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FINDINGS AND IMPLICATIONS OF A CORRELATION ANALYSIS OF THE CLOSED AND THE OPEN BIRTH INTERVALS

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Abstract—A correlation analysis of data on four fertility variables viz. closed birth interval, open birth interval, age and parity, collected in a survey of about 2,000 married women in the reproductive ages in rural India, is carried out in order to study the interrelationships among these variables. Two hypotheses are formulated governing the relationship of the closed and open birth intervals with the fecundability distribution of fertile women, and Parity Progression Ratios which are largely influenced by the proportion of women becoming sterile after each parity. The data lend support to the hypothesis that while the closed intervals are influenced mainly by the distribution of fecundability of women of non-zero fecundability, the open birth intervals are influenced mainly by Parity Progression Ratios or the proportion of women becoming secondarily sterile after each parity. The analysis suggests that we can use the mean open intervals of women classified by parity as indices of fertility, and such an index is comparable to the index of average age of women of given parity. In areas where it is difficult to ascertain the correct age of women this might be of practical value.

In this article, an attempt is made to analyse and interpret some of the data on birth intervals and other fertility indices collected through a large scale fertility survey carried out in the Gandhigram area. The data, collected in the first round of enquiry of the Standard Fertility Survey conducted in Athoor Block in India during January to April 1965, especially those relating to age, parity, closed and open birth intervals of women in the reproductive age group, have been used in this analysis. The analysis is focussed on an understanding of the interrelationships of the closed and open intervals and their correlation with other fertility indices based on age and parity, considering the birth intervals as separate entities in themselves. It is hoped that such a statistical analysis will throw much light on the utility of birth intervals as indices of fertility.

Before proceeding into the details of the analysis and the interpretation of the results, it seems worthwhile to define the different dimensions of fertility. For the purpose of this article, a distinction is made between fertility determinants and fertility indices. In the former group are included the concepts of Fecundability (monthly probability of a married woman conceiving in the susceptible state) and the Parity Progression Ratio (probability that a married woman reaching parity i will ever progress to parity $i + 1$ in her reproductive span). In the latter group are included the conventional indices of fertility like birth rate, fertility rate, gross reproduction rate, average number of children born to women of different age groups, completed family size etc.

Fecundability and parity progression ratios are termed fertility determinants because they are supposed to be the basic factors in determining the fertility levels of the population. They are not easily measurable, being probabilistic in nature and rather abstract in concept.

Though other factors such as age at marriage, postpartum amenorrhea and foetal wastage could also be logically included among the fertility determinants, they are not taken into account in this article since this analysis purports to investigate only the relative effects of fecundability and Parity Progression Ratios on closed and open birth intervals holding other factors invariant.

A fertility index is an outward measure of the combined operation of different levels of fecundability and parity progression ratios (PPR's) in a population. Though other types of definitions of these terms are possible and have been made in the past, we are making the above definitions for the sake of clarity in our approach to the analysis of the data.

Now, if we assume an infinite reproductive span for every woman, it is obvious that with any fecundability level greater than zero a woman of parity i will eventually progress to have her $(i + 1)$th child. Under such a condition the proportion of women delivering their ith child who progress to $(i + 1)$th child will depend just on what proportion of women reaching parity i, have their fecundability reduced to zero because of voluntary or natural factors. The PPR's depend only on the proportion of women becoming secondarily sterile after each parity and not on the distribution of fecundability among women who still retain a non-zero fecundability level. The PPR's can be considered "independent" of the parameters of the distribution of fecundability of fertile women.

When we come down to the realistic case of a limited reproductive span, this "independence" of PPR's and the fecundability distribution is still to a large extent maintained in the earlier parities but thwarted in higher parities. Since women of higher parities have only a few years left for reproduction, unless their fecundability level is very high to minimise the waiting time to conception, they may not progress to their next child; and the PPR's do become functions of the fecundability distribution. However, we can safely make the assumption that among women of the younger age groups and lower parities the PPR's and the fecundability distribution can be considered to be independent of each other since the former are determined largely by the incidence of secondary sterility (natural or voluntary), and less by the distribution of fecundability among fertile women.

Hypotheses Proposed for Testing

If we have to establish the potential value of the closed (T) and open (U) birth intervals as indices of fertility, we should analyse the problem in the two phases—viz., Causal and Correlational—as explained below.

