ENVIRONMENTAL FACTORS IN HUMAN REPRODUCTION

by

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The role of environmental factors in human reproduction has been stressed from time immemorial. The effect of light, season and festivals on parturition and the sex ratio is a subject for study by modern scientists. It was believed that 28 day menstrual cycle may have relationship to the phases of the moon.

We have made an attempt to correlate some of the environmental factors which affect the frequency of childbirth and also the sex ratio. The present study analyses the abortions, premature labors, still births and confinements at term at S. S. G. Hospital, Baroda, India, from 1966 to 1969 (four years). There were 10,000 confinements at term, and 1245 abortions. Any confinement from 8-01 a.m. to 8 p.m. is considered as day confinement and 8-01 p.m. to 8 a.m. is considered as night confinement.

Baroda is on a Latitude 22° M and Longitude 73.16° E and altitude of 153 feet from mean sea level.

Analysis

There is no significant difference between number of deliveries during the night and during the day. (Table I). The length of the night and the day have wide variations in different months. In summer there is light from 5.30 a.m. to 7.30 p.m. i.e. 14 hours. There is slight excess of male births during the day as compared to the females. The difference between male births and female births is significant (Table II). The male to female ratio is 111:100. The preponderance of males over the females in explained by some authorities on the basis of Y bearing sperms being lighter in weight and, therefore, can reach the ovum first. The sex ratio at the time of fertilization is believed to be 150:100 but as more males are aborted than females, the males at the time of birth are in slight excess.

TABLE I

CONFINEMENTS IN RELATION TO SEX AND THE TIME

DAY	NIGHT
MALES	MALES
2698	2574
2317	2411
FEMALES	FEMALES

While studying the monthly variations in confinements, we find fewer births from February to April and more births from August to October (Table III). Nag found more births in September to November in Bengal. Belavalgided reports more births in August, September and October. The marriage season in Gujarat is usually in April and May or in Decem-

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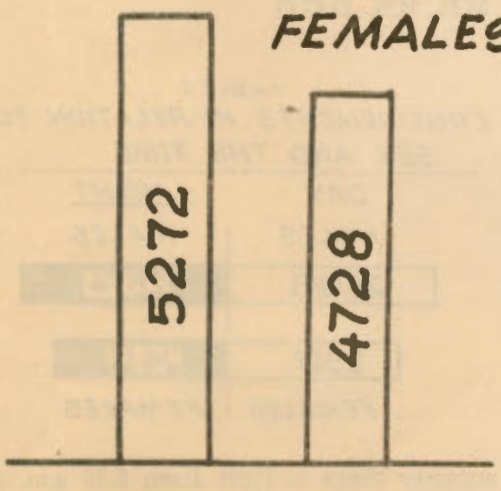
TABLE II

SEX RATIO



RATIO 111 : 100

TABLE III

MONTHLY VARIATIONS

MONTH	CONF	PREMATURE	STILLBIRTHS	ABORTIONS
JAN	751	295	[32]	93
FEB	692	293	45	86
MAR	668	[258]	45	110
APR	695	308	45	121
MAY	767	301	60	[142]
JUN	760	290	56	133
JUL	926	395	65	110
AUG	[1026]	463	[65]	103
SEP	998	423	49	102
OCT	985	[518]	60	83
NOV	916	404	52	[76]
DEC	816	337	46	86
	10.000	4285	620	1245

ber and January. However, marriages do take place all the year round except that there are fewer marriages from August to October. However, the marriage season should affect the frequency of the first births and should not have any relation to subsequent confinements. It is possible that temperature differences may also be responsible for the difference in confinements. More confinements in August, September and October would mean that there are more conceptions in November, December and January which are cold months in Baroda. Less confinements in February, March and April would mean less conceptions in May, June and July which are warm months in Baroda (Table IV).

TABLE IV

Mean Monthly Temperature in Baroda

Month	Degree centigrade
January	22.31
February	24.84
March	27.80
April	31.41
May	33.57
June	32.67
July	29.45
August	28.68
September	28.91
October	29.51
November	27.38
December	22.45

The sleeping habits of the people should also be taken into consideration. Most people prefer to sleep on the open terrace in summer in Gujarat. This certainly restricts the opportunity for sexual relationship which could be responsible for fewer conceptions. It is believed that the sex desire is reduced in the hot season and increased in the cold months. There is sufficient evidence in the literature to show reduced spermatogenic activity in summer. Fernandes, found reduced spermatogenic activity in rats when exposed to temperature of 103° F for five hours. Roy and Sengupta (1964) have confirmed reduced spermatogenic activity in summer, in buffaloes in India. Nelson (1961) has proved reduced sperm counts in humans in summer months.

Mills (1918) found seasonal variations in human conception and found the

highest conception rate when the mean monthly temperature was 21° C. Spalding and Macfarlane found among Caucasian population no seasonal variation in conception rate in towns with summer mean monthly temperature 21.7° C but they found higher conception rate in winter when summer mean monthly temperature was 27°C.

Minimum number of abortions is recorded in November and maximum abortions are recorded in May which is statistically significant (Table III). Collins found peak incidence of abortion in May whereas Nag found more abortions in January to March. Banerjee and Mukhrjee (1962) studied the abortion pattern in different centres in India and found peak incidence of abortions in April and May. We are not sure if this difference could be attributed to temperature variations in summer and winter. The percentage difference in abortions in primigravidae and multiparae is same (Table V). Though more abortions are registered during the day than during the night, it is misleading. Though the abortion takes place at night, it is likely to be labelled as complete when the senior doctor confirms and so abortions taking place at night are recorded as having taken place during the day. Moreover, curretage operations for incomplete abortions are also more likely to be performed during the day.

TABLE V
Abortions

Day	Night	Primi	Multi
731	514	280/2305 11.8%	965/7695 12.5%

Minimum stillbirths were recorded in January and maximum stillbirths were recorded in July and August (Table III). The difference is statistically significant (P is .001). The parity and sex has no significant relation to stillbirths (Table VI).

TABLE VI
Stillbirths

Day		Night	
Males	Females	Males	Females
175	150	155	140
Primi	Multi		
146	474		
6.1%	6.4%		

The premature births (baby weight less than 2500 G) are minimum in March and maximum in October (Table III). The incidence of premature births in primigravidae and multiparae is significant (Table VII). The sex of the infant and the time of delivery in relation to day or night has no apparent correlation to the incidence of premature births. More premature births are recorded in females than in males.

Summary and Conclusions

1. More male babies are born than female babies, in the ratio of 111:100.
2. There is no significant difference in

TABLE VII
Premature births

Day		Night		Total	
Male	Female	Male	Female	Males	Females
1046	1089	1018	1132	2064	2221
Primi	Multi				
1290	2995				
54.3%	38.9%				

the number of deliveries during the day and during the night.

3. More conceptions take place in winter and fewer conceptions take place in summer.

4. There are more abortion in May.

5. More premature births are recorded in October and fewer premature births in March.

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