

# **AN EFFECT OF SOCIODEMOGRAPHIC VARIABLES ON CHILD SPACING IN YEREVAN**

**Master of Health Thesis Project Utilizing Professional Publication Framework**

INNA KHACHIYAN, MPH Candidate

College of Health Sciences

American University of Armenia

**Primary Advisor: Dr. Susan McMarlin**

**Secondary Advisor: Dr. George Jakab**

Yerevan, Armenia

October 2005

Acknowledgements .....	ii
Executive Summary .....	iii
1. Brief summary.....	1
2. Literature review .....	2
3. Methods and materials .....	6
3.1 Data collection .....	7
3.2 Study variables .....	7
3.3 Sample size calculations .....	8
3.4 Survey Instrument .....	9
4. Survey administration.....	9
5. Ethical considerations .....	9
6. Statistical Analysis .....	10
7. Results .....	10
Descriptive findings .....	10
7.1 Age.....	10
7.2 Education. ....	11
7.3 Household expenditures .....	11
7.4 Employment.....	11
7.5 Number of people in the household .....	12
7.6 Parity.....	12
7.7 Factors affected spacing between last child and the child before .....	12
7.8 Contraception.....	12
7.9 Minimum length of time between the birth of a child and the beginning of a new pregnancy. ....	13
8. The prevalence of women who have IPI less than three years between last child and child before .....	13
9. Results of Regression Analysis.....	13
10. Discussion.....	13
11. Limitations .....	15
12. Conclusions and Recommendations .....	16
References:.....	18
Tables.....	21
Figures.....	25
Appendix 1 Oral Consent form in Armenian for the participants .....	29
Appendix 2 Oral Consent form in English for the participants .....	30
Appendix 3 Questionnaire in Armenian .....	31
Appendix 4 Questionnaire in English.....	37

### *Acknowledgements*

I would like to express my deep gratitude to my advisors Drs. Susan McMarlin and George Jakab for their support, insightful comments and helpful suggestions.

I want to express my appreciation to Dr. Haroutune K. Armenian and the whole Public Health faculty members for their effective teaching.

Many thanks to B.Grace Sullivan for her helpful advice and assistance.

I am grateful to teacher associate Yelena Amirkhanyan for support and valuable advices during all studying process.

I want to express my thanks to the heads of the policlinics and maternity houses for their assistance during accomplishment of this project.

I would like to express my gratefulness to my family for their support and encouragement.

### *Executive Summary*

Interpregnancy interval (IPI) is the time (in months) between the initiation of the current pregnancy and the last live birth. A short interpregnancy interval has been identified as potentially being a risk factor for adverse birth outcomes. The identification of modifiable causal factors is an essential first step in any primary prevention program. Adverse birth outcomes closely associated with foetal and neonatal mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life.

A cross-sectional analytical survey was conducted in Yerevan in order to compare interpregnancy intervals among different sociodemographic groups of Yerevan women and to determine the distribution of interpregnancy intervals among women of Yerevan. Sample size was calculated taking into consideration that 48 percent of urban women has less than 3 year spacing between births. Systematic random sampling was used to select the study population (n=115).

The percentage of respondents who have interpregnancy intervals less than three years was 51.9 percent versus 48.0 percent of those with interpregnancy intervals more than three years between last two children. The mean birth interval was 41.12 months.

Regression analysis showed that only age was statistically significant predictor of the interpregnancy interval (P=0.0375, 95% CI 1.00, 1.15). Other sociodemographic factors such as income level, education, employment did not reach 5 percent significance level.

Given that age was the only one predictor of child spacing it is very important to inform young women to space three years until initiation of the next pregnancy. Communication campaigns should be implemented using a 3-year spacing message. Messages can emphasize that waiting 3 years between births clearly improves child survival, while waiting even longer is even

better. Also it could be suggested that a woman should use contraception until her youngest child is two to four years of age. Family planning and maternal and child health care providers should work together to help women achieve their preferred birth intervals.

### *1. Brief summary*

Interpregnancy interval (IPI) is the time (in months) between the initiation of the current pregnancy and the last live birth (Fuentes-Afflick & Hessol, 2000). A short interpregnancy interval is an IPI in which the subsequent pregnancy is initiated within 12 months after delivery of the previous child (Fuentes-Afflick & Hessol).

Adequate child-spacing is positively associated with the health of mothers and their children (Al-Nahedh, 1999). Interpregnancy interval has considerable impact on the children further physical and mental capability (Martin, 1979).

Not much is known about the actual biological and behavioral mechanisms responsible for the relationship between birth spacing and child survival. However, the adverse consequences of a short interval for infant and child survival and maternal mortality and morbidity have been attributed to the biological effects related to the “maternal depletion syndrome”; or, more generally the woman not fully recuperating from one pregnancy before supporting the next one. (Conde-Agudelo & Belizan, 2004).

A short interpregnancy interval has been identified as potentially being a risk factor for adverse birth outcomes (Kallan, 1996). The identification of modifiable causal factors is an essential first step in any primary prevention program.

As a result of shorter pregnancy intervals, Kramer (1987) associates the following adverse birth outcomes: low birth weight, less than 2,500 grams; preterm birth or a birth before 37 weeks of gestation; and small size for gestational age. These factors are in turn influenced by interpregnancy intervals, by variety of social and behavioral characteristics including socio-economic status, maternal age, rates of prenatal care, smoking, substance abuse, and stress, infections, pre-pregnancy weight and height of mother (Belsey, 1976).

Low birth weight (LBW) defined as a birth weight less than 2,500 grams, remains a significant public health problem in many parts of the world and is associated with a range of both short- and long-term adverse consequences. Low birth weight is closely associated with foetal and neonatal mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life (Barker, 1992).

According to Alexander (1998), preterm birth is a gestational age less than 37 completed weeks (or less than 259 days). Preterm birth is one of the most important causes of perinatal mortality in the world (Berkowitz, Papiernik, 1993). In addition, it is responsible for nearly half of all cases of congenital neurological disability, including cerebral palsy (Goldenberg, Rouse, 1998). The primary prevention of preterm birth is therefore a major public health goal.

## *2. Literature review*

Many studies have shown the importance of the length of preceding birth intervals for the survival chances of young children. In particular, the existing literature shows the evidence that the risk for adverse birth outcomes is lowest when the interpregnancy interval is between two and four years and increased when the interval departed from 2 and 4 years (Spratley & Taffel, 1981). Kallan (1996) points out associations between interpregnancy intervals and adverse birth outcomes such as low birth weight, preterm birth, and small size for gestational age.

In 1999, three studies were conducted in Utah of the US (Zhu, Rolfs, Nangle, & Horan). They evaluated the interpregnancy interval in relation to low birth weight, preterm birth, and small size for gestational age by analyzing data from the birth certificates of 173,205 singleton infants born alive in Utah from 1989 to 1996. In all three studies J-shaped relationship between interpregnancy interval and birth outcomes were observed. The researchers found that the

optimal pregnancy spacing for preventing low birth weight, preterm birth, and small size for gestational age is 18-23 months (Zhu, Rolfs, Nangle, & Horan).

