increases contraceptive use, *National Family Health Survey Bulletin*, 7(7):1-4.

ROSS, J. A., and WINFREY, W. L., 2001, Contraceptive Use, Intention to Use and Unmet Need During the Extended Postpartum Period, *International Family Planning Perspectives*, 27(1): 20–27.

RUTSTEIN, S.O.,1998, Change in the desired number of children: A cross-country cohort analysis of levels and correlates of change, DHS Analytical Reports No. 9, Calverton, Maryland: Macro International Inc.

SARVESTANI, A., AHMADI, A., ENAYAT, H., and MOVAHED, M., 2017, Level and Factors Related to Unintended Pregnancy with a Brief Review of New Population Policies in Iran, *Iranian Journal of Public Health*, 46(7): 973-981.

SATYAVADA, A., and ADAMCHAK, D. J., 2000, Determinants of current use of contraception and children ever born in Nepal, *Social Biology*, 47(1-2): 51-60.

SHARIFF, A., 1995, Socioeconomic and demographic differentials between Hindus and Muslims in India, *Economic and Political Weekly*, 30(46): 2947−2953.

SHARMA, A. K., 1994, Muslim fertility in urban U.P.: A qualitative study, *Demography India*, 23(1−2): 41−49.

SINGH, K.P., 1988, Religion and fertility: A study in differentials, *Population Geography*, 10(1−2): 18−27.

SRIVASTAVA, J.N., and SAKSENA, D.N., 1989, Hindu-Muslim differentials in family size ideals by socio-economic status, *Journal of Family Welfare*, 35(4): 38−48.

TULADHAR, S., KHANAL, K.R., LILA, K.C., GHIMIRE, P.K., and ONTA K., 2013, Women's Empowerment and Spousal Violence in Relation to Health Outcomes in Nepal: Further analysis of the 2011 Nepal Demographic and Health Survey, Calverton, Maryland, USA: Nepal Ministry of Health and Population, New ERA, and ICF International.

UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, POPULATION DIVISION, 2015, *Trends in Contraceptive Use Worldwide 2015*, New York: United Nations.

WESTOFF, C., 2010, *Desired Number of Children: 2000-2008, DHS Comparative Reports* No. 25, Calverton, Maryland, USA: ICF Macro.