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AN ANALYSIS OF THE PRINCIPAL PROXIMATE DETERMINANTS OF FERTILITY AMONG SCHEDULED TRIBE WOMEN IN KOKRAJHAR DISTRICT OF ASSAM, INDIA

Ashok Kumar Saha*[1], Dimacha Dwibrang Mwchahary[2]

[1]Department of Mathematical Sciences, Bodoland University, 783370, Assam, India.

[2]Department of Mathematics, Kokrajhar University, 783370, Assam, India.

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***Corresponding Author: Ashok Kumar Saha**
Department of Mathematical Sciences, Bodoland University, 783370, Assam, India.
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ABSTRACT

This paper provides a significant assessment of the principal proximate determinants of fertility and their fertility inhibiting effects using primary data. The Bongaarts approach for proximate determinants of fertility was followed in this investigation. The total fertility rate of scheduled tribe was found 2.14 and the age specific marital fertility is high in the age group20-24. The analysis shows that contraception appears as the most prominent determinant in fertility reduction among scheduled tribe women, followed by abortion, lactational infecundability and marriage. Among the four proximate determinants of fertility, the contribution of index of contraception was the highest in inhibiting fertility. Thus the use of contraception will be the dominant factor for reduction in fertility. The national goal of attaining a replacement level of fertility could be expected to be achieved if the rate of contraception use of scheduled tribe women can be increased up to a certain level.

KEYWORDS: *Proximate determinants, Total fertility rate, Contraception, Fertility.*

1. INTRODUCTION

The relationship between biological behavioral characteristics and socioeconomic conditions is identified as the proximate determinants of reproduction. Fertility is directly influenced by proximate determinants. Socio-economic factor has immense influence on fertility behaviour of any community. Understanding the different aspects of fertility the decision makers make policies highlighting the psychological and socioeconomic factors that affect fertility. Judith Black and Kingsley Davis (1956) attempted to use "intermediate fertility variables" to characterize the factors that have an immediate impact on fertility. John Bongaarts also established direct determinants of fertility in 1978 and give the

name "proximate determinants of fertility". According to Robert Potter and John Bongaarts, “the proximate determinants of fertility are the biological and behavioural factors through which social, economic and environmental variables affect fertility.” Since they are closest to the reproductive event, they are referred to as proximate determinants. It is feasible to investigate fertility differentials among diverse populations or trends in fertility levels of any country over a period of time by investigating the fluctuations in one or more of the proximate factors. The proximate factors of fertility can be categorised in two groups: those influencing the length of the reproductive span and those influencing the rate of child-bearing within the reproductive span.

2. Review of Literature

Shallo (2020) the single most significant factor contributing to Ethiopia's declining fertility was the usage of contraceptives. The nation needs a contraceptive prevalence rate of 69 percent, an increase of over 100 percent from its existing rate, in order to reach the fertility of replacement level.

Dash and Nagdeve (2020) it is revealed from the study that an increase in use of contraception has led to decline in Total Fertility Rate (TFR) over the decade. The knowledge of contraception is almost universal in India. Even after a slight decline in proportion married, there had been a considerably high contribution of the proportion married towards increasing Total Fertility Rate (TFR). It is evident from the decomposition that only the increase in use of contraception has a positive impact on declining fertility.

Chola and Michelo (2016) the distribution between rural and urban areas was 56 percent and 44 percent, respectively, with an overall mean age of 27.8 years. The two factors that most significantly reduced natural fertility from its biological limit of 19.10 were marriage 40 percent and postpartum infecundity 22 percent. Only 3 percent of people used contraception. Therefore, policies and programs should take into account the impacts of marriage, postpartum infecundity, and contraception on fertility in order to manage fertility in Zambia.In Zambia, controlling and sustaining population increase will continue to be difficult without such focused actions.

Majumder and Ram (2015) the fertility declines have been observed in most regions of the developing world over the last three decades. It is clear that Asia experienced the start of the shift from high to low rates of reproduction frequently at the time. With sizable rural and uneducated strata in the majority of heavily populated nations such as Bangladesh, Sri Lanka, Indonesia, Vietnam, China, and India, the majority of Asia's fertility decrease has specifically been among the poor.

Nath and Mazumdar (2013) in India, a sharp declining in urban fertility reached to near below replacement level. According to Sample Registration Sample (SRS) 1999, the urban fertility, other than Kerala and Tamil Nadu and West Bengal, the states like Assam, Himachal Pradesh, Karnataka, Andhra Pradesh and Punjab also observed near below replacement level.

Mahjabeen and Khan (2011) the study's conclusions show that the following policy implications can be made in order to achieve further fertility decline: advocating for women to marry at a later age, particularly in rural areas; supporting efforts to improve the quality of contraceptive use to induce higher use-effectiveness that will lead to greater contribution to fertility decline; increasing the use of sterilisation for those who have reached their desired fertility and wish to limit further births; and educating women about the advantages and disadvantages of longer breastfeeding.

