



Scientific Reports

NUMBER 44 SEPTEMBER 1983

DESMOND HUNTE

Evaluation of the Trinidad and Tobago Fertility Survey 1977

INTERNATIONAL STATISTICAL INSTITUTE
Permanent Office, Director: F. Lunenberg
428 Prinses Beatrixlaan, PO Box 950
2270 AZ Voorburg
Netherlands

WORLD FERTILITY SURVEY
Project Director:
Halvor Gille
35-37 Grosvenor Gardens
London SW1W 0BS, UK

The World Fertility Survey (WFS) 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 co-operation 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. Substantial support is also provided by the UK Overseas Development Administration.

For information on Country Reports, WFS publications, and WFS depository libraries, write to the Publications Office, International Statistical Institute, 428 Prinses Beatrixlaan, PO Box 950, 2270 AZ Voorburg, Netherlands. For information on the WFS generally, write to the Information Office, World Fertility Survey, International Statistical Institute, 35-37 Grosvenor Gardens, London SW1W 0BS, UK.

L'Enquête Mondiale sur la Fécondité (EMF) est un programme international de recherche dont le but est d'évaluer l'état actuel de la fécondité humaine dans le monde. Afin d'atteindre cet objectif, des enquêtes par sondage sur la fécondité sont mises en œuvre et financées dans le plus grand nombre de pays possible. Ces études, élaborées et réalisées de façon scientifique, fournissent des données représentatives au niveau national et comparables au niveau international.

L'EMF est entreprise, en collaboration avec les Nations Unies, par l'Institut International de Statistique, qui coopère avec l'Union internationale pour l'étude scientifique de la population. Le financement de ce programme est essentiellement assuré par le Fonds des Nations Unies pour les activités en matière de population et par l'Agence des Etats-Unis pour le développement international. Une contribution importante est aussi faite par le Département pour le développement des pays d'outre-mer du Royaume-Uni.

Pour toute information concernant les rapports d'enquêtes nationales, les publications de l'EMF ou les bibliothèques depositaires, écrire au Bureau des publications, Institut International de Statistique, 428 Prinses Beatrixlaan, BP 950, 2270 AZ Voorburg, Pays-Bas. Pour tous renseignements complémentaires sur l'EMF en général, écrire au Bureau d'information, Enquête Mondiale sur la Fécondité, Institut International de Statistique, 35-37 Grosvenor Gardens, Londres SW1W 0BS, Royaume-Uni.

La Encuesta Mundial de Fecundidad (EMF) es un programa internacional de investigación cuyo propósito es determinar el estado actual de la fecundidad humana en el mundo. Para lograr este objetivo, se están promoviendo y financiando encuestas de fecundidad por muestreo en el mayor número posible de países. Estas encuestas son diseñadas y realizadas científicamente, nacionalmente representativas y comparables a nivel internacional.

El proyecto está a cargo del Instituto Internacional de Estadística, contando con la colaboración de las Naciones Unidas y en cooperación con la Unión Internacional para el Estudio Científico de la Población. Es financiado principalmente por el Fondo de las Naciones Unidas para Actividades de Población y por la Agencia para el Desarrollo Internacional de los Estados Unidos. La Oficina Británica para el Desarrollo de Países Extranjeros proporciona también un gran apoyo financiero.

Puede obtenerse información sobre Informes de Países como otras publicaciones de la EMF y las bibliotecas depositarias, escribiendo a la Oficina de Publicaciones, Instituto Internacional de Estadística, Prinses Beatrixlaan 428, Casilla Postal 950, 2270 AZ Voorburg, Países Bajos. Si desea información de carácter general sobre la EMF, escriba a la Oficina de Información, Encuesta Mundial de Fecundidad, Instituto Internacional de Estadística, 35-37 Grosvenor Gardens, Londres SW1W 0BS, Reino Unido.

