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TEY NAI PENG
IDRIS ABDURAHMAN

Factors Affecting Contraceptive Use in Peninsular Malaysia

INTERNATIONAL STATISTICAL INSTITUTE
Permanent Office. Director: E. Lunenberg
428 Prinses Beatrixlaan, PO Box 950
Voorburg
Netherlands

WORLD FERTILITY SURVEY
Project Director: Dr Dirk J. van de Kaa
35-37 Grosvenor Gardens
London SW1W OBS, UK

The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.

The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in cooperation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development.

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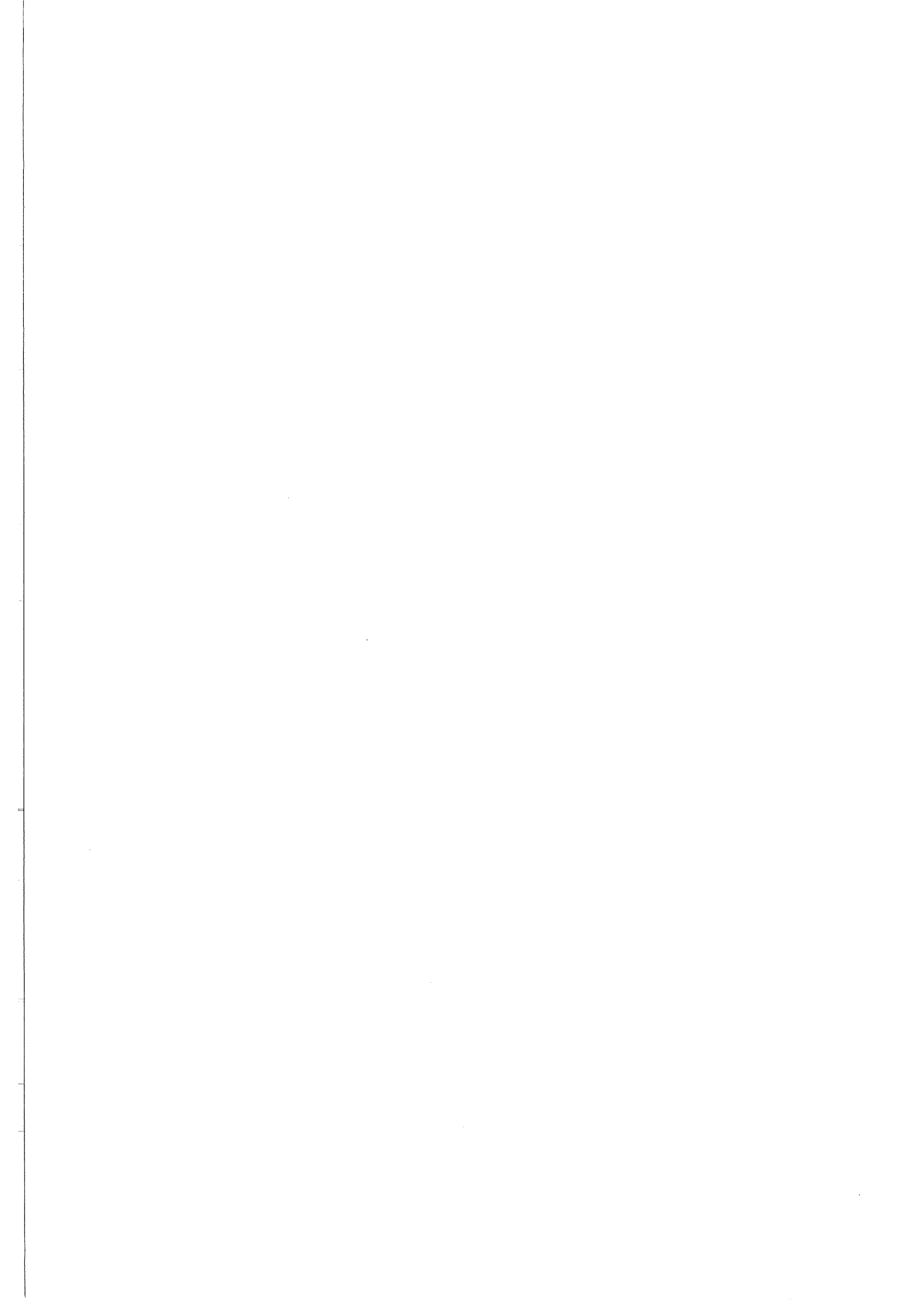
Factors Affecting Contraceptive Use in Peninsular Malaysia

TEY NAI PENG

Assistant Director
Research, Evaluation and Management Information System
Division
National Family Planning Board
Malaysia

IDRIS ABDURAHMAN

System Analyst
Research, Evaluation and Management Information System
Division
National Family Planning Board
Malaysia



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Preface

A central concern of the World Fertility Survey programme is the provision of technical assistance for in-depth analysis of the data collected by the participating countries. A major vehicle for the provision of such assistance has been the organization of workshops on data analysis. These workshops play an important role in providing training to national researchers and at the same time help to promote and successfully complete second-stage analysis projects.

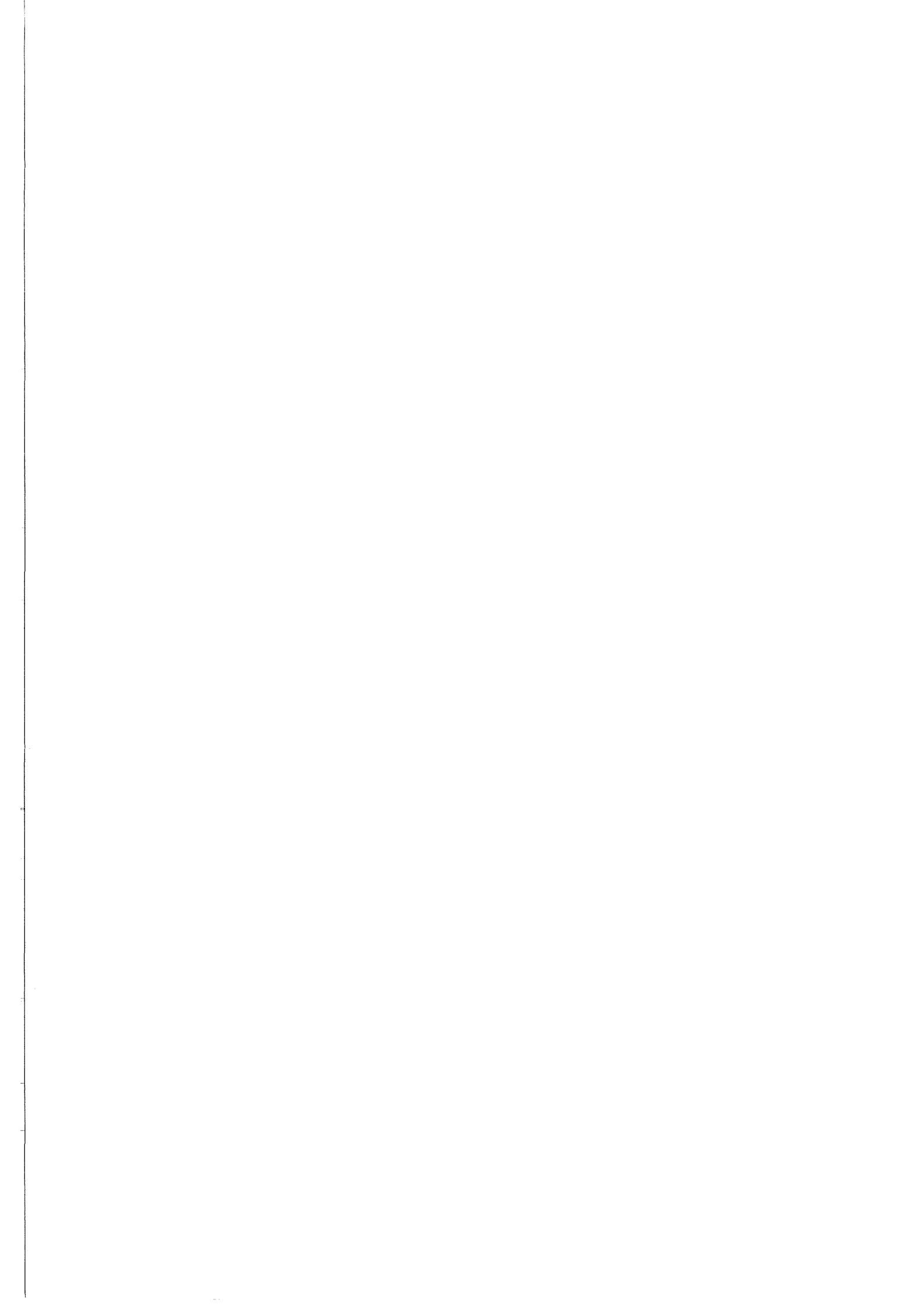
As part of this programme, the WFS and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) organized a Regional Workshop on the Application of Multivariate Analysis Techniques to the Analysis of WFS Data, which took place at the Asian Institute of Technology in Bangkok, Thailand, from 23 September to 23 November 1979.

The workshop was attended by eleven participants from six countries in the ESCAP region: Bangladesh, Indonesia, Korea, Malaysia, Nepal and Thailand. Technical assistance was provided at various stages of the workshop by R. Little, G. Rodríguez, A. Westlake and J. Cleland (WFS), N. Ogawa and J. Rele (ESCAP), J. Palmore (East-West Center, Honolulu) and M. Weinberger (UN Population Division, New York).

