4.1 Introduction

A woman’s reproductive behaviour can be visualized as a chronology of vital events: menarche, births and interbirth intervals, and menopause. Commencement and termination of childbearing are crucial events in women’s life cycle. In general, the reproductive span of women is considered to begin with their entrance in sexual union (marriage in India context) and supposed to end as soon as menopause encounters. However, it seems more logical to assume the effective termination of women’s reproductive span being at her age at last conception (last birth when there is one to one correspondence between a conception and live birth) as the first and last conceptions define a woman’s realized reproductive period. Considering the fertility behaviour, timing of the culmination of childbearing is a relatively little-known aspect, in contrast to well studied vital events like age at marriage, onset of childbearing and progression of women from one parity to another [Singh and Bhattacharya, 1970; Singh and Bhaduri, 1971; Singh et al., 1976; Nath et al., 1993; Bloom and Reddy, 1986; Sidhu and Sidhu, 1987; Pasupuleti and Chattopadhyay, 2013; Mukherjee...
The age at which women have their last birth requires a comprehensive study, because in many important ways, it determines how the remaining life cycle of women will be spent. As only after exiting from her child bearing cycle, a woman can devote her time completely to other pursuits apart from intensive child care. Furthermore, the ages at which women stop having children and the length of the reproductive span can be important factors affecting population growth. For demographers, age at last birth is important in estimating fertility rates, as well as in identifying natural fertility populations (defined for those where parity-dependent control of reproduction is absent) [Coale and Trussell, 1974]. Also, taken together with increasing age at marriage and increasing age at first birth, declining age at last conception has been a potential indication of the onset of demographic transitions from high to low fertility [Coale, 1984]. Moreover, woman’s age at last conception also has an effect on maternal and child health and mortality. It has been substantiated in various studies that women who conceive at ages higher than 35 years, become more prone to pregnancy complications and associated risks to mother’s and baby’s health [Andersen et al., 2000, Heffner, 2004].

One way to obtain the women’s age at last conception is to use retrospective survey data, provided complete maternity history of each woman is available. But for adopting this approach we need to confine ourselves to those women only, who have completed their child bearing and, this leaves us with scarce evidences regarding age at last conception of younger women who are yet to complete their families. Therefore, adopting any indirect method or the modelling approach to estimate the distribution age of women at last conception will provide an idea about young women’s concluding behaviour regarding fertility together with those who have completed their families. There exist few downright studies investigating this aspect of women’s reproductive behaviour. Hoem [1970] studied the distribution of age at last conception using some probabilistic fertility models of life table type. Krishnamoorthy [1979] and Suchindran and Horne [1984], developed some methodologies to obtain the distribution of age at first and last birth for a woman using the data.
on age-specific fertility rates. Proceeding in similar direction, Suchindran and Koo [1992] developed an indirect technique to obtain the distribution of maternal age at last birth. It is worthwhile to mention that there exist strong evidence that humans deliberately shape their family sizes, and sex-composition of offspring, to meet their compositional goals [Bongaarts and Potter [1983] Skinner [1997]]. It seems quite obvious that termination of women’s childbearing activities must be influenced by the couples’ desires and decisions regarding the number and sex composition of children they wish to have in their family. Recently Verma and Singh [2015] have proposed the distribution of maternal age at last birth by assuming that woman’s age at last birth depends on the couple’s desired sex composition in the family or number of children they wish to have. They used one stringent assumption that there is one to one correspondence between conception and live birth. This assumption seems to be unrealistic since a conception may result into either live birth or foetal loss [Singh and Singh, 1978]. Pondering the above mentioned aspects, the current chapter is an attempt to find the distribution of age at last conception of women making allowance for different types of pregnancy outcomes and considering subgroups of women following different contraceptive policies and fertility stopping rules. For the fulfilment of this objective, we followed Singh and Singh [1978] which gives a generalized parity dependent model for couple fertility.