PN AA0032

Scientific Reports

Evaluation of the Trinidad and Tobago Fertility Survey 1977

DESMOND HUNTE
Central Statistical Office
Trinidad and Tobago

1

Contents

PREFACE	7
1 INTRODUCTION	9
1.1 Background	9
1.2 World Fertility Survey, Trinidad and Tobago Fertility Survey	9
1.3 Objectives of the analysis	10
1.4 Sources of data	10
1.5 Types and sources of error	11
1.6 Effects of errors	12
1.7 Effects of errors on evaluation of data	12
2 AGE REPORTING	13
2.1 Introduction	13
2.2 Single years of age	13
3 NUPTIALITY	20
3.1 Age distribution and comparison with census and ISER data	20
3.2 Digit preference in nuptiality reporting	22
3.3 Mean age at first union	26
3.4 Coale's nuptiality model for estimation of age at first union	28
3.5 Mean number of unions	28
3.6 Conclusions	29
4 FERTILITY	30
4.1 Children ever born	30
4.2 Recent trends and current levels of fertility	32
4.3 Cohort-period fertility rates	35
4.4 Cohort-period fertility rates of subpopulations	37
4.5 Fertility according to birth order	44
4.6 Marriage and motherhood cohort fertility rates	45
4.7 Birth intervals	46
4.8 Checks for omission and displacement of live births	47
4.9 Conclusions	48
5 INFANT AND CHILD MORTALITY	49
6 SUMMARY OF FINDINGS	52
REFERENCES	55
TABLES	
1 Myers' blended index by sex for the 1970 census and the TTFS household survey	14
2 Digit preference (deviation from 10 per cent) and Myers' index for women in the individual questionnaire (15-49 years) by type of place of residence and by education	16
3 Sex ratios for five-year age groups, 1970 and 1980 censuses and TTFS	16

4	Consistency of age reporting, household and individual surveys	19	24	Cohort-period fertility rates, women of East Indian descent	40
5	Percentage distribution of women by age and union status	20	25	Cohort-period fertility rates, women with less than seven years of education	41
6	Percentage distribution of women ever in a union by age and type of place of residence	21	26	Cohort-period fertility rates, women with seven or more years of primary education	42
7	Percentage distribution of women ever in a union by type of union and residence	21	27	Cohort-period fertility rates, women with secondary or more education	43
8	Percentage distribution of women by five-year age group and union status, TTFS (reconstructed to time of 1970 census and utilizing the census definition) and 1970 census	22	28	Cohort-period fertility rates for first births	44
9	Percentage distribution of women aged 15-34 by five-year age group, and women aged 35-44 by union status, ISER (1970) and TTFS (1977)	22	29	Cohort-period fertility rates for births of order four or higher	45
10	Percentage distribution by year of first union according to type of place of residence and education	23	30	Fertility rates for periods, according to time since first union (marriage cohort) and time since first birth (motherhood cohort)	46
11	Percentage distribution by age at first union according to type of place of residence and education	24	31	Mean birth intervals in months by years before the survey for each cohort	46
12	Cumulative proportions of women entering a union by specified age, by cohort	27	32	Sex ratios at birth	47
13	Mean age at first union and proportion eventually in a union by cohort, estimated from Coale's nuptiality model	28	33	Proportion dead of children ever born, by sex and by current age of woman	47
14	Mean number of unions for women ever in a union by current age, education and current union status	28	34	Proportion dead at less than age five of children ever born by sex and years before the survey plus level in Coale-Demeny life tables	47
15	Mean number of children ever born to women by age group, 1960 and 1970 censuses, ISER survey, and TTFS reconstructed data	30	35	Probabilities of infant and child deaths for calendar years 1950-76, TTFS and vital statistics	50
16	Mean number of children ever born by cohort, residence, education and ethnic origin	32	36	Probabilities of death in the first year (${}_1q_0$) and first five years (${}_5q_0$) of life for periods before the survey, 1953-76, total and by type of place of residence and education	50
17	Total fertility rates per woman for calendar years 1960-76	32	37	Probability of death in the first year of life (${}_1q_0$) by years before the survey and age of mother at time of child's birth	51
18	Age-specific fertility rates (per 1000 women) for calendar years and total fertility rates per woman	33	FIGURES		
19	Age-specific fertility rates (per 1000 women) and percentage decline in rates: 1962-6, 1967-71, 1972-6	33	1	Percentage distribution of the population by sex and single years of age, household survey	13
20	Cohort-period fertility rates, cumulative rates and P/F ratios	35	2	Percentage distribution of all women by single years of age, household survey, 1970 census and 1980 census	14
21	Cohort-period fertility rates, cumulative rates and P/F ratios, urban women	37	3	Digit preference by residence and education, individual survey	15
22	Cohort-period fertility rates, cumulative rates and P/F ratios, rural women	38	4	Sex ratios by five-year age group, household survey, 1970 census and 1980 census	16
23	Cohort-period fertility rates, women of African descent	39	5	Percentage distribution of women by five-year age group, household survey, 1970 census and 1976 projection	17
			6	Percentage distribution of women aged 15-49 by five-year age group, TTFS and 1970 and 1980 censuses, reconstructed to 1977	17