The first three weeks of the workshop consisted mainly of intensive instruction in the methodology of multivariate analysis and its application to WFS data, including the use of computer software. The remaining seven weeks were devoted to specific second-stage analysis projects applying multivariate techniques to the data from each participating country. At the end of the workshop, the participants had completed a first draft of their reports. These were finalized at a follow-up meeting held in Bangkok from 18 to 22 August 1980.

A complete set of the reports produced by the workshop participants will be published by ESCAP. However, three reports deemed of greater interest and relevance to other participating countries are also being issued in the *WFS Scientific Reports* series, to ensure a wider circulation. The present study, 'Factors Affecting Contraceptive Use in Peninsular Malaysia' by Tey Nai Peng and Idris Abdurahman is one such report.

DIRK J. VAN DE KAA
Project Director



1 Introduction

This report is concerned with selected factors affecting contraceptive use in Peninsular Malaysia, including demographic and background variables as well as fertility preferences and the availability of family planning services. The analysis is based on data collected in the Malaysian Fertility and Family Survey (MFFS) of 1974. The study contains policy implications relevant to the population and family planning programme in the country. We begin by giving some background information to the study.

1.1 POPULATION AND FAMILY PLANNING PROGRAMMES

Malaysia's population is estimated at 12 961 209 in 1978 with 10 917 556 in Peninsular Malaysia, 816 643 in Sabah and 1 227 010 in Sarawak. The population as a whole is growing at a rate of 2.6 per cent annually, while the population in Peninsular Malaysia is growing at a rate of 2.5 per cent annually. Between 1957 and 1976, the crude birth rate declined from 46.2 to 30.6. Of the population in Peninsular Malaysia, 53.5 per cent are Malays, 35.5 per cent are Chinese, 10.6 per cent are Indians and 0.8 per cent belong to other communities. About 34 per cent of the population live in urban areas and 66 per cent in rural areas. Married women between 15–49 years are estimated to number 1.5 million and constitute 15 per cent of the population.

In Malaysia, organized family planning activities started in 1953, when the voluntary Family Planning Association (FPA) of Selangor was first established. In 1958, FPAs were established in three other states and a Federation of Family Planning Associations (FFPA) was formed. By 1962, each of the eleven states in Peninsular Malaysia had formed a FPA. The activities of the FPAs were concentrated in urban areas.

In 1966, due to the growing awareness of the social, economic and health implications of the high rate of population growth, the Family Planning Act was passed in Parliament, followed by the establishment of a National Family Planning Board to provide the necessary leadership in implementing and co-ordinating a national family planning programme.

Acceptors throughout the country are being recruited and served by the Board's clinics, integration clinics (Ministry of Health), FFPA clinics, Felda's (Federal Land Development Authority) clinics, traditional birth attendants, estates and private practitioners. In 1968, the first year when the service programme was fully operational, a total of 74 075 new acceptors were recruited but this number fell to a low level of 53 182 new acceptors in 1971. Between 1976–8, the acceptor figure hovered around 75 000 a year. By the end of December 1978, a cumulative total of 729 695 acceptors had been recruited. (Note that in the Malaysian context, a person is considered a new

acceptor only once in a lifetime.) In 1974, when the MFFS was conducted, the proportions of programme acceptors by method were as follows: pill, 87 per cent; IUD, 1 per cent; sterilization, 7 per cent; condom, 4 per cent; and others, 1 per cent.

The foregoing is meant as a quick review of the state of the population and the family planning programme in the country. We do not intend to go into greater detail as a host of literature on such topics is available (see, for instance, Nor Laily Aziz, Tan Boon Ann and Kuan Lin Chee).

1.2 THE MALAYSIAN FERTILITY AND FAMILY SURVEY 1974

The Malaysian Fertility and Family Survey was conducted in 1974 in conjunction with the World Fertility Survey (WFS). It had two major objectives. Internationally, it was part of the WFS programme aimed at studying human fertility and reproductive behaviour. Nationally, it aimed to provide operational information for monitoring the national family planning and population programmes.

The survey, which covered only Peninsular Malaysia, was conducted jointly by the Department of Statistics and the National Family Planning Board. A total of 8103 living quarters were selected for the survey. In these, a total of 6368 ever-married women aged 15–49 were identified as eligible respondents and 6316 of them were successfully interviewed.

The sample frame used for the MFFS was the same as that used for the 1973/4 Household Expenditure and Income Survey. For sampling purposes, the whole of Peninsular Malaysia was divided into 837 large geographical units called primary areas. Several primary areas with similar characteristics were combined to form strata. In the first stage, the Primary Areas were selected with probability proportional to the population of that area. In the second-stage selection, probabilities were calculated so as to give a self-weighting sample, which facilitates estimation procedures.

Most of the questions used in the MFFS are similar to those in the core questionnaire recommended by WFS. Consistent with its objectives, the MFFS included a substantial number of questions from the WFS family planning module. Detailed information on contraceptive use was collected using questions from the WFS questionnaire for the developed countries, and in line with some questions asked in earlier KAP studies in Malaysia.

1.3 OBJECTIVES AND SCOPE OF THE PRESENT STUDY

The MFFS First Report was published in 1977. The analy-

sis presented in the report was based primarily on cross-classifications of the data. A summary of the basic findings is presented in the following chapter.

Following the publication of the First Country Report, plans were made to analyse the massive amount of data collected from the MFFS. Analyses of fertility differentials, women's participation in the labour force and fertility, service accessibility and contraceptive use, child spacing and infant mortality are now in progress.

In view of the importance of contraceptive behaviour for the family planning programmes, an in-depth analysis of contraceptive use at this stage appears most pertinent. Results in the country report and table 2 of this paper suggest that many factors affect contraceptive use. However, these factors have a complex pattern of intercorrelations, which makes it difficult to attribute effects simply to one factor or another. Differences in use by level of educational attainment (table 2), for instance, could be attributed to compositional differences on educational strata by place of residence. For this reason, it is necessary to assess the joint effects of several factors — in this example, education and residence.

The broad aims of the present study are: (i) to measure the combined predictive power on contraceptive use of selected demographic, background and socio-economic variables, as well as fertility preferences and perceived service accessibility, and (ii) to examine the effect of each of these variables, controlling for confounding factors, in order to evaluate their direct contributions and demon-

strate their indirect effects on contraceptive use through other variables. In this study it will be possible to include variables such as the characteristics of the husband which have not been included in the First Country Report. A study on family planning availability and contraceptive use in Costa Rica, Colombia, Nepal and Republic of Korea (Rodríguez 1978) has indicated that perceived service accessibility can exert an important influence on contraceptive use. It is of particular policy interest to determine the contribution of perceived accessibility on contraceptive use net of the effects of other factors, as well as the effects of other factors net of perceived accessibility. In addition, investigating the relationship between fertility preferences and contraceptive use, we hope to provide information on the unmet need for contraception.

Our intention is to assess the effects of some of these variables, such as fertility preferences and accessibility, which government policy, through the Family Planning Programme for example, might influence. We wish to ascertain if these relationships persist when other variables are taken into account. This is important to determine, for otherwise we may be misled into assigning effects to some variables which are in reality due to others.

The topic of contraceptive use offers a wide spectrum of areas for investigation. The subjects of non-use, continuity of use, method-specific use, effectiveness of contraceptive methods in birth spacing, and the effects of contraceptive use on fertility levels are areas for further investigation, and will not be discussed in this paper.

2 Background to the Study

2.1 FINDINGS FROM THE MFFS AND RELATED SURVEYS

The level of family planning knowledge and contraceptive use has increased remarkably since the launching of the National Family Planning Programme. In 1966, when the West Malaysian Family Survey was taken, only 44 per cent of ever-married women interviewed reported knowledge of family planning. This percentage has increased to 85 per cent in 1970 (Department of Statistics 1971) and 92 per cent in 1974.

In terms of contraceptive practice, the proportion of married women aged 15–44 years who had ever used contraception increased more than threefold. In 1966, 14 per cent of all married women had practised contraception, whereas in 1970 it was 27 per cent and in 1974 it was 52 per cent. The proportion of women currently using a method increased more than fourfold from 8 per cent in 1966 to 16 per cent in 1970 and 36 per cent in 1974.

Table 1 shows that, at the time of the MFFS, 39.7 per cent of all currently married women aged 15–49 years had ever used an efficient method, which includes pill, IUD, condom, injection and sterilization, and another 10.8 per cent had used only an inefficient method. In terms of

current use, 23.2 per cent of currently married women were using an efficient method and 9.5 per cent were using an inefficient method.

Restricting the denominator to exposed women only, ie currently married, non-pregnant women who believed themselves to be fecund, the percentage increases to 55.8 per cent for ever-users and 42.3 per cent for current users. Note that for the purpose of the analysis, couples who reported themselves sterilized for contraceptive purposes were included in the numerator as well as denominator. Much of the large difference between ever-use and current use among all currently married women, compared to among exposed women, can be attributed to women in the older age group, who are no longer fecund, and thus do not need contraception any more. Among current users, 71 per cent were using an efficient method. Nearly half of all the users were using pills. The next most popular methods were sterilization, rhythm and condom, in that order.