## 4.2 Model

Let $X(T)$ denote the number of conceptions to a female during a time interval $(0, T)$ of length $T$ since marriage. Let the successive conceptions to a woman occur at times $Z_1, Z_2, \ldots, Z_{n+1}$ and $Y_n = Z_{n+1} - Z_n$ is the time between $n^{th}$ and $n + 1^{th}$ conception, which is sum of two parts the rest period following the $n^{th}$ conception and time of resumption of fecundable state after the $n^{th}$ conception and the time of $n + 1^{th}$ conception. Clearly, $Y_0 = Z_1$ and this interval does not consists of the rest period. The distribution function of $Z_{n+1}$ given by [Singh and Singh, 1978] is based on the following assumptions:
1. The female has led a married life throughout the period of observation.

2. The probability of occurrence of first conception in the time interval \((t, t + \Delta t)\) is \(\lambda_0 \Delta t + O(\Delta t)\) where, \(\lambda_0\) is conception rate in the beginning and \(\lambda_0 > 0, t > 0\).

3. Let \(\theta\) be probability of complete conception i.e. a conception results in a live birth, such that \((1 - \theta)\) is probability of incomplete conception.

4. Every conception is followed by a period of temporary sterility called the "rest period" which includes duration of pregnancy and the associated post-partum amenorrhea. Let \(h_1\) and \(h_2 (h_1 < h_2)\) be rest periods associated with incomplete and complete conceptions respectively which are assumed to be constant as a first approximation.

5. The conditional probability of conception during time interval \((t, t + \Delta t)\) is \(\lambda_j \Delta t + O(\Delta t)\) if the \(j^{th}\) conception is incomplete and has occurred prior to \((t - h_1)\) or it is complete and it has occurred prior to time \((t - h_2)\); zero otherwise, where \(\lambda_j\) is the rate of conception after \(j^{th}\) birth.

Then, the distribution function of \(Z_{n+1} = Y_0 + Y_1 + Y_2 + ...Y_n\) for marital duration \((0, T); T = t\), is given as:

\[
P[Z_{n+1} \leq t] = \sum_{j=0}^{n} \binom{n}{j} \theta^j (1 - \theta)^{n-j} \left[ \sum_{s=0}^{n} \prod_{i=0}^{n} \lambda_i \left[ 1 - e^{-\lambda_s(t-jh_2-n-jh_1)} \right] \prod_{i=0}^{n} \frac{\lambda_i - \lambda_s}{\lambda_i - \lambda_s} \right]
\]

(4.1)

where, \(t > jh_2 + n - jh_1\) and,

\[
P[Z_1 \leq t] = (1 - e^{-\lambda_0 t}); \quad P[Z_0 \leq t] = 1
\]

(4.2)
The expression of $P[Z_{n+1} \leq t]$ given by 4.1 is for the case when for each conception, the conception rate $\lambda$ assumes different value. But, there may be cases when few or all $\lambda$‘s assume same value. In the next section we define some hypothetical but realistic plans regarding values of $\lambda$ and illustrate the application of above model under these plans to obtain the distribution of age at last conception.

4.3 Application of the model

Anticipating $\lambda_0 = 0.65$, $h_1 = 0.5$ years (4 months of gestation and 2 months of post-partum amenorrhea), $h_2 = 1.25$ years (9 months of gestation and 6 months of post-partum amenorrhea) and $\theta = 0.85$ we define following hypothetical plans assuming two groups of women using birth control methods of varying effectiveness:

**Plan A:** No use of contraception and conception rate remains same for conceptions of all orders i.e. $\lambda_0 = \lambda_1 = \ldots = \lambda_n$.