Klerman (1998) showed that the shorter the time interval between pregnancies, the greater the likelihood of preterm birth in the second pregnancy (Klerman, et al.). The study shows that women with only 13 weeks between delivery of the first child and conception of a second child had nearly double the rate of preterm delivery of the second child than women who did not get pregnant again until 104 weeks or longer after the first child was born. Other problems associated with birth intervals less than nine months are the following: maternal deaths, third trimester bleeding, premature rupture of membranes, and anemia (CATALYST Consortium, 2002). Researchers suggest that one or more years between pregnancies are essential for the restoration of adequate maternal nutritional resources in healthy pregnancies (Klerman, et al.).

In retrospective cohort study done in Scotland researchers examined 89,143 women having second births in 1992-1998 who conceived within five years of their first birth. The main finding of the study is that short interpregnancy interval is an independent risk factor for preterm delivery and neonatal death in the second birth (Smith, Pell, & Dobbie, 2003).

The purpose of another study conducted in Denmark was to examine low birth weight and preterm birth after short interpregnancy intervals (Basso, Olsen, Knudsen, & Christensen, 1998). Researchers studied a cohort of a register-based random sample of women who had at least two live births in Denmark between 1980 and 1992. They concluded that short interpregnancy intervals were associated with an increased risk of premature delivery. This risk should be taken into account when planning a new pregnancy (Basso, et al).

Almost all previous studies located by the author have shown the evidence that 18-23 months spacing is a positive factor for the health of both mothers and children. However, in

2002 the CATALYST Consortium, a global reproductive health agency associated with the U.S. Agency for International Development, announced the results of new research. Their studies have found “there is an *optimal* interval for birth spacing- a period associated with the lowest risks for adverse health outcomes-and that optimal interval is three to five years (Catalyst Consortium, 2002). Their birth spacing research concluded that three to five year intervals would save more lives. Compared to 24-29 months intervals the new recommendations would result is the following: 26 percent reduction in neonatal deaths, 43 percent reduction in infant deaths, and 51 percent reduction in under five deaths (CATALYST Consortium).

If women spaced birth from three to five years, in India, for example, infant mortality would drop 29 percent, under age five mortality would drop 35 percent, deaths to children under age five would fall by 1,434,000 annually (Faramand & Diallo, 2003). In Egypt, infant mortality would drop 35 percent under age five mortality would drop 45 percent, deaths to children under age five would fall by 109,000 annually (Faramand & Diallo).

The relationship of sociodemographic variables and child spacing was shown in a study carried out in rural Saudi Arabia (Al-Nahedh, 1999). A cross-sectional study with a sample of 322 women) was conducted in rural Saudi Arabia. The purpose was to examine the effect of age, educational level, type of infant-feeding, parity, and other variables on child spacing. Researchers found that birth intervals significantly increase with age and level of education of mothers. Older women, 35 years and older, were 19 times more likely to have a long birth interval. Mothers with more than secondary education had longer birth intervals (Al-Nahedh).

*Armenia:*

The problem of birth spacing is also evident for Armenia. In Armenia, the percentage of women who have birth intervals less than three years is 48 percent in urban area and 63 percent in rural (Demographic and Health Surveys 2000). In Armenia the infant mortality rate is 10.7 per 1,000 live births (National Statistical Service, 2005). In addition, low birth weight account for seven percent in Armenia (UNICEF Global Database, 2001)

*Study:*

Taking into consideration that all previous studies showed a significant association between short interpregnancy intervals and adverse birth outcomes, this study will be conducted in Yerevan, in order determine child-spacing information among Yerevan women with regards to sociodemographic factors.

Based on previous studies it is expected that age, education, income, employment and household crowding can affect interpregnancy spacing among Yerevan women (AI-Nadhedh, Melki et al)

*Research aim and objectives*

The aim of the study was to identify target population for future educational program. The objectives of the proposed cross-sectional survey were the following:

The objectives of the proposed cross-sectional survey were the following:

- To determine the distribution of interpregnancy spacing among a sample of women living in Yerevan.
- To identify the influence of age, income, education and employment on interpregnancy intervals of women of the sample.

The research questions of the study were:

1. What is the proportion of Yerevan mothers with interpregnancy intervals less than three years?
2. What is the association between birth spacing and ages of the women?
3. What is the association between birth spacing and income level?
4. Is there an association between birth spacing and education?
5. Is there an association between birth spacing and employment ?

### *3. Methods and materials*

A cross-sectional analytical survey was conducted in Yerevan in order to compare interpregnancy intervals among different sociodemographic groups of Yerevan women.

The target population was women with two children in Yerevan. The study population was women randomly selected out of archives of three randomly selected policlinics and maternity homes of Yerevan, who had at least two children. Random number generator selected policlinics from the complete list of policlinics and maternity homes of Yerevan.

Inclusion criteria are the following: All registered women 18-45 years old with at least two children, whose names are randomly drawn from the card index, have contact information, voluntarily agree to complete the questionnaire will be accepted into the study.

Exclusion criteria are the following: women less than 18 and more than 45 years old, having only one child, unwilling to participate, have no contact information.

Rationale for choosing the age range between 18-45 years is that these ages are considered as childbearing age range (Reddy, 2003). Also, this range was chosen in order to avoid memory bias in reporting the interval between the current and previous children.

### *3.1 Data collection*

Data on all women were collected prospectively at selected maternity homes and primary care polyclinics located in Yerevan. After the selection of the polyclinics, archives of the previous five years were used in order to determine the sample frame. Systematic random sampling technique was used to select respondents. Systematic random sampling is chosen in order to provide an equal probability for each registered woman to be selected. Therefore, the sample is felt to be representative of the target population.

### *3.2 Study variables*

The dependent variable is interpregnancy interval, which was measured by nominal scale (birth intervals less than three years and birth interval more than three years between last child and child before).

Independent variables are age, education, income, employment, marital status, number of pregnancies, miscarriages, stillbirths, number of live births, number of living children, number of abortions, number of people residing in the household, pregnancy choice (was it planned or not planned), factors affecting spacing between two children, and the use of contraceptive methods prior to each pregnancy.

For more the comprehensive analysis some variables were created. The last inter-pregnancy spacing was defined, as the number of months between last two deliveries. The variable “Outcome” was created by using question 7 (Appendix 3 &4).

In order to describe factors affecting space between last child and child before three new variables were created. Variable “fact 1” represents the choice of the respondent of desire to have next child versus failed birth control and breastfeeding, no menstrual period. Variable “fact 2” represents the choice of the respondent of failed birth control factor versus desire to have next

child and breast feeding, no menstrual period. Variable “fact 3” is the choice of breast feeding, no menstrual period factor versus failed birth control and desire to have a next child factors.