In the First Country Report, use of contraception was shown to be associated with age, education, income, ethnicity and type of place of residence. Table 2 shows the percentage of exposed women currently using contraception by selected variables. The relationship of use of contra-

Table 1 Percentage of Currently Married Women and Exposed Women who Have Ever Used and who Are Currently Using Efficient and Inefficient Methods

Type of use	Currently married women (15–49)	Exposed women (15–49)	Current users
<i>Ever-use</i>			
Efficient	39.7	44.7	—
Inefficient only	10.8	11.1	—
All	50.5	55.8	—
<i>Current use</i>			
1 Pill	16.1	20.8	49.1
2 IUD	0.7	0.9	2.1
3 Condom	2.8	3.7	8.7
4 Injection	0.2	0.2	0.5
5 Sterilization	3.7	4.8	11.3
6 Rhythm	3.5	4.6	10.8
7 Withdrawal	1.9	2.5	6.0
8 Abstinence	1.7	2.2	5.3
9 Other folk methods	2.0	2.6	6.2
Efficient	23.2	30.1	71.7
Inefficient only	9.5	12.2	28.3
All	32.7	42.3	100.0
No of cases	(5760)	(4448)	

Table 2 Percentage of Exposed Women Currently Using Any Contraceptive Method and Percentage of Current Users Using an Efficient Method

Characteristics	% of exposed women currently using any method	% of exposed women currently using efficient method	% of current users using efficient method
<i>All women</i>	42.3	30.1	70.9
<i>Age</i>			
Less than 24 years	33.9	24.9	73.5
25–29	47.7	37.1	77.8
30–34	45.9	33.5	73.0
35–39	44.2	31.7	71.7
40–44	42.4	26.5	62.0
More than 45 years	33.3	16.9	50.8
<i>Marital duration</i>			
Less than 5 years	38.1	27.9	73.2
5–9	48.6	34.9	71.8
10–14	46.8	35.4	74.6
15–19	43.3	30.9	71.4
More than 20 years	36.9	23.8	64.5
<i>No of living children</i>			
0	10.1	4.9	48.5
1	36.5	28.0	76.7
2	43.0	29.7	69.1
3	45.6	32.1	70.4
4	47.3	33.0	69.8
5+	45.5	32.8	72.1
<i>No of times married</i>			
1	44.6	31.9	71.5
2+	22.2	14.7	66.2
<i>Ethnicity</i>			
Malay	30.0	22.0	73.3
Chinese	60.0	41.4	69.0
Indian	54.0	37.9	70.2
<i>Type of place of residence</i>			
Urban	57.0	40.1	70.4
Rural	36.0	25.6	71.1
<i>Family type^a</i>			
Nuclear	43.1	30.7	71.2
Extended: horizontal	54.1	37.0	68.4
Extended: vertical	38.0	27.3	71.8
Extended: mixed	45.6	33.3	73.0
<i>Wife's education</i>			
No schooling	31.5	21.7	68.9
1–6 years	44.8	32.5	72.5
7+ years	57.9	40.2	69.4
<i>Husband's education</i>			
No schooling	26.6	17.8	66.9
1–6 years	40.2	29.0	72.1
7+ years	57.4	40.4	70.4
<i>Husband's occupation</i>			
Professional, technical and clerical	60.1	41.0	68.2
Sales	55.7	40.5	76.3
Agricultural employees	24.7	17.4	70.4
Farmers (self-employed)	34.8	26.8	77.0
Service	46.0	33.1	72.0
Production	45.3	31.1	68.7
Unclassified	40.7	31.3	76.9

Characteristics	% of exposed women currently using any method	% of exposed women currently using efficient method	% of current users using efficient method
<i>Wife's work pattern</i>			
Never worked	43.9	33.4	76.1
Worked before marriage only	47.0	33.5	71.3
Worked after marriage	29.9	12.0	40.1
Worked before and after marriage	44.9	28.4	63.3
Currently working	40.0	28.0	70.0
<i>Family income</i>			
Less than \$100	18.0	13.2	73.3
\$100-249	36.7	26.0	70.8
\$250-499	49.2	34.6	70.3
\$500+	61.3	44.0	71.8
<i>Wife's desire for additional children</i>			
Wants more	33.9	24.7	72.9
Wants no more	52.2	36.4	69.7
<i>Husband's desire for additional children</i>			
Wants more	34.9	25.6	73.4
Wants no more	53.0	37.3	70.4
Don't know	31.9	20.6	64.6
<i>Living vs desired number of children</i>			
Desires less than living	51.3	35.9	70.0
Desires equal to living	49.7	35.8	70.0
Desires more than living	35.8	25.6	71.5
<i>Perceived accessibility of FP services</i>			
Less than 20 minutes	54.6	39.8	72.9
20-59 minutes	44.6	33.4	74.9
60+ minutes	39.4	30.4	77.2
Knows no place	17.5	6.8	38.9

^a Nuclear families consist of married couples living with their unmarried children; extended horizontal families consist of married couples living with their siblings; extended vertical families consist of married couples living with parents or parents-in-law; and extended mixed families consist of married couples living with siblings and parents or parents-in-law.

ception with age and marital duration takes a typical inverted U shape, with relatively lower proportions of women in the younger and older ages using. Use of contraception is most frequent among the more educated women, and among women with higher incomes and living in the urban areas. In terms of ethnic groups, Chinese have the highest proportion using (60 per cent of exposed women are currently using contraception) followed by Indians (50 per cent) and Malays (30 per cent). Current use of contraception by religious denominations follows a distribution similar to ethnicity.

The fact that around 30 per cent of younger women who were married recently and an even higher proportion of women of low parity are currently using contraception indicates a significant emphasis on child spacing on the part of the Malaysian women. This is reinforced when we examine their fertility preferences: about 34 per cent of the women wanting future births are using contraception, compared to 52.2 per cent of those wanting no more births.

Besides the characteristics of the wives, husband's education and occupation as well as their fertility preferences show sharp differentials in the level of use. Other factors such as family type, religious belief and perceived service accessibility have been shown to correlate

with use. Among them, perceived service accessibility provides the sharpest differential. Of women who reported no knowledge of service points, 17.5 per cent are using contraception, compared to 54.6 per cent among those who reported a service outlet accessible within 20 minutes. However, in analysing the relationship between perceived service accessibility and contraceptive use, one should bear in mind the possibility of a two-way causation: use resulting in knowledge of service points, as well as knowledge of service points resulting in use.

As regards the type of method used, we find that 50 per cent of current users in the older age group or in the zero parity group, and as many as 60 per cent of those who do not know where to obtain services are using inefficient methods only. Hence, increasing service accessibility probably results in greater use of safer and more reliable methods.

2.2 REASONS FOR NEVER-USE OF CONTRACEPTION

Of the 50 per cent of currently married women who have never used contraception, only 4 per cent intend to use in the future. Women who had never used any method were

Table 3 Percentage Distribution of Never-Users by First Stated Reasons for Never Using Any Family Planning Method

Variables	Disapproved of family planning	Never heard of family planning	Married recently	Wants children	Don't know where to obtain service	Other reasons
<i>Ethnicity</i>						
Malay	16.6	11.6	9.7	28.7	2.6	30.8
Chinese	5.8	20.4	10.9	27.0	6.5	29.2
Indian	11.3	22.5	11.9	21.9	2.6	29.8
<i>Type of place of residence</i>						
Urban	11.3	16.1	10.4	26.5	3.0	32.7
Rural	14.8	13.6	10.1	28.3	3.5	29.7
<i>Age</i>						
Less than 25 years	7.5	5.1	38.3	34.1	1.5	13.5
25-29	14.8	5.0	6.7	43.4	3.9	26.1
30-34	15.7	11.0	2.0	26.7	3.8	40.9
35-39	16.9	14.0	0.7	23.2	5.1	40.1
40-44	13.2	28.1	0.3	17.0	2.8	38.5
45+ years	20.3	37.5	—	13.0	3.1	26.0
<i>No of living children</i>						
0	3.0	7.9	53.7	33.0	0.5	2.0
1	8.1	7.4	26.3	47.1	1.3	9.8
2	13.2	8.9	0.3	41.6	1.7	28.4
3	13.3	11.3	0.3	33.7	4.5	37.0
4+	18.8	20.1	0.1	14.6	5.0	41.5
<i>Wife's education</i>						
No schooling	17.0	21.9	3.1	20.7	4.5	32.9
1-6 years	12.4	10.0	11.8	32.6	3.1	30.1
7+ years	9.2	1.3	36.6	34.6	—	18.3
<i>Family income</i>						
Less than \$100	16.7	15.1	6.9	25.3	5.1	30.9
\$100-249	15.6	12.3	8.4	29.6	3.2	30.9
\$250-499	11.2	15.4	12.7	26.4	3.1	31.1
\$500+	10.0	15.0	16.8	30.5	1.8	25.9
<i>Future birth wanted</i>						
Yes	12.0	8.3	16.3	37.9	2.5	22.9
No	17.7	23.4	0.1	11.2	5.1	42.4
Don't know	10.3	25.6	2.6	23.1	—	38.5
<i>Perceived accessibility of FP services</i>						
Less than 20 minutes	10.1	8.0	13.4	33.5	0.7	34.3
20-59 minutes	16.2	6.4	8.2	34.0	0.4	34.9
60+ minutes	20.7	6.8	9.0	29.7	1.4	32.4
Knows no place	13.3	26.8	9.6	18.5	8.4	23.4

asked a question regarding reason for not using. From a tabulation of the first response (table 3), we note that 13.7 per cent of them stated disapproval of family planning as their reason for not using, 17.7 per cent reported no knowledge of family planning or did not know where or how to obtain services, 10.2 per cent were married recently, 27.7 per cent expressed a desire for additional children, and the remaining 30.6 per cent gave other reasons, not classified.

The highest proportions of never-users who give disapproval of family planning or no knowledge of it as their reason for non-use are found in the older age groups, among women who have a large number of children, among those who have no schooling or have lower incomes, among

those who do not want additional children and among those who reported the nearest service point to be more than 60 minutes away. This pattern coincides with the low use of contraception among women of the same characteristics.