(1) To establish that there is a plausible causal association between fertility determinants on the one hand and the birth intervals on the other. The exact nature of the mechanisms by which fecundability and PPR influence birth intervals, should be understood.

(2) To test whether the theoretical or presumed causal association is observed in practice in the form of high correlation coefficients between a set of established fertility indices and birth intervals in observed data.

Analytical studies into the structure and dynamics of the closed and open intervals (Srinivasan, 1967, 1968; Potter, 1963; Sheps and Perrin, 1964; Venkatacharya, 1969) have revealed that while the closed interval T_i is mainly influenced by the fecundability parameters of the population in the birth interval $i, i + 1$, the open interval U_i is influenced both by the fecundability parameters and by the PPR, i.e. probability of transition from the ith to $(i + 1)$th birth. Illustrations with numerical examples have revealed that the open interval is more sensitive to changes in the PPR's than to changes in the fecundability distribution. It appears that the effectiveness of temporary methods of contraception which reduce the fecundability of women (without making it zero) are likely to be reflected by significant changes in the closed interval T and by relatively small changes in the open interval U. On the other hand, the effects of a decrease in the PPR's through sterilization or otherwise, is likely to be reflected by significant increases in U. Thus, both T and U appear to qualify for being considered as indices useful in fertility measurement in the different dimensions of fertility already mentioned. These conclusions are purely empirical since they are based on analytical models developed in the study of the structure and dynamics of the birth intervals with all the assumptions underlying the models. They require validation on observed data of birth intervals, and we will attempt such an analysis with the data collected at the Gandhigram Fertility Survey mentioned earlier.

On the basis of the findings of analytical studies, it is possible to frame a few hypotheses governing the interrelationship of the open and closed intervals and their relationship with other fertility indices especially those based on age and parity. The two hypotheses given below are not in anyway exclusive of varieties of hypotheses that can be inferred from our arguments. Only those which are considered the most important from the point of view of validation or otherwise of the tentative conclusions drawn from the analytical studies, have been taken up for testing. The framing of the hypotheses has not been done in the customary statistical method of defining the null hypothesis and alternatives.

Hypothesis I

A simple and accepted index of fertility of a woman at any stage of her married life is the number of children (live births) born to her till that point of time or, in other words, the parity of the woman. It is in itself primarily the resultant product of the two fertility determinants of the woman, viz., fecundability and PPR as they operated in her married life up to that point of time. Parity also influences the future course of fecundability and PPR of the woman because parity *per se* is known to be associated with incidence of secondary sterility and, in a lesser way, with fecundability.

The value of parity as an index of fertility is greatly enhanced with a knowledge of the age (or duration of marriage) of the women. The average number of children born to women in different age groups (or in different periods of duration of marriage) is a widely used index of fertility, and when the index is computed for women of age 45 and over (i.e. those who have crossed their reproductive period), it provides the average completed family size of a woman. (Also, instead of considering the average parity of women of specified age, we can take the average age of women of a specified parity as an index of fertility.)

Parity, being such a useful index of past fertility as well as a factor influencing future fertility of women in the reproductive period of their life, can serve as a basis for exploring the potential values of the birth intervals T and U as indices of fertility in a woman. The correlation of these intervals with parity *per se* and parity given age, can throw much light on our problems. Since, among women of a given age, parity is considered to be strongly associated with both fecundability and PPR's directly, i.e. in a given age group, women of higher parity have higher fecundability and higher PPR than women of lower parity, the correlation coefficients of both T and U with parity given age, should be of a high order. Since the PPR has been found analytically to influence the open interval U relatively more sharply than the effect of fecundability on T and since the PPR is an important factor in determining the average parity at any age, the correlation coefficient of U with parity in any age group should be higher (in absolute magnitude) than that of T with parity in the same group. Depending upon the magnitude of these correlation coefficients, it may be possible to decide to what extent the intervals T and U qualify to be used as indices of fertility.

Hence our first hypothesis concerns itself with the correlation of both T and U with parity *per se* and parity given age, and it is formulated that the correlation of U with parity is higher than that of T with parity among women of the same age group or duration of marriage.

Hypothesis II

The foregoing argument on the basis of our analytical concepts of the birth intervals lead us to believe that T and U are essentially influenced by two different fertility determinants, fecundability and PPR, which can themselves be considered to be largely independent of each other at least in a broad spectrum of the reproductive life of the married woman. Under such circumstances, we can expect T and U to be poorly correlated between themselves. If the assumed property of independence of fecundability and PPR holds good in a broad spectrum of the reproductive span of a woman and in many earlier parities, we can expect that the correlation coefficient between T and U will remain small even when factors of age and parity are controlled.