These variables were created based on question 8 (Appendix 3 &4).

Variable “nppl2” is describing number of people residing in the household. The continuous variable was re-grouped into four distinct categories: (1) 1-3, (2) 4-6, (3) 7-9, (4) >10. This variable was created based on the question 8 (Appendix 3 &4).

### *3.3 Sample size calculations*

The sample size is calculated taking into consideration main outcome of the study: interpregnancy interval, which is binary data.

For binary data:

$$n = z^2 * pq / d^2$$

For this study power was predicted to be 80 percents,  $z=1.96$  for CI 95%,  $p$  is the proportion of those who have desired characteristics,  $q=1-p$  proportion of those who do not have desired characteristics,  $d^2$  is expected difference the true population and the study population that researcher may accept (Aday A. 1996).

Taking into consideration data of Demographic and Health Survey 48 percent of urban women has less than 3 year spacing between births,  $p$  value will be equal to 0.48 and  $q=0.52$ .

$$n = 1.96^2 * 0.48 * 0.52 / 0.1^2 = 96$$

The response rate is predicted to be about 80 percent, since the subject of this study could be interesting for women and questionnaire will be self-administered and short. Therefore the sample size should be increased to 115 ( $96 * 0.2 + 96$ ).

### *3.4 Survey Instrument*

The survey instrument is a self-administered questionnaire. Some questions of the questionnaire were adapted from Demographic and Health Survey (Armenia, 2000), “Armavir Household Health Assessment: Follow-up 2004”. The questionnaire included items about the demographic characteristics of mothers plus their fertility history, breastfeeding habits, household crowding and birth spacing. The questionnaire consisted both from close and open-ended questions. The questionnaire was translated into Armenian and adapted for cultural peculiarities. The main language of survey was Armenian.

Questionnaires were distributed by the researcher. The respondents were provided with information about the nature and importance of the study, the ways in which the information will be used, and risk/benefit. In addition, the respondents were asked about their willingness to participate and were informed about the duration of the interview. The questionnaire was pre-tested. Eight women from Yerevan participated in the pre-test. They were not from the research sites. No difficulties or problems occurred during the pre-test.

### *4. Survey administration*

Data collection started on 25<sup>th</sup> of July and finished on 6<sup>th</sup> of September 2005. Data collection was performed in polyclinics, maternity houses and houses of the respondents. The completed questionnaires were reviewed and entered into SPSS software.

### *5. Ethical considerations*

The IRB of the American University of Armenia approved this study. Participants of the study were fully informed about the purpose of the study. Subjects were not obligated to participate, and they were free to drop out at any time. Confidentiality of respondents and of their provided information was assured. All identifiers such as name, surname and telephone

number were deleted after the data collection was completed. Therefore, it would not be possible to identify any participant by the questionnaire. Prior to beginning of each interview, an oral consent form was provided to each participant in Armenian language. There were no incentives provide for participation other than to assist with generating research data on the study topic. There was no direct benefit from this study; however the results of this survey will allow highlighting target populations for the future educational programs.

#### *6. Statistical Analysis*

Statistical analysis was performed using SPSS 11.0 and Stata 7.0 software. Descriptive analysis was done to describe the overall population and the sociodemographic characteristics of the participants. Binary logistic regression was done to estimate the association between outcome variable (interpregnancy intervals) and independent variables using odds ratios (OR) with 95% confidence intervals (CIs).

#### *7. Results*

Of 115 contacted women 13 refused to participate. The *response rate* was 88 percent.

##### *Descriptive findings*

##### *7.1 Age.*

The mean age of respondents was 34.7 years (SD 5.96). The age range was from 24-45 years. Out of all respondents, 51.1 percent were younger than 35 years and 49 percent were above 35 years (Figure 2). Those women who have IPI less than 36 months with the increase of age tend to space longer.

However, the interpregnancy interval was not significantly differ across age groups (P=0.904).

### *7.2 Education.*

Thirty three percent of the respondents had higher education and 44.1 had professional technical education (Figure 3). Among those who have IPI less than 36 months 47.17 percent have professional technical education. Whereas, 39.58 percent of those who spaced more than 37 months have higher education at university level. The percentage of the IPI did not differ by the level of respondents' education ( $P=0.63$ ) (Table 1).

### *7.3 Household expenditures*

Almost five (4.9) percent of respondents mentioned spending less than 25,000 drams monthly, however, 21.6 percent indicated they spent 100,000 – 200,000 drams monthly (Figure 4). Among those who have IPI less than 36 months, 28.9 percent spent from 100,001 to 20,000 drams monthly.

Women who have IPI less than 36 months tend to space less with the increasing of household expenditures (57.1 percent who spend more than 200,001 drams monthly tend to space less than 3 years). IPI did not significantly differ by household expenditures ( $P=0.22$ ) (Table 2)

### *7.4 Employment.*

Fifty percent of the respondents and 22.5 percent of their husbands were mentioned as unemployed.

Those who are employed full time comprised 27.5 percent, and approximately one-half of the respondents were unemployed. Among those who are not observed as having IPI less than 36 months, 48 percent are unemployed. The percentage of those not spacing was higher among those who were employed part time (63.6 percent). There is no statistically significant difference in percentages of employment with regards to the IPI ( $P=0.85$ ). (Table 1)

### *7.5 Number of people in the household*

The mean number of people living in household was 5.26 (SD1.89, range of 3-12).

The percentage of those spaced less than 36 months increase with the increasing number of people in the household (Table 3).

### *7.6 Parity*

The mean birth interval of 102 women was 41.11 (SD 31.15). Parity or the number of live birth was distributed as follows: two children 76.5 percent, 3 children 21.6 percent and 4 children 2 percent. The mean number of children is 2.22 (SD 0.52). The percentage of those spaced less than 36 months decrease with the increasing number of children. No statistically significant association was observed between parity and the IPI (P=0.80)

### *7.7 Factors affected spacing between last child and the child before*

The most common factor affected interval between last child and the child before was “Desire to have next child” (58 percent), 24 percent was due to failed birth control, 12 percent breast feeding, no menstrual period. 91.7 percent of those spaced less than 36 months rely on lactational amenorrhea method as a contraceptive method (Figure 5). None of the three factors have statistically significant association with interpregnancy interval itself. “Failed birth control” (P=0.52), “Desire to have next child” (P=0.60), “Breast feeding, no menstrual period” (P=0.95).

### *7.8 Contraception*

The percentage of the respondents who used contraceptives methods was 62.7. The most commonly used contraceptive methods is intrauterine device (IUD) (22.5 percent), followed by condom 18.6 percent, rhythm method (14.7) and withdrawal (8.8 percent). There were no

statistical differences among spacing and the type of contraceptive methods used by the respondents.