The results presented in table 3 have to be interpreted with caution, as responses do not appear to have been checked against other items in the questionnaire. An example of inconsistency in responses is the fact that 11.2 per cent of never-users classified as desiring no more children have given wanting children as their reason for not using a method.

3 Methodology

3.1 USE OF MULTIVARIATE ANALYSIS

In section 2.1, we discussed the effects of demographic, background, socio-economic variables as well as fertility preferences and perceived service accessibility on contraceptive use. The simple tabulations presented in the First Country Report and in table 2 of this study examine only the gross effects of each of these variables on contraceptive use, inclusive of the effects that may be attributed to other variables. For instance, when examining the effects of fertility preferences on contraceptive use, one has to know the influences of other variables such as age and number of living children, place of residence, ethnicity and socio-economic status, all of which are intercorrelated in one way or another.

In the following analysis, we have used multivariate statistical techniques to disentangle the effects of each of these intercorrelated variables on contraceptive use by means of the computer package program, *Statistical Package for Social Sciences*, the SPSS (Nie 1975). More specifically an analysis of variance sub-program (ANOVA) is used to determine the predictive power of each of the independent variables as well as combined variables on the dependent variable, the degree of association and statistical significance. Tables of Multiple Classification Analysis (MCA), produced by the ANOVA program, provide the adjusted means controlling for the effects of variables entered up to each step in our analysis as well as for all variables in the model. It should be borne in mind that the analysis of variance is based on the additivity assumption, that is, the assumption that differences in the dependent variable according to one variable are the same for all values of other variables in the model. In the analysis that follows, we will check for interaction effects to ensure that the additivity assumption is valid.

3.2 DEPENDENT VARIABLES

Current use of any method was chosen in preference to ever-use as the main dependent variable for the analysis, in view of its greater precision and its more direct implications for the Family Planning Programme. Nearly three-quarters (71 per cent) of the current users are using efficient methods. A separate analysis confined to all current users on the use of an efficient method has also been done to ascertain the differentials in their use. However, in this covariance analysis, it was found that none of the factors, except number of living children and perceived service accessibility, had a significant relationship with use of an efficient method among current users. Furthermore, due to the inherent causal circularity between use of an efficient method and knowledge of an outlet where it can be obtained, the choice of use of efficient method as a dependent

variable offered no advantages over use of any method.

The sample base of 4458 women for the analysis is restricted to currently married, non-pregnant and fecund women (including couples who were sterilized for contraceptive purposes), henceforth referred to as exposed women.

3.3 INDEPENDENT VARIABLES

On the basis of the First Country Report, together with table 2, and further scanning through the variables on the tape, a list of variables found to be associated with contraceptive use was prepared which is shown below. These independent or predictor variables were grouped into five major blocks, namely, demographic, background, socio-economic, fertility preferences and perceived service accessibility. This grouping was done to facilitate selection of variables for the subsequent analysis.

List of independent variables

Demographic variables

Wife's age
Duration of marriage
Years since first marriage
Number of living children
Number of living sons
Number of living daughters

Socio-economic variables

Wife's education
Wife's work pattern
Husband's education
Husband's occupation
Family income

Background variables

Type of place of residence
Childhood place of residence
Ethnicity
Religion
Family type

Fertility preference variables

Wife's desire for additional children
Husband's desire for additional children
Number of living children vs number desired
Sex preferences for the next child
Expectations of children's support in old age

Perceived service accessibility variable

Knowledge of an outlet and perceived travel time to it

3.4 SELECTION OF VARIABLES

Clearly some of the variables in the above list are redundant, and others highly intercorrelated. Some degree of selection is therefore desirable. The strategy we shall follow is to

consider each of the blocks of variables in turn, and select those variables within each block which are of greater relevance to the substantive aims of this study or those which have more predictive power in terms of their partial R^2 , thus constructing a model of variables connected with contraceptive use. The model will then be used to study the effect of each of the important variables on contraceptive use controlling the others.

In the *demographic* block, we start by selecting age, for its importance in contraceptive use. Among the measures of marital exposure, duration of marriage was considered more precise than years since first marriage, as periods spent in the non-married state (ie separation, divorce or widowhood) are excluded in the former measure. After introducing age and marital duration, age at marriage is redundant. As regards family size and sex composition of living children, we selected the number of living children as a control variable for further analysis but will use the number of living sons and daughters to study the influence of sex preferences on use.

Thus three demographic controls were considered: age, marital duration and number of living children. We tried fitting one, two and all three using linear and quadratic terms. None of the variables by itself explained more than 1.5 per cent of the variance in current use. Two variables explained up to 4.5 per cent and all three 6 per cent. Note, however, that linear and quadratic terms are highly collinear. We found that three variables — marital duration, number of living children and a quadratic term on age — explained 4.5 per cent of the variance with only three terms, and therefore we chose this set as our control. The quadratic term of age was preferred to a linear term due to the non-linear relationship of age with use as observed in table 2. Introducing a linear term of age in addition to the quadratic term does not improve the predictive power and hence has not been included in the model.

The demographic controls used as covariates in the analysis were left as continuous variables. In assessing the effects of number of living children, however, this variable was taken as a factor and grouped into six categories: 0, 1, 2, 3, 4 and 5+. In order to examine the effect of sex composition on contraceptive use, the numbers of sons and daughters were combined as a joint factor in the analysis (see tables 5 and 6).

Among the *background variables*, type of place of residence was considered more relevant than childhood type of place of residence. This variable was introduced as a factor with two categories: urban and rural. Ethnicity appeared to be another important variable in use. This variable was introduced as a factor with three categories: Malay, Chinese and Indian. Most background and socio-economic variables are correlated with ethnicity, but the interaction effects on contraceptive use are found to be insignificant. As each ethnic group follows a more or less distinctive religion, the inclusion of religion as a separate independent variable would have been redundant.

The two variables, ethnicity and type of place of residence, are found to have no significant interactive effect on contraceptive use. However, for practical reasons (related to the maximum number of factors permitted by the SPSS sub-program ANOVA), we created a joint variable with six categories of ethnicity and residence, to be used in controlling the effects of other variables.

No differential in use was observed between nuclear and extended families. However, further splitting of extended families yielded some effects. Horizontally extended families had the highest proportion of use at 54 per cent compared to 38 per cent in vertically extended families. However, since this variable is much less significant than either ethnicity or place of residence, it is not used in the model.

Among the *socio-economic* variables, we considered all five variables as possible factors in the model. Husband's and wife's educational levels, husband's occupation, family income and wife's work status are classified into various categories as shown in tables 9–13. In order to examine the contribution of each of these variables or any subset of them to the explanation of variation in contraceptive use, we used a hierarchical form of analysis of variance. The details are presented in table A1 in the appendix.

The partial R^2 's for each combination of the five variables considered, controlling for demographic and background characteristics, indicate that a single variable (husband's occupation) explained up to 2.5 per cent of the variance in contraceptive use. Combination of two variables (wife's education and husband's occupation or husband's education) explained up to 3.3 per cent. Including three or four variables improved prediction to 3.8 and 3.9 per cent respectively. Inclusion of wife's education and family income in the model explained 3.1 per cent of the variation. We have chosen this combination instead of the education-occupation combination, because it explained a comparable proportion of variance with fewer categories. Further, being a variable characterizing the female population under study, it has greater relevance in the analysis of contraceptive use by women and has long-run policy implication. Family income is a good variable to be considered because it is a succinct indicator of socio-economic status. Thus two variables will be used to represent the socio-economic block in the model: wife's education and family income. The other three variables will, however, be considered at a later stage.

In the *fertility preferences* block, only 63 women are undecided concerning desire for future births. Since their contraceptive use follows a pattern similar to those who want a future birth, they are grouped together. Thus the study population is classified into two groups: those wanting no more children and those wanting more children or undecided. For husband's preferences, however, three categories were retained. A preliminary analysis showed that husband's and wife's desire to have children individually explained 2.3 per cent of the variation after controlling for demographic and background characteristics, and comparison between desired family size and achieved family size did no better. The question on sex preference for the next child was asked only to women who desired a future birth. This variable was omitted because its inclusion would necessitate the elimination of half of the study population. Replies to the question on expectations of support by children in old age are very unevenly distributed and thus this variable was also eliminated.

Thus, the fertility preferences block is represented in the model by a single variable: wife's desire for a future birth. Husband's desire for additional children is considered at a later stage as it is important and useful to ascertain the differences in the effects each of these measures have on contraceptive use, controlling for other variables.

Table 4 Hierarchical Covariance Analysis of Demographic Controls, Background Variables, Socio-Economic Variables, Fertility Preferences and Perceived Service Accessibility

Source of variation	Sum of squares	DF	Mean square	F	Partial R ²	Multiple R ²
<i>Covariates</i>	48.330	3	16.110	81.810	0.045	
Marital duration	1.825	1	1.825	9.263	0.002	0.002
No of living children	39.938	1	39.938	202.731	0.037	0.039
Age (quadratic term)	6.560	1	6.568	33.34	0.006	0.045
<i>Main effects</i>	162.936	14	11.638	59.102	0.151	
Ethnicity and residence	81.598	5	16.320	82.874	0.075	0.120
Wife's education	21.252	2	10.626	53.962	0.020	0.140
Family income	11.984	3	3.995	20.786	0.011	0.151
Fertility preferences	11.594	1	11.592	58.875	0.011	0.162
Availability	13.216	3	4.405	22.868	0.034	0.196
<i>Summary</i>						
Explained	227.082	91	2.495	12.672	0.0	0.196
Residual	852.270	4328	0.197			
Total	1097.352	4419	0.244			

NOTE: All F values are significant at $P < .001$.

