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## **Differential Rates of Achievements in PHC-Areas in Mass Vasectomy Campaigns in Gujarat**

The mass vasectomy camp approach with a higher-than-normal incentive I- marked a significant development in the efforts to evolve an effective approach for generating early acceptance of family planning practice by couples [7]. But, there was good deal of variation in the level of success achieved in different areas of the state [10]. This called for an analysis of the areal differences in achievements during the campaigns.

### **Objective and Methodology**

The present study seeks to analyse the differentials in vasectomy programme achievements during the campaigns vis-a-vis characteristics of the area. The area served by a Primary Health Centre (PHC) was taken as the unit of analysis as it represents the smallest administrative unit of the programme infrastructure. The study was limited to 28 PHC-areas selected from seven Gujarat districts showing significant variation in characteristics [7]. The following table gives an idea of the range of variation in achievements among the PHCs under study prior to and during each of the Gujarat campaigns.

TABLE 1— ACHIEVEMENTS IN VASECTOMY PROGRAMME  
IN PHC-AREA

Period	No. of Vasectomies Performed by a PHC		Rate/1000Population(1971) Population (1971)	
	Minimum	Maximum	Minimum	Maximum
Pre-campaign (Upto 14.11.71)	89	1637	0.9	19.7
First Campaign (15.11.71-15.1.72)	113	2234	1.2	45.1
Second Campaign (15.11.72-28.2.73)	16	930	0.1	20.7

The index of vasectomy programme achievements is defined as :

$I_{(ji)}$  = Ranks ( $R_{ij}$ ) ( $j = 1, 2, \dots, 28$ ) where  $R_{ij}$  is the rank of the  $J$ -th PHC-area in achievement in vasectomy in terms of number of vasectomies per thousand population (1971 Census) in the  $i$ -th period.  $i = 0$  represents the pre-campaign period since inception of the programme, and  $j = 1$  and  $2$  for the first and second mass vasectomy campaigns respectively.

For showing variation in Characteristics among PHC areas, we have drawn upon the 1971 Census reports for data in computing the following variables :

*A. Socio-Economic Characteristics*

- (i) Density of Population per square km.,
- (ii) % of Literate,
- (Hi) % of Cultivators among workers, and
- (iv) % of Non-Scheduled Caste/Scheduled Tribe Population.

*B. Development Characteristics*

- (i) No. of Schools per 100,000 population,
- (ii) No. of Hospitals/Health Centres per 100,000 population,
- (iii) % of Villages with electricity for any purpose.

Characteristics under *A* can be taken to broadly indicate the level of socio-economic development obtaining in the area, while those under *B*, may be considered as crude indicators of the developmental efforts.

Data on these characteristics for PHC areas are readily available in the Primary Census Abstracts and Village Directories given in Census Handbooks (1971). These characteristics are presumed to indicate socio-economic development of a PHC-area because PHC-areas are predominantly rural. We give **below** some data for an idea of the extent of variation in the selected characteristics among the PHCs under study.

TABLE 2—SELECTED CHARACTERISTICS OF PHC-AREAS

<i>Characteristic</i>	<i>Minimum</i>	<i>Maximum</i>	$Q_1$	$Q_2$	$Q_3$
A. (i) Population density/Km	38	517	107	142	199
(ii) % Literate	3.4	44.0	12.0	21.0	34.0
(iii) % Cultivators	16	92	40	54	65
(iv) % Non-Scheduled Caste and Scheduled Tribe Population	3.0	96.9	46.0	67.0	92.2
B. (i) No. of Schools per 100,000 population	10	200	14	84	94
(ii) No. of Hospitals/Health Centres per 100,000 population	0.9	9.9	2.2	3.8	6.1
(iii) % Villages with Electricity	0.0	89.0	1.5	5.2	14.8

NOTE :  $Q_1$ ,  $Q_2$  and  $Q_3$  are the quartile values for the distribution of the characteristic.

