

**AN AREAL ANALYSIS OF FAMILY PLANNING PROGRAM
PERFORMANCE IN RURAL BANGLADESH**

35

T. Osteria
S. Bhatia
A.S.G. Faruque
J. Chakraborty



**INTERNATIONAL CENTRE FOR
DIARRHOEAL DISEASE RESEARCH, BANGLADESH**

Dacca, Bangladesh

May 1979

(Reprinted August, 1981)

Working Paper No. 12

AN AREAL ANALYSIS OF FAMILY PLANNING
PROGRAM PERFORMANCE IN RURAL BANGLADESH

T. Osteria¹

S. Bhatia²

A.S.G. Faruque³

J. Chakraborty⁴

INTERNATIONAL CENTRE FOR
DIARRHOEAL DISEASE RESEARCH, BANGLADESH
G.P.O. Box 128, Dacca - 2
Bangladesh

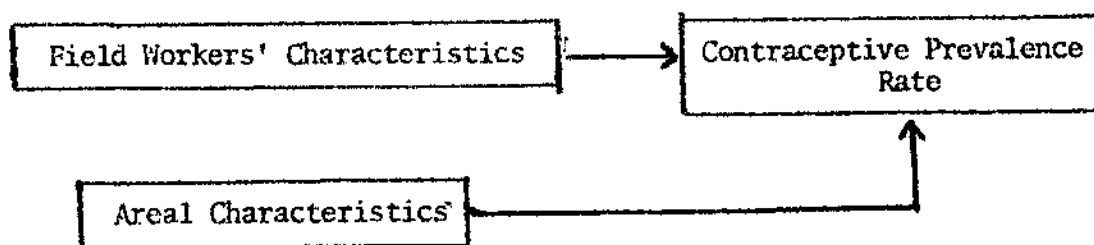
-
- 1 Investigator
 - 2 Investigator
 - 3 Physician
 - 4 Supervisor

PREFACE

The International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) is an autonomous, international, philanthropic and non-profit centre for research, education and training as well as clinical service. The Centre is derived from the Cholera Research Laboratory (CRL). The activities of the institution are to undertake and promote study, research and dissemination of knowledge in diarrhoeal diseases and directly related subjects of nutrition and fertility with a view to develop improved methods of health care and for the prevention and control of diarrhoeal diseases and improvement of public health programmes with special relevance to developing countries. ICDDR,B issues two types of papers: scientific reports and working papers which demonstrate the type of research activity currently in progress at ICDDR,B. The views expressed in these papers are those of authors and do not necessarily represent views of International Centre for Diarrhoeal Disease Research, Bangladesh. They should not be quoted without the permission of the authors.

poorly trained field workers who were not able to manage the side effects. A study was undertaken to examine variation in field workers performance in the previous project (5). By regression analysis using contraceptive acceptance rates and use-prevalence rates as the dependent variables and field workers' age, education, examination scores a year after training, marital status and number of children, it was concluded that about 25% of the variability between villages in both prevalence and acceptance could be explained by the field worker's characteristics. Most important was the examination score. The residual 75% variability remained largely unexplained (5).

It was hypothesized that once better educated and better trained field workers are recruited, the problems of side effects could be assuaged by proper counselling and back-up services and more sustained use of contraception would be realized. The present study repeats and extends the analysis by additionally looking at the village characteristics and the degree to which such differences could explain the level of contraceptive use as of March 31, 1978. The model is as follows:



The variables to be measured are indicated as follows:

Variables to be Utilized in Areal Analysis of Family Planning Performance

Dependent Variable	Independent Variables
Prevalence Rate (March, 1978)	A. <u>Field Workers' Characteristics</u> 1. Education 2. Age 3. No. of children 4. Scores (1st exam, Oct. 1977) 5. Scores (2nd exam, Nov. 1977)
	B. <u>Areal Characteristics</u> 1. Percentage wanting no more children. 2. Percentage with previous contraceptive usage

The prevalence rate for the end of March, 1978 was computed from the record keeping system using the eligible population as the base.

The field workers' characteristics were from the field workers' file. In October, five days after the training, an examination was given to the field workers. In November, 1977 another examination was given. The training content included anatomy and physiology of reproduction, mechanism of action of contraception, side effects management and back up services.

The areal characteristics of these villages were drawn from the survey undertaken in December 1977, to assess the level of contraceptive knowledge, use and demand.