**Plan B:** Rate of conception differs from one conception to another due to use of contraceptive methods of different effectiveness. Couples use contraceptives of 70% effectiveness after they have had their first conception, of 75% effectiveness after having their second conception, of 85% effectiveness after accomplishing third conception, of 92% effectiveness after fourth conception and then the couples become sterile or adopt a contraceptive method 100% effectiveness afterwards. Therefore, we have $\lambda_1 = 0.30\lambda_0$, $\lambda_2 = 0.25\lambda_0$, $\lambda_3 = 0.15\lambda_0$ and $\lambda_4 = 0.08$.

4.3.1 Derivation of expression for the distribution function of $Z_{n+1}$ under Plan A

In order to derive the expression for $P[Z_{n+1} \leq t]$ when all $\lambda$‘s are same, we use following lemma due to Chiang [1968].
Lemma: For any distinct numbers $\lambda_0, \lambda_1, \lambda_2, \ldots, \lambda_i$, we have

$$\sum_{j=0}^{i} \frac{\lambda_j^r}{\prod_{l=0}^{i} (\lambda_j - \lambda_l)} = 0; \quad 0 \leq r < i$$

$$= 1; \quad r = i$$

$$= U_{r-i}(\lambda_0, \lambda_1, \lambda_2, \ldots, \lambda_i) \quad r > i$$

where, $U_{r-i}(\lambda_0, \lambda_1, \lambda_2, \ldots, \lambda_i)$, a homogeneous expression of order $(r - i)$ in $(i + 1)$ numbers $\lambda_0, \lambda_1, \lambda_2, \ldots, \lambda_i$ is given by,

$$U_{r-i}(\lambda_0, \lambda_1, \lambda_2, \ldots, \lambda_i) = \sum_{j_1, j_2, \ldots, j_{r-i} = 0}^{i} \lambda_{j_1} \lambda_{j_2} \ldots \lambda_{j_{r-i}} \quad (4.3)$$

which contains $\binom{i}{r}$ terms.

Now, consider $[1 - e^{-\lambda s(t - j h_2 - n - j h_1)}]$, on expanding this term we get:

$$[1 - e^{-\lambda s(t - j h_2 - n - j h_1)}] = \lambda_s (t - j h_2 - n - j h_1) - \frac{\lambda_s (t - j h_2 - n - j h_1)^2}{2!} + \ldots$$

$$= \sum_{m=0}^{\infty} (-1)^m \frac{\lambda_s (t - j h_2 - n - j h_1)^{m+1}}{(m+1)!} \quad (4.4)$$

From equation 4.1, let us consider the term,

$$\sum_{s=0}^{n} \frac{\prod_{i=0}^{n} \lambda_i [1 - e^{-\lambda s(t - j h_2 - n - j h_1)}]}{\prod_{l=0}^{i} (\lambda_i - \lambda_l)} =$$

$$\sum_{s=0}^{n} \frac{\prod_{i=0}^{n} \lambda_i \lambda_s [\sum_{m=0}^{\infty} (-1)^m \frac{\lambda_s (t - j h_2 - n - j h_1)^{m+1}}{(m+1)!}]}{\prod_{l=0}^{i} (\lambda_i - \lambda_l)}; \quad t > j h_2 + n - j h_1$$
Now, using the lemma in expression 4.5 the expression reduces to,

\[
= \prod_{i=0}^{n} \lambda_i \sum_{m=0}^{\infty} (-1)^{m+n} \frac{(t-jh_2-n-jh_1)^{m+1}}{(m+1)!} \sum_{s=0}^{n} \frac{\lambda_s^m}{\prod_{i \neq s}^{n} (\lambda_s - \lambda_i)}; \quad t > jh_2 + n - jh_1
\]

Further, for \( \lambda_0 = \lambda_1 = ... = \lambda_n = \lambda \) (say), we have, \( U_{m-n}(\lambda_0, \lambda_1, ... \lambda_n) = m! \lambda^{m-n} \) and \( \prod_{i=0}^{n} \lambda_i = \lambda^{n+1} \)

\[
= \prod_{i=0}^{n} \lambda_i \sum_{m=0}^{\infty} (-1)^{m+n} \frac{(t-jh_2-n-jh_1)^{m+1}}{(m+1)!} U_{m-n}(\lambda_0, \lambda_1, ... \lambda_n); \quad t > jh_2 + n - jh_1
\]