#### *7.9 Optimal time between the birth of a child and the beginning of a new pregnancy.*

Around fifty four percent of the respondents answered that the optimal length between the birth of a child and the beginning of a new pregnancy is from two and half years to three years, 2.9 percent reported that the optimal length between two pregnancies is less than one year, 26.5 percent answered that optimal length is from one year to two years.

#### *8. The prevalence of women who have IPI less than three years between last child and child before*

The percentage of respondents who have IPI less than three years was 51.9 percent versus 48.0 percent of those who have IPI more than three years between last two children. (Figure1). Mean birth interval was 41.12 months.

#### *9. Results of Regression Analysis*

##### *The Effect of Socio-demographic Indicators*

Level of education, employment of both respondent and husband, number of people residing in the household, factors affecting child spacing, contraception, parity, marital status were not significantly associated with the interpregnancy interval (Table5).

Only age was statistically significant predictor of the interpregnancy interval ( $P=0.0375$ , 95 % CI 1.00, 1.15) (Table 4).

#### *10. Discussion*

This study was conducted in Yerevan taking into consideration that 48 percent of women in urban area have interpregnancy interval less than three years (Demographic and Health Surveys 2000).

The birth interval of three years has a significant positive effect on birth weight of the children and as a result decreases the risk of child mortality and morbidity. In Armenia, low birth weight is accounted seven percent, which is lower than in Azerbaijan, Brazil and Egypt (UNICEF Global Database). In Armenia, the infant mortality rate is 10.7 per 1,000 live births (National Statistical Service, 2005).

This study revealed that 52 percent of women have IPI less than three years. Although 52 percent of inadequate spacing may seem not so optimistic; however this factor may be responsible for decline in child mortality and morbidity in Armenia in recent years (Armenia Demographic and Health Survey, 2000).

The sample of this survey was women 20-44 years old. This age range is considered as childbearing period, thus sample is young and can be representative of Yerevan women population.

The present study provides information on sociodemographic factors associated with child spacing in Armenia.

Age was a significant predictor of the interpregnancy interval. Like in the study conducted in Saudi Arabia it can be assumed that interpregnancy interval increased with the age of mothers (Al-Hahedh). This fact is not surprising because most of the mothers still rely on lactational amenorrhea method as contraceptive method and others reached their desired number of children.

It was found that 33 percent of the respondents had higher education and 50 percent of their husband had higher education. This fact talks about cultural features. In Armenia almost every young boy or girl after finishing the school are obligated to enter the university. Surprisingly, educational level was not associated with the child spacing unlike the study of

Saudi Arabia (Al-Nahedh), where mothers with more than secondary education had longer child spacing.

Study conducted in American University of Beirut found that inter-pregnancy spacing increased with higher levels of household crowding (Melki et al). However, in the current study number of people in the household was not also significantly associated with the IPI.

The CATALYST Consortium, a global reproductive health activity of the Center for Population, Health, and Nutrition of USAID, recommends a 3-5-year birth spacing for improved maternal and child health. The current median interval in Yerevan, Armenia, is more than recommended cut-off, which may lower perinatal health risks. However, certain high-risk groups still exist in this population, especially women who currently have no live children and those who are recuperating from a premature termination of pregnancy, such as abortion, miscarriage, or stillbirth.

As strengths of this study high response rate and random sampling could be considered.

### *11. Limitations*

Methods of data collection can introduce bias, due to participants' attitude to the survey and due to data entry processes. The results also can be biased due to the questionnaire design. Questionnaire was not validated.

Another limitation could have been excluding women with only one child. These women may be aware and practicing appropriate spacing recommendations.

Also, the wide spread use of abortions in the country could also have skewed the results (Robert Johnston, 2005). Women who became pregnant shortly after the birth of another child may have elected to have had an abortion.

In addition, because of the cross sectional nature of the study, no clear cut causal association between socio-demographic factors and inter-pregnancy spacing can be deduced.

### *12. Conclusions and Recommendations*

This study was first step in investigation of child spacing information in Yerevan. One of the important findings of this study was that the majority of Yerevan women reported that the minimum length between the birth of a child and the beginning of a new pregnancy is two and half to three years. Taking into consideration that improving knowledge regarding optimal birth spacing among Yerevan women may decrease percentage of those who spaced less than three years, it is recommended:

- To implement educational campaigns using a three to five years spacing message.

Messages can emphasize that waiting 3 years between births clearly improves child survival, while waiting even longer is even better. In addition, it could be suggested that a woman should use contraception until her youngest child is two to four years of age. Family planning and maternal and child health care providers should work together to help women achieve their preferred birth intervals. Increasing the age at marriage, along with family planning and adequate spacing would go a long way to decrease the percentage of not adequate birth spacing (less than 36 months).

This educational campaign should be implemented for general population also because it is well known that parents in Armenia put a lot of pressure on young couple to start having children as soon as possible.

Since 26 percent of women reported that optimal space between births is one to two years it is recommended:

- To initiate research on the level of knowledge regarding optimal birth spacing among Yerevan women.

As the survey revealed that age was the only one predictor of child spacing, it is very important :

- To inform young women to space three years until initiation of the next pregnancy.

Another point in that, in order to determine what other factors could correlate with birth spacing of Yerevan women it would be more helpful to conduct a qualitative study. Qualitative study is recommended, since discovering of new issues regarding birth spacing may raise some sensitive issues, which could be released only by in-depth interviews or focus group discussions.

Since this survey was conducted to determine interpregnancy intervals between last child and the child before, it is recommended:

- To initiate research on factors affecting IPI of first two children.

In addition, given that this kind of study was initiated in Armenia first time and only in Yerevan, it is recommended to:

- To conduct a study in marzes of Armenia, in order to have a data on marzes regarding IPI of rural women and compare the data with the results of this survey.

Finally, cross-sectional design did not allow us to report causality. Further research of knowledge of causal factors that could result in interpregnancy intervals is necessary.

