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# ESTIMATION OF TFR OF MIGRANT COUPLES: A BIRTH INTERVAL APPROACH

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## ABSTRACT

Several studies have been conducted that have estimated/reported total fertility rate based on the number of births and hence through age specific fertility rate (ASFR). Such studies are mostly based on the data of ASFR for non migrant couples or for the mixture of both migrant and non-migrant. A very simple procedure for the estimation of Total Fertility Rate (TFR) of migrated couples, based on closed birth interval has been suggested in the present article .This study explores the impact of temporary separation due to the migration of males leaving their wives at home, on fertility through a theoretical procedure proposed under reasonable assumptions. The present procedure has been applied to an observed set of data relating to migrants from a rural area.

**KEYWORDS:** Birth Intervals, Migrant Couples, Total Fertility Rate, Probability Distribution, Fecundability

## 1. INTRODUCTION

Human reproduction, being a very complex process, is affected not only by biological factors but also by a number of socio-economic and cultural factors. Temporary separation between spouses due to migration especially in developing countries plays an important role in changing the socio-economic, cultural and other conditions of the couples and hence fertility is influenced greatly (Goldstein et al [2]; Mishra et. al. [3] and Yadava and Yadava [6]).

Fertility and hence TFR of a migrated couple has been studied by a number of probability distributions derived based on the number of births occurred during a fixed period of time (Singh *et.al.*,[5] and Yadava *et.al.*[7]), but very few approaches/ models have been derived to study the fertility behaviour of such couples based on birth intervals data. Models based on birth interval data, no doubt, provide better indices for detecting current changes in fertility behaviour of a couple rather the fertility indices based on the number of births (Chakraborty [1]).

One of the important characteristics of males migrant in developing countries like India is that they mostly move without their family at least at the beginning period of start of migration. Migrated males used to visit their home at a certain interval of time. Thus, the wives of such migrated husbands have less exposure time for conception than a non-migrant couple. The effect of such separation on fertility however, depends on the proportion of separated wives from their husbands and the duration of separation. It has been observed that in spite of a big difference in exposure time between migrated and non-migrated couples, not much difference in fertility performance has been observed between these two types of couples due to a high coital frequency among the former group of couples (Singh *et.al.*,[5] and Yadava and Yadava [6]).

This paper aims to derive a simple procedure for the estimation of total fertility rate (TFR) of migrant couples based on birth interval data. Here a couple is defined as migrant when one partners (spouse) used to stay at some distant place and visit his/her spouse after certain interval of time. The procedure is illustrated with an observed set of real data, collected from the rural areas. The study showed some reasonably consistent estimate of TFR.

## 2. PROCEDURE FOR THE ESTIMATION OF TFR

Here total fertility rate (TFR) is defined as

$$TFR = \sum_{x=\alpha}^{\beta} f_x = \int_{\alpha}^{\beta} f_x \, dx \tag{1}$$

where,

$f_x$=age specific fertility rate (ASFR) of female of age x

$\alpha$ = lower limit of reproductive period

$\beta$ = upper limit of reproductive period

Thus the total exposure period for a female to conceive is ($\beta$ - $\alpha$),if both partners living together.

But where age of marriage m (say) is legal time for cohabitation, then the marital duration for female to conceive would be ($\beta$ - $\alpha_m$)

Thus the total period of exposure for a female to have a risk of conception is

($\beta$ - $\alpha_m$)

And then the total fertility rate will be

$$TFR = \frac{(\beta - \alpha_m)}{d_i} \tag{2}$$

where,

$d_i$ = $i^{th}$ birth interval between $i^{th}$ to $(i-1)^{th}$ birth.

If i=0, then birth interval is the first birth interval (FBI) from marriage to first birth.