Method of Analysis

The first round of enquiry of the Standard Fertility Survey in the Athoor Block, India, was carried out between January and April of 1965. A representative sample of about 3,000 households was selected, and pregnancy particulars were collected from all married women in the sample households by trained female investigators. (See Central Family Planning Institute, India, 1965, for survey details.) The data collected included the woman's age, parity, interval between the last and last-but-one live births (the Closed Interval T), and the interval from the last live birth to the date of survey (the Open Interval U). Among the 2,093 married women of reproductive age covered by the survey, there were 1,846 women of parity 1 or above, i.e., women to whom the enquiries about intervals were applicable. Four of the 1,846 women of parity 1 or above were excluded from the analysis because data on the intervals were not available.

The two hypotheses as defined above, require that analysis should be made of the interrelationship of the four variables—age, parity, the closed interval T and the open interval U. For facilitating the computing work, a Master Table was prepared, where the four items of information, age, parity, T and U, were recorded for the 1,842 women for whom such data were collected in survey. Since by our definition, T represents the interlive birth interval for women of parity 2 and above, or the interval between date of consummation of marriage and first birth for women of parity 1, all analyses had to be carried out only on women of parity 1 and above. This may not affect our findings very much since our emphasis is on the trends and patterns of relationship which are not likely to be affected by the omission of nulliparous women. Only the absolute values of the correlation coefficients or other indices of association may show some small change by the inclusion of nulliparous women in the analysis.

The nature of the hypothesis framed by us, requires for the test a thorough analysis of the interrelationship of the 4 variables through an analysis of variance or correlation analysis. The method of analysis of variance, being a powerful statistical technique applicable in such situations, was thought of as a plausible line of approach to the data. However, a preliminary analysis of the data indicated that the interaction of age and parity on both *T* and *U* is quite striking; and it is not proper to talk of effect of age on *T* or *U*, without specifying parity. The presence of age-parity interaction on *T* and *U* can be detected from a perusal of the mean values of *T* and *U* for each age-parity combination, given in Table 1.

It may be seen from the same table that, for any specified age group, the mean value of *U* generally decreases with parity. This trend is observed for every age group. On the other hand, the mean value of *U* for any parity shows an increase with age, indicating the presence of an interaction. The few cases of departures from these general trends, observed in the data given in Table 1, are all in cases where the sample size is small, less than 10; and as such these fluctuations can be attributed to sampling errors. These findings are also true with regard to the closed interval *T*. Under these circumstances, where age-parity interaction appears to be an influencing factor on the analysis of the interval data, it was apparent that correlation analysis of the intervals with age given parity, or parity given age, would be necessary and hence such an analysis was carried out. The analysis was done

TABLE 1.—Mean Values of Closed (*T*) and Open (*U*) Intervals by Age and Parity

Parity	n	$\bar{T}$	$\bar{U}$	n	$\bar{T}$	$\bar{U}$	n	$\bar{T}$	$\bar{U}$	n	$\bar{T}$	$\bar{U}$
	ages 15-19			ages 20-24			ages 25-29			ages 30-34		
1. . . .	97	23.0	14.9	142	32.0	28.5	45	44.5	61.2	19	54.2	129.0
2. . . .	28	23.4	12.2	137	31.2	19.8	77	38.3	36.1	29	40.8	73.5
3. . . .	2	22.0	21.5	93	30.7	19.9	110	36.8	28.0	57	40.5	57.4
4. . . .	1	24.0	5.0	32	27.0	14.7	92	34.4	20.6	49	42.6	45.5
5. . . .	...	...	...	4	24.8	9.5	68	31.0	17.1	83	38.1	31.7
6. . . .	...	...	...	1	19.0	21.0	27	29.3	11.5	60	36.0	25.8
7. . . .	...	...	...	...	...	...	5	26.8	12.6	36	34.7	22.2
8. . . .	...	...	...	...	...	...	1	4.0	2.0	12	34.1	17.3
9. . . .	...	...	...	...	...	...	...	...	...	6	29.0	9.0
10+. . .	...	...	...	...	...	...	...	...	...	4	33.3	11.5
Combined omitting parity 0	128	23.1	14.3	409	31.1	22.3	425	35.8	28.3	355	39.1	43.3
	ages 35-39			ages 40-44			ages 45+			combined		
1. . . .	7	82.0	183.0	5	84.2	212.6	...	...	...	315	34.5	41.1
2. . . .	12	58.1	137.4	8	45.7	187.0	4	82.8	179.3	295	35.5	40.1
3. . . .	28	52.7	83.7	10	50.6	169.7	5	40.6	233.2	305	37.5	44.1
4. . . .	39	41.4	78.8	24	49.2	125.5	7	37.4	126.3	244	37.7	47.3
5. . . .	48	45.9	53.5	23	57.9	76.9	9	68.2	111.8	235	40.5	39.0
6. . . .	50	41.9	49.9	33	41.7	82.7	13	46.0	121.2	184	38.3	47.1
7. . . .	52	39.2	37.1	28	35.6	71.2	10	44.1	84.1	131	37.1	43.0
8. . . .	21	32.8	34.3	16	40.3	70.9	5	33.6	103.8	55	34.8	46.9
9. . . .	14	36.3	36.2	15	39.6	65.3	10	38.2	84.0	45	36.8	52.9
10+. . .	10	32.2	28.4	12	30.8	51.1	7	26.1	76.4	33	30.5	44.8
Combined omitting parity 0	281	43.5	60.0	174	44.7	94.7	70	45.4	115.5	1842	36.9	43.3