### The Index

For each characteristic a PHC-area is assigned a grade in the following manner :

<i>Value of the Characteristic (V)</i>	<i>Grade (G)</i>
$V < Q_1$	1
$Q_1 < v < Q_2$	2
$Q_2 < v < Q_3$	3
$v > Q_3$	4

The index of relative social development is defined as follows :

$$I_s(j) = \text{Rank} \left( \frac{7}{I \cdot G_{ij}} \right) (j = 1, 2, 28)$$

$$i = 1.$$

Where  $G_{ij}$  is the quartile grade for  $i$ -th characteristic of  $j$ -th PHC area. The index is calculated by first multiplying the quartile grades for each characteristic of a PHC-area and then ranking the PHCs in descending order of the value of the product.  $I_s$  is 1 for the PHC regarded as the most socially developed and  $I_s$  is 28 for the PHC least socially developed among the twenty-eight PHC-areas under study.

### Interrelationships between Social Development and Vasectomy Programme Achievement

With a view to discovering the relationship between social development and achievement in the vasectomy programme, Spearman's rank correlation ( $r_s$ ) coefficients between  $I_s$  and  $I_v$  are found for each of the periods and are shown in Table 3. The implications are that : (i) no relationship is indicated between social development and achievement in the vasectomy programme in the pre-campaign period; and (ii) there is negative correlation between social development and achievement in first campaign, or in other words, first campaign was relatively more successful in socially less-developed PHC-areas, but such does not appear to be the case in the second campaign.

TABLE 3-RANK CORRELATIONS

Sr. No.	Variables	$r_s$	Significance
1	$I_{s_1}$ Vs $I_{v_1}$ (0)	0.03	Not significant
2	$I_{s_2}$ Vs $I_{v_2}$ (1)	-0.49	Significant at 5% and 1% levels
3	$I_{s_2}$ Vs $I_{v_1}$ (2)	-0.30	Not significant

The observed differences between the two campaigns should be viewed in the light of the following facts :

- (i) The first campaign was the *first-ever* attempt to organise a large-scale campaign and was thus enthusiastically conducted by the programme

staff and leaders. There was less co-operation between programme staff and non-programme government staff including local leaders in the conduct of the second campaign than in the first campaign [7].

- (ii) The situation in which the second campaign was conducted was different from the first campaign because the impressions or experiences of the first campaign including social/medical complications might have affected acceptance of Vasectomy in the second campaign.
- (iii) The strategy of the second campaign viz., "48 hours' confinement" of the vasectomised persons in the Health Centre after the operation and the observance of 'eligibility card' adopted for assuring high quality of cases might have variously constrained the number of operations.

When regressed individually against values of the characteristics, no significant correlation is found between the pre-campaign achievement rate and percentage of non-scheduled Caste/Scheduled Tribe population, but a very high negative correlation ( $-0.71$ ) is found between first campaign achievement rate and percentage of Non-Scheduled Caste/Scheduled Tribe population. The correlation co-efficient is significant both at 5% and 1% levels of significance. The correlation coefficient between second campaign achievement rate and percentage of Non-Scheduled Caste/Scheduled Tribe population turns out to be  $-0.50$  which is statistically significant. It is also ascertained that the first correlation coefficient is statistically significantly higher than the second correlation coefficient. Incidentally, there is significant correlation ( $r_s = 0.56$ ) also between percentage of Scheduled Caste/Scheduled Tribe population in the district and the corresponding achievement rate in the first campaign. This implies that the mass vasectomy campaigns, especially the first campaign, was relatively more successful in PHC-areas having higher proportion of Scheduled Caste/Scheduled Tribe population. The reasons why this phenomenon has been observed are not quite clear. The people belonging to the backward group might have been subjected to greater motivational efforts, persuasion or even pressures than other people. Their high response might be simply due to the high incentive money since most of the people of this group are poorer than others.

