Original Research Article

An Analysis of Unwanted Births in Bangladesh: A Major Public Health Concern

ABSTRACT

Background: In Bangladesh, on average, a woman has 2.3 births, with around 30% of them being undesired. For the well-being of families and the regulation of population growth, it is crucial to reduce unwanted births. In-depth study of the variables influencing the shift in unplanned childbearing is necessary for this decrease. This research looks at how population structure, outside influences including family planning programs, and their interactions affected the percentage of women who gave birth unintentionally between 2007 and 2017, as well as between 2014 and 2017.
Methods: The idea of standardization is used in this research to compare the impact of family planning programs and non-program variables on unintended pregnancies. We use the aggregate and detailed three-fold decomposition techniques to break down variations in the percentage of undesired births into the contributions of the three main causes using data from the Bangladesh Demographic and Health Survey. We use logistic regression estimates to break out the changes.
Results: 15.4% of women in 2007 gave birth unintentionally. This proportion slightly rises to 15.6 in 2011 and falls by 12.8 percent from that year to 2014, a three-year span. In 2017, this proportion dropped even further, to 10.4, a 23.8 percent decrease from 2014. The estimated absolute changes (i.e., total effects) in the proportion of women having unwanted birth from 2007 to 2011, 2011 to 2014, and 2014 to 2017 are, respectively, 0.002 (or 0.2 percentage points), -0.020 (or -2 percentage points), and -0.032, according to the aggregate decomposition analysis results (or -3.2 percentage points). While changes in that percentage over the other two decades are determined to be statistically significant, the change in that proportion from 2007 to 2011 is found to be statistically non-significant.
Conclusions: In Bangladesh, a considerable reduction in population structure combined with family planning initiatives that are not diminishing lowers the percentage of unintended pregnancies, whereas simultaneous reductions in population structure and initiatives produce a more dramatic decrease.

Keywords: Unwanted Births: Public Health; Bangladesh.

1. INTRODUCTION

Unwanted births have a detrimental impact on the health of the mother and child, family relationships, and population management [1]. “Unwanted births are often defined as actual births that exceed a woman's intended number of births. Even though Bangladesh's average total fertility per woman shows a consistent drop, the fraction of undesired births is still significant. In Bangladesh, on average, a woman has 2.3 births, with around 30% of them being undesired. In Bangladesh, the proportion of unintended pregnancies varies from 1.3

out of 3.4 births per woman in 1993/1994 to 0.7 out of 2.3 births per woman in 2017" [2]. "While undesired pregnancies and births together increase the number of births per woman in the United States by just 10- 15%" [3].

However, it is possible to minimize undesired childbirth nearly entirely, as was shown in the Maldives in 2017 when the nation's overall birth rate was 1.9 [4]. In order to maintain family stability and slow Bangladesh's population growth, it is crucial to reduce undesired pregnancy rates [5]. "In order to reduce undesired childbearing, one must have a thorough understanding of the variables that influence this transformation. Due to this necessity, this research looks at the factors that have changed the percentage of women in Bangladesh who had unintended pregnancies between 2007 and 2017. By examining the effects of changes in population structure (or characteristics), behavioral responses to predictors, or changes in external factors (such as activities of family planning (FP) programs) other than those included in the analysis, and the interaction effect of those two types of changes, this study seeks to provide an answer to this question. Health professionals, demographers, and sociologists are all quite concerned about unintended pregnancy. Poor physical and mental health of the mother and child, poor parent-child relationships, and fast population expansion are all directly related to it" [1].

"Bangladesh's enormous population is rapidly expanding, which has a substantial impact on the country's many socioeconomic and environmental issues, including widespread unemployment, extreme poverty, and environmental degradation" [6, 7]. "Bangladesh is now South Asia's most populated nation and the tenth most populous country overall" [8]. Preventing undesired pregnancies will also aid in further lowering fertility, which would aid in controlling Bangladesh's population growth and allow the government to handle current socioeconomic and environmental issues more effectively and early [9].

"Unintended childbearing is significantly correlated with marital status, younger childbirth ages, number of prior births, employment status, household income status, region, urban-rural residence, slum settlement, ethnicity, and failure of contraception, primarily withdrawal method, according to studies on the topic conducted in various countries outside Bangladesh" [10–12]. Despite the fact that none of these research discovered any statistically significant correlation between unwanted pregnancy and family income or education level [13–15], other investigations did.

