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DEMOGRAPHIC AND PSYCHO SOCIAL CORRELATES ASSOCIATED WITH THE ACCEPTABILITY OF IMPLANT METHOD OF CONTRACEPTION IN COMPARISON WITH COPPER T INTRA UTERINE DEVICE

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ABSTRACT

The present study was undertaken to explore the acceptability of the new single silastic implant containing norethindrone acetate in comparison with copper IUD. The study group was largely made up of parous young women of child-bearing age (average 27 years and parity two). No difference could be detected between the groups as regards background variables such as age, number of live-births living children* educational and socio-economic status. The study showed that a single silastic implant containing norethindrone acetate is largely acceptable because of its easy route of administration. Out of 100 implant cases 63 per cent cases reported no change in menstrual cycle after insertion whereas the corresponding percentage in copper T group was 44 per cent. Trouble experienced after insertion was less in implant group as compared to copper T group (37% in implant group and 60% in copper T group). Change in libido was experienced by only one in implant group and two in copper T group. The percentage of women in both the groups reporting side effects as the primary reason for discontinuation was low* being 6 per cent in implant group and 4 per cent in copper T group.*

The study showed this implant is equally acceptable as copper T IUD and could be recommended for long-term contraception in women.

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A quest continues for the development of an ideal contraceptive which Is safe, more practical, less demanding of professional talents and Is more acceptable to the users. Single silastic implant containing norethindrone acetate is one of the newer methods of fertility control recently introduced in clinical trials which has shown that it is an effective and safe method of contraception. It becomes available in India in 1974. Clinical trials done with different types of steroid implants In other countries also showed that inject able long acting contraceptive preparations offered convenience in administration, effectiveness and safety [1-5]. The use of long acting injects able preparations for the control of human fertility is still at an early stage of development. Results of the clinical trials with four different implants developed one after another with a view to improve performance, efficacy and acceptance of the one over the previous one used, indicated that a single silastic implant-D was a reasonably effective and acceptable method for long-term contraception in regularly menstruating as well as postabortal women6~8. Its acceptability as a fertility control method has not been studied. The choice of implant method of contraception and adjustments to it can be influenced by social and cultural milieu in which the acceptor lives.

Material and Methods

The present study was undertaken to explore the acceptability of the new implant method of contraception in comparison with Copper T device. The study was carried out at the All India Institute of Medical Sciences on patients attending the gynecological and obstetrics outpatient services during 1976-77. The study is based on the observation of two groups.

Group I consisted of 100 cases who accepted subcutaneous silastic Implant-D containing norethindrone acetate. This silastic Implant was made of 22 mm polydimethyl siloxane tubing No.602-301 (Dow Corning Corporation, Midland Michigan). Having a well thickness of 0.60 mm and an outside diameter of 3.1 mm. It contained 40 mg of norethindrone acetate and had a release rate of 150 jig/24 hrs and life-spans of 6 months. This was inserted subcutaneously in the lateral aspect of thigh under 1 per cent xylocaine anesthesia to the women volunteers as an outdoor procedure and removal was similarly contemplated under local anesthesia.

Group II consisted of 50 cases who accepted Copper T 200 device. This paper also attempts to study the attitude of the subjects towards subcutaneous silastic implant in comparison with Copper T IUD and also to know the users[1] experience about side effects in the sexual somatic and emotional areas and how do these factors determine the acceptability of Implant.

Observations were obtained for each patient immediately after the removal of the implant. A social psychologist with considerable experience was engaged for data collection. Home visits were also made in order to interview the cases within seven days after removal of implant. Specific interviews were conducted for those who discontinued the Implant or copper T. IUD before the end of span.

Observations and Discussions

Table 1 presents the distribution of two groups interviewed by selected characteristics measured at the time of the interview. The study group was made up of largely younger women of child-bearing age. In the sample, majority of the acceptors were less than 30 years of age (85% implant groups: 80% Copper T group). There were few acceptors above 35 years of age (5% and 8% in implant and Copper T groups respectively). The mean age of acceptors in implant and Copper T groups were 27, 47 and 27, 22 years respectively. They had an average family of 2.21 and 2.04 living children respectively. In Implant group 60 per cent of women belonged to parity (1-2) whereas among Copper T acceptors, 84 per cent belonged to parity (1-2). Mean parity of the two groups were 2.3 and 1.90 respectively. .The proportion of acceptors who had received no education in implant and Copper T groups were 14 and 16 per cent only. The acceptors in majority were Hindus (92% in implant group, 78% in Copper T group). Forty-two per cent of implant insertions were done after abortion whereas 68 per cent of Copper T cases were done after abortion. On the whole, the implant group compares well with Copper T group in terms of background characteristics as age, number of living children, educational and socio-economic status (SES) level. The SES of the sample worked out according to Kuppuswamy's socio-economic status scale (90) is shown in table 1. Majority of the respondents belonged to SES II and III (74%) in the implant group and (84%) in the Copper T group. The Chi-square test shows that the socio-economic

TABLE 1 (a)
PERCENT DISTRIBUTION OF CASES INTERVIEWED BY TYPE OF CONTRACEPTION USED and BY SELECTED CHARACTERISTICS

Characteristics	Type of Contraception	
	Implant 'D' (Per cent)	Copper *T* (Per cent)
WIFE'S AGE		
Less than 20 years	-	2
21-25 years	31	36
26-30 years	54	42
31-35 years	10	12
More than 35 years	5	8
Mean Age (years)	27.47	27.22
NUMBER OF PREGNANCIES		
1	7	6
2	22	26
3	27	38
4	22	18
5 or more	22	12
Mean Pregnancy	3.54	3.12
NUMBER OF LIVE BIRTHS (PARITY)		
1	23	34
2	46	50
3	22	10
4 or more	9	6
Mean Parity	2.33	1.90
NUMBER OF LIVING CHILDREN		
1	23	26
2	46	50
3	22	18
4	6	6
5 or more	3	-
Mean	2.21	2.04

status of the two groups does not differ significantly. Significant number of women, in the study belonged to nuclear family (78% in the implant group, 68% in the Copper T group).

TABLE 1 (b)
PERCENT DISTRIBUTION OF CASES INTERVIEWED BY TYPE OF CONTRACEPTION USED AND BY SELECTED CHARACTERISTICS

Characteristics	Type of Contraception	
	Implant [f]D' (Per cent)	Copper *T' (Per cent)
FAMILY TYPE		
Nuclear	78	68
Joint	22	32
WIFE'S EDUCATION		
None	14	16
Read and Write	6	-
Primary Schooling	16	14
Middle Schooling	20	6
Higher Secondary	24	30
College	20	34
RELIGION		
Hindu	92	78
Muslim	1	-
Christian	3	8
Sikh	4	14
TIME OF ACCEPTANCE		
Post-abortion	42	68
Interval	58	32
SOCIO ECONOMIC STATUS (KUPPUSWAMY SCALE)		
Class I	7	4
Class II	31	42
Class III	43	42
Class IV	16	12
Class V	3	-

Menstrual Status

Table 2 shows the menstrual status of the study group before insertion. Before insertion, 70 per cent of implant users stated they could predict approximately the due date of their next period whereas in Copper T group 94 per cent could predict the same. Even after implant insertions 87 per cent did not experience any breakthrough bleeding, whereas the corresponding percentage in Copper T group was 96 per cent. It has always been assumed that women like the reassurance of regularity in menstruation and that for any method of contraception to be acceptable, it must preserve a regular

TABLE **2**
MENSTRUAL STATUS BEFORE INSERTIONS OF IMPLANT/COPPER IUD

Menstrual Status	Implant Group	Copper *T' Group
LENGTH OF PERIOD USUALLY		
Longer length of time	7 (7)	2 (4)
Shorter length of time	3 (3)	6 (12)
About the same or normal	82 (82)	37 (74)
Different every time	8 (8)	5 (10)
AMOUNT OF FLOW USUALLY		
Heavier	8 (8)	2 (4)
Lighter	5 (5)	5 (10)
Normal	83 (83)	38 (76)
Different every time	4 (4)	5 (10)
TOTAL	100 (100)	50 (100)

Figures in brackets indicate percentages.

menstrual pattern. The major cause of women discontinuing to use the method is due to its disturbance of the menstrual pattern. Initial barrier to acceptance was irregular menstruation. Tab le 3 shows the menstrual s tat us after insertion of implant/Copper IUD. In implant group 63 per cent of acceptors reported no change in the menstrual cycle after insertion whereas the corresponding percentage in Copper T group was 44 per cent. Chi-square test showed a significant association between both the attributes.