The *service accessibility* block is represented by a single variable on knowledge of an outlet and perceived travel time to it.

3.5 HIERARCHICAL ANALYSIS OF COVARIANCE

In our model, we have introduced the variables in a hierarchical manner, first controlling for demographic variables and then for other variables in the following order: background characteristics, followed by socio-economic variables, fertility preferences and finally perceived service accessibility. Demographic variables are introduced first in the model as covariates to remove the variations in the dependent variable which could be attributed to them. The subsequent variables are introduced in the model based partly on causal ordering and partly on their substantive relevance to the aims of the study. The results are shown in table 4, which shows that all the selected variables have statistically significant effects on contraceptive use.

Note that in the hierarchical form of analysis, the significance of each variable is tested adjusting for variables introduced earlier in the model (but not adjusting for variables introduced later). The advantage of this hierarchical procedure over the classical step-wise regression is that it provides some ordering of analytical priority and facilitates the interpretation of the effects of correlated factors. However, for later analysis of a particular variable we also examine the effects of variables adjusted for both previous and subsequent variables, the latter to assess how the effects of the variable operate through subsequent variables.

First we note that the demographic controls account for 4.5 per cent of the variation in contraceptive use. Control-

ling for demographic variables we found that the background variables, ethnicity and type of place of residence, explained about 7.5 per cent of the variation. Wife's education and family income together contributed an additional 3 per cent of the variation net of compositional differences in demographic and background characteristics. Fertility preferences increased predicted variation by a further 1.1 per cent. Perceived service accessibility, after controlling for all previous variables, shows a significant association with contraceptive use and explained an additional 3.4 per cent of the variation. The proportion of variance explained by all variables is 19.6 per cent. Note that the partial R² values in the analysis refer to those adjusted for previous but not subsequent variables.

In the model shown in table 4, the two-way interactions were found to be insignificant (P greater than 0.029) by an overall F test. The only variables which had some significant interaction (P less than 0.0007) were joint ethnicity and residence with fertility preferences. However, as the two-way interactions for all other variables were found to be highly insignificant, we chose to use the additive model since this allows multiple classification analysis to be performed.

After this brief examination of the model, we now proceed to interpret the results obtained from the hierarchical covariance analysis to ascertain the direct and indirect effects of each factor associated with contraceptive use. First, we examine the differential in contraceptive use by each of these factors, unadjusted for other variables, to examine the total effects; then add and accumulate adjustments for other variables introduced step by step, and examine the effects which operate through these other variables. In the analysis, variables which have significant indirect effects will be identified.

4 Direct and Indirect Effects of Factors Associated with Contraceptive Use

4.1 FAMILY SIZE AND COMPOSITION

The primary reasons for using contraception are spacing of births and limiting family size. In either case, contraceptive use is directly related to the number of children a woman has. Therefore, we shall begin by examining the differentials in contraceptive use by number of living children and we shall ascertain whether such use is for spacing or for limiting purposes.

From table 5, it may be noted that unadjusted use of contraception increases monotonically with the number of living children from 10 per cent among women with no children to 45 per cent and more after the third child. The correlation ratio between number of living children and contraceptive use is 0.17.

After adjusting for compositional differences in age and marital duration, the differences by number of living children become more pronounced, with the correlation ratio increasing to 0.31. This could be explained by the fact that current use of contraception increases with age up to the age of 29 and then decreases with age. Therefore, the effect of controlling age is to increase the percentage using in the higher parities (older women) and decrease the percentage using in the lower parities (younger women).

Further control of other variables in the model step by step reduces the differential in use by number of living children indicating that a part of the effect is explained by ethnicity and type of place of residence. Introduction of fertility preferences reduces the differentials in use to some extent, which suggests that a small portion of the effects of number of living children on contraceptive use is mediated through fertility preferences. However, what is significant to note is that the relationship between number of living children and contraceptive use remains quite strong even after taking into account desire for future births and

perceived service accessibility, and controlling for all other variables. This indicates the strength of a direct effect of the number of living children on the use of contraception.

The sharpest differential in use is noted between those with no children and those with one child, reflecting, no doubt, the absence of any desire to delay the first child. The percentage currently using is remarkably high among women who have one or two children (30–40 per cent). This suggests that Malaysian women are practising contraception early in their reproductive life for spacing purposes. This pattern of use will have significant effects in reducing the fertility level, while at the same time protecting the health of the mother and child.

Turning now to look at the effects of sex composition on current use (see table 6), we find only slight son preference, expressed through contraceptive use. From the adjusted means, the difference in the proportion currently using contraception among women who have one son and no daughter and among those who have one daughter and no son is negligible (36 and 34 per cent respectively). This demonstrates that a remarkably high proportion of women are using contraception even before they have a child of each sex. Among those with two or more sons and no daughter, the unadjusted proportion using contraception is 42 per cent, which is identical to the proportion among those who have two or more daughters and no son. Among women who have two or more sons and one daughter, the adjusted proportion using contraception is six percentage points higher than among those with two or more daughters and one son. The relative lack of preference for sons or daughters compared to certain other Asian cultures signifies that the family planning programme can be implemented more effectively, for women need not continue to produce children merely to achieve a desired sex composition.

Table 5 Percentage of Exposed Women Using Any Contraceptive Method by Number of Living Children, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variable controlled	No of living children						% point diff.	Partial R
	0	1	2	3	4	5+		
None	10	36	43	45	47	45	37	0.17
Demographic variables	0 ^a	24	36	43	49	55	60	0.31
Plus race and residence	3	28	38	42	48	52	49	0.25
Plus wife's education	2	27	36	42	48	53	51	0.27
Plus family income	2	27	36	42	49	52	50	0.26
Plus desire for additional children	7	32	39	44	48	49	42	0.21
Plus perceived accessibility of FP services	13	33	39	44	47	47	34	0.17
No of cases	242	536	692	713	590	1647		

^a The fitted mean is -5.

Table 6 Percentage of Exposed Women Currently Using Any Contraceptive Method by Number of Living Sons and Daughters, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Daughters Sons	0			1			2+			% point diff.	Partial R
		0	1	2+	0	1	2+	0	1	2+		
None		10	36	42	36	43	50	42	40	44	40	0.18
Demographic variables		0 ^a	25	39	25	37	51	38	41	55	60	0.31
Plus race and residence		3	29	40	28	38	49	39	40	53	50	0.25
Plus wife's education		3	28	39	27	37	50	39	41	53	50	0.26
Plus family income		3	29	39	27	37	49	38	41	53	50	0.25
Plus desire for additional children		7	33	42	31	39	49	41	42	49	42	0.21
Plus perceived accessibility of FP services		16	36	43	34	40	48	42	42	46	32	0.15
No of cases		246	279	334	263	373	617	261	538	1533		

^a The fitted mean is -5.

4.2 ETHNICITY AND TYPE OF PLACE OF RESIDENCE

Ethnicity is a major determinant of the way of life of Malaysians; examples of variables related to ethnicity are religion, occupation, income, urbanity, age at marriage, fertility and contraceptive behaviour. Besides, differences in cultural background, social relations and family systems are linked to ethnicity. Hence, in the examination of contraceptive use, ethnicity will subsume a large number of factors which are not easily measured. From table 7, we note that ethnicity has a partial correlation ratio of 0.20 with contraceptive use, even after controlling for all the other variables in the model. Among the ethnic groups, Chinese women have the highest proportion using contraception, (60 per cent), followed by the Indians (54 per cent), and the Malays (29 per cent). The percentage point difference is 31. After adjusting for all other variables in the model, ethnic differentials in use are somewhat reduced but remain significant, with a 22 percentage point difference; the adjusted proportions using contraception among Malays, Chinese and Indians being 33, 55 and 48 per cent respectively. Ethnic differentials in use may thus be attributed partly to compositional differences in age and parity, type of place of residence and socio-economic factors. Most of the remaining effect of ethnicity on contraceptive use appears to be direct rather than operating through variations in fertility preferences or service accessibility.

In terms of type of place of residence, the unadjusted means indicate that 56 per cent of exposed women in the urban areas are currently using contraception compared to only 35 per cent among those residing in the rural areas (see table 8). The partial correlation ratio between residence and current use is substantially reduced following the introduction of ethnicity. This is due to the fact that most Chinese are urban residents and as we have already noted, Chinese women are twice as likely to use contraception as the Malays; hence controlling for ethnicity accounted for nearly half the effects of type of place of residence. When controlled for demographic variables, ethnicity, wife's education, and family income, residential differentials in use are reduced to only 6 percentage points: 46 per cent of urban women would be expected to use contraception,

compared to 40 per cent of the rural women. This result is indicative of the fact that the concept of family planning has been widely publicized and well accepted by women in the rural areas as well as in the urban areas. It suggests that the family planning programme has been successfully extended into the rural areas, and the apparent urban-rural differential of 21 percentage points is mainly due to the differences in the demographic and socio-economic characteristics of urban versus rural areas.