"Unwanted pregnancy is significantly influenced by a woman's present age, her age at marriage, her religion, her level of education, her exposure to media, her husband's desire for more children, and her unmet need for FP, according to studies that examined the issue in Bangladesh" [16, 17]. "Other factors that have been linked to unwanted pregnancies in Bangladesh include wealth level, present age, parity, age at marriage, religion, media access, and contraceptive usage" [18, 19]. "According to birth statistics from Bangladesh Demographic and Health Surveys (BDHSs), 3.3%, 2.9%, 2.4%, and 0.5% of births in 2007, 2011, 2014, and 2017 were the result of pregnancies that women first reported as intended but subsequently described as unwanted when the mothers were queried about that birth. This shift in categorization may be the result of mothers' adjustments to the reality of a new birth or their unwillingness to justify a child as having been originally undesired" [20].

According to D'Angelo, Gilbert, Rochat, Santelli, and Herold's (2007) findings, unexpected pregnancy, premature delivery, and undesired births are not all caused by the same factors [21]. A mistimed delivery is usually anticipated to occur later, but an undesired birth is never supposed to occur, even if the timing of a planned birth is dependent on social and policy background [22]. The present research uses decomposition analysis with the idea of standardizing technique to measure the impact of FP programs on fertility in order to

examine the impacts of various variables [23]. The provision of FP counseling and contraception at home, as well as the provision of FP services at the union level (which consists of nine wards or villages), are important FP program activities in Bangladesh [9].

2. METHODOLOGY

2.1 Data

This analysis is based on data from four BDHSs that were performed as part of the Demographic and Health Survey (DHS) program in 2007, 2011, 2014, and 2017. The BDHSs are regarded as the most trustworthy sources of demographic information on Bangladesh by national and international organizations [24]. The DHS program has gained a reputation for gathering and sharing precise data that is nationally representative. More than 400 surveys in more than 90 countries received assistance from this initiative [25].

A total of 11,441, 10,997, 17,843, and 17,864 ever-married women were surveyed in the BDHSs conducted in 2007, 2011, 2014, and 2017, respectively. If a woman gave birth at least once in the five years before to each BDHS, and if the wantedness of that delivery was documented, she was included for the analysis. In the surveys conducted in 2007, 2011, 2014, and 2017 it was discovered that 5,367, 4,921, 7,326, and 4,492 instances, respectively, had given birth at least once in the previous five years, and it was also noted whether or not they had desired their most recent kid during that time. Cases that lacked data for any of the chosen predictors were not included in the study. There were very few instances of such missing data in all the surveys that were chosen, therefore there was no discernible influence on the outcomes of analysis and comparison across time. Finally, 5,367, 4,921, 7,326, and 4,492 instances from the surveys conducted in 2007, 2011, 2014, and 2017 were chosen for study.

2.2 Analytical framework

An analytical framework constructed utilizing the causal relationships between unintended pregnancy and other variables serves as the basis for this study's analysis. This framework's main tenet is that certain demographic and behavioral factors might increase a woman's actual number of births over the number she wants, a phenomenon known as an undesired birth. Further influencing these demographic and behavioral processes are various socioeconomic determinants and program considerations (those related to FP programme). In order to lower births, socioeconomic progress decreases desire for children and raises demand for birth control (contraception and induced abortion). By lowering its financial and societal costs, FP programs expand access to birth control [26]. Unwanted births mostly happen when the rate of growth in birth control usage is too slow to stop the unwanted births brought on by a reduction in planned family size. Child replacement (due to child death), sex preferences, lack of access to FP services, difficulty of women to execute their reproductive choices due to resistance from husbands or others, and absence of birth control are some of the main causes of this non-use [27]. In addition to this, contraceptive failure—which much relies on the caliber of FP programs—can also lead to unintended pregnancies [11, 17]. Through some of the aforementioned characteristics, other socioeconomic factors also have a significant impact on unintended pregnancies. By enhancing women's capacity to use and accept birth control, for instance, and by expanding their engagement in the labor market, improvements in women's education generally and the likelihood of unintended pregnancies may be reduced [28].

This research analyzes as many predictors as it can using the data from the BDHSs and the analytical methodology created here. Measuring the influence of program elements is among

the consequences that are crucial for understanding unintended pregnancy [29]. The current study calculates the effect of program factors on unintended pregnancies based on the assumption that program factors are primarily responsible for the unexplained portion of the overall change in the proportion of women who experience unintended pregnancies as measured by decomposition analysis.