Table 4 describes the distribution of side effects in two groups, experienced after insertion of implant or Copper T. In implant cases 63 per cent did not experience any side

TABLE 3
MENSTRUAL STATUS AFTER INSERTION OF IMPLANT/COPPER IUD

Change in menstrual cycle after insertion	Implant Group	Copper 'T* Group
No	63 (63)	22 (44)
Yes	37 (37)	28 (56)
TOTAL	100 (100)	50 -(100)

Figures in brackets indicate percentages. Chi-Square = 4.9 ($p < .05$)

TABLE 4
DISTRIBUTION OF STUDY GROUPS (IMPLANT/COPPER IUD) ACCORDING TO THE TROUBLE EXPERIENCED AFTER INSERTION

Whether experienced any trouble or not	Implant Group	Copper 'T' Group	Total
No trouble after Insertion	63 (63)	20 (40)	83
Some trouble felt after insertion	37 (37)	30 (60)	67
TOTAL	100	50	150

Figures in brackets indicate percentages. Chi-Square - 7.135 ($p < .01$)

effects after the insertion whereas among Copper T users 50 per cent were free from side effects; others experienced problems like vaginal discharge, abdominal pain, weakness etc. Chi-square test showed significant association between both the attributes.

Regarding libido, an overwhelming majority (98%) did not experience any change except one had decreased desire and one had increased desire in implant group. So also the case with Copper T group. Ninety two per cent did not experience any change and the rest had decreased desire. Even among husbands of implant women, 96 per cent did not experience any change except one had increased desire, whereas in copper T group, 98 per cent have no change only two had increased desire.

Regarding health aspects, 85 per cent of implant acceptors had the same state of health after insertion, the corresponding percentage is 62 among Copper T group. Only five per cent complained about the loss of appetite.

The percentage of women in both the groups reporting side effects as the primary reason for discontinuation is almost identical (6% in implant group; 4% in Copper T) i.e. irregular bleeding and continuous bleeding.

Attitudinal Variables

Some conclusions based on the findings of attitudinal changes in the present study may be useful in assessing how the new method is acceptable to the patients. The attitude of patients to use a new method provides complementary and useful information in research on methods in family planning. The attitude was sufficiently strong to support further research on Implant method of contraception. Table 5 shows the attitude of women towards single silastic implant and Table 6 shows the attitude of women towards Copper T IUD. Attitudes are measured by using Lickert Scale. The findings showed implant method is equally acceptable as Copper T IUD.

Thus, It is found that implant form of contraception if made available and promoted in fertility control programme, can be well accepted.

TABLE 5
ATTITUDE** OF WOMEN TOWARDS SINGLE SILASTIC IMPLANT

	Strongly agree	Agree	Slightly agree	Undecided	Disagree	Strongly disagree	Total
Silastic method most suitable Indian population	40 (40)	38 (38)	6 (6)	3 (3)	4 (4)	9 (9)	100 (100)
This method has advantage over FRMS*	29 (29)	51 (51)	9 (9)	2 (2)	5 (5)	4 (4)	100 (100)
Husband usually prefer this method over other FRMS	28 (28)	31 (31)	13 (13)	18 (18)	7 (7)	3 (3)	100 (100)

*Fertility Regulating Methods
**Measured by Likert's scale
Figures in brackets indicate percentages.

TABLE 6
ATTITUDE** OF WOMEN TOWARDS COPPER 'T' IUD

	Strongly Agree	Agree	Slightly agree	Un-decided	Disagree	Strongly Disagree	Total
Copper 'T'* method most suitable Indian population	5 (10)	24 (48)	11 (22)	4 (8)	6 (12)	- **(-)**	50 (100)
This method has definite advantage over other FRMS*	7 (14)	23 (46)	9 (18)	3 (6)	8 (16)	- (-)	50 (100)
Husbands usually prefer this method over other FRMS*	6 (12)	19 (38)	12 (24)	10 (20)	2 (4)	1 (2)	50 (100)

*Fertility Regulating Methods
**Measured by Likert's scale
Figures in brackets indicate percentages.

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PROTEIN ENERGY MALNUTRITION IN CHILDREN - A CASE FOR THE NEED OF A PLANNED FAMILY

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ABSTRACT

An attempt has been made to know the prevalence of Protein Energy Malnutrition (PEM) in the children aged below six years of a rural population of Uttar Pradesh and to study the influence of birth order*spacing with younger and elder siblings and total number of children in the family on its prevalence.*

The prevalence of all grades of PEM was 66.9 per cent; 21.4 per cent and 4.3 per cent children were graded as having PEM graded II and III respectively. The prevalence of PEM was found directly associated with the higher birth order less of spacing with younger and elder siblings and higher number of children* thus emphasizing the need of effective implementation of family welfare planning forits control.*

Protein energy malnutrition (PEM) is undoubtedly the most serious nutritional problem affecting several thousand young children in India. Inadequate food, ignorance, undesirable social practices tend to impede child's early growth. Lack of spacing and large number of siblings are the order of the day amongst low income groups and in rural areas. The problem of PEM assumes much greater magnitude and significance in rural areas. The present study, therefore, has been undertaken to assess the prevalence of PEM and the influenced of some biological factors on the prevalence in rural children.

Materials and Methods

The present study was carried out in Community Development Block Dalmau, District Rae Bareili, Uttar Pradesh. Ten

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villages out of 94 in the block were selected by simple random sampling method. All the children below the age of six years in all the households of selected villages were the unit of enquiry. Thus, 1,479 children out of a total 1,558 *i.e.* 94.9 per cent were studied. Remaining 79 children could not be studied due to no availability of child and noncooperation of parents during the study period.

The data were collected by door-to-door survey by interviewing the parents of the children. The information thus collected was recorded on an interview schedule which had been earlier tested on similar population.

The magnitude of the problem of PEM in the children was assessed by deficit in weight for age, using growth standards of ICMR for different agesl. The observed weight was expressed as percentage of the standard weight. The following indices suggested by Gomez were used for classifying the children suffering from PEM into three grades2;

Grade I : 75-90 per cent of expected weight for age and sex

Grade II : 60-75 per cent of expected weight for age and sex

Grade III : below 60 per cent of expected weight for age and sex plus all children presenting with oedema.

Observations

The nutritional status of about one-third (33.1%) children was found adequate in accordance with the criteria adopted.

The single largest group of children 800 (41.2%) was found having PEM of grade I, PEM of grade II (moderate malnutrition) was observed in 317 (21.4%), while 64 (4.3%) children were having severe degree (grade III) of PEM (Table 1).