in the following two stages, keeping in mind the hypotheses that require testing.

First, the correlations of T and U with parity were separately analysed for each age group, and it was found that in every age group, the correlation coefficient of U with parity is higher than that of T with parity, establishing the superiority of U over T as an index of fertility (average parity in each group). Similar analysis of correlation coefficients of T and U with age, given parity, were also carried out.

Second, the interrelationship between T and U was examined by computing their total correlation coefficient as well as the partial correlation coefficient eliminating the effects of age and parity. The canonical correlation coefficient of T and U on age and parity was computed and compared with the multiple correlation of U with age and parity, and it was established that additional knowledge of T does not improve the prediction of U on the basis of age and parity.

Findings and Interpretations

Correlation of T and U with Age, Parity

Table 2 furnishes the correlation coefficients of T and U with parity for all women in the sample, for women of each group separately, and the partial correlation coefficient with parity eliminating the effect of age.

Table 2.—Correlation Coefficients of Closed (T) and Open (U) Intervals with Parity

Nature of correlation	Parity and T	Parity and U	Sample size
All age groups			
Total. . . .	.026	.036	1842
Partial (age controlled)	-.220	-.550	1842
Total, group			
15-19. . . .	.010	-.083	128
20-24. . . .	-.095	-.250	409
25-29. . . .	-.236	-.455	425
30-34. . . .	-.196	-.562	355
35-39. . . .	-.271	-.540	281
40-44. . . .	-.267	-.577	174
45+.	-.315	-.918	70

The inferences that could be drawn are:

(i) The total correlation coefficient of T with parity and U with parity, are not significantly different from zero.

(ii) The lack of correlation between parity and T or parity and U, is due to the opposing effects of age and parity on these intervals. While increase in age tends to increase T or U, increase in parity tends to decrease the mean values of the intervals.

This fact has already been mentioned. The foregoing table brings out the same fact quite strikingly, the partial correlation coefficient of T with parity and U with parity (eliminating age) turning to be negative and significantly different from zero (−.220 and −.550 respectively). Elimination of the effect of age seems to make U more powerful than T in predicting parity. The higher value of the partial correlation coefficient of U with parity than T with parity lends support to our first hypothesis that once age is controlled, U is a better predictor of parity than is T. While knowledge of parity (eliminating age) is able to explain only less than 5 per cent of the variation in T, it is able to explain about 30 per cent of the variation in U.

(iii) It can also be noted from the table that the correlations of T and parity as well as U and parity tend to increase, in their absolute magnitude, with age.

Though T and U appear similar in this aspect, one important difference exists. While the maximum correlation coefficient (in absolute value) of T with parity is only .315 which is attained in the age group 45+, the maximum correlation coefficient of U with parity, which is attained in the same age group, is as high as .918. Thus, while in the age group 45+, parity is able to explain only 10 per cent of the variation in T, it is able to explain 85 per cent of the variation in U. Further in every age group, the absolute value of the correlation coefficient of U with parity is higher than that of T with parity.