Further, for \( \lambda_0 = \lambda_1 = ... = \lambda_n = \lambda \) (say), we have,

\[
\sum_{s=0}^{n} \frac{\prod_{i \neq s}^{n} (\lambda_i - \lambda_s)}{\prod_{i \neq s}^{n} (\lambda_i - \lambda_s)} =
\]

\[
\sum_{m=n}^{\infty} (-1)^{m+n} \left[ \lambda(t-jh_2-n-jh_1) \right]^{m+1} \frac{1}{n!(m-n)!}; \quad t > jh_2 + n - jh_1
\]

On representing \( \lambda(t-jh_2-n-jh_1) \) by \( x \) we get equation 4.7 in the form:

\[
\sum_{m=n}^{\infty} (-1)^{m+n} \left[ \lambda(t-jh_2-n-jh_1) \right]^{m+1} \frac{1}{n!(m-n)!} = \sum_{m=n}^{\infty} (-1)^{m+n} \frac{x^{m+1}}{(m+1)!} \frac{1}{n!(m-n)!}
\]

\[
= \frac{x^{n+1}}{(n+1)!} - \frac{x^{n+2}}{(n+2)n!} + \frac{x^{n+3}}{(n+3)n!} - \frac{x^{n+4}}{(n+4)n!} + ... \]

\[
= \frac{x^{n+1}}{(n+1)!} - \frac{(n+1)x.x^{n+1}}{(n+2)(n+1)!} + \frac{(n+1)x^2.x^{n+1}}{(n+3)(n+1)!} - \frac{(n+1)x^3.x^{n+1}}{(n+4)(n+1)!} + ...
\]
4. Distribution of Women’s Age at Last Conception......

\[
\begin{align*}
&= \frac{x^{n+1}}{(n+1)!} - \frac{x^{n+2}}{(n+2)!} + \frac{x^2}{2} \frac{x^{n+1}}{(n+1)!} - \frac{2(n+2)x^n x^{n+1}}{(n+3)(n+2)!} + \frac{x^3}{3} \frac{x^{n+1}}{(n+1)!} - \frac{3(n+2)x^3 x^{n+1}}{(n+4)(n+2)!} + \ldots \quad (4.8)
\end{align*}
\]

On expanding and simplifying (4.8) and substituting \( x = \lambda(t - jh_2 - \bar{n} - jh_1) \) we get,

\[
\sum_{m=n}^{\infty} (-1)^{m+n} \left[ \frac{\lambda(t - jh_2 - \bar{n} - jh_1)}{(m+1)} \right]^{m+1} \frac{1}{n!(m-n)!} = \left[ 1 - \lambda(t - jh_2 - \bar{n} - jh_1) \right]^2 + \ldots \sum_{m=(n+1)}^{\infty} \frac{\lambda(t - jh_2 - \bar{n} - jh_1)^3}{m!} = e^{-\lambda(t-jh_2-\bar{n}-jh_1)} \sum_{m=0}^{\infty} \frac{\lambda(t - jh_2 - \bar{n} - jh_1)^m}{m!} = 1 - e^{-\lambda(t-jh_2-\bar{n}-jh_1)} \sum_{m=0}^{\infty} \frac{\lambda(t - jh_2 - \bar{n} - jh_1)^m}{m!}
\]

Or,

\[
\sum_{s=0}^{n} \prod_{i=0}^{n} \lambda_i \left[ 1 - e^{-\lambda_i(t-jh_2-\bar{n}-jh_1)} \right] \prod_{i \neq s}^{n} (\lambda_i - \lambda_s) = 1 - e^{-\lambda(t-jh_2-\bar{n}-jh_1)} \sum_{m=0}^{n} \frac{\lambda(t - jh_2 - \bar{n} - jh_1)^m}{m!}
\]