It is interesting to observe that grade III malnutrition was absent in the children whose birth order was one and two. A significant and variable prevalence of PEM was observed in the children of birth order IV and above (Table 2)

TABLE 1

PREVALENCE OF PEM IN THE STUDY POPULATION

Nutritional Grades	Number	Percent Prevalence
Normal	489	33.1
Grade I	609	41.2
Grade II	317	21.4
Grade III	64	4.3
Total"	1,479	100.0

TABLE 2

GRADES OF PEM IN RELATION TO THE BIRTH ORDER

Birth or order	Total No. of Children	Normal		Protein energy malnutrition Grade I		Grade II		Grade III	
		No.	%	No.	%	No.	%	No.	%
I	346	167	48.3	147	42.5	32	9.2	-	-
II	192	72	37.5	82	42.7	38	19.8	-	-
III	227	57	25.1	101	44.5	52	22.9	17	7.5
IV	221	44	19.9	96	43.4	62	28.1	19	8.6
V and above	493	149	30.2	183	37.1	133	27.0	28	5.7
Total	1,479	469	33.1	609	41.2	317	21.4	64	4.3

Spacing with younger child: The factor of spacing with younger child could not be studied in 547 (37%) children as there was no younger sibling.

There is not much variation In the nutritional grades of children of the spacing of three years, but statistically significant difference was observed (X^2 = 31.0, d.f. - 6, p *L* 0.001). (Table 3).

Spacing with elder child: The factors of spacing with elder child could not be studied in 346 (23.4%) of the children as there was no elder sibling.

The prevalence of grade II and grade III PEM showed an increase with the lessening of the spacing as this was lowest (14.6% and 1.0% respectively) in those whose spacing was three years or more and highest (38.3 and 9.0% respectively) in those whose spacing with the elder child was less than one year. This difference was found significant statistically (X^2 = 15.4, d.f. 6, p *C* 0.01) (Table 4).

Total number of children in the family: There were 839 families in the study universe and the number of children in these families ranged from 1 to 8.

The prevalence of grade II PEM was lowest (15.7%) in those families where there was only one child and was highest (21.4%) in the families having five or more children (Table 5).

The families in which there was only one child, the prevalence of PEM grade III was found to be zero and was 7.8 per cent where there were five or more children. This rising trend of the prevalence of PEM grade II and III in relation to total children was found highly significant (X^2 = 78, 82, d.f. - 12, p ^ 0.001).

Discussion

According to Gomez classification, only one-third children were found having normal weight for age[2]. The prevalence of PEM grade I, II and III were 41.2 per cent, 21.4 per cent and 4.3 per cent respectively. The prevalence was found to be significantly associated with fertility pattern in the family.

TABLE 3

GRADES OF PEM IN RELATION TO THE SPACING WITH YOUNGER CHILD (n = 932)

Spacing with younger child (years)	Total No. of children	Normal		Protein energy malnutrition Grade I		Grade II		Grade III	
		No.	%	No.	%	No.	%	No.	%
Below 1	68	23	33.8	32	47.1	9	13.2	4	5.9
1-2	317	98	30.9	130	41.0	72	22.7	17	5.4
2-3	323	91	28.2	142	44.0	75	23.2	15	4.6
3 and above	224	102	45.5	99	44.2	23	10.3	-	-
Total	932	314	33.7	403	43.2	179	19.2	36	3.9

TABLE 4

GRADES OF PEM IN RELATION TO THE SPACING WITH THE ELDER SIBLING (n = 1133)

Spacking with elder child (years)	Total No. of children	Mnrmal normal		Protein energy malnutrition Grade I		Grade II		Grade III	
		No.	%	No.	%	No.	%	No.	%
Below 1	67	13	19.4	22	32.8	26	38.8	6	9.0
1-2	359	101	28.1	116	32.3	114	31.8	28	7.8
2-3	412	109	26.5	160	38.8	116	28.2	27	6.5
3 and above	295	115	39.0	134	45.4	43	14.6	3	1.0
Total	1,133	338	29.8	432	38.1	299	26.4	64	5.6

TABLE 5

GRADES OF PEM IN RELATION TO NUMBER OF CHILDREN IN THE FAMILY

Total children per family	Total No. of child-ren studied	Normal		Protein energy malnutrition Grade I		Grade II		Grade III	
		No.	%	No.	%	No.	%	No.	%
1	408	193	47.3	151	37.0	64	15.7	-	-
2	559	167	29.9	222	39.7	141	25.2	29	5.2
3	217	52	24.0	100	41.1	51	23.5	14	11.4
4	141	38	26.9	66	46.8	28	19.9	9	6.4
5and above	154	39	25.3	70	45.8	33	21.4	12	7.5
Total	1,479	489	33.1	609	41.2	317	21.4	64	4.3

Birth order of the children and the prevalence of PEM were found significantly associated. Highest prevalence of PEM grade II and III was in those whose birth order was fourth followed by the third. The overall prevalence of PEM was lowest in those children whose birth order was one. Rao *et al.* reported that there existed a relationship between the anthropometric measurement and the birth order3. Findings of the present study are in conformity with it and support the observation made by Gopalan, Seal and Mudikhedkar and Shah[4*5*6]. Low prevalence of PEM in the children of first and second birth order brings home the fact that children born earlier get more attention and care and hence have better health. Prevalence of PEM and spacing with younger as well as elder child, showed a significant association as the prevalence of moderate and severe degree of PEM increased with the lessening of spacing. However, it appears that when spacing is less than three years, spacing with elder sibling has more profound influence on prevalence of PEM grades II and III (Table 6).

These observations indicate that the growth potential of a child is somehow deficient, if his/her birth was preceded by a birth within three years. This assumption Is further strengthened by the fact that prevalence of PEM was lowest in those children who were eldest. Present observations in this regard are somewhat different from the generally accepted belief that PEM is a "disease child gets when the next child arrives" or "sickness of the deposed child", underlying the importance of subsequent deliveries. Mudikhedkar and Shah have reported that the PEM was less In the children who had a spacing with other sibling of three years or more, but they have not specified the spacing with younger and elder child[6].

TABLE 6

PREVALENCE OF PEM IN RELATION TO SPACING WITH ELDER AND YOUNGER SIBLING

Spacing (years)	Prevalence per 100 of PEM grade II and III	
	With elder child	With younger child
Below 1	47.8	19.1
1 - 2	39.6	28.1
2 - 3	34.7	27.8

There was a significant rising trend in the prevalence of PEM with the increase in the total number of children in the family. The largest prevalence of moderate as well as severe degrees was found in those children whose parents had five or more children. This can be explained by the. fact that the parents are not able to look after larger number of children well and the average amount of food which is available is shared by a large number of mouths.

Thus, it can be concluded that the prevalence of PEM in children can substantially be reduced if the number of the children is less and there is atleast three years of spacing between the two children. The findings of the present study strongly support the family welfare programme and its effective implementation will go a long way in the reduction of the most dreaded nutritional problem of the childhood.

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PROPORTIONAL MORTALITY AS A MEASURE OF HEALTH INDEX - A STUDY OF MAHARASHTRA STATE

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ABSTRACT

Swaroop and Uemura, Mathen and Sen have suggested proportional mortality (ratio of deaths of preschool, age group to deaths over 50 years (Ij) and death of preschool age group to deaths in the age group 1-49 (I2) as an indication of development and nutritional status[2]-. By using these indices (Il, l2) an attempt has been made to know the development and nutritional status in the districts of Maharashtra State during 1962-75. The indices Ii, 1 2 showed a declining trend which indicates an improvement in health situation. Sex-wise analysis of these indices revealed that the values have declined in both sex, but found to be more in male than female. Districts like Greater Bombay, Thana, Kolaba, Ratnagiri, Poona, Satara, Sangli are found to be having better "Health Situation", than other districts in Maharashtra State.

The need for numerical measurement of "standard of living" has been felt for a long time. In 1952, United Nations has suggested twelve components as an acceptable international catalogue of the components of level of living. The first, variable, suggested was "Health including demographic conditions" and the following indicators have been recommended as measurements!. Expectation of life at birth, infant mortality rate, crude death rate, number of hospital beds In relation to the population and number of physicians in relation to the population. On examining these indicators, it was noted that the indicators have limitations according to the available data. Swaroop and Uemura have suggested that the percentage of deaths at 50 years and over to deaths at all ages can be utilized as an index for studying the health and demographic status[2]. They have demonstrated that

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proportional mortality above 50 years has the maximum discriminatory power in classifying the country into "developed" and "developing" country. The ratio has been expressed as the product of three ratios, *viz.* product of age specific death rate of population above 50 years, proportional population above 50 years, and inverse of crude death rate. The proportion of population above 50 years was high in developing countries and varies according to mortality, thus, leading to comprehensive indicator of the level of living-*.