From the above discussions it is observed that Bongaarts model is one of the most popular method for examining fertility and fertility change. Keeping the background information mentioned above this research aims to investigate the four primary proximate factors of fertility among scheduled tribe women in Kokrajhar district, Assam.

3. OBJECTIVES

The specific objectives of this study are

(i) To study the contribution of the four proximate determinants of fertility among scheduled tribe women.

(ii) To study the fertility inhibiting effects of the four proximate determinants among scheduled tribe women.

4. MATERIALS AND METHODS

The sampling design adopted for the present study is purposive stratified random sampling. The study used a cross-sectional design and primary survey data from ever-married women residing in Kokrajhar district, Assam. The analytical sample comprised 270 respondents. A questionnaire was used to collect information about their demographic and socioeconomic characteristics. The information collected on age of female at marriage, total number of children ever born and surviving, contraception used, duration of breastfeeding practices, abortion etc. These records have been utilized to estimate the values of four principal proximate determinants of fertility.

The Bongaarts model, which is well-known throughout the world, calculates the correlation between a society's overall birth rate and its proximate fertility variables. The Bongaarts model postulates that however, there are four primary proximal determinants that affect women's actual reproductive performance, their natural reproductive potential, or total fecundity rate (TF), is assumed to be virtually the same for all women. The following is the Bongaarts model:

$TFR = TF \times C_m \times C_c \times C_a \times C_i$

Where,

C_m= marriage index, $0 \leq C_m \leq 1$; 0 if there is no marriage and 1 if every woman who is of childbearing age is married.

C_c= contraception index, $0 \leq C_c \leq 1$; 0 if every fecund woman uses 100% effective birth control and 1 without the use of birth control.

C_a = induced abortion index, $0 \leq C_a \leq 1$; 0 means that every pregnancies are terminated, and 1 means that no induced abortion took place.

C_i = postpartum infecundability index, $0 \leq C_i \leq 1$; 0 if the period of infecundability is infinite 1 when postpartum abstinence and lactation are absent.

TF = An average of 15.3 (Bongaarts 1982), the majority of populations have TF values between 13 and 17 births per woman. As said by Bongaarts, his model is:

$TFR = C_m . C_c . C_a . C_i . 15.3$

Estimation of the Indicators

The indices C_m, C_c, C_a, and C_i can be estimated in a variety of ways. In the majority of applications, the indices are calculated directly from the proximate determinant measurements and are explained as follows:

a). Estimation of Proportions Married (Cm)

Marriage has been recognized by demographers as one of the primary proximal factors of fertility. Due to divorce, separation, or the husband's death, women in Indian communities spend a sizable percentage of their prime reproductive years following their first marriage. Age-specific proportions of married women form the basis of the

marriage index. Because age-specific marital fertility rates peak throughout the core childbearing ages, married women in these years contribute more to the TFR than either the youngest or the oldest women. The weighted average of the age-specific percentages of women who are currently married weights derived from age-specific marital fertility rates are used to estimate the index C_m. Consequently, the proportion of married people index is computed as

$$C_m = \frac{\sum m(a)g(a)}{\sum g(a)} \quad \text{..... (1)}$$

Where

m (a) = The proportions of women who are currently married by age

g (a) = The fertility rates of marriages by age

b). Estimation of Contraception (C_c)

The pervasiveness and efficacy of contraceptive use by couples within the age ranges for reproduction are inversely correlated with the contraception index. The projected value of the index Cc is:

C_c = 1- 1.08 x u x e .....(2)

Where,

u = the percentage of currently utilizing contraception among married women of reproductive age

e = average efficacy of contraceptive use

1.08 = the sterilizing adjustment factor, predicated on the idea that some sterile women may use contraceptives without being aware of their fertility and that not all contraceptive users may be fecund at the time of usage.

c). Estimation of Induced Abortion (C_a)

The percentage that fertility is decreased as a result of induced abortion is known as the index C_a. The predicted value of the induced abortion C_a index is:

$$C_a = \frac{TFR}{TFR + b.\ TA} \quad \text{.....(3)}$$

Where,

TA = Sum of abortion rate

b = 0.4 (1 + u), the births were prevented due to induced abortion

u = Proportion of married women who use birth control

d). Estimation Lactational infecundability (C_i)

Lactation lengthens the time between births and has an inhibitory effect on fertility. Without lactation, the overall waiting period before conception is 7.5 months, with roughly a 20-month average birth interval, 1.5 months of infecundable periods that resulted in a live birth, and, on average, the additional time due to intrauterine mortality, which equals to two months for every birth interval and a nine-month period of conception. It is comparable to the typical duration of the infecundable period (7.5 + 2 + 9 = 18.5) months during lactation. The index lactational infecundability is determined by dividing the average birth interval ratio with and without lactation or C_i.

$$Ci = \frac{20}{18.5+i} \quad \text{.....(4)}$$

Where,

i = the average amount of time that breastfeeding or postpartum abstinence causes postpartum infecundability. The equation that follows is used to estimate it:

$i = 1.753e^{0.1396B - 0.001872B^2}$

B = average number of months spent breastfeeding.