*References:*

- Aday, A. (1996). *Designing and conducting health surveys (2<sup>nd</sup> ed.)*. San Francisco: Jossey-Bass Publishing Company.
- Alexander, GR. (1998). *Preterm birth: etiology, mechanisms and prevention*. *Prenat Neonat Med*; 3:3-9.
- AI-Nadhedh N.N.N. (1999), *The effect of sociodemographic variables on child-spacing in rural Saudi Arabia, Volume 5, Issue1, Page 136-140*, Retrived 12.07.05 from [http://hit-sweb.who.int\\_base\(http://www.emro.who.int.Publications/EMHJ/0501/\):20.htm](http://hit-sweb.who.int_base(http://www.emro.who.int.Publications/EMHJ/0501/):20.htm)
- Basso, O., Olsen, J., Knudsen LB., Christensn K., (1998) *Low birth weight and preterm birth after short interpregnancy intervals, Danish Epidemiology Science Centre*.
- Barker,D.J.P.(1992). *Fetal and infant origins of disease, BMJ Books, London*.
- Belsey, MA. (1976). *The epidemiology of infertility. Bulletin of The WHO, 54: 319-341*
- Berkowitz GS, Papiernik E. (1993). *Epidemiology of preterm birth. Epidemiol Rev 15:414-43*
- Conde-Agudelo, A. and Belizan, J. (1998). *Maternal mortality and morbidity associated with interpregnancy interval: A cross sectional study. British Medical Journal (321): 1255-1259*.
- Demographic and Health Surveys *Birth spacing: Three to Five Saves Lives – Side-bars, Population reports, Series L, Number 13, 1990-2002, Retrieved 15.07.05 from <http://www.infoforhealth.org/pr/113/113tables.shtml>*
- Faramand, Harb, T., Diallo, I., (2003)-*CATALYST Consortium, Advance Africa, MAQ Mini-University USAID-Washington DC May 12*
- Fuentes-Afflick, E. And Hessel, N.A. (2000).*Interpregnancy interval and the risk of premature infants. Obstetrics and Gynecology 95(3): 383-390*.
- Goldenberg RL, Rouse, DJ. (1998). *Prevention of premature birth. New England Journal of Medicine;339:313-20*.

- Johnston, R. (2005) *Historical abortion statistics, Armenia*, Retrived October 13, 2005 from <http://www.johnstonsarchive.net/policy/abortion/ab-armenia.html>
- Kallan, J.E. (1992). *Effects of interpregnancy intervals on preterm birth, intrauterine growth retardation, and fetal loss. Social Biology 39(3-4): 231-245. Fall/Winter. 82.*
- Kennedy, K.I. (1996). *Post-partum contraception. Bailliere's Clinical Obstetrics and Gynecology 10(1): 25-41.*
- Kramer, MS. (1987). *Determinants of Low Birth Weight: A methodologic and meta-analysis, Bulletin of the World Health Organization, vol. 65, pp. 663-737.*
- Klerman, LV, Cliver, SP, Goldenberg RL. (1998). *The impact of short interpregnancy intervals on pregnancy outcomes in a low-income population. Am J Public Health;88:1182-5*
- Lang, J., Lieberman, E., Ryan, K., and Monson, R. (1990). *Interpregnancy interval and risk of preterm labor. American Journal of Epidemiology 132(2): 304-309.*
- Martin EC. (1979). *A study of the effect of the birth interval on the development of 9-year-old school children in Singapore. Journal of tropical pediatrics and environmental child health, 25 (2-3): 46-76*
- National Statistical Service [Armenia], Ministry of Health [Armenia], and ORC Marco. 2001. *Armenia Demographic and Health Survey 2000. Calverton, Maryland: National Statistical Service, Ministry of Health and ORC Marco*
- Reddy, S., *Reproductive Health Status in AP* , Retrived June 18, 2005 from <http://www.ihonet.org.in/HealthSystemsFactSheets/ReproductiveHealth.htm>
- RHCatalyst: *New Findings on Birth Spacing: Three to Five Years is the Optimal Interval*, 2002, from [http://www.rhcatalyst.org/sie/PageServer?pagename=Programs\\_Birth\\_Spacing\\_Optimal\\_Interval](http://www.rhcatalyst.org/sie/PageServer?pagename=Programs_Birth_Spacing_Optimal_Interval)
- Smith, GC., Pell, JP., Dobbie, R. (2003) *Interpregnancy interval and risk of preterm birth and neonatal death: retrospective cohort study. BMJ.;327(7410):313.*
- UNICEF(1999), Global database, Ministry of Statistics of RA, State Registry and Analysis, Reporting Form No. 32,

Ventura, SJ, Martin, JA, Curtin, SC, Mathews, TJ. (1997) *Report of final natality statistics, 1995. Mon Vital Stat Rep; 45(11):Suppl.*

Villar J, Belizan JM. (1982). *The relative contribution of prematurity and fetal growth retardation to low birth weight in developing and developed societies. Am J Obstet Gynecol; 143:793–.* [[Medline](#)]

World Health Organization (1992). *International statistical classification of diseases and related health problems, 10<sup>th</sup> edition.* Retrieved September 15, 2004, from <http://www.who.int/en/fter>.

Zhu, B.P., Rolfs, R.T., Nangle, B.E., And Horan, J.M. (1999). *Effect of the interval between pregnancies on perinatal outcomes. New England Journal of Medicine 340(8): 589-594.*

**Tables**

**Table1. Interpregnancy interval by education and employment**

	<b>Interpregnancy interval</b>	
	<b>IPI &lt;3 yrs</b>	<b>IPI&gt;3yrs</b>
	<b>%( Frequency)</b>	<b>%( Frequency )</b>
<b>Education</b>		
School (less than 8 years)	1.8 (1)	0(0)
School (less than 10 years)	18.8(10)	8 (16.33)
Professional technical education	47.1 (25)	40.8 (20)
Institute/University	28.3 (15)	38.7 (19)
Post-Graduate	3.7 (2)	2.0(1)
<i>Pearson chi2= 3.43 Pr =0.63</i>		
<b>Employment</b>		
Yes, part time	23.0 (14)	19.5 (8)
Yes, full time	27.9 (17)	26.8 (11)
No	47.5 (29)	53.7 (22)
<i>Pearson chi2=1.00 P =0.80</i>		

**Table 2. Interpregnancy intervals by household expenditures**

Interpregnancy intervals by household expenditures		
Interpregnancy interval		
	IPI <3 yrs	IPI >3yrs
	%( Frequency )	%( Frequency )
<b>Expenditures</b>		
<25.000 drams	2.2 (1)	13.8 (4)
25.001-50.000 drams	24.4 (11)	10.3 (3)
50.001-100.000 drams	17.8(8)	13.8 (4)
100.001-200.000drams	28.9 (13)	31.0 (9)
>200.001	19.7 (12)	31.0 (9)
<i>Pearson chi2= 5.6 Pr =0.22</i>		

**Table 3 IPI by number of people residing in the household**

			nppl2				Total
			1	2	3	4	
outcome	0-36	Count	4	44	11	2	61
		% within outcome	6,6%	72,1%	18,0%	3,3%	100,0%
		% within nppl2	36,4%	62,0%	68,8%	50,0%	59,8%
		% of Total	3,9%	43,1%	10,8%	2,0%	59,8%
	37+	Count	7	27	5	2	41
		% within outcome	17,1%	65,9%	12,2%	4,9%	100,0%
		% within nppl2	63,6%	38,0%	31,3%	50,0%	40,2%
		% of Total	6,9%	26,5%	4,9%	2,0%	40,2%
Total		Count	11	71	16	4	102
		% within outcome	10,8%	69,6%	15,7%	3,9%	100,0%
		% within nppl2	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	10,8%	69,6%	15,7%	3,9%	100,0%