Mathen and Sen have further, evaluated the data on preschool population and showed that the ratio of deaths in preschool age group to deaths over 50 years (I^) and the ratio of deaths of pre-school age group to the deaths in the age group 1 to 49 (I2) are indicators of development, and nutritional status of the countries[4].

In the index Ii the first ratio is the specific mortality rate for pre-school children which have got very good relation with the stage of development of a country/ region and the last ratio is the proportion of people over 50 years which decreases with the progress of the country. Hence, the index I_1 which is the product of the above two important ratios measures the improvement in demographic conditions. Index I_2 which has been expressed as the deaths of pre-school population to that of deaths in the age group 1 to 49 years corresponds to nutritional status of the country.

In the present study, an attempt has been made to know the demographic and nutritional status of the State of Maharashtra by using above Ii and I2 indices. Using these indices and establishing empirical relation will give rise to number of questions. The above given indices are, however, simple to calculate on the basis of available vital statistics data and it is not necessary to depend on census data. By using above indices, it is possible to evolve some meaningful conclusion regarding demographic, health and nutritional status which will give an insight into the short-term developments. One of the limitations of the index is that this depends upon the completeness of the registration. However, in a developing country like ours where the numerator and denominators are affected to the same extent by under registration, the index will not be much vitiated.

TABLE 1

PER CENT OF DEATHS OUT OF TOTAL DEATHS FOR SELECTED AGE GROUPS BY SEX IN THE STATE OF MAHARASHTRA FOR THE PERIOD 1962-1975

Years	Male				Female				All Persons			
	1-4	5-49	50+	Total	1-4	5-49	50+	Total	1-4	5-49	50+	Total
1962	17.06	50.99	31.95	100.00	18.77	50.61	30.62	100.00	17.90	50.80	31.30	100.00
1963	19.89	48.74	31.37	100.00	22.87	47.99	29.14	100.00	21.36	48.37	30.27	100.00
1964	19.20	47.50	33.30	100.00	22.27	47.42	30.31	100.00	20.69	47.46	31.85	100.00
1965	19.82	46.33	33.85	100.00	23.26	45.75	30.99	100.00	21.48	46.05	32.47	100.00
1966	20.27	44.13	35.60	100.00	24.12	44.05	31.83	100.00	22.14	44.09	33.77	100.00
1967	20.42	45.09	34.49	100.00	24.18	44.80	31.02	100.00	22.24	44.98	32.81	100.00
1968	16.99	45.11	37.90	100.00	21.81	44.25	33.94	100.00	18.82	45.17	36.01	100.00
1969	18.15	44.05	37.80	100.00	22.78	44.09	33.13	100.00	20.34	44.07	35.59	100.00
1970	14.11	44.08	41.81	100.00	18.17	43.93	37.90	100.00	15.98	44.02	40.00	100.00
1971	14.58	43.50	41.92	100.00	19.12	43.76	37.12	100.00	16.68	43.62	39.70	100.00
1972	13.22	43.15	43.63	100.00	17.39	43.80	38.81	100.00	15.14	43.46	41.40	100.00
1973	14.14	44.19	44.67	100.00	18.76	41.91	39.33	100.00	16.25	41.52	42.23	100.00
1974	12.93	42.00	45.07	100.00	16.92	42.68	40.40	100.00	14.72	42.30	42.98	100.00
1975	9.55	43.55	46.90	100.00	13.04	44.69	42.27	100.00	11.09	44.06	44.85	100.00

Material and Methods

Data have been collected from vital statistics year books that have been maintained by vital statistics department, Government of Maharashtra. Information's regarding deaths by age and sex for 26 districts of Maharashtra from 1962-1975 have been collected. The index Ii and I2 have been calculated for 26 districts of Maharashtra, by sex and all persons for each year from 1962-1975. Kendall's coefficient of concordance has been applied to know the extent of association between the districts and various years for each index.

Results and Discussion

A pre-school child death of Maharashtra which was 17.90 per cent of total deaths in 1962 has declined to 11.09 per cent in 1975 (table 1). Deaths at 50 and above years have increased from 31.30 per cent in 1962 to 44.85 per cent in 1975, whereas percentage of deaths between 5-49 remains more or less the same. Per cent of female deaths are higher in 1-4 age group than male. Male deaths are high in 50+ age group during the study period. Percentage of deaths out of total deaths are decreasing in 1-4 age group and increasing in 5C+ age group in both sex during study period. The index II and I2 has been calculated for 26 districts and for the State by sex and all persons for each year from 1962. Table 2 gives index values at State level. In 1962, there were 22

TABLE 2

INDEX VALUE FOR MAHARASHTRA STATE BY SEX (1962-1975)

Year	Index I_1			Index I_2		
	Male	Female	Total	Male	Female	Total
1962	.5339	.6131	.5718	.2507	.2705	.2605
1963	.6342	.7851	.7054	.2899	.3228	.3063
1964	.5767	.7347	.6497	.2879	.3195	.3036
1965	.5855	.7504	.6615	.2996	.3370	.3181
1966	.5692	.7576	.6555	.3147	.3537	.3342
1967	.5919	.7794	.6778	.3117	.3505	.3310
1968	.4483	.6116	.5221	.2737	.3155	.2943
1969	.4801	.6876	.5717	.2918	.3407	.3159
1970	,3374	.4794	.3996	.2424	.2902	.2654
1971	.3878	.5151	.4201	.2511	.3040	.2766
1972	.3029	.4481	.3658	.2344-	.2842	.2584
1973	.3165	.4769	.3849	.2554	.3092	.2818
1974	.2869	.4188	,3425	.2354	.2839	.2518
1975	.2037	.3086	.2474	.1799	.2259	.2012

districts having index value between 25-74 and in 1975 all the 26 districts lie between 0-50. The correlation coefficient between the index and the period indicated that, as the years progress the index has declined (r = -.4775). This may be due to increase in deaths of 50 and above years (increase in denominator in I_1 index). It is also observed in table 1 that the percentage of deaths above 50 out of total deaths is higher than that of 1-4.

It was found that with the progress of year value of the index I_2 declines. In 1962, only two districts are having index value less than 25 whereas in 1975, 23 districts are having less than 25. This clearly shows that there was a decline in pre-school child deaths. It can be explained while looking at the percentage of deaths between 5-49 in table 1. The percentage of deaths in 5-49 out of total deaths is more or less same during 1968 to 1975, for both sexes, whereas the decline in pre-school deaths is very remarkable.

To know the uniformity in the level of index value during 1962-75 the Kendall's coefficient of concordance (W) test was used[5]. Kendall's coefficient of concordance (W) explains the extent of association among several (K) rankings of N objectives/individuals. For this purpose, first, the index values of each year were ranked (lowest rank for highest index value) for 26 districts separately.' The obtained ranks were then added for each year and mean of ranks, standard deviation and coefficient of variation was calculated (table 3). By using these rank sum and rank sum squares, Kendell's coefficient of association (W) was calculated by sex-wise for I_1 I_2 indices (table 4). The calculated X_2 (Chisquare) was not significant and concludes that with the considerable agreement in ranks, the index value has shown uniform pattern during different years.

The mean ranks increase and coefficient of variation decreases as the years progress as shown in table 3. This gives evidence that as the year progresses the index value declines. Further the total 1^ was uniformly increasing after 1962, whereas total I2 increases only after 1965. Similarly, the mean rank was uniformly increasing after 1962 in male Ii, female Ii, but fluctuating for Male 12, Female 12. Steady increase in mean rank explains that the index value of Ii (over districts) declined, thus leading to improvement in health situation and nutrition status.