The discrepancy between TF and TFR is the cause of the inhibitory influence of four proximal factors. Each determinant's proportional involvement to the decline in fertility relative to overall fecundity is computed as follows: For the marriage index (C_m)

$$\frac{100\log(Cm)}{logCm + logCc + logCa + logCi}$$

It is also possible to determine how the other factors affect fertility. The number of babies prevented by marriage's influence on fertility is calculated as

$$\frac{(15.3 - 3.21)\log Cm}{logCm + logCc + logCa + logCi}$$

5. RESULTS AND ANALYSIS

According to the available data, the waiting period for conception is 18 months. As a result, an estimate of TF for a 30-year reproductive life (360 months) is 360/(1.5 + 18+2+9) = 11.80, where the minimal PPA duration in the absence of breastfeeding is 1.5 months, plus two months for pregnancy waste and nine more months for full gestation. As a result, the modified lactational infecundability index (Ci) is as

$$C_i = \frac{30.5}{29+i} = \frac{30.5}{29+13.09} = 0.7246$$

Where, lactational infecundability is represented by i.

Table 1 show that the age-specific marital fertility rate as well as the percentage of married women in this survey population across five distinct reproductive age groups. Age specific marital fertility rate is highest 109.55 in the age group 20-24 followed by 106.45 in the age group 25-29. The values obtained in the age group 15-19 and 30-34 are very closure to the age group 25-29. Age specific marital fertility rate is found lowest in the age group 35-39. The total marital fertility among scheduled tribe women is 2.20.

Table 1: Percentage of married women and Age specific marital fertility rates.

Age (in years)	Percentage married m(a)	ASMFR g(a)	m(a) x g(a)
15-19	0.77	105.13	80.95
20-24	0.92	109.55	100.79
25-29	0.87	106.45	92.61
30-34	0.67	104.14	69.79
35-39	0.14	14.29	2.00
TMFR		2.20	

Source: Primary data

The percentages of people who now utilize contraceptive methods and their effectiveness are displayed in Table 2. It is evident from the statistics that around 44.0 percent of all contraceptive method users take oral pills. 3.20 percent utilize another procedure, and 6.00 percent use the terminal method, which is sterilization.

Table 2: Current usage rates and effectiveness of various forms of birth control e_i.

Method	Proportion of women who use methods of contraception (u_i)	Efficiency of contraceptive techniques (e_i) (Bongaarts, 1983)
Sterilisation	6.00	1.00
Oral pills	44.00	0.90
Others	3.20	0.7

Source: Primary data

The findings show that (table 3), with a 52.00 percent reduction in fertility (Cc = 0.48), contraception has the most effect among the four indices. In Northeast India's urban society, the value Cc = 0.37 (Nath & Mazumdar, 2013). Contraception has the most notable impact on the drop in fertility among the various educational levels. The second most significant factor lowering fertility is abortion. 40% of abortions have an impact on a decrease in fertility (Ca = 0.60). The third most significant factor lowering fertility is lactational infecundability, which lowers the overall fecundity rate by 38% (Ci = 0.62). Marriage only lowers actual fertility by 21%, or Cm = 0.79.

Table 3: For scheduled tribes, calculated indices for fertility's four main proximate determinants.

Proximate determinants indices	Value	Fertility reduction
C_m, Proportion married	0.79	21.00%
C_c, Index of contraception	0.48	52.00%
C_a, Index of abortion	0.60	40.00%
C_i, Infecundability index	0.62	38.00%

Source: Primary data

Estimations and observations of the total natural marital fertility as well as the total marital fertility rate and total fertility rate are displayed in Table 4. Four proximate determinants have an inhibitory influence, which accounts for the discrepancy between total fertility rate and total fecundity. The overall fecundity rate is 11.80, below the requirement of 15.3 for Bongaart. The estimated total fertility rate and the observed total fertility rate, 2.14, are the same. The overall marital fertility rate is 2.73.

Table 4: Calculations for specific reproductive measures.