7	Percentage distribution of females in urban and rural areas by five-year age group, household and individual surveys	18	14	Percentage distribution of births by years prior to the survey	31
8	Percentage distribution of women aged 15–49 by year of birth and single years of age	19	15	Mean number of children ever born by age of mother in single years	31
9	Percentage distribution of women aged 15–49 by five-year age group for each union status	21	16	Percentage distribution of births by calendar year of birth	34
10	Percentage distribution of women by year of first union and residence	24	17	Percentage distribution of births by calendar year of birth for urban and rural women	34
11	Percentage distribution of women by year of first union and education	25	18	Birth cohort-period fertility rates for all women by central age	36
12	Percentage distribution of women by age at first union and education	26	19	Mortality rates by calendar year (three-year moving averages), vital statistics and individual survey	49
13	Percentage of women ever in a union by current age for given years prior to the survey	27			

Preface

One of the major objectives of the World Fertility Survey programme is to assist the participating countries in obtaining high quality data through national fertility surveys. The high standards set by the WFS are expected to yield better quality data than typically obtained in the past, but this expectation in no way obviates the need for a detailed assessment of the quality of the data. It is recognized that such an evaluation will not only alert the analysts by identifying defects, if any, in the data, but also throw light on the shortcomings of the WFS approach, which can be taken into account in the design of future fertility surveys.

It is in this context that, as part of its analysis policy, the WFS is conducting a systematic programme for a scientific assessment of the quality of the data from each survey. A series of data evaluation workshops is being organized at the WFS London headquarters with the dual objective of expediting this part of the work and of providing training in techniques of analysis to researchers from the participating countries. Working in close collaboration with WFS staff and consultants, participants from four or five countries evaluate the data from their respective surveys after receiving formal training in the relevant demographic and data processing techniques.

The fourth such workshop, involving research on four countries - Lesotho, Syria, Trinidad, and Tobago and Turkey - was held between October and December in 1981. The present document reports on the results of the evaluation of the data of the Trinidad and Tobago Fertility Survey of 1977 and was prepared by Desmond Hunte, the participant from Trinidad and Tobago. Ibrahim Ali, K. Balasubramanian and Sunday Uner, the other participants, contributed to the present evaluation through their ideas and discussions.

Dr Shea Oscar Rutstein, as the co-ordinator of the workshop, assumed a major responsibility in the successful completion of the work, while many other staff members also made significant contributions to it. Andrew Westlake and Maryse Hodgson provided much valuable assistance.

HALVOR GILLE
Project Director

Previous Page Blank

1 Introduction

1.1 BACKGROUND

The need for accurate and up-to-date demographic statistics in developing countries for the purposes of development planning has long been recognized. However, in many countries such data are either non-existent or of poor quality, partly because of lack of resources and partly because of lack of expertise. This situation has caused concern, because these countries, despite their limited resources, need to plan for development in order to provide the best quality of life for their people. Many countries lack the necessary technical skills, and population data relating to size and growth and human resources are often inadequate.

The Republic of Trinidad and Tobago shares some of these problems. While the importance of human resources has been recognized in development planning, there have been shortcomings in the availability of data. The need for up-to-date, high quality data and for the application of modern techniques of analysis led the government to its decision to participate in the World Fertility Survey programme, organized by the International Statistical Institute.