TABLE 3

MEAN, STANDARD DEVIATION, C.V. OF RANKS OF INDEX BY YEAR AND SEX

Index	Year	Male			Female			Total		
		Mean	S.D.	C.V.	Mean	S.D.	C.V.	Mean	S.D.	C.V.
	1962	5.08	3.63	71.55	7.23	4.14	57.20	5.58	3.97	71.15
	1963	2.73	1.31	48.09	3.50	2.08	59.43	2.81	1.58	56.23
	1964	3.62	2.45	67.79	4.00	2.05	51.19	3.88	2.23	57.47
	1965	3.38	1.33	39.26	3.20	1.62	50.55	3.27	1.64	50.15
	1966	4.04	2.16	53.56	3.50	5.09	145.99	3.85	1.97	51.17
	1967	4.54	2.34	51.48	4.85	2.88	59.41	5.12	2.86	55.86
	1968	6.88	1.56	22.62	6.62	2.06.	31.09	6.54	1.98	30.23
I_1	1969	6.65	1.13	16.97	5.62	1.62	28.81	6.35	1.35	21.26
	1970	9.73	1.22	12.52	9.5 8	1.12	11.64	9.62	1.09	11.23
	1971	9.69	1.09	11.22	9.20	1.78	19.31	9.50	1.21	12.74
	1972	11.04	1.51	13.67	10.97	1.45	13.25	11.00	1.30	11.82
	1973	10.96	1.31	11.96	10.77	1.45	13.46	11.00	1.17	10.64
	1974	12.81	.80	6.25	12.23	2.34	19.15	12.67	1.42	11.21
	1975	13.85	.37	2.66	13.66	.87	6.40	13.83	.48	3.47
	1962	8.00	5.26	65.77	9.23	5.10	55.27	8.58	5.25	61.19
	1963	5.67	3.57'	61.88	6.79	3.67	54.12	6.15	3.56	57.89
	1964	6.62	3.98	60.17	6.81	3.95	5B.03	7.15	3.91	54.69
	1965	3.88	1.51	38.75	4.27	1.81	42.37	3.96	1.48	37.37
I_2	1966	3.19	2.31	72.53	3.08	2.69	87.22	3.19	2.71	34.95
	1967	3.65	2.38	65.20	4.45	2.89	64.95	4.15	2.38	57.35
	1968	6.31	2.66	42.25	6.66	2.88	43.30	6.42	3.02	46.97
	1969	5.31	2.41	45.46	4.93	2.67	54.23	4.87	2.37	48.67
	1970	9.73	2.34	24.07	8.97	2.24	25.02	8.38	3.06	36.52
	1971	8.84	2.16	24.50	8.70	2.27	26.05	8.81	2.40	27.24
	1972	10.42	2.32	22.24	9.89	2.19	22-14	10.27	2.20	21.42
	1973	8.46	2.47	29.19	7.89	2.82	35.73	8.13	2.58	31.73
	1974	11.50	1.88	16.36	10.04	3.46	34.47	11.38	2.08	18.28
	1975	13.31	1.56	8.70	13.39	0.94	7.00	13.46	0.86	6.39

TABLE 4

KENDALL COEFFICIENT OF CONCORDANCE (W) AND CHISQUARE VALUES FOR AND 12 BY SEX-WISE

Sex	Index	W	X2*
Male	I_1	.0038	1.2844
	I_2	.0095	3.2110
Female	I_1	.0057	1.9266
	I_2	.0114	3.8532
Total	I_1	.0045	1.5210
	I_2	.0102	3.4476

*Chisquare values are not significant with d.f. - 13.

The overall assessment, considering district as an unit, reveals improvement at State level. To know the level of each district during the. study period (1962-75), the districts were, however, classified according to index value above, below and fluctuating around State index (table 5).

TABLE 5
DISTRICTS WHICH ARE ABOVE, BELOW, FLUCTUATING AROUND STATE INDEX DURING 1962-75

Male			Female		Total	
	I_1	I_2	I_1	I_2	I_1	I_2
Districts which are Above State Index during 1962-75	Nasik Dhulia Jalgaon Parbhani Nanded Buldhana Akola Amravati Yeotmal Wardha Nagpur Chanda	Nasik Dhulia" Jalgaon Sholapur Aurangabad Parbhani Naaded Osmanabad Akola Amravati Yeotmal	Nasik Dhulia Jalgaon Parbhani Buldhana Yeotmal Wardha	Nasik Dhulia Jalgaon Akola Yeotmal	Nasik Dhulia Jalgaon Parbhani Buldhana Amaravati Yeotmal Wardha Nagpur Chanda	Nasik Dhulia Jalgaon Parbhani Osmanabad Akola Yrotmal
Districts which are Below State Index during 1962-75	Greater Bombay Thane Kolaba Ratnagiri Poona Satara Sangli Sholapur Kolhapur	Greater Bombay Thane Kolaba Ratnagiri Poona Satara Sangli	Greater Bombay Thane Kolaba Ratnagiri Poona Satara Sangli Ahmednagar Kolhapur Bheer	Greater Bombay Thane Kolaba Ratnagiri .Poona Satara Sangli Ahmednagar	Greater Bombay Thane Kolaba Ratnagiri Poona Satara Sangli Ahmednagar Kolhapur	Greater Bombay Thane Kolaba Ratnagiri Poona Satara Sangli
Districts which are Fluctua-ting Around State Index during 1962-75	Ahmednagar Aurangabad Sheer Osmanabad Bhandara	Kolhapur Ahmednagar Bheer Buldhana Wardha Nagpur Bhandara Chanda	Sholapur Aurangabad Nanded Osmanabad Akola Amravati Nagpur ,Bhandara Chanda	Sholapur Kolhapur Aurangabad Parbhani Bheer Handed Osmanabad Buldhana" Amravati Wardha Nagpur Bhandara Chanda	Sholapur Aurangabad Bheer Nanded Osmanabad Akola Amravati Bhandara	Ahmednagar Sholapur Kolhapur Aurangabad Bheer Nanded Buldhana Amravati Wardha Nagpur' Bhandara Chanda

Districts like Greater Bombay, Thane, Kolaba, Ratnagiri, Poona, Satara, Sangli have shown constantly lower index value than State index which indicates that these districts are having better health and nutrition level (Developed), whereas Nasik, Dhulia, Jalgaon etc. are having constantly higher than the State Index throughout the study period which indicates that these districts are less developed in terras of health situation. Further, the districts such as Ahmednagar, Bhandara, Bheer etc. are fluctuating around the State index which can be attributed to the fact that the health situation was not established and fluctuates as health plan implementation programme changes. These districts can be improved by a constant and simple public health measure, consequently leading to better health situation in majority of districts in the State.

Conclusion

The indices Ii and I2 which are the measures of demographic and nutrition level of a country/region are declining during the period 1962-1975 in the State of Maharashtra, an indication of improvement in health situation including demographic conditions. Sex-wise analysis of these indices revealed that the values were declining in both sex during the period 1962-75. The decline In male was higher than female. This was because that there was higher percentage of pre-school female deaths than male. Analysis of cause of deaths by sex reveals that higher total of lives among female children in the age group 1-4 are due to fever and digestive disorder over male children^. This emphasizes that female children are under- and mal-nourished and also relatively more exposed to communicable diseases than male. The negligence towards the female child is still predominant in Indian society. The diet of the pre-school child is unbalanced. Deficiency of calories and Iron Is a predominant factor, aggravated by shortage of other nutrients. Deficiency of iron is affecting more in these age groups than others7.

The districts such as Nasik, Dhulia, Jalgaon are having high index value than State index which indicates that the health and nutrition level in these districts is very poor. Mortality of female and male under four years seems to be very high. Special health measures are required to improve the situation.