4.3 WIFE'S EDUCATION, HUSBAND'S EDUCATION, WIFE'S WORK PATTERN, HUSBAND'S OCCUPATION AND FAMILY INCOME

We have noted that part of the ethnic and residential differential in contraceptive use may be attributed to variations in socio-economic indicators such as education and family income. We now proceed to ascertain the direct and indirect effects of each of the five socio-economic variables, controlling for demographic and background characteristics as well as fertility preferences and perceived service accessibility. It will be recalled that the three variables, husband's education, husband's occupation and wife's work pattern were not included in the original model. Adding wife's work pattern increased the predictive precision by only 0.1 per cent, whereas husband's education increased the precision by 0.3 per cent and husband's occupation by 0.4 per cent. The unadjusted means from table 9 indicate that 58 per cent of the women who had seven or more years of education are using contraception compared to 44 per cent of those who had one to six years of education and 31 per cent of those who had no schooling. Educational differentials in contraceptive use remained practically unchanged after controlling for demographic and background variables. However, the effect of wife's education is partly explained by socio-economic status as reflected by family income, net of the effects of demographic and background controls. This is expected as wife's education is closely related to family income which in turn has a positive relationship with contraceptive use. Introduction of perceived service accessibility further reduced differentials by wife's education, suggesting that a small part of its effect is

Table 7 Percentage of Exposed Women Currently Using Any Contraceptive Method by Ethnicity, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Ethnicity			% point diff.	Partial R
	Malay	Chinese	Indian		
None	29	60	54	31	0.29
Demographic variables	30	38	53	28	0.28
Plus residence	32	56	52	24	0.24
Plus wife's education	32	57	51	25	0.24
Plus family income	33	55	50	22	0.21
Plus desire for additional children	34	54	47	20	0.19
Plus perceived accessibility of FP services	33	55	48	22	0.20
No of cases	2510	1540	395		

Table 8 Percentage of Exposed Women Currently Using Any Contraceptive Method by Place of Residence, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Place of residence		% point diff.	Partial R
	Urban	Rural		
None	56	35	21	0.20
Demographic variables	55	36	19	0.18
Plus ethnicity	50	33	12	0.11
Plus wife's education	48	39	9	0.08
Plus family income	46	40	6	0.06
Plus desire for additional children	46	40	6	0.05
Plus perceived accessibility of FP services	45	41	4	0.04
No of cases	1387	3037		

Table 9 Percentage of Exposed Women Currently Using Any Contraceptive Method by Wife's Education, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Wife's education			% point diff.	Partial R
	No schooling	1-6 years	7+ years		
None	31	44	58	27	0.17
Demographic variables	31	44	59	28	0.18
Plus race and residence	30	44	58	28	0.16
Plus family income	34	44	52	18	0.12
Plus desire for additional children	35	44	52	17	0.11
Plus perceived accessibility of FP services	37	43	50	13	0.08
No of cases	1391	2481	575		

Table 10 Percentage of Exposed Women Currently Using Any Contraceptive Method by Husband's Education, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Husband's education			% point diff.	Partial R
	No schooling	1-6 years	7+ years		
None	26	40	57	31	0.19
Demographic variables	27	39	58	31	0.20
Plus race and residence	30	40	54	24	0.16
Plus wife's education	33	41	51	18	0.11
Plus family income	35	41	49	14	0.09
Plus desire for additional children	35	41	49	14	0.09
Plus perceived accessibility of FP services	37	41	48	11	0.07
No of cases	612	2775	1048		

Table 11 Percentage of Exposed Women Currently Using Any Contraceptive Method by Wife's Work Pattern, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Never worked	Worked before marriage	Worked after marriage	Worked before and after marriage	Currently working	% point diff.	Partial R
None	43	47	30	45	40	17	0.05
Demographic variables	44	45	31	43	40	14	0.05
Plus race and residence	45	40	33	39	41	12	0.05
Plus wife's education	41	41	34	40	42	10	0.04
Plus family income	43	41	34	40	42	9	0.03
Plus desire for additional children	43	41	34	41	42	9	0.03
Plus perceived accessibility of FP services	43	41	35	40	42	8	0.03
No of cases	1350	703	117	285	1986		

Table 12 Percentage of Exposed Women Currently Using Any Contraceptive Method by Husband's Occupation, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Husband's occupation							%point diff.	Partial R
	Prof., tech. and cler.	Sales	Agric. employ-ees	Farmers (self-emp.)	Service	Produc-tion	Unclass-ified		
None	60	55	24	35	46	45	40	36	0.34
Demographic variables	61	54	27	34	46	43	40	34	0.23
Plus race and residence	59	46	33	37	51	39	39	26	0.17
Plus wife's education	55	46	35	39	49	40	40	20	0.13
Plus family income	52	45	37	39	48	40	40	15	0.10
Plus desire for additional children	51	45	37	40	48	40	39	14	0.10
Plus perceived accessibility of FP services	50	45	38	40	47	40	39	12	0.08
No of cases	579	451	902	672	408	1194	212		

mediated through this variable.

The summary effect of husband's education on contraceptive use unadjusted for other variables shows a correlation of 0.19. The unadjusted means show a differential in use of 31 percentage points ranging from 26 per cent among women whose husbands had no education to 57 per cent among those whose husbands had seven or more years of education. As in the case of wife's education, much of the difference in contraceptive use by husband's education is attributable to other variables (see table 10). Because of the close association between husband's and wife's education, controlling for the latter reduces the differential in use, as part of the effect operates through wife's education.

In assessing the influence of wife's work pattern on contraceptive use, we find that it has a relatively small correlation ratio with use of 0.05 before adjustment and 0.03 after adjusting for all other variables in the model (see table 11). The unadjusted proportion using contraception is 47 per cent among women who worked before marriage, compared to only 30 per cent among women who worked after marriage but are not currently working. It should be noted that the percentage for the latter group is based on a small sample of 117 cases.

Table 12 provides the differentials in use by husband's occupation, unadjusted and adjusted. Before adjustment, husband's occupation produces sharp differentials in use ranging from 24 per cent among women whose husbands are agricultural workers to 60 per cent among those whose husbands belong to professional, managerial, administrative and clerical groups. The demographic controls reduce the differentials slightly. A large part of the effect of husband's occupation on use, however, is attributed to background and socio-economic variables. This could be explained by the fact that most agricultural workers and farmers are rural Malays, have less education as well as lower incomes. Fertility preferences and perceived service accessibility further account for some of the variation, after controlling previous variables.

From the above analysis of husband's education and husband's occupation, we note that the husband's variables are as important as the wife's variables in explaining contraceptive use; two-thirds of the effects of the husband's variables as against only one third of the effects of the wife's variables can be attributed to other variables.

Among the five socio-economic variables considered, family income produces the sharpest differentials in use,

Table 13 Percentage of Exposed Women Currently Using Any Contraceptive Method by Family Income, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Less than \$100	\$100-249	\$250-499	\$500+	% point diff.	Partial R
None	18	36	49	61	43	0.27
Demographic variables	21	37	47	60	39	0.24
Plus race and residence	28	39	41	55	27	0.16
Plus wife's education	30	40	44	52	22	0.13
Plus desire for additional children	31	40	44	52	21	0.13
Plus perceived accessibility of FP services	34	40	43	50	16	0.10
No of cases	606	1639	1380	795		

Table 14 Percentage of Exposed Women Currently Using Any Contraceptive Method by Desire for Additional Children, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Wife's desire for additional children		% point diff.	Partial R
	Yes or DK	No		
None	34	52	18	0.18
Demographic variables	32	54	22	0.22
Plus race and residence	35	50	15	0.15
Plus wife's education	36	49	13	0.14
Plus family income	36	49	13	0.14
Plus perceived accessibility of FP services	36	49	13	0.12
No of cases	2376	2044		

unadjusted and adjusted (see table 13). Unadjusted, it has a correlation ratio of 0.27 with current use, and explains 7.1 per cent of the total variation on its own. After adjusting for all the variables in the model, it has a correlation ratio of 0.10 with current use. The unadjusted means show that only 18 per cent of women with family income of less than \$100 are using contraception, compared to 61 per cent among women in the income group \$500 and above. Use of contraception increases monotonically according to income level, even after adjusting for all the other variables in the model. A large part of the differential in contraceptive use by family income can be explained by ethnicity, place of residence and wife's education, as these variables are closely related to income.

4.4 FERTILITY PREFERENCES

In the First Country Report it was found that 56 per cent of the women who gave a valid response to the question on whether they wanted a future birth, answered affirmatively, whereas in answer to a separate question on total desired family size 59 per cent of the respondents indicated that they had fewer children than they desired. The fair agreement between these two sets of responses suggests a relatively high aggregate level of consistency in stated fertility preferences.

From table 14, we note that, when unadjusted, the correlation ratio between wife's fertility preferences and current use is 0.18. The unadjusted means show that

34 per cent of women who desire more children are using contraception compared to 52 per cent among those who desire no more children. By introducing demographic controls, we observe a larger differential in use between the two groups of women. Further controlling ethnicity and type of place of residence reduces substantially the differentials in current use of contraception, explaining a part of the differentials. Adding an adjustment for perceived service accessibility leaves the differential in use practically unchanged. The net effect is that after adjustment the percentage point difference in use is reduced from 18 to 13, ie 49 per cent of the women who want no more children are using contraception compared to 36 per cent of those who want more children or are undecided. The high proportion of women using contraception among those who want more children suggests that women are spacing their births. On the other hand, as many as 51 per cent of women (adjusted percentage) who want no more children are not using any contraceptive method, indicating that substantial demand for contraception has not been met.

Differentials in use according to husband's desire for additional children, as reported by the wife, follow closely that of the wife's desire for more children, before and after adjustment (see tables 14 and 15), due to a high degree of consistency in both responses. However, it is worth noting that adjustment for wife's desire makes only a small additional change in the partial R. Therefore, the wife's perception of her husband's attitude is also in itself an important determinant of contraceptive use.

