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The Usefulness of Operations Research Methodology in Family Planning: Experience from Turkey, Bangladesh, and Pakistan

Introduction

OPERATIONS research, also termed at times as "services research" or "systems research", deals with the functioning or processes and procedures of service delivery programmes. It is now a well-established approach to study problems in service delivery and to develop alternative strategies for an effective and optimum use of resources to provide services. As the research is set in motion by problem identification, it is easy to envisage that problems may be quite different in different cultural and service contexts. However, several useful insights can be gained by considering the experience of different countries in dealing with their programmatic issues through the application of operations research methodology.

The main objective of this paper is to review the experience of operations research in family planning in Bangladesh, Pakistan, and Turkey. These countries were selected primarily to illustrate the range of topics that can be covered and levels of success achieved with the application of operations research methodology. Along with reports on the results of operation research projects, this paper also identifies the strengths and weaknesses found in these studies. The discussion is organized by research topic, followed by an assessment of the insights gained from these studies.

Service-delivery programmes are generally complex as they involve such interdependent aspects as supplies, buildings, reporting procedures, personnel, clients, etc. Thus issues may arise at all levels and may cover a variety of problems. This paper deals with three main issues: (1) provision of family planning services by non-physicians; (2) involvement of community leaders; and (3) integration of family planning and maternal and child health services.

Provision of Family Planning Services by Non-physicians

Most of the developing countries suffer from a shortage of physicians. Also, owing to the high prevalence of various types of illness in these countries physicians are heavily

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occupied with curative activities, and have little time for public health work, such as birth spacing through family planning. In addition, women in much of the developing world prefer female physicians for physical examinations, but they number even fewer than male physicians. Non-physician health personnel are generally more numerous than physicians, and are less expensive to train and employ. Therefore, they can provide more cost-effective services than physicians. However, their deployment for clinical tasks needs to be examined carefully so that it does not entail any greater health risks to the patients/clients than in case of physicians. It is therefore important to demonstrate that non-physicians can be adequately trained to undertake certain clinical procedures and that they provide services that are as satisfactory as those of physicians. Having established this prerequisite, the training of non-physicians for delivering family planning services can be quite critical in meeting the demand for these services. Three studies, supported by the Special Programme of Research, Development and Research Training of the World Health Organization, addressed this issue.

Government-supported family planning activities in Turkey started in the early sixties. From the outset, the programme gave priority to the insertion of lUDs, which were found quite acceptable among Turkish couples. However, one major barrier to a greater use of lUDs was the poor acceptability of male physicians as providers. A training programme was designed for auxiliary nurse-midwives (ANMs) to provide the knowledge and skills required for counseling new acceptors on the use of lUDs, screening new acceptors to detect contraindications to the method, insertion of lUDs, follow-up of users, and diagnosis and management of side-effects or complications. In the first phase, 14 ANMs were involved in the study (Akin *et al.*, 1980). They had no previous experience in family planning and most of them worked in villages in the Cubuk district. In Turkey, ANMs have five years of basic education and three years of professional education. Nurse-midwives (NMs) have six years of general and four years of professional education. They were trained by a medical doctor over a period of three to four weeks and much of the training focussed on the provision of lUDs and on common gynaecological complaints, such as vaginitis and cervicitis. The trainees practiced pelvic examination on a pelvic model before conducting the examinations on volunteer subjects drawn from outpatients and inpatients attending the Cubuk District Hospital. Later, the trainees were required to undertake supervised IUD insertions.

The ANMs made 30 incorrect diagnoses out of a total of 341 examinations (9%) during the practical training in history-taking and pelvic examination (Table 1). Most of these errors were minor. Each trainee performed between three and 16 IUD insertions. Out of a total of 115 insertions, four (3%) cases required cervical dilatation which could not be completed by the trainees. In two cases, it was found that the trainees had cut the thread too short, and in one case the trainee had intended to insert an IUD at the wrong time in the menstrual cycle. Overall, it was concluded that ANMs could be trained to insert lUDs without any additional health risks to users. However, the authors pointed out the limitations of the study, especially in terms of its replicability to a larger-scale implementation (Akin *et al.*, 1980). In addition, the comparison of the quality of care provided by physicians and ANMs was warranted.