When compared to other developing countries, the indices $I_1$and 1_2 are much higher in India and also in Maharashtra State. The ratio of pre-school deaths to deaths in the age group 1-49 was seven in USA, eight in Japan, six in United Kingdom for the year 1964, 24 in Maharashtra even in 1975. This indicates that many efforts are needed to improve the health conditions of the State and the country by implementing nutritional programmes catering to the needs of pre-school population in order to reach the stage of development.

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ESTIMATION OF COMPLETENESS OF DEATH REGISTRATION IN SOME ASEAN COUNTRIES - CIRCA 1970

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ABSTRACT

In this paper an attempt has been made to ascertain the completeness of death registration in Malaysia, Philippines and Thailand around the year 1970 in order to study their applicability and . shortcomings by using techniques developed by Brass, Preston & Hill and Martin. The comparative analysis of these three countries reveals that the registration system in Malaysia is better than that of other two countries.

In most of the developing countries a systematic analysis of levels and trends of the major components of population growth is severely handicapped due to lack of reliable and adequate data. Despite the existing law for compulsory registration of births and deaths in most of the developing countries, different studies have revealed a very high degree of under-registration of births and deaths in these countries. As such, the vital rates obtained directly by using the civil registration data do not provide adequate 'information on levels and trends of mortality in these countries. Recently, however, Brass, Preston & Hill and Martin have developed techniques which can be used to detect the percentage of incompleteness of deaths and, therefore, mortality rate can be adjusted to obtain the actual level of mortalityl»2,3. The main objective of this paper is to use the above mentioned methods to ascertain the completeness of death registration in Malaysia, Philippines and Thailand around 1970 in order to study their applicability and shortcomings. The suitable data for other points of time are not available for all these countries. This would have been no doubt better for checking the consistency of the results obtained in the paper. However, the consistency of the results has been established from other evidences available to us.

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Description of the Methods

In the stable population $D(x^+)$ deaths cumulated from age x to the end of life can be given as:

$$\frac{D(x+)}{P} = \int_x^w be^{-ra}\, \ell(a)\, \mu(a)\, da \quad \text{(Where all notations have their usual meaning).}$$

$$= -b \int_x^w e^{-ra}\, d(a)$$

$$= c(x) - \frac{rP(x+)}{P}$$

$$\text{or} \qquad c(x) = r\frac{P(x+)}{P} + \frac{D(x+)}{P}$$

$$\text{or} \qquad \frac{P(x)}{P(x+)} = r + \frac{D(x+)}{P(x+)} \qquad \ldots (1)$$

This Is an identity (analogous to b = r+d) given by Brass which follows only when population in question is demographically stable. Now, if D(x+) deaths are taken from the civil registration which is incomplete, it needs some adjustment for identity to be true. Hence, it can be put as;

$$\frac{P(x)}{P(x+)} = r + f\,\frac{D(x+)}{P(x+)} \qquad (2)$$

Where f = —1/c, the reciprocal of completeness of the death registration and this Is true only when "completeness of death registration is independent of initial age, say x considered".

If assumptions are met for any population and age mis-reporting and census omission are negligible, the values of r and f can be estimated by taking any pair of ages. But, the assumption of stability is very strong and in a population which is not stable, the rate of natural increase may be different for each age group. Martin therefore, suggested that r(x+), the growth rate of the population aged x and above must be used instead of r in the equation (2)[3]. So the equation (2) becomes,

$$\frac{P(X)}{P(X^{+})} = r(X^+) + f\,\frac{D(X^+)}{P(X^+)} \qquad \ldots (3)$$

which is still under restriction that completeness of death registration is invariant of age. This value of f can be directly estimated from (3) since all other terms are known. However, the estimate, of f either from equation (2) or (3) will certainly be affected by (i) misreporting of age either of the population or of deaths; (ii) differential coverage of death registration by age. Preston and Hill suggested the following formula to estimate the completeness of registration which does not need any such estimation procedure[2].

$$C = \frac{DR(x+)}{r(x+)} \left[\int_{x}^{w} d(a)\, e^{r(a-x)}\, da - 1 \right] \quad \ldots \quad (4)$$

For given value of r(x+), the distribution of death by age and the recorded death rate, the equation (4) provides unique solution of completeness. The equation (4) can also be written as:

$$C = \frac{d}{r} \left[\int_{0}^{w} d(a)\, e^{ra}\, da - 1 \right] \quad \ldots \quad (5)$$

which does not require the age distribution of the population and thus, it overcomes the problem of age misreporting of the population. The derivation of formula, thus, is given by Preston & Hill^, But the relationship shown in equation (4) or (5) is true only incase of a stable population. If the population in question is stable, the technique of Preston and Hill may be preferred because unlike Brass and Martin it does not require the age distribution of the population and hence the estimates so obtained are not affected by patterns of age misreporting that would transfer population across the initial age xl»2*3. The adjusted crude birth rate can be obtained with the help of identity b* = d* + r where * indicates the adjusted birth and death rates. The completeness of birth registration, therefore, is given by C = b/b* where b is registered birth rate. Direct formula can, however, be obtained for estimating directly the completeness of birth registration. We know that the number of deaths at age a, under stability condition is given by:

$$D(a) = B e^{-ra} d(a) \quad \ldots (6)$$

where B is the true number of births and d(a) is the proportion of deaths at age" a. Let Ki and K_2 be the extent of registration of births and deaths respectively and assume K_1

invariant of age and K_2 invariant of age of mother and order of birth. Then

$$D^*(a) = K_1 D(a)$$

$$B^* = K_2 B$$

By substituting the above values in equation (6) we get

$$\left(\frac{K_1}{K_2}\right)\frac{1}{B} = 1 \Big/ \int_0^w D(a)\, e^{ra}\, da \qquad \ldots (7)$$

Again $r = (B^* - D^*)/N$

$$= K_2 B \left[1 - \left(\frac{K_1}{K_2}\right)\frac{1}{B} D\right]$$

By substituting the value of B from (6) we ultimately get

$$K_2 = \left[1 - \frac{1}{\int_0^w d(a)\, e^{ra}\, da}\right]^{r/b}$$

from which

$$C_2 = \left(\frac{b}{r}\right)\left[1 - 1/\int_0^w d(a)\, e^{ra}\, da\right] \qquad \ldots (8)$$

Equation (8) gives the completeness of birth registration which can be directly calculated with the knowledge of r and age distribution of deaths. The adjusted birth rate b* can be given as:

$$b^* = \frac{r \int_0^w d(a)\, e^{ra}\, da}{\int_0^w d(a)\, e^{ra}\, da - 1} \qquad \ldots (9)$$

However, the above relation Is obtained with same basic equation used by Preston[2]. We would, therefore, expect the same value of b* or C2. In addition, error in b* comes out to be same as due to error in r. It is, therefore, decided

to use equation (5) only for estimating the completeness of the death registration.