2.3 Variables

The status of having an unintended pregnancy in the five years before to the research surveys is the dependent variable for this paper. If a lady has more children than she would want or would consider having, her pregnancy is considered undesired in this case. This indirect method of identification serves as a filter by relieving moms from immediately reporting a delivery as undesired since they may not wish to do so. A woman's desired number of children has traditionally been thought to be the number of children she would prefer to have if she could start her family/partnership again from scratch. One crucial aspect is that when questioned about her ideal family size, women often struggle to express their desire for a smaller one and instead state their actual number of children as their ideal number. In spite of this adjustment tendency, a significant portion of women with bigger families were found to report a lower intended family size than their actual family size in all the included surveys [2, 30-32].

The accepted analytical framework, previous research, analysis method, and data accessibility all serve as guiding principles for choosing independent variables for the study. A variable was only included in the analysis if it was specified in the same manner in all of the surveys to guarantee good inter-survey comparability since the study was based on four rounds of BDHS data. The study takes into account the respondent's current age, age at marriage, education, current employment situation, religion, place of residence, socioeconomic position, children's sexual preferences, and experience with child loss as independent factors. From the perspective of Bangladesh, respondents' educational attainment was divided into four categories: no education (if five years of schooling are not completed), primary (if five to nine years of schooling are completed), secondary (if ten to eleven years of schooling are completed), and higher education (if 12 or more years of schooling is completed). Muslim and non-Muslim religions were divided into two groups; the non-Muslim category also included Hindu, Buddhist, Christian, and Other religions. The household wealth index values of a respondent, which were directly supplied by the BDHS data, were used to estimate her socioeconomic position. The wealth index values were split into three equal groups. Finally, the respondents' socioeconomic level in the highest, middle, and lowest wealth terciles was rated as high, medium, and poor, respectively.

2.4 Analytical techniques

Descriptive and multivariate approaches are both used in this study's data analysis. It is acknowledged that determining how FP programs affect fertility is a challenging undertaking for two reasons: The measurement of an FP program's effectiveness necessitates a wide range of data, much of which is typically unavailable, especially in developing countries, as well as additional information from socioeconomic, political, and cultural domains [23, 33]. In addition, there are complex and obscured relationships between fertility and its determinants. The important issue that emerges is how much of the potential change in fertility can be attributed to programme elements. Fertility may vary as a result of both programme and non-programme impacts.

A approach may thus be deemed perfect if it can independently account for programmed and unplanned impacts on fertility. This study uses the notion of standardization approach

[23] that has been recommended by the United Nations for measuring the effects of FP programs and non-programme factors on the change in the proportion of women with unwanted birth, taking into account the fact that data are available and the criteria for an ideal method. The justification for employing the standardized technique may be succinctly stated as follows.

By standardizing a number of non-programme elements that might have an impact on the observed percentage throughout a time but not actually alter it, the observed change in that proportion (if any) can be accounted for. Part of the observed change in that percentage is explained by this standardization, and all or some of the residual changes—those not explained by the standardized factors—can then be assigned to the FP program on the basis of plausible theories and supporting data. Decomposition analysis method may be used to standardization approach suitably. The parameters that will be standardized in this method should be carefully chosen because to the challenges in identifying the non-programme characteristics that are associated with fertility. The analysis in this study takes into account as many non-programme elements as is feasible given the data at hand in the context of the analytical framework that was chosen and the body of prior research. Decomposition analysis and binary logistic regression, two multivariate methodologies, have been predominantly employed to assess the impact of FP programs using the standardized approach.

A binary logistic regression model was employed to calculate the likelihood of an unintended pregnancy. The answer variable had a binary code that read "1" if a respondent's most recent birth occurred within the last five years and "0" otherwise. For the study periods of 2007, 2011, 2014, and 2017, a three-fold decomposition technique has been used to determine the contribution of group differences in predictors to the overall difference in the predicted proportion of women with unwanted birth (outcome difference). Both aggregate and detailed decomposition are carried out in this investigation. Jann (2008) [36] proposed the following formula for three-fold decomposition, using the decomposition technique developed by Blinder (1973) [34] and Oaxaca (1973) [35].

$R = E + C + I \quad (1)$

where, $R = (Y_A) - E(Y_B)$, $E = [E(X_A) - E(X_B)]'P_B$, $C = E(X_B)'(P_A - p_B)$, and $I = [E(X_A) - E(X_B)]'(P_A - p_B)$.

Here, Xs are the vectors containing the predictors and constants, E(Y)s are the expected rates of women having unintended pregnancies in two surveys A and B, and ps are slope parameters and intercepts.