TABLE 1 : ACCURACY OF DIAGNOSES BY AUXILIARY NURSE-MIDWIVES (ANM) DURING PELVIC EXAMINATION, TURKEY

Condition Present	*Total Number of Diagnoses Made*	*Number of Incorrect Diagnoses*
Pregnancy	84	*5*
Pelvic Inflammatory Disease (PID)	14	1
Abnormal Bleeding	13	0
Cervicitis	6	0
Cervical Erosion	8	1
Cervical Polyp	5	0
Prolapse	5	1
Fibroids	2	0
Mass in Adnexa	2	1
Retained Products	4	0
No Abnormality	198	21
Total	341	30(8.8%)

SOURCE: Akin *et al.*, 1980.

In a later study (Eren *et al.*, 1983), these trained ANMs were compared with physicians to determine whether they could provide a similar standard of clinical care. Among the 14 trained, one had been transferred to another area. The performance of the remaining 13 ANMs was compared with that of six male and two female physicians. Women who requested IUDs were informed about the project and informed volunteers were randomly allocated to nurse-midwives ANM or physician. ANMs were readily available and could insert IUDs immediately; physicians only visited villages on specific days and required an appointment. Careful records were kept of all referrals and of the accuracy of the physician or ANM diagnosis. After receiving their IUDs, women were asked to return for follow-up at 1, 3, 6, 9 and 12 months. Physicians and ANMs followed-up their own clients. One follow-up examination was conducted by an independent obstetrician-gynaecologist who did not know whether the patient was a subject of ANM or of a physician. The gynaecologist also evaluated—and, where necessary, treated—all referrals from both physicians and non-physicians. Altogether, 495 women were recruited in the study, 238 were allocated to physicians and 257 to ANMs. There was no difference in age or parity of women by the type of service provider (i.e., physician or ANM). Also, there was no statistically significant difference in discontinuations due to expulsions, removals, or pregnancies by the type of provider (Table 2). Both physicians and ANMs referred a comparable number of cases to the independent specialist, but many women refused to have follow-up examinations by a male physician. The independent gynaecologist reported four physician referrals and six ANM referrals as incorrect. The study showed that adequately trained ANMs can provide standards of clinical care for IUD users comparable to those provided by physicians (Eren *et al.*, 1983).

TABLE 2 : FREQUENCY AND NATURE OF DISCONTINUATIONS OF IUD, BY TYPE OF PROVIDER, TURKEY

Events	*Physicians*		*Aux. Nurse -Midwives*	
	Number	%	*Number*	%
lUDs inserted	238	-	257	-
Discontinuation				
Expulsion Removal	16	6.7	21	8.2
	44	18.5	47	18.2
Pregnancy	6	2.5	6	2.2
Lost to follow-up	22	9.2	25	9.7
Total Discontinuations	88	37.0	99	38.5

SOURCE: Eren *et* al., 1983.

Having demonstrated that ANMs could be successfully trained to provide lUDs to women, the question remained whether such implementation could be made on a larger scale. The first two studies were based on 14 ANMs working under the supervision of one doctor in a district. The confidence in these findings could be enhanced only if the scope of the study was expanded to cover a larger number of ANMs working in different parts of Turkey. The Turkish Ministry of Health agreed for an expanded field trial to te"st the field performance of 200 ANMs and a study was launched to investigate the degree of success in training non-physicians and their competence in the provision of IUD services throughout the country (Akin *et al.*, 1986). For this study 201 midwives (168 ANMs and 33 NMs) were selected from 14 provinces of Turkey. They were randomly allocated to six training centres which were established in Ankara, Istanbul, and Izmir. The trainees were tested through written examinations and were supervised during the period when they inserted lUDs. Each trainee performed 60 pelvic examinations and about 24 IUD insertions, on average. The frequency of misdiagnosis decreased with the increased number of examinations (Table 3). Misdiagnosis of pregnancy and pelvic inflammatory disease (PID) were classified as "major" and the misdiagnosis of the vertical uterine position was classified as "minor". No difference was found in terms of their theoretical knowledge and clinical skills between ANMs and NMs. The project demonstrated that, for IUD provision, NMs and ANMs can be trained and used in the field. Optimal supervision is at six-monthly intervals. The supervision could be by a trained non-physician or a physician but a trained non-physician supervisor was found to work more successfully.