(4.9)

Therefore, in case when all \( \lambda_j \)s are equal, the distribution function of \( Y_0 + Y_1 + Y_2 + \ldots + Y_n = Z_{n+1} \) is given as:

\[
P[Z_{n+1} \leq t] = \sum_{j=0}^{n} \binom{n}{j} \theta^j (1-\theta)^{n-j} \left[ 1 - e^{-\lambda(t-jh_2-\bar{n}-jh_1)} \sum_{m=0}^{n} \frac{\lambda(t - jh_2 - \bar{n} - jh_1)^m}{m!} \right]
\]

(4.10)
For Plan B, equation 4.1 can be used since all $\lambda$ values differ in this plan.

**Methodology**

In order to get the intended probability distribution under Plan A and Plan B, one have to comply the steps mentioned below for each of the two plans separately:

1. Using expressions of $P[Z_{n+1} \leq t]$, obtain the distribution function of $(n + 1)^{th}$ conception at different marital durations $t_1, t_2, t_3, \ldots$.

2. The probability distribution of $(n + 1)^{th}$ conception in the marital duration $(t_i, t_{i+1})$ can be obtained with the help of well known relationship
   \[ P[a < Z \leq b] = F(b) - F(a). \]

3. In order to determine the probability distribution of age at $(n + 1)^{th}$ conception for a cohort of women getting married at a certain age $M$(say), shift the origin of marital duration at $M$.

4. Advancing towards estimation of *age at last conception*’s distribution for a cohort of women marrying at age $M$, it is required to weight the probability distribution obtained in previous step with probability of exactly $m = (n + 1)$ conceptions to the women.

Manifestly, no couple will go on reproducing children indefinitely instead, they will have some stopping rule regarding the size and sex composition of their family. Hence, it is fairish to hypothesize that a woman’s probability to have exactly $m = (n + 1)$ conceptions in a given time duration must be affected by the couple’s preferences for sex composition and maximum size of the family they wish to have.

Keeping in view the above mentioned facts and possibility that a conception may to turn out to be incomplete($1 - \theta = 0.15$), we define following five hypothetical sub plans specifying the size and sex composition of the family desired by the couples.
S1: Stop child bearing as soon as one male is born or total number of conceptions is 2, whichever comes early.
S2: Stop child bearing as soon as one male is born or total number of conceptions is 3, whichever comes early.
S3: Stop child bearing as soon as one male is born or total number of conceptions is 4, whichever comes early.
S4: Stop child bearing as soon as one male and one female are born or total number of conceptions is 3, whichever comes early.
S5: Stop child bearing as soon as one male and one female are born or total number of conceptions is 4, whichever comes early.

Considering the widely accepted sex ratio at birth of 106 males per thousand females, the probability of a male birth is \( p = 0.515 \), probability of a female birth is \( q = 1 - p = 0.485 \) and as assumed above, probability that a conception is incomplete \( 1 - \theta = 0.15 \). Let us define the events,

\( L = a \) conception remains incomplete.
\( M = a \) conception is complete and results in a male birth.
\( F = a \) conception is complete and results in a female birth.

Therefore,

\[
P[L] = 1 - \theta = 0.15, \quad P[M] = p_c = 0.438 \quad \text{and} \quad P[F] = q_c = 0.412.\]

Also, \( (1 - \theta) + p_c + q_c = 1 \)

Next, we illustrate the calculation of probability of having exactly \( m = n + 1 \) conceptions under five considered sub plans. Consider a couple following one of the above defined five stopping rules, S1 for example. For this couple will stop at exactly 1 conception if and only if the first conception is complete and terminates in to a male child birth, the probability of exactly one conception under S1 is \( p_c \). The couples following this stopping rule will proceed to next conception if and only if first conception was incomplete or, complete but resulted in a female birth. As maximum family size for considered sub plan is 2, they will
stop further childbearing, irrespective of the fact whether second conception is complete and results in a male or female birth or it remained incomplete. Therefore, probability of exactly 2 conceptions under S1 is 

\[(1 - \theta)q_c + (1 - \theta)(1 - \theta) + (1 - \theta)p_c + q_c q_c + q_c (1 - \theta) + q_c p_c.\]