Due to alterations in population structure or characteristics, E signifies a shift in the percentage of undesired births (structural effect). The coefficient impact or effect sizes are represented by the undefined portion C. Coefficient impact quantifies the contribution of changes in behavioral reaction to predictors, i.e., the behavior of respondents in a population segment as opposed to changes in that segment's size. I stands for the interaction effect, which takes into consideration the simultaneous existence of different features and coefficients between the two groups. The unexplained portion (coefficient effects) has been employed in this research as a gauge of the impact of outside causes (that is unobserved factors). Although the influence of FP programs has often been thought to represent the unexplained half, other variables like the diffusion effect may also play a role. However, in addition to the above reasons, FP programs may also contribute to this spreading impact.

The present analysis has taken into account changes in population structure or characteristics that might lead to a drop in unintended pregnancies as well as increases in the proportions of women who are less prone to give birth unintentionally. Although other methods may be used to estimate the components of ps, the logistic regression model is

used in this work. In decomposition analysis, normalized estimates of regression coefficients have been used instead of conventional estimates, which has the advantage that projected probabilities for distinct subcategories are not impacted by the classification of the predictors [37]. If a different category of a dummy variable is selected to omit, the lack of invariance issue that arises in detailed decomposition may be resolved by using normalized estimates [38]. The study was carried out using SPSS and Stata, two statistical programs.

3. RESULTS

This section provides levels and variations in the proportions of women and the proportions of women giving birth to children who are not intended, odds of giving birth to children who are not intended, and a breakdown of the effects of changing various factors on changes in the proportions of women giving birth to children who are intended.

Table 1 demonstrates a consistent reduction across the research period in the percentages of women who married before the age of 18, had no schooling, were from poor socioeconomic backgrounds, and favored boys over girls. In all of the research years, there were very few highly educated women, non-Muslim women, and women who preferred daughters to boys. But during the course of the research period, the percentage of those with higher education has steadily increased (see Table 1).

Table 1 shows that 15.4% of women in 2007 gave birth unintentionally. This proportion slightly rises to 15.6 in 2011 and falls by 12.8 percent from that year to 2014, a three-year span.

In 2017, this proportion dropped even further, to 10.4, a 23.8 percent decrease from 2014. In general, it is shown that the percentage of unintended pregnancies declines as respondents' socioeconomic class, age at marriage, and level of education rise (see Table 1). On the other side, all of the studies indicated that women who were older, worked, identified as Muslim, favored boys over girls, had lost a child, and preferred more boys than girls were more likely to have undesired pregnancies than their respective counterparts.

Table 1 Percent distribution of unwanted birth

Percentage distribution of Total women Characteristics	2007	2011	2014	2017
Current age				
<30	74	73.7	76	80.6
30+	26	26.3	24	19.4
Age at marriage				
<18	84.1	78.2	76	71.6
18+	15.9	21.8	24	28.4
Education				
No education	35.1	26	18.5	13.8
Primary	30.6	30.5	29.8	27.4
Secondary	28.1	35.3	43.2	47.3
Higher	6.2	8.2	8.4	11.5
Current work status				
Not working	82	75.3	89.6	78.2
Working	18	24.7	10.4	21.8

Religion				
Muslim	91	90.9	90.2	92.1
Non-Muslim	9	9.1	9.8	7.9
Residence				
Urban	31.5	35.5	31.9	32.4
Rural	68.5	64.5	68.1	67.6
Socioeconomic status				
Low	38.5	38.2	37.5	36.6
Medium	31.9	32.3	32.4	31.8
High	29.6	29.5	30.1	31.6
Children's sex preferences				
Prefers equal boys and girls	80.2	83.8	88.6	88.9
Prefers more boys than girls	17.6	14	9.6	8.7
Prefers more girls than boys	2.2	2.2	1.9	2.4
Experienced child death				
No	75.9	84.6	84.3	87.4
Yes	24.1	15.4	15.7	12.6
Total	100 (5,367)	100 (4,921)	100 (7,326)	100 (4,492)

The results of the logistic regression analysis, which are shown in Table 2, indicate that the respondent's current age, age at first marriage, education level, and religion are strongly related to undesired birth during the whole research period.