Table 15 Percentage of Exposed Women Currently Using Any Contraceptive Method by Husband's Desire for Additional Children, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Husband's desire for additional children			% point diff.	Partial R
	Yes	No	DK		
None	35	53	32	21	0.19
Demographic variables	33	54	33	21	0.22
Plus race and residence	36	51	33	18	0.15
Plus wife's education	36	50	35	15	0.14
Plus family income	36	50	36	14	0.14
Plus wife's desire for additional children	38	48	37	11	0.11
Plus perceived accessibility of FP services	38	47	38	9	0.09
No of cases	2066	1912	460		

Table 16 Hierarchical Analysis of Covariance of Demographic Controls, Background Variables, Socio-Economic Variables, and Perceived Service Accessibility on Unmet Need for Contraception

Source of variation	Sum of squares	DF	Mean square	F	Partial R ²
<i>Covariates</i>	21.384	3	7.128	34.030	0.042
Marital duration	14.352	1	14.352	68.516	0.028
No of living children	2.159	1	2.159	10.307	0.004
Age (quadratic term)	4.874	1	4.874	23.266	0.010
<i>Main effects</i>	67.546	13	5.196	24.805	0.132
Ethnicity and residence	38.118	5	7.624	36.396	0.075
Wife's education	7.427	2	3.713	17.727	0.015
Family income	5.717	3	1.906	9.098	0.011
Perceived accessibility of FP services	16.234	3	5.428	25.913	0.032
<i>Summary</i>					
Explained	98.065	77	1.274	6.080	
Residual	411.812	1966	0.209		
Total	509.877	2043	0.250		

NOTE: All F values are significant at $P < .001$.

The above analysis indicates that socio-economic factors and perceived service accessibility do not seem to have a strong association with fertility preferences. Controlling for these variables does not change the differentials in use according to the desire for additional children.

4.5 THE UNMET NEED FOR CONTRACEPTION

The percentage not using contraception among exposed women who want no more children has been used as a measure of unmet need in an article by Westoff (1978). Note that this measure of unmet need relates to demand arising only from women who desire to terminate child-bearing, and does not include the potential demand for contraception among women who desire to space wanted births.

Table 16 shows the results of hierarchical analysis of covariance of the proportion who are not using contraception among exposed women who want no more children, using the same covariates and factors as used earlier. We note that all variables considered — age, marital duration, family size, ethnicity, residence, education,

income and service accessibility — significantly affect the proportion not using contraception among the exposed women who want no more children.

Looking at table 14, we note that the unmet need is about 51 per cent among women with a stated desire for no more children, net of the effects of other variables. Among women who report that their husbands desire no more children, the unmet need is 53 per cent (table 15). The measure of unmet need has important implications for family planning programmes. We shall, therefore, examine some of the differentials in use or non-use of contraception among women who want no more children.

The extent of unmet need for contraception by number of living children, type of place of residence, ethnicity, education, family income, and perceived service accessibility as well as the association of these variables with unmet need as measured by partial correlation ratios, are summarized in table 17. Percentages before adjustment and after adjustment for all other variables in the model are shown. First, examining the extent of unmet need for contraception by number of living children, we find that the unadjusted percentages not currently using among exposed women who desire no more children range from

Table 17 Percentage Not Currently Using Contraception among Exposed Women who Desire No More Children by Selected Variables

Variables	No of cases	Unadjusted means	Adjusted means ^a
<i>No of living children</i>			
0	1	—	—
1	21	34	52
2	146	46	60
3	231	44	53
4+	1645	49	46
Correlation ratios		(0.05)	(0.08)
<i>Type of place of residence</i>			
Urban	745	36	46
Rural	1299	55	49
Correlation ratios		(0.18)	(0.03)
<i>Ethnicity</i>			
Malay	925	65	61
Chinese	850	33	36
Indian	269	38	41
Correlation ratios		(0.31)	(0.24)
<i>Wife's education</i>			
No schooling	797	58	51
1-6 years	1065	44	47
7+ years	182	24	39
Correlation ratios		(0.20)	(0.07)
<i>Family income</i>			
Less than \$100	227	73	55
\$100-249	710	56	52
\$250-499	720	42	47
\$500+	387	30	39
Correlation ratios		(0.26)	(0.10)
<i>Perceived accessibility of FP services</i>			
Less than 20 minutes	802	37	41
20-59 minutes	620	47	46
60+ minutes	235	52	47
Knows no place	387	71	67
Correlation ratios		(0.24)	(0.19)

^a Adjusted for all variables in the model.

34 per cent among those with one child, 44-46 per cent among those with two or more children to 49 per cent among those with four or more children. After controlling for all the variables in the model, the unmet need is estimated to be highest among women with two living children, ie 60 per cent compared to 52 per cent among those with one child, 53 per cent among those with three children and 46 per cent among those with four or more children.

In terms of ethnic groups, the unmet need (unadjusted) ranges from 33 per cent among Chinese women, 33 per cent, likewise, among Indian women to 65 per cent among Malay women. Adjusting for the variations in other variables, the differentials are reduced to 20 percentage points with unmet need ranging from 36 per cent among Chinese women, 41 per cent among Indian women to 61 per cent among Malay women. Looking at the type of place of residence, the extent of unmet need is much more substantial in the rural areas (55 per cent) than in urban areas (36 per

cent). However, after adding adjustments for all variables, the differential is reduced to only 3 percentage points, 46 per cent in the urban areas and 49 per cent in the rural areas. Thus urban/rural differential may be attributed to ethnic or socio-economic composition.

Among women who have seven or more years' education, the unmet need is 24 per cent, compared to 44 per cent among women who have one to six years' education, and 58 per cent among those with no schooling. Adjusting for all other variables in the model has the effect of reducing the percentage point difference from 34 to 12, indicating that effects of education are in part explained by variations in other variables. The adjusted proportions show that among those with seven or more years' education, the unmet need for contraception would be 39 per cent, compared to 47 per cent among those with one to six years' education and 51 per cent among those with no schooling, net of other variables.

Unadjusted, family income produces sharp differentials in the extent of unmet need, ranging from 30 per cent among those from the \$500 and above group, 42 per cent among those with incomes of \$250-499, 56 per cent among those with incomes of \$100-249 to 73 per cent among those with incomes of less than \$100. Controlling for variations in other variables, we would expect the differentials to be reduced from 43 percentage points to only 16 percentage points, reflecting the effects of other variables.

Women who perceive services to be more accessible have a lower proportion of unmet need. The unadjusted means show that among those who perceive services to be accessible in less than 20 minutes, the unmet need is 37 per cent, compared to 46 per cent among those who perceive a service outlet to be accessible within 20-59 minutes, 52 per cent among those who know of an outlet an hour or more distant and 71 per cent among those who do not know of an outlet. After controlling for variations in all variables in the model, the differential in the extent of unmet need for contraception is reduced from 34 to 28 percentage points. The net effect shows that among women who perceive services to be accessible in less than 20 minutes, 41 per cent would have an unmet need for contraception, compared to 46 per cent among those who perceive services to be accessible within 20-59 minutes, 47 per cent among those who perceive services to be accessible in an hour or more and 67 per cent among those who have no knowledge of an outlet. The fact that a substantially high proportion of women who desire no more children and perceive services to be fairly accessible are not using contraception suggests a need for more activities encouraging and promoting the use of contraception as well as new projects.

We may conclude that the extent of unmet need for contraception is considerable, especially among women from the higher parity and lower socio-economic groups. There is therefore a need to fulfil the demand for contraception by creating greater awareness of the benefit of planned parenthood.

4.6 PERCEIVED SERVICE ACCESSIBILITY

Table 18 shows the percent distribution of exposed women according to perceived service accessibility. In the MFFS,

Table 18 Percentage of Exposed Women who Know of a Family Planning Service Outlet and Perceived Travelling Time by Type of Place of Residence, Ethnicity, Wife's Education and Family Income

Variables	Perceived service accessibility			
	Less than 20 minutes	20–59 minutes	60+ minutes	Knows no place
All exposed women	38.2	30.4	11.3	20.2
<i>Type of place of residence</i>				
Urban	51.5	27.5	5.4	15.6
Rural	32.0	31.6	14.0	22.3
<i>Ethnicity</i>				
Malay	32.3	33.5	13.7	20.5
Chinese	47.6	24.5	7.5	20.4
Indian	38.3	33.0	10.7	18.0
<i>Wife's education</i>				
No education	26.6	27.5	12.4	33.6
1–6 years	41.6	31.3	11.7	15.4
7+ years	51.0	33.2	7.1	8.7
<i>Family income</i>				
Less than \$100	18.5	26.9	18.3	36.3
\$100–249	33.6	31.6	12.4	22.4
\$250–499	45.1	30.9	9.3	14.7
\$500+	50.7	29.6	7.0	12.7

women were first asked where they would prefer to go if they needed family planning help; only if they had no preference were they asked for the nearest place. Thus the question on travel time was asked with regard to the preferred or nearest place.

Of all exposed women, about 20 per cent do not know of an outlet where they can obtain services, 38 per cent report an outlet accessible in less than 20 minutes, 30 per cent report an outlet within 20–59 minutes' travelling time and 11 per cent report on outlet an hour or more distant. Restricting the base to those who have knowledge of an outlet, 48 per cent report the preferred or nearest outlet to be accessible within less than 20 minutes, while 38 per cent report 20–59 minutes and 14 per cent report more than an hour's travel time.