The Republic of Trinidad and Tobago consists of the two islands of Trinidad and Tobago, which together comprise a total area of 5130 square kilometres (1980 square miles), with Trinidad, the larger island, covering 4825 square kilometres. The population in 1980 (provisional census figures) was 1.07 million, while in 1970 it was 945 000, and in 1960 830 000. The population densities for the same periods were 209, 129 and 111 inhabitants per square kilometre, respectively.

The islands lie just north of the South American coastline and are the southernmost part of the Caribbean islands. The mountain ranges, running from east to west, which lie in the north, centre and south of Trinidad, occupy a fairly large proportion of the land area, increasing the pressure on habitable land.

Trinidad and Tobago were formerly colonies of England, and at the turn of the century, agriculture in the form of cocoa, coconut and sugar plantations dominated the economy and life of the islands. The discovery of oil in the early part of the century changed the economy considerably, although its full impact was not felt until after the second World War.

In the year of the survey, 1977, 60 per cent of the total population over 14 years of age participated in the labour force; however, only 36 per cent of women did so. In this year, 13 per cent of the total labour force were unemployed, but 19 per cent of the women in the labour force were unemployed.

There has been a continuous decline in the percentage of the labour force engaged in the agricultural sector. Whereas in 1901 and 1931, 49 and 44 per cent of the labour force

were engaged in this sector (farming, fishing and forestry), the proportion fell to 28 per cent in 1946 and dropped to 13 per cent in 1977. Among women in the labour force, the proportion in the agricultural sector fell from 39 per cent in 1901 to 11 per cent in 1977. The three sectors of commerce, services, and mining, quarrying and manufacturing (including petroleum), together engaged 62 per cent of the labour force in 1977, with 20 per cent in the last sector. Among women in the labour force, however, 35 per cent were engaged in the services sector alone and another 48 per cent in either commerce or mining, quarrying and manufacturing, so that 83 per cent were engaged in one or another of these three sectors.

The population is young and concentrated in urban areas. It is estimated that over 55 per cent lived in urban areas in 1980. Approximately 42 per cent of the population were under 15 years at the 1970 census, the median age being approximately 18 years. Declining fertility, however, is changing this distribution and, in 1980, it was estimated that approximately 34.0 per cent of the population were under 15.

The literacy rate is high. The proportion over five years of age who cannot read or write fell from 47 per cent in 1911 to 26 per cent in 1946. Education is compulsory from ages five to twelve, and in 1960 only 8.9 per cent reported having no education.

Fertility rates have declined, particularly since the early 1960s. In 1960 the total fertility rate stood at 5558 live births per 1000 women. By 1965 it had fallen to 4491, in 1970 it was 3382, and in 1975 it was 3119.

The introduction of family planning programmes began in 1956 with the first family planning clinics, followed by the establishment of several more clinics in the 1960s which have contributed to the declines in the fertility rates.

1.2 WORLD FERTILITY SURVEY, TRINIDAD AND TOBAGO FERTILITY SURVEY

The World Fertility Survey (WFS) is a programme organized by the International Statistical Institute. The surveys are conducted by the participating countries themselves, with assistance from the WFS. The main objectives of the programmes are:

- 1 to provide data on the levels and trends of fertility for each participating country;
- 2 to provide data for comparative purposes among the participating countries;
- 3 to increase the participating country's ability to analyse its fertility.

In addition to the data needed for the analysis of fertility levels, suitable data have been collected for an analysis of nuptiality and infant and child mortality.

To achieve its objectives, the WFS provided guidelines for the conduct of the surveys through its recommended questionnaire and the training of interviewers. Basic core questions were common to all surveys and interviewers had to be trained for a minimum number of hours.

Trinidad and Tobago conducted the Trinidad and Tobago Fertility Survey (TTFS) in 1977. While many core questions were retained, modifications were made to reflect the particular social and cultural practices of the country as regards mating patterns. To ensure that the questionnaire and interviewers met the high standards set by the WFS, the questionnaire was pre-tested in the field, and the interviewers had field training before the actual survey started. In addition, a re-interview programme was carried out after the survey to measure consistency in reporting.

The survey design is that of the continuous sample survey of population (CSSP), which is a multi-purpose two-stage sample design. The first stage consists of primary sampling units, called enumeration districts, each containing approximately 150 households. The second stage unit consists of households. The country is broken up into nine strata, which are the administrative areas: the two main towns and seven counties.