Table 2 Relative odds of having unwanted birth

Characteristics	**Relative odds of having unwanted birth**			
	2007	**2011**	**2014**	**2017**
Constant	**0.157*** **	**0.187*** **	**0.148*** **	**0.105*** **
Current age				
<30 ®	1.000	1.000	1.000	1.000
30+	7.899***	6.611***	7.268***	8.209***
Age at marriage				
<18 ®	1.000	1.000	1.000	1.000
18+	0. 479***	0.463***	0.670***	0. 625**
Education				
No education ®	1.000	1.000	1.000	1.000
Primary	0.809*	0.839	0.914	0.826
Secondary	0.535***	0.416***	0.485***	0.438***
Higher	0.146***	0.394***	0.197***	0.205***
Current work status				
Not working ®	1.000	1.000	1.000	1.000
Working	1.219	1.017	1.178	1.461**
Religion				
Muslim ®	1.000	1.000	1.000	1.000
Non-Muslim	0.615**	0.656*	0.484***	0.490**
Residence				

Urban ®	1.000	1.000	1.000	1.000
Rural	0.687***	0.843	0.904	0.967
Socioeconomic status				
Low ®	1.000	1.000	1.000	1.000
Medium	0.956	0.889	0.879	0.864
High	0.82	0.86	0.691**	0.803
Children's sex				
Prefers equal boys and girls ®	1.000	1.000	1.000	1.000
Prefers more boys than girls	1.009	0.812	1.016	1.302
Prefers more girls than boys	0.818	0.687	0.542	0.917
Experienced child death				
No ®	1.000	1.000	1.000	1.000
Yes	0.945	0.943	1.052	1.017

® = Reference Category. *p < 0.05; **p < 0.01; ***p < 0.001

Besides these, unwanted childbearing is found significantly associated - with respondent's work status only in 2017 survey, with residing in rural areas only in 2007 survey, and with having a high socioeconomic status only in 2014 survey (see Table 2).

The estimated absolute changes (i.e., total effects) in the proportion of women having unwanted birth from 2007 to 2011, 2011 to 2014, and 2014 to 2017 are, respectively, 0.002 (or 0.2 percentage points), -0.020 (or -2 percentage points), and -0.032, according to the aggregate decomposition analysis results (or -3.2 percentage points). While changes in that percentage over the other two decades are determined to be statistically significant, the change in that proportion from 2007 to 2011 is found to be statistically non-significant.

4. DISCUSSION

Using decomposition analysis, this paper investigates the primary variables that changed undesired childbirth among ever-married women in Bangladesh between 2007 and 2017. According to research, the percentage of women who have unintended pregnancies plateaus between 2007 and 2011 and then significantly decreases between 2014 and 2017 by 23.8 percent and 12.8 percent, respectively. The decreased number of factors that significantly impact unintended pregnancies after 2007 indicates that there has been some improvement in group homogeneity, according to logistic regression analysis. The fraction of women giving birth unintentionally continues to significantly decline, according to aggregate decomposition study of population structure. While the impact of extraneous variables (coefficient effect), which are thought of as the impact of FP activities, is shown to be inconsistent across the research periods. This research identifies a deficiency in the actions of the FP program from 2007 to 2011. Throughout the whole research period, the interaction impact of structural and coefficient changes was determined to be non-significant. All of the variables that were shown to be strongly connected with undesired childbearing in the logistic regression analysis are not significantly related to the change in the percentage of unwanted births, according to a detailed decomposition study.

The results of the aggregate decomposition analysis make it clear that the proportion of women giving birth unintentionally has significantly decreased over the study period due to changes in population structure, particularly the overall rise in the proportion of women who exhibit traits that are unfavorably associated with unwanted childbearing. Although structural change had a significant reducing effect on unintended pregnancy, the marginal increase in the proportion of unintended births between 2007 and 2011 as a result of a significant increasing effect of behavioral response points to inadequacy of FP programs' support during that time, which negated the reducing effect of structural change. Such insufficiency may be caused by a decrease in FP services, a marginal improvement in FP services, or a shift in the nature of the demand for FP services. The significant decline in the proportion of unintended pregnancies between 2011 and 2014, which was caused by a significant reducing effect of structural change in the presence of a non-significant reducing effect of the change in behavioral response, shows that a significant change in population structure during that time significantly decreased the proportion of unintended pregnancies amid a non-declining FP services; this finding therefore suggests that FP support was sufficient. Last but not least, data from the years 2014 to 2017 show a more pronounced decline in the proportion of unwanted births (3.3 percentage points or 23.8 percent decline), primarily as a result of the concurrently significant reducing effect of the change in population structure and the change in behavioral response, or the improvement in FP services. The average number of children desired during this time remained unchanged at 2.3, making it unlikely that the percentage of women at risk of an unintended pregnancy would rise. An increase in the number of women at risk of an unplanned pregnancy at a certain period might add additional pressure on the current family planning programs during that time. Thus, the huge decrease in undesired childbearing between 2014 and 2017 was partly a result of the intended family size plateauing at that time.