Findings for the studies conducted in Turkey were so convincing that the Turkish Ministry of Health passed the new Population Law, in May 1983, which authorized the use of trained midwives for the provision of IUD services. Regional training centres for midwives were established and the training programmes were initiated. Further, beginning in 1984, family planning teaching methods were included in the undergraduate curriculum of nurse-midwifery schools.

TABLE 3 : PERCENTAGE OF MISDIAGNOSIS BY THE NUMBER OF EXAMINATION, TURKEY

Diagnosis	*Number of Examinations*			
	1-10	11-20	21-3O	*31-40*
Misdiagnosis				
Major	8.9	2.5	0.1	0.9
Minor	31.5	17.4	10.2	6.0
Correct Diagnosis	59.6	80.1	89.7	93.1
Total	100	100	100	100
Total Number of Diagnoses: 2,010				

SOURCE: Akin *et al.*, 1986.

In Bangladesh, a study was launched to assess the feasibility of involving traditional village practitioners ("hakeems") to dispense contraceptives, counsel clients and diagnose and refer complications. From each of four selected Thanas, village practitioners were chosen and trained for 21 days in reproductive physiology, family planning and contraceptive methods. They subsequently returned to their respective communities. The project assessed whether their involvement strengthened the family planning programme and improved the contraceptive prevalence rate. The training programme for the village practitioners had less than 3% drop-outs and their knowledge and skills were substantially increased. More important, the practitioners were now referring many problem cases to hospitals and clinics which they had earlier treated until death. The major success, however, was that the surveys showed that contraceptive use improved, especially the use of condoms, during the experiment and that the consumers considered the practitioners better doctors after the training. This study (Rahman, 1985) was instrumental in the involvement of village practitioners in family planning activities in Bangladesh.

Community Involvement

It has been long recognized that a workable method for increasing the use of family planning services is to inform people about these services through education and publicity. In many cases, policy makers would like to consider the usefulness of enlisting the support of respected members of the community to encourage the use of family planning methods in their capacity as role models. With support from the WHO's Special Programme, a number of studies were conducted to assess the usefulness of involving community leaders for promoting a greater use of family planning services.

With increased labour force participation among females in Turkey, it was felt important to consider the feasibility of using trained labour union shop stewardesses as motivators for family planning services. The purpose was to test whether female workers motivated by a shop stewardess would accept and continue to use contraceptive methods as readily as those who were motivated by health educators. The site of the study was Bursa Merinos Textile Factory (BMTF), which was chosen in view of the interest shown by the management of the factory. BMTF was a wool factory and employed about 800 female and 2,428 male workers at the time of study in 1981. All had some elementary education. The study (Turhan, 1986) was conducted in four phases. In the first phase, a baseline survey was conducted to obtain basic information about the knowledge, attitude and practice of family planning of

female workers and their background characteristics. A family planning clinic was established six months prior to the start of an educational programme, during the second phase of the study. In the third phase, educational activities were conducted and service statistics were routinely collected. Finally, a survey was conducted to evaluate the effectiveness of educational activities for female factory workers.

The baseline survey was conducted in June 1981 and all female factory workers were interviewed about their marriage, fertility, and knowledge and attitude about contraceptive methods as well as about their method preference. A clinic to provide family planning services was established in August 1981 and a female physician and a nurse-midwife were recruited. The family planning services were provided both to female factory workers and to wives of male workers. The clinic remained operational until September 1983. Among the 410 female workers, 133 were motivated for family planning by trained union shop stewardesses, 142 by professional health educators and 135 workers were given education only in first-aid. The first two categories formed the "study" groups and the third a "control" group. A final survey was conducted in October 1982 to assess the impact of the motivation programme and evaluate the role of shop stewardesses as motivators.

The prevalence of contraceptive use was found to be already quite high (81%) at the onset of the study (Turhan, 1986). However, 64% of all users relied on coitus interruptus. The users of this method experienced high failure rate and consequently had to resort to abortion. The increase in contraceptive use after the study was modest. Nevertheless, the prevalence of more effective methods increased and the prevalence of coitus interruptus decreased to 45%. No significant differences were found between the group of women motivated by stewardesses and those by health educators. The "control" group had a slightly lower prevalence of use (Table 4). The "control" group also exhibited an increase in the use of modern effective methods. This was mainly due to the exchange of information among workers in different groups. Despite this limitation, the study demonstrated that union stewardesses were as good as professional educators for motivating women to use modern methods.