RESULTS

Characteristics of the Field Workers

Table 1 presents the characteristics of the female village workers (FWWs) with similar characteristics for the village workers in the previous project shown for comparison. It can be noted that the new workers are younger. The average age of the FWWs is 23 years as contrasted to an average age of 39 years of the village workers in the old project area. The high level of education in the modified project is evinced by 41.2% of the FWWs having at least 10 years of schooling. In contrast, the village workers in the old project area were predominantly illiterate. A larger number of children was likewise reported by the village workers in the old program.

TABLE 1

A comparison of the Characteristics of the Female Village Workers (FWWs) of the modified program with the village workers of the original program.

<u>a. Age</u>					
FWWs			Village Workers*		
<u>Year</u>	<u>No.</u>	<u>%</u>	<u>Year</u>	<u>No.</u>	<u>%</u>
15-19	6	7.5	15-24	20	13.1
20-24	49	61.3	25-34	26	17.0
25-29	17	21.3	35+	107	69.9
30-34	7	8.8			
35-39	1	1.1			
	<u>80</u>	<u>100.0</u>		<u>153</u>	<u>100.0</u>

Mean = 23.3 years

Mean = 39

* Source: M. Rahman, T. Osteria, et al. Variation in Field Worker Performance in the Contraceptive Distribution Project. CRL Working Paper No. 5, May 1978.

TABLE 1 Contd.

h. Education

Years of
Schooling

6	1	1.2	Illiterate	108	70.5
7	16	20.0			
8	23	28.8	Literate	42	27.5
9	7	8.8	No information	3	2.0
10	9	11.2			
11	22	27.5		153	100.0
13	2	2.5			
	<u>80</u>	<u>100.0</u>			

c. Family Size

No. of
Children

0	10	12.5
1 - 2	44	55.0
3 - 4	17	21.3
5 - 6	8	10.0
7+	1	1.2
	<u>80</u>	<u>100.0</u>

No. of
Children

0	14	9.2
1 - 2	54	35.3
3 - 4	47	30.7
5+	30	19.6
Unknown	8	5.2
	<u>153</u>	<u>100.0</u>

Mean

1.6

3.5

Table 2 presents the averages for the selected characteristics of the FVWs. The average age of the female village worker is 23 years with a standard deviation of 3.7 years. The high level of education of these workers is reflected in an average of 9 years of schooling with a variability of 1.7 years. It could be noted that there has been no change in the average scores of the field workers over the 6 months period of program operation. However, the variability was reduced from 15 to 8 - an indication of improvement of level of knowledge. The average number of children of the field workers was 2.1 with a standard deviation of 1.6.

TABLE 2

Averages and Standard Deviation for
Selected Characteristics of the Female
Village Workers, October 1977

Variable	Mean	Deviation
Age	23.2	3.7
Years of schooling	9.0	1.7
Score (1st exam, Oct. 1977)	88.3	15.4
Score (2nd exam, Mar. 1978)	88.8	8.1
No. of children	2.1	1.6

Characteristics of Villages

Table 3 gives the information relating to knowledge and use of contraception by couples as well as some socio-demographic characteristics for the 80 study villages as of the December 1977 survey. On the average, 39% of the women wanted no more children and 46% intended to use contraception. The difference between the two percentages might be a reflection of a certain proportion of wives who intend to use contraception for spacing purposes. As of the December 1977 survey, about 21% were currently using a method and twenty eight percent had previously used a method. The percentage of women with 4 or more children was close to half (46.1%). On the average, 92% had heard of a method. The average prevalence rate in March 1978 was 26.3% with a standard deviation of 8.

For analytical purposes and to minimize interaction two variables were drawn to characterize villages namely percentage wanting no more children and the percentage who had previously used contraception.

TABLE 3

Averages of Percentage and Standard Deviation
for Selected Information Pertaining to the
Study Villages, December 1977

Variable	Averages (%)	Standard Deviation
% want no more children	39.1	11.4
% intending to use contraception	45.7	15.6
% using a method	21.1	10.1
% previously used a method	27.6	14.6
% with 4 or more children	46.1	8.7
% who have heard of a method	91.7	8.4

Correlation Analysis

Table 4 shows the correlation matrix for the different variables being studied. Asterisks were placed to denote significant relationships between the indicated variables. The younger field workers had better education as evinced by a correlation coefficient (r) of $-.273$. As expected age related positively with number of children ($r = .791$). Scores in the examinations ($r = .373$) given after training tended to improve with increase in the level of schooling of the field workers. The level of education is negatively related with the field workers' number of children ($r = -.322$). The prevalence rate is higher in villages where the proportion desiring no more children is high ($r = .532$).