“In the deep decomposition study, none of the categories that were discovered to be strongly related with undesired childbearing in the logistic regression analysis were found to significantly influence the percentage of unwanted births. Overall findings indicate that a crucial factor in lowering unplanned childbirth is a reduction in the percentage of women who married before the age of 18 and had no formal education, and an increase in the percentage of women with a secondary or higher education. Female education helps women break free from the traditional role of woman as mother and wife” [39, 40]. “Both of these facts lower the risk of higher-order births, which in turn lowers the likelihood of unwanted birth” [41]. Getting married at older ages significantly shortens a woman's reproductive span. A significant decrease in the number of women in these two groups and an increase in the number of women with secondary or higher education would play a critical role in reducing unwanted childbearing in the nation, according to the current study, which demonstrates that a vast majority of Bangladeshi women marry before the age of 18, and a large percentage of women lack education.

Younger women in Bangladesh are better at carrying out their reproductive choices as shown by the lower chance of unwanted pregnancy among those under 30 years of age and the decreasing impact of the growth in the number of women in this group on undesired childbearing. A research by Roy and Singh (2016) [17] that was carried out in Bangladesh came to a similar conclusion. Even though results from logistic regression analysis indicate that Muslim women are significantly more likely than non-Muslim women to experience an unintended pregnancy throughout the entire study period, an increase in the proportion of Muslim women only significantly increases the likelihood of unintended pregnancies from 2014 to 2017. The fact that Muslim women have greater restrictions on their activities than do women of other faiths, as well as the possibility that they would see pregnancy as "given by Allah," may contribute to this increased likelihood [19, 42]. Rural women are less likely than urban women to have undesired children in all polls, although their association is first

proven to be significant in 2007. The latter years' non-significant disparities in unwanted pregnancies between urban and rural women suggest a growth in socioeconomic and FP service uniformity between the two groups. Because they want so many more children than urban women, rural women are shown to be less likely to label their births as undesired than urban women. In all the research years, it was discovered that rural women's average intended family size was more than 4% greater than that of urban women's [2, 30-32]. In all study years, children's sexual preferences were shown to be insignificant in determining unplanned pregnancy; this conclusion is consistent with those of earlier studies conducted in Bangladesh [9, 43]. In addition to this, although working women are shown to be more likely to have an unintended pregnancy in all surveys, the relationship between these two is only found to be statistically significant in 2017.

The proportion of unplanned birth should be lower among working women than among nonworking women since working women are predicted to have more autonomy and utilize contraceptives at greater rates than nonworking women [44, 45]. As a result, an independent research to investigate the origins of this phenomena is suggested by the greater propensity for unintended pregnancies among working women than among non-working women. Studies that have already been conducted on unplanned pregnancy in Bangladesh have examined other factors such the usage of contraception in the past and present [46, 47]. It is impossible to determine whether the women were using contraception at the time of the baby whose birth was being investigated because the BDHS data used in those and the current studies do not include the time period of past contraceptive use; consequently, current contraceptive use most definitely does not correspond to the time of that conception. Furthermore, a woman may not have intentionally used contraception in the past or present to create a child, which could have been an intended birth.

These two facts unequivocally demonstrate that previous and present contraceptive usage is completely irrelevant to understanding unplanned childbirth at an arbitrary time point and was therefore excluded from the analysis in this research.

4. CONCLUSION

The results of this research provide clear and precise information regarding the factors that have changed the rate of unintended pregnancies in Bangladesh. Results indicate that improvements in population structure combined with efficient and non-declining FP services significantly lower the fraction of women giving birth unintentionally in Bangladesh. However, such decline is sped up by advancements in population structure and FP services. Unwanted childbirth is significantly reduced in particular by a decline in the percentage of women who marry before the age of 18 and who have no formal education as well as a rise in the percentage who have a secondary or higher education. The results of this study indicate that a further decline in unintended pregnancies in Bangladesh is likely to result from improvements in population structure; in these improvements, efforts made by both government and non-government organizations to raise women's marriageable ages and extend their education to at least a secondary level will be crucial. In Bangladesh, a greater emphasis on upholding the legal marriage age for females (18 years in normal circumstances) will aid in preventing women from being married before the age of 18. Along with this, expanding and customizing FP services to meet the needs of women will hasten the drop in unintended pregnancies.