Application and Results

The estimation of completeness of death registration discussed above needs the calculation of P(Y), the number of persons arriving at age Y and natural population growth (in case of Brass) or age specific natural growth rate (in case of Martin)[1,3.] However, the procedure given by Preston and Hill does not use the age distribution of population and thereby it avoids some of the problems arising due to age misreporting of the population[2]. The number arriving at age Y is estimated as one-tenth of the number recorded in the two adjacent 5-year age groups centered on Y. The estimate of slope of a line given by equations (2) and (3) is affected by selective omission by age or misstatement of age. But age misreporting directly affects P(Y)/P(Y+) whereas it has less direct affect on D(Y+)/P(Y+) because cumulating dampens the relative effect of errors at a particular age. The calculation of natural growth rate either total or age specific may further be affected by migration. It may not, however, be as serious in case of growth rate of the total population as in case of age specific growth rate because of the age selective migrations. Hence, in case of migration value of 'f' estimated through the application of the procedures of Brass and Martin would turn out to be negative so as to balance the excess[1,3]. Two procedures - simple least square and direct solution of equations (2) and (3), were used to estimate the completeness of death registration in Malaysia, Philippines and Thailand Circa 1970. The age specific estimates of completeness by using Martin and Brass procedures are shown in table 1 and the mean of age specific estimates and least square estimates are given in table 3 together with the estimates obtained by using Preston's procedurel, 2, and 3. These estimates are, however, very much sensitive to the initial age chosen, rather for certain ages, completeness of registration surprisingly comes out to be more than one. It may be said that the Martin's procedure is modified form of Brass's procedure but there seems to be hardly any systematic change in the estimates of completeness of death registration. Since geometric mean is known to be affected by the extreme values, it may be better to choose some age range within which the estimates of completeness are rather more stable. From table 1 it is clear that the age range 15-60

TABLE 1

ESTIM OFCOMPLETENE OF CIVIL REGISTRATION OF AGE AND SEX IN MALAYSIA, PHILIPPINES AND DEATHS BY THAILAND, 1970

Age	Martin's Method									Brass Method								
	Malaysia			Philippines			Thailand			Malaysia			Philippines			Thailand		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
5+	62.04	102.92	74.25	61.73	99.86	78.58	46.64	104.68	69.06	54.57	68.20	59.44	54.41	78.63	62.47	48.53	48.75	48.60
10+	48.48	64.66	53.94	42.85	49.45	45.39	38.90	39.55	39.16	45.54	47.57	46.25	38.73	42.89	40.32	41.58	39.98	40.84
15+	44.51	48.02	45.73	43.19	40.69	42.06	36.55	34.56	35.63	50.04	47.08	48.62	43.42	41.35	42.42	45.42	40.79	43.24
20+	50.48	50.78	50.35	50.44	40.41	45.59	40.98	35.31	38.27	65.10	56.30	60.91	56.35	46.11	51.36	61.35	51.88	56.75
25+	64.73	71.43	66, P7	67.81	57.31	62.79	60.38	52.77	56.75	94.50	62.88	89.00	73.53	60.37	67.08	85.94	73.78	80.04
30+	73.93	95.65	80.67	86.30	77.82	82.28	70.69	62.64	66.86	107.12	94.25	101.11	85.08	70.44	77.89	79.55	67.04	73.42
35+	71.62	82.95	74.96	76.88	72.87	74.96	64.38	55.99	60.37	105.47	83.58	94.97	74.40	63.70	69.23	64.13	54.85	59.62
40+	83.22	99.83	87.98	70.47	73.05	71.41	57.57	50.85	54.38	117.60	90.04	104.32	68.41	59.43	64.09	60.64	53.58	57.26
45+	88.86	102.66	92.62	74.39	117.04	75.30	59.34	54.24	56.95	116.47	87.77	102.64	72.12	60.46	66.39	65.67	59.57	62.76
50+	106.43	111.07	107.00	83.67	83.65	83.43	67.87	61.75	64.96	115.51	85.17	100.84	70.15	58.11	64.18	72.08	64.76	68.52
55+	114.79	112.28	113.09	83.96	85.05	84.28	74.07	67.86	71.08	104.50	83.37	94.72	70.71	61.86	66.37	72.45	64.71	68.62
60+	118.76	100.85	110.54	72.09	73. 79	72.78	76.46	72.63	74.61	95.18	79.46	88.00	69.73	65.16	67.52	69.44	63.50	66.45
65+	59.92	46.49	53.40	41.69	38.81	40.26	43.92	35.96	39.65	54.09	43.96	49.30	40.83	37.61	39.22	41.06	33.15	36.77

is the most suitable to estimate the completeness of death registration. The estimates so obtained are given in table 2. These estimates, however, seem to be better and generally higher (except for female's death registration in Thailand) than those based on the total age range as given In table 3. This Is true for both of Brass and Martin's methods l-3, other studies too showed the same extent of completeness of death registration 2, 4, 5.

TABLE 2

ESTIMATE OF COMPLETENESS OF DEATH REGISTRATION IN MALAYSIA, PHILIPPINES AND THAILAND CIRCA 1970

Methodology Used	Malaysia			Philippines			Thailand		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Martin*	.77931	.84153	.79550	.66044	.67769	.69428	.59332	.53432	.53746
Brass*	.94151	.77399	.86249	.58052	.62862	.67431	.66782	.58721	.62872
Preston	.7669	.6832	.7289	.5810	.6065	.6325	.5818	.5154	.5497

*Geometric mean of age specific completeness of registered deaths between age range of 15-60 years.

TABLE 3

ESTIMATES OF COMPLETENESS OF DEATH REGISTRATION IN MALAYSIA, PHILIPPINES AND THAILAND, 1970

Method Given by	Malaysia			Philippines		Thailand		
	Male Male	Female	Total	Female	Total	Male	Female	Total
LSE	79.97 57.27	69.14	74.96	54.07	55.72	56.54	49.27	52.90
Martin G.M.	72.35 63.75	80.02	74.48	64.00	63.53	55.09	55.94	54.31
LSE	68.77 48.18	53.29	61.35	43.56	45.85	49.30	40.54	44.71
Brass G.M.	81.81 61.15	70.69	76.53	56.15	58.56	60.52	53.78	57.22
Pres- G.M. ton & Hill	76.79 63.25	68.32	72.89	58.10	51.54	54.97		

LSE - Least Square Estimate

CM." Geometric mean of age specific completeness of registered deaths.

The comparative analysis of these three countries, Malaysia, Philippines and Thailand reveals that the registration system in Malaysia is better than that of other two countries. But the extent of completeness of registration in Malaysia as shown earlier by other studies (Saw and Cho) was much more higher than the extent shown here6>7. However, it is not the case when these methodologies were applied to the data for Philippines and Thailand. The difference may be partially due to different assumptions of these procedures and their compensatory power with each other. Besides the requirement of stability condition, the assumption that completeness of registration is invariant of age may cause more serious problem in the estimation of fertility. At the same time in Preston's approach the main input data is required on the age distribution of deaths and this requires the smoothing of the age distribution of deaths before using the method to avoid the effect of digit preference on the estimate of completeness of death registration and thereby of births[2].

The three methods discussed above are, however, suitable to estimate the extent of under-registration of births and deaths at the national level but not at-the level of the State or other sub-national areas especially where heavy in or out-migration take place and stability of age distribution is suspected. Applicability of these methods should be guided more by the availability of data and Preston and Hill's method is on this count certainly more convenient to use and

TABLE 4
ADJUSTED CRUDE DEATH [RATES <1970) FOR MALAYSIA, PHILIPPINES AND THAILAND

Method	Malaysia			Philipplines			Thailand		
Given by	Male	Female	Total	Male	Female	Total	Male	Female	Total
Martin*	10.50	7.37	9.79	11.45	8.59	10.04	13.25	10.18	11.98
Brass*	9.29	8.35	9.53	11.93	9.79	10.89	12.06	10.59	11.37
Preston and Hill	9.89	8.64	10.00	11.54	9.46	10.52	12.54	11.05	11.84

*Adjustment factors used are G.M. from Table 3.

obtain the vital rates at the national level[2]. It is, however, felt that these procedures are more suitable for estimating under-registration of adult deaths from age 15 to 60. As such for estimating under-registration of deaths of children, other indirect measures using children ever born and children surviving may be obtained.