*Pearson chi2= 3.34 Pr =0.34*

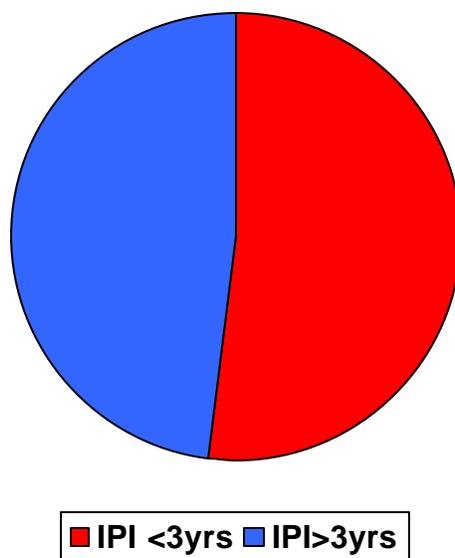
Table 4. *Simple logistic regression of IPI with different predictors*

<i>Factors</i>	<i>Odd Ratio</i>	<i>Std. Err.</i>	<i>P&gt;  z </i>	<i>95% CI</i>
<b>Age</b>	1.07	.037	<b>0.037*</b>	1.00, 1.15
<b>Education</b>	1.24	0.31	0.38	0.75, 2.04
<b>Household expenses</b>	0.99	.005	0.96	0.09, 1.01
<b>Employment</b>	0.77	0.19	0.31	0.47, 1.26
<b>Marital status</b>	0.48	0.32	0.28	0.13, 1.78
<b>Contraception use</b>	0.95	0.40	0.91	0.41, 2.18
<b>Fact 1</b>	0.91	0.53	0.88	0.29, 2.88
<b>Fact 2</b>	1.36	0.57	0.46	0.59, 3.09
<b>Fact 3</b>	0.73	0.33	0.49	0.29, 1.79
<b>nppl2</b>	0.98	0.10	0.91	0.80, 1.21
<b>Number of pregnancies</b>	1.01	0.01	0.55	0.98, 1.03
<b>Parity</b>	1.14	0.43	0.95	0.06, 17.8
<b>Miscarriages</b>	1.03	0.05	0.47	0.93, 1.14
<b>Stillbirths</b>	1.42	0.56	0.37	0.65, 3.08
<b>Abortions</b>	1.03	0.41	0.45	0.95, 1.11

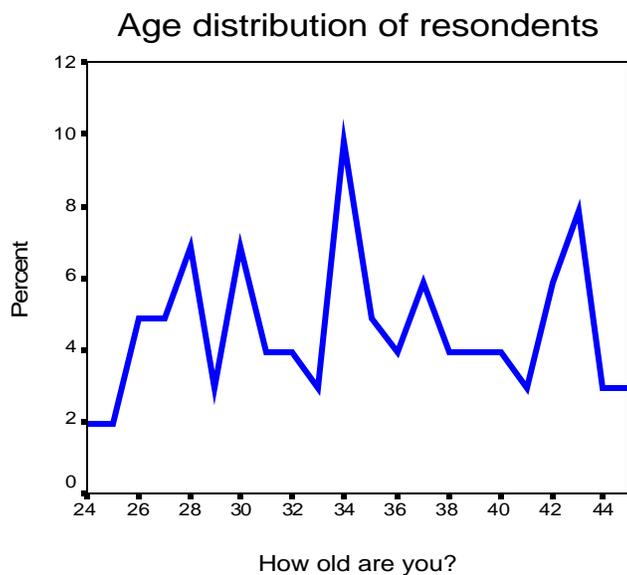
*\*Statistically significant result  $P < 0.05$*

*Figures*

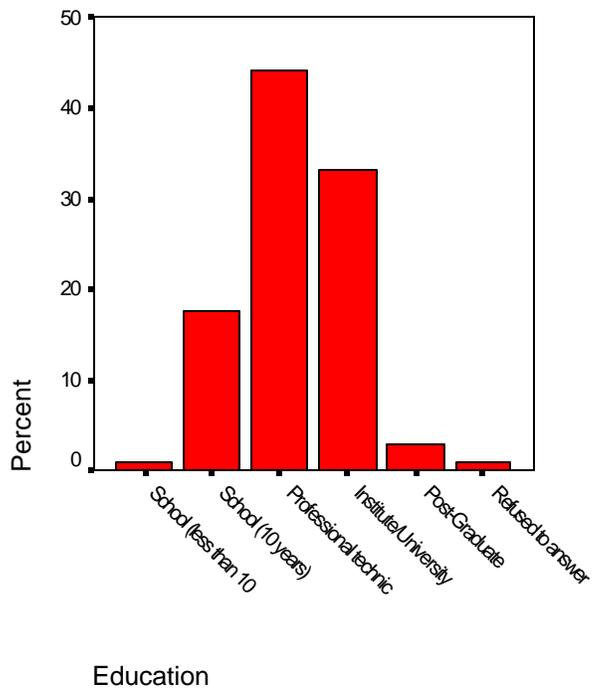
**FIGURE 1. Percentage of women spaced more than 3 years and less than 3 years**