The questionnaire had two parts: the household schedule and the individual questionnaire. The household schedule contained basic questions on age, sex, education and ethnic group for each member of the household. The individual questionnaire was administered to all eligible respondents, ie women aged 15-49 years who were not attending primary or secondary school full time. This second condition of full-time education applied only to women aged 15-19. However the women who were ineligible through being in full-time education were included in the data file for analysis, so that all women aged 15-49 are included.

Although the household schedule could have been answered by any responsible member of the household, the individual questionnaire had to be answered by the eligible woman herself. As will be seen later, this difference and the conditions of eligibility may have had a slight effect on the quality of the data, mainly for age reporting.

The individual questionnaire contained questions relating to:

- 1 respondent's background
- 2 pregnancy history
- 3 union status and partners
- 4 contraceptive knowledge and use
- 5 fertility regulation
- 6 work history
- 7 income.

Of the eligible respondents, 97.2 per cent (4359) were successfully interviewed. The non-responding individuals (2.8 per cent) were mainly cases of refusal (1.6 per cent) and no contact made (0.7 per cent). The responding individuals, together with the ineligible 15-19 year olds, gave an overall sample size of 4981.

A re-interview programme involving 141 of the selected households was carried out between November and December 1977, 3-4 months after the original survey. Age misrepresentation was found to be the main source of discrepancy, particularly for older women. Less frequent

inconsistencies were found with the union history and the pregnancy history.

1.3 OBJECTIVES OF THE ANALYSIS

As would be expected, the interpretation of any set of data is affected by the quality of the data analysed. The survey was chiefly concerned with current levels and trends of fertility, and we will look at the relevant data, ie data on age, nuptiality (union/partners) and fertility (pregnancy history). In addition, the quality of the data on infant and child mortality will also be considered.

This report covers three main areas:

- 1 age and date reporting;
- 2 nuptiality;
- 3 fertility and child mortality.

The main sources of data analysed are the questions dealing with age, types of relationship and their dates, the dates of birth, and the dates of death of any children.

Likely sources of errors are considered. While the chief source of error may be either the respondent or the interviewer, it is always difficult to assess how far the interviewer is a major source of error.

The effect of errors is also an area of concern, as there may be interaction between various factors; for example, age misreporting may affect fertility rates. The analysis also presents comparisons between the TTFS and other sources of similar data, ie the 1970 and 1980 censuses and other surveys.

1.4 SOURCES OF DATA

In order to ascertain age, a question on 'month and year of birth' was used. Where the respondent was unable to give an exact date, she was asked to give her approximate age. As a last resort, if these two methods failed to get a response, the interviewer was asked to estimate the age of the respondent. For all events (births, unions and deaths), the respondent was asked to give the month and year of the event and, when these dates could not be recalled, she was asked to state how old she was at the time of the event. It was sometimes necessary to impute the answers. It should be noted that on the household questionnaire, 'age at last birthday' was asked instead of 'month and year of birth'.

In the pregnancy history section, where the respondent indicated that she had been pregnant at some time in the past, she was asked the result of the pregnancy, and if it was a live birth, the date of birth and sex of the child. In addition, she was asked if the child had since died and if so the month and year of death. These questions were asked for all pregnancies. The data yielded were vital for computing fertility and child mortality rates, as well as the length of birth intervals.

For the union history (the partner/relationships section), once it was established that the woman had ever been in a union, she was asked to state the date when the first union had started, the type of union, whether it had ended or not, and if it had, the date on which this took place. This was

repeated for all relationships right up to the time of interview.

Three types of relationships are considered: married, common law (consensual) and visiting. The visiting union is by far the most unstable and the one most likely to present a problem for analysis, mainly because of the respondent's interpretation of the term 'visiting'. These three unions will be combined in the analysis of nuptiality, especially when using the Coale model.

1.5 TYPES AND SOURCES OF ERROR

Selection procedures

One of the first sources of error in a survey of this type is the determination of what is an eligible respondent. Fortunately in the Trinidad and Tobago Fertility Survey (TTFS), this was less of a problem in that all women aged 15-49 were included in the sample. (In other countries where a subsample of women of childbearing age was selected, the characteristics of those selected may be compared with the non-selected women in order to detect biases.)