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LATE MORBIDITY FOLLOWING FEMALE STERILISATION - A COMPARATIVE ANALYSIS IN RURAL AND URBAN WOMEN

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ABSTRACT

Female sterilization has become a widely accepted method of family limitation. Howsoever technically simple the procedure is, it is known to carry some morbidity, both immediate and late. Many women, however, blame the operation for a variety of ailments. These complaints were studied in two categories of women, one belonging to a village in Karnataka and the other to an urban community. The results, thus obtained, were' analyzed and compared. The differences that emerge from this comparison could be constructively made use of* in future* to substantially reduce the psychological morbidity. The study also stresses the importance of subjecting these women to examination and investigation which may reveal other etiological factors for their ailments.*

Female sterilization has gained acceptance in our country with the result that a phenomenal number of tubectomies have been performed to date. It has always been found that women are seeking relief for a variety of ailments, imaginary or otherwise, which they attribute directly to this surgical procedure. Howsoever, simple and harmless sterilization is claimed to be, yet it is known to produce certain amount of morbidity which may be psychological, marital or gynecological. Therefore, an attempt has been made to study and compare the late morbidity in segments of rural and urban population. The urban, 'women were examined to determine or rule out any organic basis for their complaints. Certain distinct differences between the two categories emerge from

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this analysis, which could be constructively made use of, in future. Morbidity may probably be brought down by; combining health education with motivational approach and by selecting proper category of patients who understand the nature of operation they have to undergo.

Material and Methods

A field study was organized in Mallur, a village in Kolar District of Karnataka and, as a prelude to this study, a survey was done which estimated the population to be 2454. All the 131 women who had undergone sterilization in that village were personally interviewed to obtain the necessary data.

For comparison, the women attending the Gynecology Outpatient department of St. John's Medical College Hospital in Bangalore were chosen. One hundred consecutive urban women who had undergone sterilization were taken for the study. Both the categories of women had undergone sterilization at least a year back, before the time of interview. In addition to collecting data, the urban women were examined and investigated thoroughly to ascertain the presence or absence of any organic basis for their complaints.

Results and Discussion

The method of collecting information by personal interview of all the women, as has been done in this study, appears to be superior[1]. It is better than many other methods like obtaining information through request cards or by specially designed questionnaires2, 3,4,5,6. While analyzing the data in the present study, an attempt has been made to compare between the two groups of women who had undergone sterilization. This again, is different from the other comparative analysis made earlier. Kuntal *et al.* made use of a suitable control group for comparison while Dawn compared sterilized women with cases of infertility and Chakravarty's control group consisted of women with functional menorrhagia [1,7,8.]

Most of the researchers agree that it is difficult to assess the late morbidity following sterilization and that it is even more difficult to determine whether the complaints are in any way connected with the operation. Hence, it

appears more logical to compare two sets of women who have undergone the same operation rather than with women with or without other gynecological lesions. This way, the psychological overlay generated by the other lesions could be effectively eliminated. There were certain constraints in undertaking this study. The time lapse between the surgery and the time of study varied and the impact of this factor could not be analyzed. Similarly, in table 1 It was difficult to discuss the age at sterilization of the rural women. One had to rely on circumstantial evidence. More number of village women, however, had undergone sterilization at a younger age -and this is significant probably because of marriages at an earlier age in the village.

It can be observed from table 2 that a higher percentage of urban women completed their families with just two children. Unlike the 30 per cent of urban multiparous women who underwent surgery, the rural women, after a certain number of children were positively unwilling for the operation.

TABLE 1

AGE AT STERILISATION

Age Group	Rural		Urban	
in years	Number of cases	Percentage	Number of cases	Percentage
19 - 22	27	20.6	14	14.0
23 - 26	44	33.5	45	45.0
27 - 30	37	28.2	23	23.0
31 - 34	10	7.6	11	11.0
35 - 38	10	7.6	4	4.0
39 - 42	3	2.2	3	3.0

TABLE 2

COMPARISON OF PERCENTAGE BREAK UP BASED ON LIVING CHILDREN

No. of Living	Rural		Urban	
Children	Number of cases	Percentage	Number of cases	Percentage
1	1	0.76	-	-
2	8	6.10	17	17.0
3	34	25.90	33	33.0
4	47	35.80	20	20.0
5 and more	11	8.30	30	30.0

The type of operation undergone by these women has been shown in table 3. It has been pointed out in a study conducted earlier that the results vary with not only the criteria for morbidity adopted by different workers but also with factors like type and route of operation, relation to pregnancy etc9. Their immediate morbidity was 24.6 per cent for vaginal and 26.1 per cent for abdominal sterilization. In an another study, the morbidity was found in 50.6 per cent of cases**. It can be further seen that puerperal sterilization remains the most popular method among both segments of population. However, understandably more city women have undergone Medical Termination of Pregnancy with concomitant sterilization. It has been found in a study that some regret following permanent sterilization is common and gave a very high incidence of psychiatric (40%), marital (22%) and gynecological morbidity (34%)10. The satisfaction rate was high when parity alone was the indication. Similarly, Paniagua *et al.* reported less morbidity with puerperal sterilization than with other types in all their analysis*.

It may be observed from table 4 that nearly two-thirds of the rural women complained of ailments which they attributed to sterilization. The urban women, being more educated and knowledgeable, suffered less psychological impact and only few of them complained. In Kuntal *et al.'s* study 44 per cent were asymptomatic!.

In both the groups with symptoms, the operation was blamed for menstrual abnormalities, the incidence in our series being 21.2 per cent in rural and 25.0 per cent in urban women. Enoch and Jones reported an Incidence of 34 per cent while Chaubal *et al.* found menorrhagia in one-third of the cases!0,12. White (1966) found menorrhagia in 20.6 per cent of cases, out of which 5.5 per cent underwent hysterectomy^. This stresses the importance of subjecting these patients to careful investigation. Vaginal discharge and pain abdomen were commonly attributed to sterilization in both the groups but on investigation some unconnected aetio-logical factor could be diagnosed. Among village women, 8.3 per cent complained of scar tenderness which had no organic basis. Presence of dyspareunia was difficult to elicit in these women. Likewise, the extent of psychological overlay on the organic morbidity was impossible to assess. Table 5 lists the complaints which could not be correlated to the sterilisation procedure.

TABLE 3

TYPE OF OPERATION

Type of Tubectomy	Rural		Urban	
	Number of Cases	Percentage	Number of Cases	Percentage
Puerperal Abdominal	117	89.3	72	72.0
Interval Abdominal	1	0.76	5	5.0
Interval Vaginal	11	8.30	5	5.0
MTP with Sterilization	2	1.52	12	12.0
Caesarean with Sterilization	-		6	6.0

TABLE 4
GYNAECOLOGICAL COMPLAINTS

Complaints	Rural		Urban	
	No. of patients	Percentage	No. of patients	Percentage
Asymptomatic	49	37.6	53	53.0
Menorrhagia	14	10.6	21	21.0
Polymenor rhoe a	7	5.3	2	2.0
01i gomenor rhoe a	7	5.3	3	2.0
Amenorrhoea	-	-	2	2.0
Dysmenorrhoea	11	8.3	6	6.0
Pain lower abdomen	25	18.9	29	29.0
Backache	6	4.6	7	7.0
Vaginal Discharge	22	16.7	39	39.0
Dyspareunla	-	-	3	3.0
Mass abdomen	-	-	3	3.0

TABLE 5

OTHER COMPLAINTS

Complaints	Rural		Urban	
No. of Cases Percentage	No. of Cases	Percentage	No. of Cases	Percentage
General weakness	29	22.10	14	14.0
Mass per vagina	1	0.76	3	3.0
Obesity	-	-	3	3.0
Dyspepsia	1	0.76	5	5.0
Urinary complaint	-	-	2	2.0
Skin infection over scar	-		2	2.0

Summary and Conclusions

1. A field survey was conducted in Mallur, a village in Karnataka to interview 131 women who had undergone sterilization at least a year previously. This group was compared with 100 consecutive sterilized women who attended the Gynecology outpatient department of a city hospital.

2. Incidence of age at sterilization, parity and type of sterilization procedure were compared.

3. The gynecological and other complaints of both groups were compared. In all 37.6 per cent of the rural segment and 53 per cent of the urban segment were asymptomatic.

4. Menstrual abnormality, pain abdomen and vaginal discharge were the commonest gynecological complaints, while general weakness was the commonest non-gynecological complaint.

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