An interesting observation in the correlation analysis is that villages with a large proportion of wives reporting previous use of contraception in December 1977 showed lower prevalence rates as of March 1978. These villages with large proportions of women who had used a method were part of the old contraceptive distribution project area. It is these villages where condoms and pills were first introduced by the poorly trained workers. The side effects experienced by these women from the pills might have acted as a deterrent to the immediate acceptance of another method. It is expected that with the availability of wider range of methods and better management of side effects, they will be motivated to renew use of contraception.

TABLE 4

Correlation Matrix of the Selected Variables of FWs and of the 80 Villages.

		X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈
X ₁	Age	1.000							
X ₂	Years of Schooling (FW's)	-.273**	1.000						
X ₃	Score (October 1977)	-.054	.373**	1.000					
X ₄	Score (November 1977)	.008	-.374**	-.540**	1.000				
X ₅	No. of living children (FW's)	.791**	-.322**	-.130	-.028	1.000			
X ₆	% wanting no more children	.093	-.165	-.101	-.099	.123	1.000		
X ₇	% with previous use of contraception	-.076	.097	.011	.101	-.095	-.132	1.000	
X ₈	Prevalence Rates	.094	-.044	-.172	-.071	.120	.532**	-.217*	1.000

* Significant at 5%

** Significant at 1%

Regression Analysis

The objective in this section is to determine if a relationship exists between prevalence rates and the field workers characteristics as well as the village characteristics. If such a relationship exists, then we would expect to find a statistically significant association between prevalence and the aforementioned variables. If it was the quality of the field workers that explained prevalence, then one would expect that their characteristics would explain most of the variation in prevalence and administrative policies could be geared toward upgrading the level of field workers.

The unit of analysis was the village and these data were available for the 80 villages. Two statistical indices have been utilized to examine areal variables in contraceptive use prevalence. These are the partial correlation coefficient (R) and the standardized beta (β). The partial correlation coefficient is the correlation between two variables in a cross section of individuals keeping all other independent variables constant all having the same variable (or the third variable is held constant). The standardized beta answers the question: which of the independent variables (X) is most important in determining the dependent variable Y? Beta has been used as a measure of the relative importance of the X's being ranged in order of the sizes of these coefficients, ignoring signs.

Table 5 presents the regression analysis using March 1978 prevalence rates as the dependent variable. The proportion of variation explained by all variables taken together is 33.7%. The F value obtained is 5.23 which is significant at (5% and) 1% level. This indicates that the variables selected were able to differentiate prevalence rates in the villages. When the variables are examined, the most predictive of prevalence is the proportion of women wanting no more children.

TABLE 5

Regression Analysis Using Prevalence Rate in
March 1978 as Dependent Variable and
Selected Independent Variables

<u>Independent Variables</u>	<u>Partial R</u>	<u>Standardized B</u>
<u>Village Characteristics</u>		
% wanting no more children	.522**	.5112**
% who previously used contraception	-.188	-.1588

** significant at 5% and 1%.

TABLE 5 Contd.

	<u>Partial R</u>	<u>Standardized B</u>
<u>Field Workers Characteristics</u>		
Score (October 1977)	-.184	-.1868
Years of Schooling	.131	.1265
Score (November 1977)	.050	.0498
No. of children	.027	.0369
Age	.022	.0290

$$F = 5.23^{**}$$

$$R^2 = .337$$

** significant at 5% and 1%.

Table 6 and 7, a separate analysis was made for the village and the field workers' characteristics. It is apparent that the village characteristics in terms of desire for no more children outweigh the field workers characteristics. A significant relationship existed between village characteristics and prevalence rates while field workers characteristics alone failed to produce a significant association.

TABLE 6

Regression Analysis Using Prevalence Rate in
March 1978 as Dependent Variable and
Village Characteristics as Independent Variables

<u>Independent Variables</u>	<u>Partial R</u>	<u>Standardized B</u>
% wanting no more children	.521	.5128
% who previously use contraceptives	-.175	-.1490

$$F = 16.93^{**}$$

$$R^2 = .305$$

TABLE 7

Regression Analysis Using Prevalence Rate in
March 1978 as Dependent Variable and Field
Workers Characteristics as Independent Variables

<u>Independent Variables</u>	<u>Partial R</u>	<u>Standardized B</u>
Score (Oct. 1977)	-.153	-.1856
No. of living children	.059	.0973
Years of Schooling	.051	.0589
Age	.014	.0226
Score (Nov. 1977)	.008	.0099

$$F = .66$$

$$R^2 = .043$$

The findings from this study suggests that in the initial stages of program operation, the demand for contraception is the single determining factor for eventual contraceptive use. It may be possible that with time progression, the level of knowledge of the field workers would be an important consideration in sustaining use of the method.