Despite having all facilities, many locations, particularly private ones, do not provide certain FP services, such as menstruation control [46]. Training and other required steps should be taken to boost the motivation level of the FP employees. Given that Muslim women are less likely to use contraception and that they consider a number of criteria when making their

decision [47, 48], offering Muslim women a broad range of contraceptives and providing them with specialized counseling assistance may boost their usage of contraception [9]. Finally, it can be said that by reducing unintended pregnancies in Bangladesh, the study's results may be used to assist formulate policies that will help manage population increase while also enhancing mother and child health and family relationships.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

REFERENCES

1. Barber JS, Axinn WG, Thorton A. Unwanted childbearing, health, and mother-child relationship. J Health Soc Behav. 1999;40:231-57.
2. National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. Bangladesh Demographic and Health Survey (BDHS) 2014.
3. United Nations (UN). What accounts for near replacement-level fertility in the United States? United Nations expert group meeting on policy response to low fertility, New York; 2015.
4. The World Bank. The World Bank Open Data. 2019. https://data.worldbank.org/indicator. Accessed 17 Oct 2019.
5. Brown SS, Eisenberg L. The best intentions: Unintended pregnancy and the well-being of children and families. Washington, D.C.: National Academies Press; 1995.
6. Moral S. Family planning programme losing importance? The Daily Prothom Alo. 2017. http://en.prothom-alo.com/bangladesh/news/150395/Family-planning-programme-losing-importance. Accessed 8 Jun 2017.
7. Huq S, Rahman AA, Mallick D. Population and environment in Bangladesh. The IUCN Bangladesh, Bangladesh Centre for Advanced Studies, Dhaka; 1998. https://pdfs.semanticscholar.org/8969/12 5306307e5b0a590001ef9fd004b3be8059.pdf.
8. United Nations (UN). World Population Prospects 2019, Volume II: Demographic Profiles. New York: Department of Economic and Social Affairs, Population Division; 2019.
9. Rahman MM. Fertility stalls in Bangladesh. University of Otago, Dunedin; 2018. https://ourarchive.otago.ac.nz/bitstream/handle/10523/8337/RahmanMdMahfuzur2018PhD.pdf?sequence = 1&isAllowed = y. Accessed 2 Jan 2019.
10. Eggleston E. Determinants of unintended pregnancy among women in Ecuador. Int Fam Plan Perspect. 1999;25(1):27-33.
11. Erfani A. Levels, trends, and determinants of unintended pregnancy in Iran: The role of contraceptive failures. Stud Fam Plann. 2013;44(3):299-317.
12. Ikamari L, Izugbara C, Ochako R. Prevalence and determinants of unintended pregnancy among women in Nairobi, Kenya. BMC Pregnancy Childbirth. 2013;13:69.
13. Adetunji J. Levels, trends, and determinants of unintended childbearing in developing countries. In: 62nd Annual Meeting of Population Association of America. Washington, D.C.; 1997.
14. Gillespie D, Ahmed S, Tsuia A, Radloff S. Unwanted fertility among the poor: aninequity? Bulletin of the World Health Organization; 2007. http://www.who.int/bulletin/volumes/8572/06-033829.pdf. Accessed 5 Nov 2018.