TABLE 4: PERCENTAGE DISTRIBUTION OF FEMALE FACTORY WORKERS BY TYPE OF THE CONTRACEPTIVE METHOD USED AT THE END OF STUDY AND THE TYPE OF MOTIVATOR, TURKEY

Contraceptive Method	*Stewardesses*	*Health Educator*	*None*	*Total*
No Method	16.5	18.3	18.5	17.8
IUD	26.3	38.7	29.6	31.7
Pill	12.8	4.2	9.6	8.8
Condom	2.3	1.4	2.2	2.0
Withdrawal	38.3	33.8	38.5	36.8
Other Methods	3.8	3.5	1.4	2.9
Total	100	100	100	100
Number of Women	133	142	135	410

SOURCE: Turhan, 1986.

Another study (Ozturk, unpublished) in Turkey considered the feasibility of using school teachers and imams (religious leaders among muslims) for promotion of family planning activities. The position of the imam is quite important among muslims, who seek advice from these leaders on personal matters. Three groups of villages in the Cubuk district were included in the study. In the first group, female school teachers and imams were trained as motivators to work jointly for family planning motivation activities. In the second group of villages, only school teachers were trained and in the third group of villages no interventions were made. The last group of villages served as "control" group. Altogether, there were 21 villages in these three categories. During the intervention period, teachers motivated women during their daily contact with mothers, while imams did the same during their Friday sermons, attended by men, by speaking in favour of limiting family size. The impact of these approaches was evaluated against the results of the baseline survey conducted before the interventions started.

TABLES: CONTRACEPTIVE PREVALENCE RATE (%) IN STUDY VILLAGES, BY TYPE OF MOTIVATOR, TURKEY

Contraceptive Prevalence	*Teachers and Imams*	*Teachers Only*	*None*
Number of Women	632	591	571
Use of Effective Methods			
At Baseline Survey	28	34	34
At 24 Months After Study	56	49	47
% Change	+ 100	+ 44	+ 38
Use of Traditional Methods			
At Baseline Survey	28	19	30
At 24 Months After Study	19	16	26
% Change	-32	-16	-13
Use of No Method			
At Baseline Survey	44	47	36
At 24 Months After Study	26	36	27
% Change	-43	-26	-25

SOURCE: Ozturk, Unpublished.

The results showed a distinct increase in the use of effective methods in the first group of villages where both teachers and imams performed family planning motivation activities. From baseline to 24 months after the end of intervention phase, the use of modern methods of family planning doubled from 28% to 56% and the use of traditional methods declined from 28% to 19% (Table 5). The increase in contraceptive use was also noticed among the villages where only teachers performed the motivation activities. However, this increase was not as substantial as in the "control" villages where no interventions were made. It was therefore concluded that the two-pronged motivation to both males and females by imams

and school teachers was an effective approach to promote family planning and the involvement of imams had a significant impact.

Integration of Family Planning and Maternal and Child Health Services

The last major theme covered in this paper deals with the topic of integration of family planning (FP) and maternal and child health (MCH) services. This topic is of a great interest to policy makers and planners in a number of developing countries where access to such services is rather limited and where use of contraceptive methods is low. However, the implications of the integration of FP and MCH services go beyond the logistical and administrative matters. They also deal with the way clients perceive these services and providers assess the relative importance of their different types of activities. For example, the providers may perceive MCH service to be more important than FP service or advice.

Family planning activities in Pakistan have a long history but little success. Despite the existence of an official family planning programme for about 26 years, the prevalence of contraceptive use is still below 15% among currently married women. It has been therefore critical to investigate why the programme has not been much successful in increasing the level of contraceptive prevalence.