### **A Classification of PHCs and Variations in Performance**

The above discussion suggests that it might be worthwhile to categorise the PHCs in a few classes and study the performance differential. The following

rule is adopted for classifying the PHCs :

- (i) A PHC-area is treated to be relatively *socio-economically advanced* if 3 or all of the 4 socio-economic characteristics have values greater than or equal to the median ( $Q_2$ ) value.
- (ii) A PHC-area is treated to be relatively *developmentally advanced* if 2 or all of the 3 developmental characteristics have values greater than or equal to the median ( $Q_2$ ) value.
- (iii) PHC-classes I—IV are defined as follows :

<i>Socio-Economically</i>	<i>Developmentally</i>	
	<i>Advanced</i>	<i>Backward</i>
Advanced	I	II
Backward	III	IV

The PHC-areas under study are classified by the above rule. PHC-classes I and II have 5 PHC-areas each, and classes III and IV have 11 and 7 PHC-areas respectively.

With a view to testing the equality of average performances in various classes of PHC-areas an ANOVA was conducted after taking arc-sin transformation of first campaign achievement rate per thousand population first expressed as a percentage ( $x$ ). The transformed averages are :

$$X_I = 4.54 \quad X_{II} = 5.27 \quad X_{III} = 5.34 \quad X_{IV} = 9.71.$$

The ANOVA Table is given below :

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Tabular Value 95%</i>
Class	3	112.23	37.41	4.33	3.01
Error	24	207.02	8.63		
Total	27	319.25			

Thus, the hypothesis that average rates of achievement in Ist campaign are same in each class of PHC-areas is rejected.

Statistical comparison of the achievement rates in classes I and IV reveal

that though the variability does not differ significantly, the average (28.4) of class IV is significantly greater than that (6.3) of class I. This implies that first campaign was more successful in areas which are backward both socio-economically and developmentally than in areas which were advanced socio-economically and developmentally. On further analysis, it is seen that the variances in classes III and IV do not differ significantly but average performance (28.4) in class IV is greater than that (8.3) in III. This means that first campaign was less successful in areas which are socio-economically backward but developmentally advanced, compared to areas which are backward both socio-economically and developmentally.

### What Happened between Two Campaigns ?

The following table indicates the status of the sterilisation programme in the intervening period between two campaigns as contrasted with the corresponding period preceding the campaign. It is clear that the sterilisation programme performance considerably worsened in this period.

TABLE 4—STERILISATION PERFORMANCE IN APRIL 1, 1972-  
NOVEMBER 14, 1972 AS PERCENTAGE OF PERFORMANCE  
IN APRIL 1, 1971—NOVEMBER 14, 1971

<i>Percentage</i>	<i>No. of PHCs</i>
Below 10	9
<b>10-30</b>	6
30-50	3
50-80	5
80+	1
N.A.	4
Total	28

17 out of the 28 PHCs under study could undertake less than 10 vasectomies in this period of ten months, i.e., an average performance of less than 1 per month per centre. The maximum performance by a PHC was an average of only 2 vasectomies per month. It is also apparent that sterilisation programme

has suffered greater setback after the first campaign in the socio-economically weaker areas than in other areas. According to information received from the family planning workers, there were instances of motivated cases visiting the centre and going back without undergoing vasectomy, upon learning the reduction in incentives after the first campaign.

### Share of Vasectomy in Sterilisation Programme

It is observed that in all, excepting 5 PHC-areas, the share of vasectomy in sterilisation has risen to 90% or above in the period between the beginning of the first and the end of the second campaign from the varying precampaign levels. Suppose the PHC-areas are reclassified as SEA : Socio-economically advanced (classes I and II combined), and SEB : Socio-economically backward (III and IV combined). Statistical testing confirms that the per cent share of vasectomy in sterilisation in the precampaign period was significantly less in SEA (average 46.1%) as opposed to SEB (average 91.3%). This suggests the possibility that in the socio-economically advanced areas vasectomy has replaced, during the campaigns, a part of the already-existing demand for tubectomy. Restricting the comparison to only between SEA and SEB, it is observed that cumulative sterilisation rates per thousand population are not significantly different between the two classes of PHCs at the end of second campaign. This implies that mass vasectomy campaigns have helped the family planning programme to clear the backlog of sterilisation in the socio-economically backward areas. (The variation in performance between the PHCs, socio-economically at par, might be explainable by differential extent of efforts by staff and local conditions including the quality of leadership and management of the programme at the grassroot level).