SUMMARY AND DISCUSSION

In October 1975, a contraceptive distribution project was undertaken in Matlab thana in rural Bangladesh to test the hypothesis that there exists a latent demand for contraception in these areas and once supplies are made available, people will be induced to try them leading to a contraceptive behaviour with a resultant fertility decline. The distribution of pills and condoms was undertaken by illiterate field workers with limited training. Results of subsequent surveys undertaken revealed that while there was a dramatic increase in prevalence rates (from 1 to 18%) in the first 3 months of program operation, a linear decline ensued such that by the 17th month, the prevalence rate was 13%. The inability of field workers to manage the side effects was one of the reasons posited for this deterioration.

In the summer of 1977, a restructured program was introduced the main feature of which was the recruitment and training of better educated field workers who could provide a wide array of clinical services. The prevalence rate in the study areas rose to 26% six months after program inception and continued to rise to 36% at 12 months.

This paper attempts to dissect the different factors responsible for the diversity in prevalence rates among the villages at 6 months and to determine the extent to which these differences could be attributed to the characteristics of field workers independent of the areal characteristics. The female village workers' characteristics considered included age, education, number of living children and scores in the first and second examination given a month apart. The areal characteristics included the percentages wanting no more children in each of the villages and the percentage who have used a method.

The regression analysis revealed that 33.7% of the variability in prevalence rates could be explained by the aforementioned variables. The villages with large proportions wanting no more children in December 1977 exhibited high prevalence rates in March 1978. The areal characteristics explained 30.5% of the intervillage variation.

At the initial stage of program operation the demand for contraception is an important factor. With the dissemination of effective services, the level of field worker would be important in inducing use continuation of the methods and effecting a more significant decline.

The 66% of the variation that remained unexplained need to be explored adequately. The kinship pattern that operates to affect acceptance and continuous use of the method has to be studied. Besides, it would be interesting to examine whether the same set of variables would affect prevalence at a later period of program operation.

REFERENCES

1. Ross JA, Forrest JD: The demographic assessment of family planning programs: a bibliographic essay. Pop Index 44(1):8-27, Jan 78
2. Hermalin AI: An area analysis of the effect of acceptances on fertility. Stud Fam Plan 33:7-11, 1968
3. Hermalin AI: Regression analysis of areal data. In: Chandrasekaran C, Hermalin AI eds: Measuring the effect of family planning programs on fertility. Liege, IUSSP, 1975:245-299
4. Osteria T, Rahman M, Langsten R, Khan AR, Huber DH, Mosley WH: Assessment of the Matlab Contraceptive Distribution Project - implications for program strategy. Dacca, Cholera Research Laboratory, 1978. (CRL working paper, no. 4)
5. Rahman M, Osteria T, Chakraborty J, Huber DH, Mosley WH: A study of the field worker performance in the Matlab Contraceptive Distribution Project. Dacca, Cholera Research Laboratory, 1978. (CRL working paper, no. 5)
6. Snedecor GW, Cochran WG: Statistical methods. 6th ed: Ames, Iowa State University Press, 1967 (reprinted 1973)
7. Rahman M, Huber DH, Chakraborty J: A follow-up survey of sterilization acceptors in Matlab, Bangladesh. Paper presented at the Seminar on Sterilization Follow-up and Oral Contraceptive Studies, organized by the Johns Hopkins Fertility Research Project and Bangladesh Fertility Research Programme, Dacca, July 8, 1977

ICDDR,B (CRL) publications can be obtained from Publications Unit,
International Centre for Diarrhoeal Disease Research, Bangladesh,
G.P.O. Box 128, Dacca - 2, Bangladesh.

List of current publications available:

A. CRL Annual Report 1976.

CRL Annual Report 1977.

B. Working Paper:

No. 1. The influence of drinking tubewell water on diarrhea rates in
Matlab Thana, Bangladesh by George T. Curlin, K.M.A. Aziz and M.R. Khan.

No. 2. Water and the transmission of El Tor cholera in rural Bangladesh
by James M. Hughes, John M. Boyce, Richard J. Levine, Moslemuddin Khan and
George T. Curlin.

No. 3. Recent trends in fertility and mortality in rural Bangladesh
1966-1975 by A.K.M. Alauddin Chowdhury, George T. Curlin.

No. 4. Assessment of the Matlab Contraceptive Distribution Project -
implications for program strategy by T. Osteria, Makhlisur Rahman, R.
Langsten, Atiqur R. Khan, Douglas H. Huber and W. Henry Mosley.