With support from the WHO's Special Programme, the National Research Institute for Fertility Control (NRIFC) conducted a study to investigate the problems and deficiencies in the existing integrated family welfare programme (NRIFC, 1991). In addition, suitable interventions were to be designed and tested for their role in improving contraceptive use in Pakistan. The focus of the study was both on clinics, organization, clients and on the interface between providers and clients within the context of the clinic. The study design included the coverage of clinic staff, members of advisory management committees, currently married women, their husbands, religious leaders, community opinion leaders, and health practitioners. The project evaluated the human resources available, their expertise, and suitability for the tasks expected of them. An analysis was also done on the work style of the workers, their approaches to motivate people for contraception, and their success in obtaining community support for the programme. Some of the major problems encountered by the clinic staff were the lack of adequate transportation for motivational and follow-up activities, salaries not paid on time, inadequate or irregular supply of medicines, posting of female staff at far off places, and shortages of stationery and of other items. It was also noted that the staff had to pay out of their own pocket for contraceptive supplies to meet the targets. The investigators made a number of recommendations on the basis of the study. These included a re-implementation of the continuous motivation system, involvement of traditional birth attendants ("dais") for family planning activities, and improvements in the transportation facilities and in the supplies of medicines and contraceptives.

Discussion

Each of the studies reviewed above dealt with a critical programmatic issue, diagnosed the problems and led to clear policy recommendations to remedy the situation and to improve the acceptance of family planning in the local community or the target group(s). Among the

three groups, studies on the provision of family planning services by non-physicians proved to be the most successful research to execute, probably because of the clearly defined objectives of measuring the relative performance of two competing groups at some specific task/Studies using operations research methodology, however, are not free from constraints. Following are the major pitfalls noted among various studies using operations research methodology.

Implementation of Operations Research (OR) Project

The OR projects, especially those based on "before-after" comparisons are complex undertakings. Many of the OR projects seek to assess the usefulness or the appropriateness of a specific service strategy, implemented through "interventions", by comparing the situation before the interventions with that after the interventions. This type of design assumes a semi-controlled environment where interventions are the only influencing factor. In reality, however, the situation is the opposite. From the baseline to post-intervention period, people may move or their family situation may change. In some cases, the pace of modernization may have become faster in the intervening period because of some unexpected factors such as, for example, the establishment of a new factory or the building of a road. In addition, adherence to the study protocol may not be completely feasible. For example, in the Turkish study, physicians and auxiliary nurse-midwives (ANMs) referred a comparable number of clients during admission and follow-up, but women frequently /efused to be examined by male physicians during follow-up so a female physician had to take over the responsibility for the follow-up of many male physicians' cases. This compromised any measurements of the comparability of physicians and ANMs with respect to follow-up visits.

Contamination of the "Control" Groups

Many OR projects seeking to compare the impact of interventions in the study areas with the lack of interventions in the so-called "control" areas suffer from the contamination effects due to the spread of information. The studies in the use of community leaders to motivate people for using family planning have most suffered from contamination of the control groups. In the case of shop stewardesses, communication between friends on different shifts introduced a trend of increased contraceptive use in all groups and an array of unattributable figures. The teacher and imam study of Turkey was also compromised by group interaction but there were further problems with a possible bias toward the imams, since the study villages ended up being chosen so as to have imams who were apparently favourable toward family planning. Thus it was unclear whether the selection of these villages with imams having a positive outlook on family planning or the training of the imams resulted in the greater acceptance of family planning. It is quite common for people to seek better care even if it entails long travel and therefore people from the control area may be obtaining services from the study area. At times, a control for one research project becomes a study area for another project of similar nature making the results difficult to interpret.

Study Design

The extent to which results from the OR studies are valid and reliable depends on how well the design of the project was planned and executed. A number of OR studies produced results which could not be interpreted due to problems of sampling or the questionnaires. The areas were not properly selected or the individual respondents were not adequately identified and recruited in the study and therefore the results obtained from these studies could not be granted much credence. As questionnaires are the most common means of obtaining information for achieving the objectives of the study, these should be well designed so as to yield meaningful data.

Conclusions

In conclusion, operations research methodology is a powerful tool in refining family planning service systems. The application of this methodology yields results of a quality in proportion to the degree of focus of the project, the thoroughness with which pre-study research is done, and the care with which research is conducted. Careful separation of study and control groups is particularly important, as is accurate and uniform sampling procedure. Because surveys usually figure so critically in the measurement of conditions, it is important to ensure that questions are as precise as possible, that they reflect the variables they were designed to measure, and that no external factors interfere with the pattern of respondents' answers.

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