15. Herold JM, Thompson NJ, Valenzuela MS, Morris L. Unintended pregnancy and sex education in Chile: A behavioural model. J Biosoc Sci. 1994;26(4):427-39.
16. Mahfuzur R, Roy TK. Determinants of unwanted fertility in Bangladesh: whether sex preference and unmet need are dominant? Romanian J Popul Stud. 2015;9(1):81-103.
17. Roy TK, Singh BP. Correlates of unwanted births in Bangladesh: a study through path analysis. PLOS ONE. 2016;11(10):1-12.
18. Rahman M. Women's autonomy and unintended pregnancy among currently pregnant women in Bangladesh. Matern Child Health J. 2012;16(6):1206-14.
19. Rahman M, Sasagawa T, Fujii R, Tomizawa H, Makinoda S. Intimate partner violence and unintended pregnancy among Bangladeshi women. J Interpers Violence. 2012;27(15):2999-3015.
20. Koenig MA, Acharya R, Singh S, Roy TK. Do current measurement approaches underestimate levels of unwanted childbearing? Evidence from rural India. Popul Stud. 2006;60(3):243-56.
21. D'Angelo DV, Gilbert BC, Rochat RW, Santelli JS, Herold JM. Differences between mistimed and unwanted pregnancies among women who have live births. Perspect Sex Reprod Health. 2004;36(5):192-7.
22. McDonald P. Low fertility and policy. Ageing Horizon Report No.: 7, Oxford Institute of Ageing; 2007. https://www.ageing.ox.ac.uk/download/43. Accessed 5 Apr 2018.
23. United Nations (UN). Methods of measuring the impact of family planning programmes on fertility: Problems and issues. 1976. 28. Moral S. Government hiding health information
24. Miah MMR. Determinants of high fertility in Bangladesh: Their implications for social development. Int Rev Mod Sociol. 1993;23(1):75-89.
25. United States Agency for International Development (USAID). Who we are. The Demographic and Health Survey Program. 2019. https://www.dhsprogram.com/Who-We-Are/About-Us.cfm. Accessed 6 Dec 2019
26. Bongaarts J. The causes of stalling fertility transitions. Stud Fam Plann. 33. 2006;37(1): 1-16.
27. Bongaarts J. Fertility and reproductive preferences in post-transitional societies. Popul Dev Rev. 2001;27:260-81.
28. Kulkarni S, Choe MK. Wanted and unwanted fertility in selected states of India. Mumbai and Honolulu: International Institute for Population Sciences; 1998. https://pdfs.semanticscholar.org/d178/da4b4ca322 9a3bdcff874564488d912a2 076.pdf.
29. Ezeh AC, Bongaarts J, Mberu B. Global population trends and policy options. The Lancet. 2012;380(9837):142-8.
30. Al-Sabir A, Mitra SN, Islam S, Bhadra SK, Cross A, Kumar S. Bangladesh Demographic and Health Survey (BDHS) 2004. Dhaka, Bangladesh, and Calverton, USA; 2005. www.DHSprogram.com. Accessed 7 Nov 2016.
31. National Institute of Population Research and Training (NIPORT), Mitra and Associates, ICF International. Bangladesh Demographic and Health Survey (BDHS) 2011. Dhaka, Bangladesh
32. National Institute of Population Research and Training (NIPORT), Mitra and Associates, Macro International. Bangladesh Demographic and Health Survey (BDHS) 2007. Dhaka, Bangladesh, and Calverton, USA; 2009.
33. Bertrand JT, Magnani RJ, Rutenberg N. Handbook of indicators for family planning program evaluation. USAID; 1994. file:///C:/Users/MMRL/Downloads/ms-94-01.pdf.
34. Blinder AS. Wage discrimination: Reduced form and structural estimates. J Hum Resour. 1973;8(4):436-55.
35. Oaxaca R. Male-female wage differentials in urban labor markets. Int Econ Rev. 1973;14(3):693-709.
36. Jann B. The Blinder-Oaxaca decomposition for linear regression models. Stata J. 2008;8(4):453-79.

37. Maslovskaya O, Brown JJ, Smith PWF, Padmadas SS. HIV awareness in China among women of reproductive age (1997-2005): A decomposition analysis. J Biosoc Sci. 46(02): 178-198.
38. Yun M-S. Normalized equation and decomposition analysis: Computation and inference. Bonn: Institute for the Study of Labor; 2005. http://ftp.iza.org/dp1822.pdf.
39. Ezeh AC, Mberu BU, Emina JO. Stall in fertility decline in Eastern African countries: Regional analysis of patterns, determinants and implications. Philos Trans R Soc Lond B Biol Sci. 2009;364(1532):2991-3007.
40. Van de Kaa DJ. Europe's second demographic transition. Washington, D.C: Population Reference Bureau; 1987.
41. Adhikari R, Soonthorndhada K, Prasartkul P. Correlates of unintended pregnancy among currently pregnant married women in Nepal. BMC Int Health Hum Rights. 2009;9:17.
42. Caldwell JC. Routes to low mortality in poor countries. Popul Dev Rev. 1986;12(2):171-2 2 0.
43. Visaria A. Son preference and group majority/minority: Comparing Hindus and Muslims in India and Bangladesh. In: 80th Annual meeting of the Population Association of America. San Diego; 2015.
44. Hossain MB, Khan MHR, Ababneh F, Shaw JEH. Identifying factors influencing contraceptive use in Bangladesh: evidence from BDHS 2014 data. BMC Public Health.2018;18(1):192.
45. Sen KK, Islam M, Hasan MM. Socio-economic and demographic determinants of women's household decision making autonomy in Bangladesh: A cross-sectional Study. Dhaka Univ J Sci. 2018;66(2):115-20.
46. Guttmacher Institute. Menstrual regulation and unsafe abortion in Bangladesh. 2017. https://www.guttmacher.org/fact-sheet/menstrual-regulation-unsafe-abortion-bangladesh.
47. Guttmacher Institute. Bangladeshi women weigh a variety of factors when choosing a contraceptive. 2003.