All the above conclusions lend support to our first hypothesis that both T and U are correlated with parity, given age, and of the two intervals, the correlation coefficient of U with parity is of higher magnitude than that of T with parity, when age is controlled. Thus there appears to be a case suggesting itself from the above analysis that the mean value of the open interval (U) can be used as an index of fertility, if the analysis is made for women of different age groups or different parities, separately.

Similar conclusions can also be drawn if, instead of considering the correlation coefficient of T and U with parity, we consider the correlation coefficient of T and U with age, for different parities.

Table 3 provides the values of the correlation coefficients of T and U with age for all women, for women of each parity separately, and the partial correlation coefficient eliminating the effects of parity.

The conclusions that can be drawn are:

(i) The correlation coefficients of T and U with age are positive and significantly different from zero.

(ii) Elimination of the effect of parity improves the correlation of T and U with age moderately—from .273 to .344 in the case of T and from .559 to .721 in the case of U.

(iii) With regard to the correlation of T and age, there is a decreasing trend with increase in parity.

TABLE 3.—Correlation Coefficients of Closed (T) and Open (U) Intervals with Age

Nature of correlation	Age and T	Age and U	Sample size
All parities			
Total	.273	.559	1842
Partial (parity controlled)	.344	.721	1842
Total, parity			
1	.440	.756	315
2	.413	.758	295
3	.305	.905	305
4	.269	.733	244
5	.433	.635	235
6	.254	.690	184
7	.136	.559	131
8	.179	.649	55
9	.191	.678	45
10+	-.119	.477	33

Such a trend is not discernible in the case of U and age, though the correlation coefficients of U with age in the earlier parities, 1, 2 and 3, are much higher than in later parities. However, for each parity the correlation coefficient of U with age is significantly higher than that of T with age. This suggests that we can use the mean open intervals of women classified by parity as indices of fertility, and such an index is comparable to the index of average age of women for a given parity. In areas where it is difficult to ascertain ages of women correctly (as in rural India), data can be obtained relatively more accurately on the open intervals since they are the time intervals between date of birth of last child and date of survey for women in the reproductive age group. Many surveys carried out in different parts of the country have revealed beyond doubt the gross inaccuracies present in the estimate of age of women arrived at by enquiry methods. In the case of open interval only knowledge of the date of birth of the last child is needed, and this can be obtained relatively more accurately than age. When fertility declines, we can expect the mean value of the open intervals—especially of women of parities 1, 2 and 3—to increase, and we can use these mean values as fertility indices.

In this connection, it is useful to examine some of the peculiarities of correlation analysis of the interval T and U (or, as a matter of fact, any interval), with age. This is because the intervals whose relation we study with age, are themselves a part of the age. Hence the cause-effect relationship is not very clear in this case. Is it because of the increasing age that a woman has longer birth intervals, open or closed, or is there a third factor or a group of extraneous factors responsible for the increase in birth interval implying increase in age, since the age can be considered to be a sum of series of birth intervals added to the age at marriage? This question cannot be answered easily. In order to identify whether age *per se* has a correlation with the length of the birth interval, we should isolate the effect of all factors other than age from the birth intervals and this is not possible in the given situation. For instance, in the Princeton Study (Westoff and others, 1961), it was found that 23 per cent of the variance in the birth interval between marriage and first child could be explained by variation in age alone, but on closer analysis, the investigators have found that the causal mechanism cannot be established from this because of the birth interval forming part of age.

Hence, in our analysis of correlation of intervals T and U with age, we should take these limitations into consideration. However, one rewarding feature in the analysis is that we are analysing the correlation of only one birth interval (open or closed) with age. Thus though the interval forms part of age, it forms only a small segment of age, and hence its influence on age is limited. Further, since we are attempting to replace the age of a woman, which is difficult to obtain in under-developed countries, by the open interval, whether open intervals form part of age or not matters less than whether the correlation between the two is of a sufficiently high order where we can replace the one by the other.

Correlation between T and U

Table 4 provides values of the correlation coefficients between T and U, total, eliminating age, parity and both.

It is seen that T and U are poorly correlated between themselves with a correlation coefficient of .1105, and this is not improved very much by the elimination of age, parity or both. This lends support to our second hypothesis that T and U are uncorrelated with each other and to our earlier presumption that since T is largely influenced by the fecundability distribution of fertile women and U, largely by the proportion of women becoming secondarily sterile after each parity and because these two factors are poorly correlated to each other at least in the earlier periods of the reproductive span, T and U should be poorly correlated between themselves. The negative correlation that we get between T and U when we control age and parity is due to the fact that both form part of age and once age is fixed, any increase in one variable is likely to be followed by a decrease in the other.