Further evidence to support these findings is incorporated in Table 5, based on a representative sample of 3806 couples in reproductive age-groups.

It would appear that (i) Acceptance of family planning, as a matter of social discipline, is lower in PHC-class IV (31.6 per cent couples unhesitatingly approve of family planning) than in PHC-class I (where the corresponding figure is 70.5 per cent); and (ii) Current use of terminal methods is of the same order in each PHC-class, but use of non-terminal methods varies from 14.1 per cent of couples in PHC class I to only 3.6 per cent in PHC class IV.

TABLE 5—APPROVAL OF FAMILY PLANNING AND USERSHIP OF METHODS BY PHC-CLASS

<i>Approval and Usership</i>	<i>Per cent of Couples</i>				<i>Overall</i>
	<i>PHC Classes</i>				
	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	
<b>Approval</b>					
Approve unconditionally	70.5	46.5	43.5	31.6	46.4
Do not approve	2.9	7.8	12.9	9.4	9.1
Uncertain	12.8	32.0	31.3	36.7	29.5
Approve conditionally	13.8	13.7	12.3	22.3	15.0
Total	100.0	100.0	100.0	100.0	100.0
<b>Usership</b>					
Current Users—					
—All Methods	33.0	32.0	24.3	21.5	27.5
—Vasectomy	8.2	10.8	8.2	9.8	9.3
—Tubectomy	10.7	9.8	6.6	8.1	8.6
—Non-terminal methods	14.1	11.4	9.5	3.6	9.6
Current Non-Users	67.0	68.0	75.7	78.5	72.5
Total	100.0	100.0	100.0	100.0	100.0

## Implications

Numerous studies have shown that practice of family planning increases significantly with literacy, income, urbanisation etc. [3, 8]. These are apparently major factors affecting contraception. The World Population Plan of Action recognizes "that economic and social development is a central factor in the solution of population problems". While expressing the opinion that "the policy of a direct attack on the birth rate by a state sponsored family planning drive as is being attempted in India is not likely to produce the desired results in the absence of the necessary socio-economic motivation", Rao admits, "It is true that the birth rate is much higher than it should be and needs to be brought down" [9]. He also admits "that limitation of resources, both natural and financial stand in the way of a massive development effort that, by raising

per capita income to middle class levels, would bring about the demographic transition and establish the right relationship between population and the quality of life". The world population conference 1974 dispelled two misunderstandings that (i) "Population control is no panacea for development or for social problems", and (ii) "Family planning is no panacea for population problems" [4]. Myrdal has concluded that "a consideration of the economic effects of different population trends should give the governments of underdeveloped countries strong reasons for instituting, as soon as possible and as vigorously as possible, policy measures aimed at getting birth control practised among the masses of the people" [5]. Nortman remarks : "Because of the well-known association between modernisation and low fertility, the obvious prescription to relieve the economic strain of high fertility is to speed development. *This prescription however confuses ends with means*" [6]. Instead of waiting for social changes to occur and contraception to follow as a consequence one could take the programme even to the socially backward classes and motivate or induce them to accept a change. The veracity of this statement has been corroborated by the Gujarat experience with the mass vasectomy campaign approach which succeeded in generating massive acceptance in areas inhabited predominantly by socio-economically weaker section of the population. We could, therefore, question "the theory upon which the Demographic Agnostic (who predicts failure of all family planning programmes) bases his claim", which according to Bogue, is that "raising urbanization, literacy, income etc. are the major factors in accounting for increased contraception", and join the "family planner" (who is optimistic about the success of the family planning programmes) in saying "that by special programmes he can induce couples to adopt family planning despite the fact that they are rural, illiterate and poor" [1].

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