No. 5. A study of the field worker performance in the Matlab contra-
ceptive distribution project by Makhlisur Rahman, T. Osteria, J.
Chakraborty, Douglas H. Huber and W. Henry Mosley.

No. 6. Constraints on use and impact of contraceptives in rural
Bangladesh: Some preliminary speculations by R. Langsten, J. Chakraborty.

No. 7. The demographic impact of the contraceptive distribution
project by T. Osteria, W.H. Mosley and A.I. Chowdhury.

No. 8. Development of milk teeth in rural Meheran children of
Bangladesh by Moslemuddin Khan and George T. Curlin.

No. 9. A follow-up survey of sterilization acceptors in Matlab,
Bangladesh by Makhlisur Rahman, Douglas Huber and J. Chakraborty.

No. 10. The Demographic Impact of Sterilization in the Matlab Village-
Based MCH-FP Program by T. Osteria, S. Bhatia, J. Chakraborty and A.I.
Chowdhury.

No. 11. Parental dependency on children in Matlab, Bangladesh by
Makhlisur Rahman.

C. Scientific Report:

No. 1. Double round survey on pregnancy and estimate of traditional fertility rates by A.K.M. Alauddin Chowdhury.

No. 2. Pattern of medical care for diarrheal patients in Dacca urban area by Moslemuddin Khan, George T. Curlin and Md. Shahidullah.

No. 3. The effects of nutrition on natural fertility by W. Henry Mosley.

No. 4. Early childhood survivorship related to the subsequent inter-pregnancy interval and outcome of the subsequent pregnancy by Ingrid Swenson.

No. 5. Household distribution of contraceptives in Bangladesh - the rural experience by Atiqur R. Khan, Douglas H. Huber and Makhliur Rahman.

No. 6. The role of water supply in improving health in poor countries (with special reference to Bangladesh) by John Briscoe.

No. 7. Urban cholera study, 1974 and 1975, Dacca by Moslemuddin Khan and George T. Curlin.

No. 8. Immunological aspects of a cholera toxoid field trial in Bangladesh by George T. Curlin, Richard J. Levine, Ansaruddin Ahmed, K.M.A. Aziz, A.S.M. Mizanur Rahman and Willard F. Verwey.

No. 9. Demographic Surveillance System - Matlab. Volume One. Methods and procedures.

No. 10. Demographic Surveillance System - Matlab. Volume Two. Census, 1974 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

No. 11. Demographic Surveillance System - Matlab. Volume Three. Vital events and migration, 1975 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

No. 12. Demographic Surveillance System - Matlab. Volume Four. Vital events and migration, 1975 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

No. 13. Demographic Surveillance System - Matlab. Volume Five. Vital events, migration, and marriages - 1976 by Lado T. Ruzicka, A.K.M. Alauddin Chowdhury.

No. 14. Ten years review of the age and sex of cholera patients by Moslemuddin Khan, A.K.M. Jamiul Alam and A.S.M. Mizanur Rahman.

No. 15. A study of selected intestinal bacteria from adult pilgrims by M.I. Huq, G. Kibria.

No. 16. Water sources and the incidence of cholera in rural Bangladesh by Moslemuddin Khan, W. Henry Mosley, J. Chakraborty, A. Majid Sardar and M.R. Khan.

No. 17. Principles and prospects in the treatment of cholera and related dehydrating diarrhoeas by William B. Greenough, III.

No. 18. Demographic Surveillance System - Matlab. Volume Six. Vital events and migration 1977 by Aporn Samad, Kashem Sheikh, A.M. Sarder, Stanley Becker and Lincoln C. Chen.

No. 19. A follow-up survey of sterilization acceptors in the modified contraceptive distribution projects by Shushum Bhatia, Trinidad Osteria, J. Chakraborty and A.S.G. Faruque.

No. 20. Cholera due to the El Tor biotype equals the classical biotype in severity and attack rates by Moslemuddin Khan and Md. Shahidullah.

No. 21. An estimation of response bias of literacy in a census of rural Bangladesh by M. Shafiqul Islam, George T. Curlin and K.M.A. Aziz.

No. 22. Vibrio cholerae by William B. Greenough, III.

No. 23. M.R. Clients in a village-based Family Planning Programme by Shushum Bhatia and Lado T. Ruzicka.

0. Special Publication:

No. 1. Management of cholera and other acute diarrhoeas in adult and children - World Health Organization.

No. 2. Index to CRL Publications and Scientific Presentations 1960-1976 by Susan Fuller Alamgir, M. Shamsul Islam Khan, H.A. Spira.