Reproductive measures	Value
TF (Bongaarts standard)	15.3
TF	11.80
Total fertility rate (Estimated)	2.14
Cm . Cc . Ca . Ci (Combined Indices)	0.14
Total Marital fertility rate (Cc.Ci.Ca.l5.3)	2.73
Total Natural Marital fertility (Ci . 15.3)	9.49
Observed total fertility rate	2.14

Source: Primary data

Using the ratio of each index's total inhibitory effect as a proration logarithm to the logarithm of all indices, each proximate determinant's inhibitory influence is identified. According to Table 5, of the four proximate factors, contraception has the biggest effect on lowering fertility. accounting for roughly 37.48 percent of the total impact. 4.93

births are prevented. Next in line is determinant-induced abortion, which prevents 3.43 births and has an impact of roughly 26.08 percent. The impact of infecundability on fertility is approximately 24.41 percent. It barely prevents 3.31 births. Marriage only contributes 12.04 percent to the decline in fertility. It just prevents 12.04 births. Consequently, it is found that marriage has little effect on the decline in fertility.

Table 5: The contribution of each proximate fertility determinant's inhibitory effect.

Indices	Births averted per women	Percent reduction
Marriage (C_m)	1.58	12.04
Contraception (C_c)	4.93	37.48
Induced abortion (C_a)	3.43	26.08
Infecundabiiity (C_i)	3.21	24.41
Total (15.3- 3.21)	13.16	100

The observed and model estimates differ slightly, as seen in Table 6. According to this data, scheduled tribe women continue to have high reproductive rates. However, as more people utilize modern forms of contraception, particularly the terminal techniques, the TFR can be reduced in the study area.

Table 6: The number of births averted, the percentage decrease, and the updated estimate of Ci.

	Values	Births averted	Percent reduction
Marriage (C_m)	0.79	1.26	13.03
Contraception (C_c)	0.48	3.91	40.58
Induced abortion (C_a)	0.60	2.72	28.23
Infecundabiiity (C_i)	0.72 (new)	1.75	18.16
TFR (estimated)	2.16		
TTR (observed)	2.14		
Total: 11.80- 2.16(estimated)		9.64	100

Source: Primary data

6. DISCUSSION

This study assessed how the four proximal variables of fertility affected fertility inhibition using the Bongaarts model. According to the current study, of the four proximate determinants, the survey population's use of contraception significantly reduces fertility. According to survey data, the population of scheduled tribes uses contraception quite frequently. Of the women surveyed, 53.20 percent accept contraceptives. Among scheduled tribal women, oral pills are the most commonly used method.

Pregnancy terminates with an abortion. Both spontaneous and artificial abortions are possible. One could argue that spontaneous abortion is the most natural form of birth control. Women from scheduled tribes are much less likely to have an induced abortion. According to the current data, just 9.06 percent of the women who were interviewed said they had had an induced abortion.

It is commonly known that breastfeeding is the primary cause of postpartum amenorrhea, and that the longer a woman breastfeeds, the longer she experiences amenorrhea. According to the current research, they have been breastfeeding their infant for a longer period of time; on average, they have done so for 19.5 months. They are imprisoned for a longer period of time for some cause. Because scheduled tribal members are from lower-income groups and cannot afford to buy baby food, several economic variables have affected how long they breastfeed. Therefore, it would seem

that lactational practices regulate fertility levels in a natural community has low rates of induced abortion and low levels of contraception.

The distinctive factor that lowers the overall fertility rate during the time is marriage, which contributes significantly to the four proximal determinants by limiting reproduction in the examined population. According to the data, scheduled tribe women's median age at marriage was 23.18 years. The combined effect of the high marriage and childbearing ages is a reduction in fertility of 21% in the group under study. Furthermore, it should be mentioned that compared with married couples, the total fertility rate is lower.

When comparing the model estimate to the total fertility rate as observed, the two fertility rates are in good accord. There is a little discrepancy of 0.02 births per woman between the model estimate of 2.16 and the observed total fertility of 2.14.

It is evident from the explanations and consequences covered above that the Bongaarts model may prove to be a highly useful instrument in this respect and, as a result, in managing the population in the research region. There is a dearth of knowledge since open consultation for reproductive health issues is discouraged due to traditional socio cultural backgrounds. The media can be very helpful in solving this issue.

7. CONCLUSION

Among the four proximate determinants of fertility, the contribution of index of ontraception was the highest and marriage appears to have the least impact in inhibiting fertility among scheduled tribe women. Any change in fertility is inevitably linked to modifications in marriage and attitudes about induced abortion, according to the proximate factors of fertility study. However, if most women are successfully contracepted, age at first pregnancy cannot affect fertility. In certain situations, government policy may significantly affect fertility trends, but in other situations, social and economic shifts may be just as influential. One significant factor influencing fertility is the involvement of the government. One of the main causes of the fall in fertility has been national policy decisions. With its assistance, realistic and attainable goals might also be established throughout the implementation of policies aimed at transforming the nation's population from a problem into a resource. Rural scheduled tribe women and the impoverished should receive adequate attention from policies aimed at reducing fertility.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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