Looking at perceived service accessibility by background characteristics in table 18, we find that the proportion who do not know of an outlet is comparatively high among rural women (22 per cent), women who have no education (34 per cent), and those with low income (36 per cent). At the other extreme, services are perceived to be accessible in less than 20 minutes by half of the women who live in the urban areas, those who have seven or more years' education and those with an income of \$500 and above. Thus, services are perceived as more accessible in urban areas, among the better educated and in the higher income groups. In terms of ethnicity, differentials in perceived accessibility are not pronounced; and part of the differences may be attributed to residential differences. It should be noted that differences in perceived accessibility could be based on reality or could be due to lack of awareness of existing services. A comparison of perceived accessibility and objective accessibility as obtained from the community-level questionnaire used in MFFS could throw further light on this topic.

The unadjusted effect of perceived service accessibility on contraceptive use is measured by a correlation ratio of

0.27 (see table 19). After adjusting for all other variables in the model, the correlation ratio remains high at 0.20. The unadjusted means indicate that the proportion using contraception ranges from 17 per cent among those who do not know of an outlet to 39 per cent among those who report an outlet to be accessible in 60 minutes or more, 44 per cent among those who report an outlet to be accessible within 20–59 minutes and 54 per cent among those who report an outlet to be accessible in less than 20 minutes. Thus, as the outlets become more accessible, use of contraception increases. Among those who reported no knowledge of an outlet, a high proportion are using inefficient methods such as rhythm, withdrawal, abstinence and akar kayu, the roots of certain plants. It is also possible that, among condom users, some women may not be aware of the source of supply as condoms are normally obtained by husbands.

The effect of adjusting for variations in demographic controls, ethnicity and type of place of residence as well as wife's education is to reduce differentials in use by perceived service accessibility uniformly by three percentage points at each step, reflecting the association between socio-economic characteristics and perceived service accessibility noted earlier. Adding an adjustment for family income reduces the differentials in use by only one percentage point, although we have noted that family income provides very sharp differentials in perceived service accessibility (see table 18) as well as contraceptive use (see table 13). This is due to the fact that family income is closely related to education; hence introducing family income after controlling for demographic and background variables as well as education has relatively small effect. The introduction of fertility preferences leaves the figures relatively unchanged, further reducing the differentials by only one percentage point.

The net effect of perceived service accessibility after

Table 19 Percentage of Exposed Women Currently Using Any Contraceptive Method by Perceived Service Accessibility, Unadjusted and Adjusted by Selected Variables via Covariance Analysis

Variables controlled	Perceived service accessibility				% point diff.	Partial R
	Less than 20 minutes	20–59 minutes	60+ minutes	Knows no place		
None	54	44	39	17	37	.075
Demographic variables	53	44	39	19	34	.105
Plus race and residence	51	45	43	20	31	.170
Plus wife's education	50	45	43	22	28	.180
Plus family income	50	45	43	23	27	.181
Plus desire for additional children	49	45	43	23	26	.196
No of cases	1687	1343	499	890		

controlling for all other variables in the model is reflected in a differential of 26 percentage points, ranging from 23 per cent using among those who have no knowledge of an outlet, to 43 per cent among those who know of an outlet which is an hour or more away, to 45 per cent among those

who report an outlet within 20–59 minutes and to 49 per cent among those who report an outlet within less than 20 minutes. Among women who know of an outlet, the difference in use according to perceived travel time is only six percentage points.

5 Conclusions and Policy Implications

In examining factors which affect contraceptive use, we have constructed a hierarchical model consisting of demographic and background variables, socio-economic variables, fertility preferences and perceived service accessibility. We have attempted to determine the direct and indirect effects of each of those factors controlling for other variables in the model, using hierarchical covariance analysis.

Looking at the demographic variables, current use of contraception is the highest among women of the age group 25–34, marriage duration 5–14 and parities of three and above. It is also remarkably high among younger women with one or two living children. This pattern is encouraging, indicating that more women are becoming aware of the benefits of planned parenthood and are practising family planning to space their births while they are still young. The adoption of family planning among younger women can be expected to reduce the fertility level in the country. On the other hand, efforts should be made to educate and motivate those who have a greater chance of high-risk births (ie older and higher parity women) to practise family planning for the health and well-being of the family.

An examination of the sex composition of the children reveals that there is no obvious preference for sons, expressed through contraceptive behaviour, on the part of Malaysian women. Among women with one child, irrespective of sex, approximately 35 per cent are currently using contraception; among women with two children, about 42 per cent are current users, irrespective of the sex composition of the children. The relative lack of a preference for sons or daughters will enable the programme to be implemented more effectively than in a society where there is a strong gender preference.

In terms of ethnicity, Chinese women are twice as likely to use contraception as the Malays. Adjusting for variations in other variables, the differential in use is reduced somewhat but remains significant.

Much of the residential differential could be explained by the compositional differences of the other variables. Controlling for such variations, the differential in contraceptive use between urban and rural areas is reduced to only 4 percentage points from 21 percentage points when unadjusted. From this, we may conclude that the programme is successful in extending services to the rural areas through the Integration Programme. The concept of family planning has been widely spread and well accepted by rural as well as urban women.

Among the socio-economic variables which we have considered (wife's education, husband's education, family income, husband's occupation and wife's work pattern), all except wife's work pattern provide sharp differentials in contraceptive use.

A low level of contraceptive use is characteristic of women who (or whose husbands) have a low educational

level, who come from the lower income group and whose husbands work in agriculture. Controlling for demographic and background variables as well as fertility preferences and perceived service accessibility reduces the differentials in use by socio-economic variables. As these socio-economic variables are themselves highly correlated, controlling for the variation in one of these variables reduces the effects substantially.

Even though the husband's variables are found to be as significant as the wife's variables, a larger proportion of the effects of the husband's variables (two-thirds) is explained by other variables compared to that of the wife's variables (one-third).

Use of contraception varies directly with the level of education and income; hence improvements in education and standard of living will result in greater use of contraception.

In terms of the wife's and the husband's stated desire for additional children, a high proportion who want a future birth are using contraception. This further reinforces the adoption of family planning for the purpose of spacing on the part of the Malaysian women. On the other hand, about half of those who want no more children and those who have completed or exceeded their desired family size are not using a contraceptive method, indicating that the extent of unmet need for contraception is considerable.

The unmet need arising out of the demand for limiting births is found mostly among women with four children or more (before adjustment) and women with two children (after adjustment). Adjusted or unadjusted, the unmet need among Malay women is higher than among the other ethnic groups and is above 60 per cent.

Women who are from rural areas, who have no knowledge of an outlet, who are from the lower educational group and who come from the lower income groups tend to have high levels of unmet need. This finding is of great significance to the Family Planning Programme and a suitable strategy should be formulated to meet this demand.

The fact that a substantially high proportion of women who desire no more children, who have completed or exceeded their family size and who perceive services to be fairly accessible are not using contraception suggests a need for further activities to educate and motivate potential acceptors.

Family planning services are perceived to be more accessible in the urban areas as well as among the better educated and higher income groups.

The use of contraception is highest among women who know of an outlet accessible within 20 minutes, indicating that as service points become more accessible, use of contraception increases. However, after controlling for variations in other variables, the only significant differential is found between those who know of an outlet and those who have no knowledge of an outlet.

Among current users, approximately 70 per cent are using efficient methods. Differentials in the use of an efficient as opposed to an inefficient method do not exist in the variables examined, except perceived service accessi-

bility which has an inherent causal circularity with use of an efficient method. Some efforts should be made to encourage all women to use safer and more reliable methods.

References

Chander, R., V.T. Palan, Nor Laily Aziz, Tan Boon Ann (1977). *The Malaysian Fertility and Family Survey: First Report*.

Nor, Laily Aziz, Tan Boon Ann and Kuan Lim Chee (1979). *The Malaysian Family Planning Programme: Some Facts and Figures*.

Rodríguez, Germán (1978) Family Planning Availability and Contraceptive Use. *International Family Planning Perspectives and Digest*, 4(4): 100–15.

Department of Statistics, Malaysia (1971). *Interim Report on Family Survey*. 1970 Post Enumeration Survey.

Nie, Norman, H. *et al* (1975). *Statistical Package for Social Sciences*. New York: McGraw-Hill.

Westoff, Charles (1978). The Unmet Need for Birth Control in Five Asian Countries. *International Family Planning Perspectives and Digest* 4(1): 9–18.

Appendix A

Table A1 Regression of Current Use on Socio-Economic Variables Controlling Demographic and Background Characteristics

Socio-economic variables in the model	Partial R ²	Multiple R ²
<i>Model with wife's education</i>		
Wife's education	0.020	0.140
Wife's education, family income	0.031	0.151
Wife's education, wife's work pattern	0.022	0.142
Wife's education, husband's occupation	0.033	0.153
Wife's education, family income, husband's occupation	0.038	0.158
Wife's education, family income, wife's work pattern	0.032	0.152
Wife's education, husband's occupation, wife's work pattern	0.034	0.154
Wife's education, husband's occupation, family income, wife's work pattern	0.039	0.159
<i>Model with husband's education</i>		
Husband's education	0.022	0.142
Husband's education, family income	0.031	0.151
Husband's education, wife's work pattern	0.023	0.143
Husband's education, husband's occupation	0.033	0.153
Husband's education, family income, husband's occupation	0.032	0.152
Husband's education, family income, wife's work pattern	0.037	0.157
Husband's education, husband's occupation, wife's work pattern	0.034	0.154
Husband's education, family income, wife's work pattern, husband's occupation	0.038	0.158
<i>Model without education</i>		
Family income	0.020	0.140
Husband's occupation	0.025	0.145
Wife's work pattern	0.003	0.123
Family income, husband's occupation	0.032	0.152
Family income, wife's work pattern	0.022	0.142
Husband's occupation, wife's work pattern	0.026	0.146
Family income, husband's occupation, wife's work pattern	0.033	0.153