**Figure 2. Age distribution of respondents**

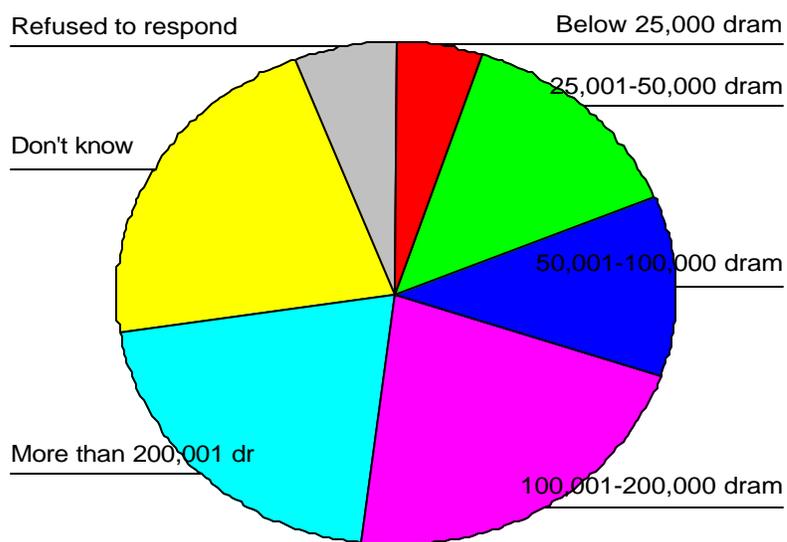


**FIGURE 3. Educational levels of respondents**

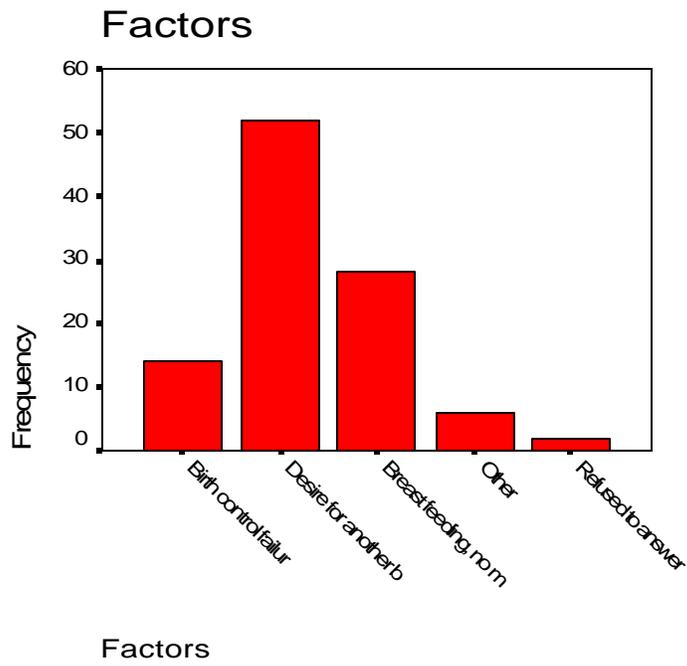


**FIGURE 4. HOUSEHOLD EXPENDITURES**

## Household expenses



**Figure 5. Factors affecting space between last child and child before**





*Appendix 2 Oral Consent form in English for the participants*

***Dear participant***

I am student of American University of Armenia, Master of Public Health. As a part of my course requirement at American University of Armenia, Master of Public Health I am conducting research on correlation between sociodemographic factors and interpregnancy intervals among women of Yerevan.

The purpose of the study is to investigate and association between sociodemographic factors and interpregnancy intervals among women of Yerevan.

You were contacted because you are in age range of 18-45, you are registered in card index of consultation and you have two children.

The information you provide us will be confidential. Your phone number and name will be removed from any records or databases after completion of the study. The data will only be used for this study and no individual will be identifiable in the analysis. The results will only be used for medical research. There will be no monetary benefits for you if you participate in this project.

We appreciate your participation in this study and your responses are highly valuable to us. It will take about 10-15 minutes to answer our questions.

You may stop the interview at any time you wish. You can easily stop being in this study at any time. There would be no consequences for you if you withdraw from the study. If you feel something we ask you about is too sensitive, you can skip any question.

If you need more information about the study or the questionnaire, please contact Dr. Michael Thompson at 512592 and **e-mail: [mthompso@aua.am](mailto:mthompso@aua.am)** ]. If you believe you have not been treated fairly you should contact or Dr. Yelena Amirkhanyan at 512568.



???????? ?????? ???? ???? ? ?????????????????????????????????????????

??? :

ÊÝ¹ñáòÙ »Ù Ò»½ á³ ï³ èË³ Ý»É Ñ³ ñó»ñÇÝ ÁÝï ñ»Éáí Ñ³ Ù³ á³ ï³ èË³ ÝÍ»ï »ñÁ:

1. ??? ?»ñí³ ï³ ñÇùÁ: \_\_\_\_\_ ï³ ñÇ

**³ ÁÇÝ¹. ÐÕÇáóÃÙ³ Ý á³ ï³ ÙáóÃÙáóÝ**

2. áòù ù³ ÝÇ± »ñ»Ë³ áóÝ»ù \_\_\_\_\_

3. Ò»ñ »ñ»Ë³ Ý»ñÇó ù³ ÝÇ±èÝ »Ý ÍÝí »É áË³ Ý³ í áñí³ Í ÑÕÇáóÃÙ³ Ý Ñ»ï ï³ Ýùáí \_\_\_\_\_

4. ÊÝ¹ñáòÙ »Ù Ýß»É Ò»ñ »ñ»Ë³ Ý»ñÇó Ìáóñ³ ù³ ÝááóñÇ ï³ ñÇùÁ ï³ ñÇÝ»ñáí ï³ ÙÇèÝ»ñáí. °Ã» áóÝ»ù³ í »ÉÇ ù³ Ý 6 »ñ»Ë³, Ýñ³ Ýó ÍÝÝ¹Ù³ Ý ï³ ñ»ÃÇí Á· ñ»ù ï³ ñ³ Ù³ ñí³ Í ï³ »ÕáòÙ.

1. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)
2. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)
3. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)
4. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)
5. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)
6. \_\_\_\_\_ (ùñ³ ÙÇè/ï³ ñÇ)

5. ÆÝàù³ Ýáí áñ Í³ ñáÕ »ù ÑÇß»É, ¹áòù ù³ ÝÇ³ Ý.³ Ù »ù ÑÕÇ³ ó»É \_\_\_\_\_

88. Ðñ³ Á³ ñí áòÙ »Ù á³ ï³ èË³ Ý»É \_\_\_\_\_



????? ????????????, ?????? ????????

4.???

---



---



---

9. Ò»ñ Í³ ñÍ Çùáí, áñÝ ç ÙÇÝÇÙ³ É Á³ Ù³ Ý³ Í³ Ñ³ ï í³ Í Á »ñ»É³ ÙÇ ÍÝÝ¹Çó  
ÙÇÝá³ Ñ³ çáñ¹ Ýáñ ÑÕÇáóÁÏ³ Ý ëÍ Ç½µÁ

1. 1 í³ ñ???????

2. 1 - 1,5 ? ? ? ?

3. 1,5 – 2 ? ? ? ?

4. 2,5 – 3 ? ? ? ?

5. Ùß³ Ý³ Í áóÁÏáóÝ ááóÝÇ

77. â· Çí »Ù

### ²ÄÆÜ 2 : Í ñÍ ùáí Í »ñ³ Í ñáóÙ

10. Ò»ñ »ñ»É³ Ý»ñÇó ù³ ÝÇëÝ »Ý Í ñÍ ùá? Í »ñ³ Í ñÍ »? \_\_\_\_\_

11. ÁÝ¹Ñ³ Ýáóñ³ éÙ³ Ùµ ù³ ÝÇ³ ÙÇë »ù Í ñÍ ùáí Í »ñ³ Í ñ»É Ó»ñ í »ñÇÝ  
»ñ»É³ ÙÇÝ \_\_\_\_\_

### ²ÄÆÜ 3 : ÁÝí³ ÝÇùÇ áÉ³ Ý³ í áñáóÙ

12. Ù»ñÍ³ ÌáóÙë¹ áóù áñ³ ç ÙÇçáó ù· ï³ · áñÍ áóÙ »ù ÑÕÇáóÁÏáóÝÇó  
É áóë³ ÷ »É áó Ñ³ Ù³ ñ

1. ²Ïá

2. àá, »Á» àá, ³ Ýó»ù Ð. 14

13. ÁÝá Ù»Áá¹ »ù ù· ï³ · áñÍ »É (· ñ³ Ýó»ù µáéáñ ??? ñ? ?áñ  
á³ ï³ ëÉ³ ÝÝ»ñÁ)

1. Ù»ñ³ ñ· ³ Ý¹³ ÙÇÝ ÙÇçáó (ëáÇñ³ É)

2. ç³ ýñ³ · Ù³ /í ñ»Ù/¹ áÝ¹ áÕ

3. ä³ Ñã³ Ý³ Í (ãñ»½»ñí³ ì Çí)

4. üÇ½ÇáÉá· Ç³ Í³ Ý· ñ³ ýÇÍ

5. ÄÝ¹Ñ³ ì í³ Í ë»é³ Í³ Ý³ Íì

6. ²μáñì

7. ²ÙÉ³ óáoÙ (?? ????????????)