Usually, the nature of FBI has been found different in term of waiting time for conception, fecundability, age at marriage, etc than other closed birth intervals (CBI) having a component of post partum non-susceptible period. Taking this into account TFR would be

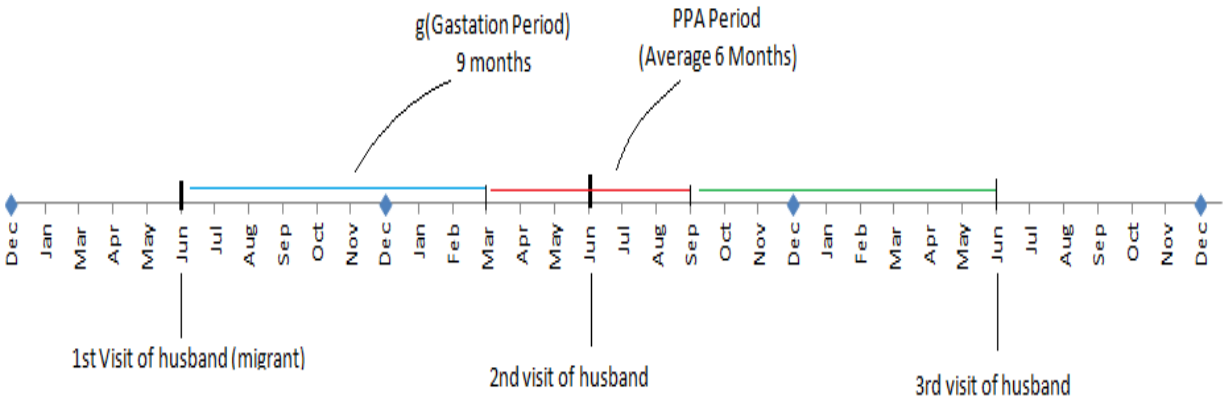
$$TFR = \frac{(\beta - \alpha_m)}{d_{ic}} + 1 \tag{3}$$

where,

$d_{ic}$ is $i^{th}$ CBI.

Now in case of a migrant couple if we assume that a migrant husband visit his wife at certain interval of time say after 1 year and stays at home for about y months, then exposure period for conception during the reproductive span would be

$$\frac{(\beta - \alpha_m)y}{12}$$




Further, it is clear from the above figure that if the husband (migrant) visit his home next year, her wife is not exposed to the risk of conception as she is in PPA period. In that case, female is exposed to the risk of conception only for y months in two years and hence exposure period during the whole reproductive span would be

$$\frac{(\beta - \alpha_m)y}{24}$$

Further due to separation CBI's would be longer for a migrant couple. An average CBI for a migrant couple has been found by Yadava *et.al.* [9]) as

$$d_{ic}^{*} = 1.25Sp^{*} + \frac{(1 - Sp^{*})(2.25 - 1.25q^{*})}{p^{*}} = E(x) \tag{4}$$

Where

S=proportion of females exposed to the risk of conception during the visit of their husbands p*=is the probability of conception during the visit period which is taken as y months in a year

$$q^{*} = (1 - p^{*})$$

Thus TFR for a migrant couple would be

$$TFR_m = \frac{(\beta - \alpha_m)\frac{y}{24}}{d_{ic}^{*}} + 1 \tag{5}$$

A conception may result either in a live birth or in a foetal loss. Let α be the proportion of conception not resulting in live births. Then average CBI ($d_{ic}^{**}$) is calculated by Yadava *et.al.*[8]) as

$$d_{ic}^{**} = 1.25Sp^*(1-\alpha) + \frac{(1 - Sp^* + \alpha Sp^*)(1 + 1.25p^* - 1.25\alpha p^*)}{p^*(1-\alpha)} = E(x) \quad (6)$$

and then TFR for a migrant couple would be

$$TFR_m = \frac{(\beta - \alpha_m)\frac{y}{24}}{d_{ic}^{**}} + 1 \quad (7)$$

## 3. AN ILLUSTRATION

If we take,

y=2months, i.e. when husband visit his wife in a year stays at home for 2 months and $p^*$= 0.414, S=0.35(as taken by Yadava *et.al.* [9])

Then the values of TFR for different values $\alpha_m$ and β are given in the following table

| $\beta\backslash\alpha_m$ | *18* | *21* | *25* |
|---|---|---|---|
| ***35*** | 1.43 | 1.35 | 1.25 |
| ***40*** | 1.55 | **1.48** | 1.37 |
| ***45*** | 1.68 | 1.60 | 1.50 |

From the above table we see that if the lower limit of reproduction period ($\alpha_m$) is 21 years and value of upper limit of the reproduction i.e. the time of menopause(β) is 40 years, then the value of TFR came out to be 1.48

## 4. CONCLUSIONS

Proposed procedure reasonably showed some consistent estimate of TFR under several alternative situations. It may be useful for administrators and other population policy makers for its implications to a society or nation where a large number of couples are engaged in such a migratory process.

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