Table 4.1 gives children combinations at which couples will stop further child bearing after having exactly \(m\) conceptions under six defined sub plans. The probability of exactly \(m\) conceptions under sub plans S1, S2, S3, S4 and S5 have been evaluated in the above described manner (Table 4.2). Using these probabilities as weights together with distribution of age at \(m^{th}\) conceptions, the distribution of age at last conception has been obtained in Tables 4.3 and 4.4 for each of five sub plans under plans A and B, respectively.

Age at last conception has been classified in thirteen groups 20-22, 22-24, 24-26, 26-28, 28-30, 30-32, 32-34, 34-36, 36-38, 38-40, 40-42, 42-44, 44-46; age being measured in years. Figures 4.1 and 4.2 provide graphical representation of age at last conception’s distribution for the cohort of women getting married at age 20 years, under plans A and B respectively. Each of the five curves in both Figure 4.1 and Figure 4.2 represents one of the five sub plans. Let us investigate these figures.

From Figure 4.1 it is clear that even under assumption of identical conception rates across women, time taken by them to terminate their child bearing is altered by adoption of different stopping rules. Moreover, what this figure suggests is that age at last birth is being largely governed by couple’s decisions about their stopping behaviour. It is apparent that under sub plans S1, 22-24 years (or a marital duration of 4 years) is most probable age at last conception and about 70\% women following sub plan S1 will conclude their families within a duration of 4 years from their marriage and about 89\% of them will stop having further children within 6 years of marital duration. Age at last conception showed a similar pattern for sub plans S2, S3 and S4 however, across these plans the probabilities of having last conception considerably declined within same marital durations of span 6-8 years or lesser. Among women adopting sub plan S2, around 76\% will acquire their last conception
within 6 years span from marriage but, for both sub plan S3 this percentage declined to
70%. For sub plan S4 the percentage of women concluding there family within 6 years of
marriage declined steeply to 57%. Further, about 89% of women abide by S2 will accom-
plish their last conception within 8 years while, under sub plan S3 and S4 these percentages
will be 82% and 80 % respectively.

Probing the implications of sub plan S5 (under plan A) on age at last birth, it is evident
from Table 4.3 and Figure 4.1 that not more that 5.8% of these women will complete their
child bearing within 4 years of their marriage. While, for sub plan S5 this percentage will
be less than 4.5% In addition, 80% of women abide by sub plan S5 and 66% of women
obeying sub plan S6 will conceive their last child within 10 years marital duration.

Figure 4.2 examines the likely course of fertility completion of women using contracep-
tive methods of varying effectiveness to space successive conceptions(Plan B), under each
of the six sub plans. It is worthwhile to mention that for plan B age at last conception’s
distribution has shifted towards later ages compared with that for plan A, comparison being
made within same sub plans(S1, S2, S3, S4 and S5). Of these women, those who regulate
their fertility in accordance with sub plan S1, more than 70% will have their last conception
within 6 years of their marriage. However, among women adopting S2, around 72% will
take 10 years from marriage to have their last conception and increase of 2 more years of
marital duration will be brought about by sub plan S3 as 72% of women following S3 will
be have their last birth within 12 years of their marriage. For about 26% women following
sub plan S4, the age at last birth will be extended beyond the age 36 years (more than 16
years of marital duration). A substantial incline in the age at last birth may be observed
under sub plans S5, compared in both ways i.e., with other four sub plans under plan B
and with corresponding sub plans under plan A. It may be attributed to greater family sizes
under these sub plans and lengthening of the conception intervals of higher order by using
contraceptives of greater effectiveness under Plan B. Glancing at sub plan S5, it is observ-
able that more than 57% women acting according to Plan B and sub plan S5, will attain their last conception after 16 years of marital duration.