TABLE 4.—Correlation Coefficients Between Closed (T) and Open (U) Intervals

Nature of correlation	Coefficient
Total.	.1105
Partial, controlling	
Age.	-.0528
Parity	-.1097
Age and Parity . .	-.2151

Note: Sample size is 1842.

These findings are also substantiated by a multi-variate correlation analysis of T and U with age and parity. The multiple correlation coefficient of U on age and parity works out to .7215.

On the other hand, the addition of the variable T to the set of independent variables, i.e. U on age, parity, and the closed interval T, increases the correlation only to .7364. Thus we see that the addition of information on T does not improve the predictive ability of age and parity together on U.

The relative ability of age (X) and parity (Y) as predictors of T and U (or vice versa) can also be examined from another angle. The canonical correlation coefficient (Hoteling, 1936) of the pair of variables (T and U) on the pair (X, Y) is defined as the maximum correlation existing between any linear combination of T and U with any linear combination of X and Y. In other words, if $P_1T + P_2U$ is a linear function of T and U denoted by F, and $m_1X + m_2Y$ is a linear function of X and Y denoted by G, the canonical correlation of the set (T, U) with the set (X, Y) is defined as the maximum correlation that can exist between F and G. The procedure that is usually followed in the computation of canonical correlation coefficient is to obtain the expression for the correlation coefficient of F and G for any general set of coefficients (P_1, P_2, m_1, m_2) and then maximise this correlation with regard to these coefficients. In other words, we choose that linear combination of T and U and that of X and Y which have the maximum correlation between themselves.

The canonical correlation between (T, U) and (X, Y) works out to .7643. Now, since the canonical correlation coefficient gives the maximum correlation that can exist between linear combinations of T, U and linear combinations of X, Y, we can consider this correlation coefficient to be the maximum that can ever be obtained by any linear combination of T, U, for prediction of fertility based on age and parity. Since the multiple correlation coefficient of U on age and parity $(R_{U.XY})$ has been found to be equal to .7215 and this comes very close to 0.7643, we can conclude that in more than one way, the addition of information on T does not improve the predictive ability of age and parity on U—i.e. U as an index of fertility, stands by itself and is very little improved by a knowledge of the conventional inter-live birth interval, T. This is a good validation for both Hypothesis I and Hypothesis II and suggests that the mean value of U for each parity or for each age group can be used as an index of fertility.

Thus in populations where it is difficult to obtain age correctly due to factors like illiteracy, lack of vital records, etc., and it is difficult to use the conventional index of the number of children born to women in different ages, we can use the mean open interval for each parity as an index of fertility. It is obvious that data on the date of birth of last child can be obtained more accurately than the age of the woman. Any investigation of fertility trends and differentials based on average number of children born to women in different age groups can also be made with the mean open interval computed for each parity.

Summary

In this article the major findings of a correlation analysis between the closed and open intervals with age and parity, carried out on the Gandhigram Fertility Survey data are provided and interpreted. They are:

(i) The total correlation coefficients of T with parity and U with parity are not significantly different from zero and this is due to the opposing effects of age and parity on the birth intervals.

(ii) The correlations of T with parity as well as U with parity tend to increase (in their absolute magnitude) with age. In every age group the absolute value of the correlation coefficient of U with parity is higher than that of T with parity.

(iii) The correlation coefficients of T and U with age are positive and significantly different from zero.

(iv) With regard to correlation of T and age there is a decreasing trend with increase in parity. For each parity, U has a higher correlation with age than T with age.

(v) T and U are poorly correlated between themselves and this is not improved very much by eliminating the effect of age, parity and both.

(vi) The analysis suggests that we can use the mean open intervals of women, classified by parity as

indices of fertility and such an index is comparable to the index of average age of women of a given parity.

(vii) Mean open interval can replace age with regard to the computation of indices of fertility.

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Owing to the large size of the sample and the varied type of analyses required, the computations were found to be heavy and the assistance of the electronic computer from the Thumba Equatorial Rocket Launching Station, Trivandrum, India was sought especially in obtaining the sums and sums of squares of the variables involved.

This article was prepared when the author was working as Deputy Director (Research) at the Institute of Rural Health and Family Planning, Gandhigram, India. The views expressed are not necessarily those of the ECAFE secretariat or of the United Nations.

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