8. Ð³ Í³ μ»ÕÙÝ³ í áñÇã Ñ³ μ»ñ

9. ë»é³ Í³ Ý³ Íì Çó Éáoë³ ÷ áóÙ

10. Î ñí ùáí Í »ñ³ Í ñÙ³ Ý Ù»Ãá¹

11. ²ÙÉ\_\_\_\_\_

77. â· Çì »Ù

#### ³ ÄÇÝ 4. ÁáÕáí ñ¹³. ñ³ Í³ Ý³ ì íÙ³ ÉÝ»ñ

14. Ò»ñ Ý»ñí³ ÷ ÙáoëÝ³ Í³ Ý³ Í³ ñ· ÷ í Ç×³ ÍÁ

1. ²ÙáoëÝ³ ó³ Í

2. ØÇ³ ÙÝ³ Í

3. ²ÙáoëÝ³ ÉáoÍ í³ Í

4. ²ÙñÇ

88. Ðñ³ Á³ ñí áóÙ »Ù á³ ì³ ëÉ³ Ý»É\_\_\_\_\_

15. Ò»ñ Í ñÃáoÃáoÝÁ.

1. ²ãñáo (10 ì³ ñáoó ùÇã)

2. ²ãñáo (10 ì³ ñÇ)

3. î »ÉÝÇÍ áóÙ/áoëáoÙÝ³ ñ³ Ý

4. ÆÝëì Çì áóì /Ð³ Ù³ Éë³ ñ³ Ý

5. ²ëãÇñ³ Ýì /¶Çì .Ã»ÍÝ³ Í áó

6. ²ÙÉ\_\_\_\_\_

16. Ò»ñ³ ÙáoëÝáo Í ñÃáoÃáoÝÁ.

1. ²ãñáo (10 ì³ ñáoó ùÇã)

2. ²ãñáo (10 ì³ ñÇ)



Appendix 4 Questionnaire in English

*Please fill in the blanks or circle the answer(s), which best matches your information.*

*1. How old are you? \_\_\_\_\_ years old*

*Section 1. Pregnancy history*

*2. How many live children do you have? \_\_\_\_\_*

*3. In regard to your children, how many of them were planned pregnancies? (how many did you decide to have prior to becoming pregnant) \_\_\_\_\_*

*4. What are the ages in months and years for each of your live children? If more than six, please write in their ages in the provided space:*

*a. \_\_\_\_\_ (day/month/year)*

*b. \_\_\_\_\_ (day/month/year)*

*c. \_\_\_\_\_ (day/month/year)*

*d. \_\_\_\_\_ (day/month/year)*

*e. \_\_\_\_\_ (day/month/year)*

*f. \_\_\_\_\_ (day/month/year)*

*g. \_\_\_\_\_*

*5. To the best of your recall, how many times have you been pregnant? \_\_\_\_\_*

*88. Refused to respond \_\_\_\_\_*

*6. To the best of your recall, please indicate the outcome for each of your pregnancies. (The numbers should add up to the total number of times you have been pregnant).*

*1. live births \_\_\_\_\_*

2. *still births* \_\_\_\_\_
3. *spontaneous abortions or miscarriages* \_\_\_\_\_
4. *elective abortions (performed in a clinic)* \_\_\_\_\_
5. *elective abortions (performed by someone other than a doctor)* \_\_\_\_\_
6. *number of children who died during their first year of life* \_\_\_\_\_
7. *Other outcomes than the ones listed* \_\_\_\_\_

7. *What is the difference in months between the birthdays spacing between your last two children?*

1. *Number of months* \_\_\_\_\_

8. *Please indicate, the reasons affecting the spacing between your last two children?*

1. *Birth control failure*
2. *Desire for another baby as soon as possible*
3. *Breast feeding, no menstrual period*
4. *Other, describe* \_\_\_\_\_

9. *In your opinion, what is the minimum length of time between the birth of a child and the beginning of a new pregnancy?*

1. *Less than one-year*
2. *1 to 1 ½ years*
3. *1 ½ to 2 years*
4. *2 ½ to 3 years*
5. *Doesn't matter*
77. *Don't know*

## **Section 2. Breast feeding history**

10. *How many of your children did you breastfeed?* \_\_ \_\_

11. *In regard to your last child, how many months was it totally breast fed?* \_\_\_\_\_

**SECTION 3: Family planning**

12. *Are you currently doing something or using any method to delay or avoid getting pregnant?*

1. Yes
2. No, if no skip to Q.14

13. **Please indicate other methods you currently use to avoid a pregnancy?**

1. IUD
2. Diaphragm/foam/jelly
3. Condom
4. Rhythm method
5. Withdrawal
6. Abortion
7. Sterilization
8. Oral contraceptives
9. Abstinence
10. Lactational Amenorrhea Method (breast feeding)
11. Other, please describe \_\_\_\_\_
77. Don't know

**Section 4. Demographic data**

14. *What is your current marital status?*

1. *Married*
2. *Single*
3. *Divorced*
4. *Widowed*

*88. Refused to respond*

*15. Please circle what is your completed educational level?*

- 1. School (less than 10 years)**
- 2. School (10 years )**
- 3. Professional technical education**
- 4. Institute/University**
- 5. Post-Graduate**
- 6. Other\_\_\_\_\_**

*16. What is the highest level of completed education of the father of your last child?*

- 1. School (less than 10 years)**
- 2. School (10 years )**
- 3. Professional technical education**
- 4. Institute/University**
- 5. Post-Graduate**
- 6. Other\_\_\_\_\_**

**17. Aside from housework, are you currently employed?**

- a. Yes, part time**
- b. Yes, full time**
- c. No**

**18. Is the father of your latest child currently employed?**

- a. Yes, part time**
- b. Yes, full time**
- c. No**
- d. Don't know**

**19. On average how much money does your household spend monthly?**

- 1. Below 25,000 dram**

2. *25,001-50,000 dram*
3. *50,001-100,000 dram*
4. *100,001-200,000 dram*
5. *More than 200,001 dram*
77. *Don't know*
88. *Refused to respond*

20. *How many people live in your household?* \_\_\_\_\_