### 4.4 Discussions and conclusions

This chapter illustrates how the stochastic modelling can be used to get the distribution of age at last conception for a cohort of women having a specified age at marriage. Age at conclusion of childbearing have important implications for fertility studies. Also, it helps policy makers to form policies regarding family planning program and for getting an idea about the proportion of women whose desire for children is fulfilled and require more effective contraceptive methods. Unlike menopause, age at last conception is more conformable to behavioural control. Having enquired about their preferences regarding composition of the family, size of the family and contraceptive behaviour, this technique enables us to predict the possible distribution of age at last birth for young women, who are yet to complete their families. The plans and sub plans considered in this chapter can be altered to visualize the future courses of fertility completion in any realistic scenario. Furthermore, using this methodology we can also envision that how the behavioural and physiological conditions of women will shape their age at last conception. This can be accomplished by considering the change in rate of conception due to behavioural factors for example, declining coital frequency with duration of marriage, which, holding all else equal, decrease conception rates [Wood 1994, Ruzicka and Bhatia 1982]. Variation in age at last birth could also arise through heterogeneity across women in the timing of sub fecundity caused by physiological aspects like and non-reproductive endocrine functioning with increasing maternal age [Elsdon 2001]. As we discussed the change in rate of conception due to contraceptive practices in plan B, the effect of variation in rate of conception induced by above mentioned and similar behavioural and physiological aspects can be anticipated by following the methodology discussed in this chapter.
This chapter demonstrates how the stochastic models can be utilized to predict the vital events under realistic and relevant assumptions which can be of real help to policy planners since, they require to visualize the future behaviour concerning vital events in the backdrop of current behaviour.
Table 4.1: Combination of conception outcomes at which couples will stop further child bearing after having exactly $m^{th}$ conceptions under defined sub plans

<table>
<thead>
<tr>
<th>$m$</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM, FLL, FL, FM</td>
<td>LLM, LFM, LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM</td>
<td>LLM, LFM, LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM</td>
<td>LMF, LFM, MLF, MMF, FLM, FFM</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM, FLL, FL, FM</td>
<td>LLM, LFM, LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM</td>
<td>FFL, FLM</td>
<td>LMF, LFM, MLF, MMF, FLM, FFM</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>LLL, LLF, LLM, LFL, LFF, LFM, FFL, FFF, FF, FFM, FLL, FL, FM</td>
<td>FFL, FLM</td>
<td>LLL, LLF, LLM, LFL, LFF, LFM, LLM, LLF, LLM, LFL, FFL, FFM, FL, FF, FLL, FFL, FFL, FFL, FFF, FFM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Distribution of Women's Age at Last Conception.......

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Table 4.2: Probability of exactly m conceptions under defined sub plans

<table>
<thead>
<tr>
<th>m</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
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<td>0.438</td>
<td>0.438</td>
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<td>0.000</td>
</tr>
<tr>
<td>2</td>
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<td>0.246</td>
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<td>0.361</td>
</tr>
<tr>
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<td>0.639</td>
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<td>0.000</td>
<td>0.377</td>
</tr>
<tr>
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<td><strong>1.000</strong></td>
<td><strong>1.000</strong></td>
<td><strong>1.000</strong></td>
<td><strong>1.000</strong></td>
</tr>
</tbody>
</table>

Table 4.3: Probability distribution of age at last conception for plan A

<table>
<thead>
<tr>
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Table 4.4: Probability distribution of age at last conception for plan B

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4. Distribution of Women’s Age at Last Conception

Figure 4.1: Probability distribution of age at last conception for a cohort of women having age at marriage 20 years under Plan A.

Figure 4.2: Probability distribution of age at last conception for a cohort of women having age at marriage 20 years under Plan B.