Another source of error directly involved with selection is the sample itself. The sample is of necessity one of surviving women. Unless the fertility and nuptiality of surviving women are similar to all women who were alive at the time considered, there will be a bias.

Non-response is a similar source of error in that the history of respondents may be quite different from non-respondents. This is the case more often than not. For example, the respondents reported as 'not at home after frequent visits' are probably women who are working to support themselves and their families who may be living with their parents or other relatives. A woman in this category may have been in a union and was separated at the time of the interview.

Errors in age and date reporting

The misreporting of age, intentionally or otherwise, may have serious effects on age structure as well as other data, such as fertility rates or ages at various events. This misreporting could be a direct result of how the question relating to age was asked; 'How old were you on your last birthday?' could in some instances yield a different answer from the question 'What is your month and year of birth?' It has been observed that digit preference for numbers ending in 0, 2, 5 and 8 are quite common, more so for 0 and 5. If a woman gives her age as 30 years at the time of the interview in July 1977, she could have been born in, say, January to July 1957. However, if asked for the month and year, she may give 1958 as her year of birth. This problem may be compounded if the question is rephrased to 'How old are you?'

This age shift can take place in either direction. For example, women in their fifties may give a younger age in order not to appear 'too old' to the interviewer, whereas those approaching adulthood may give an older age in order to be classed as adults. There may also be a deliberate misreporting of age in order to be excluded from answering the individual questionnaire. This would cause a decline in the

number of women aged 45-49 with a corresponding increase in the 50-54 age group. Although the reverse is also possible, it is unlikely to be significant.

Inability to state the correct age could also distort the age structure. Where the respondent did not give her age, she was asked to give an estimate. To do so she may have either recalled some particular event, in order to give an estimate of her age, or asked her spouse his age and responded 'I am a year or two younger than he is'.

The interviewer was asked to make an estimate where age reporting was not achieved. This task was made difficult by the fact that respondents who could not give their age were usually uneducated and from depressed urban and rural areas. A woman may appear older than her actual age, especially if her role is predominantly an agricultural one, assisting in the garden or with the growing and harvesting of the sugar cane or cocoa crop. The incidence of births may be greater for these women, but a wrong assessment of age by the interviewer may exclude them from the list of eligible respondents entirely.

Misreporting of dates is of particular significance to events such as unions, births and deaths. Since the questions asked related to month and year of occurrence, reporting of such dates was affected by the age of the respondent and her ability to remember distant events. The level of education also has an effect on the misreporting of dates, with the less educated women being more likely to make such errors.

Once again the problem of estimation where a date cannot be recalled arises. Unpleasant events such as a broken union, or an infant death can become particularly difficult to put in a proper time perspective, so that the question 'How old were you when ...?' or 'How long ago?' did a particular event take place is likely to be answered incorrectly.

Digit preference is also likely to occur in the reporting of dates for certain events and there may be a tendency to link these events with calendar events such as the Second World War, or the year of Independence.

Omissions

Omission of past events in the detailed histories may also occur. Older women may fail to report events such as births which have occurred in the distant past, because of memory lapse, or some unpleasantness associated with the event, such as the death of a child who died soon after birth. Likewise, a union that did not last very long may be omitted, particularly if it was followed by a more stable union. This often occurs with visiting unions which are the most unstable type of union.

The presence of the spouse or partner during the interview may result in the omission of visiting unions or common law relationships that existed before the present union but were unknown to the spouse. A failure to report a birth early in life or an abortion may occur for the same reason.

Omissions may also occur because the respondent did not fully understand the questions being asked. Consequently, information concerning a child who died or left home, or a union that did not last may be omitted. The respondent may also exclude events which she does not consider important.

1.6 EFFECTS OF ERRORS

Age reporting

The first effect of age misreporting will be a distortion of the age structure of the population. Similar inaccuracies will be seen in the sex ratios. Should the misreporting be the same and in the same direction, it will be difficult to tell whether any apparent distortions are genuine, especially if consideration of other factors such as external migration is necessary.

Where age is used in the estimation of certain measures (for example, fertility rates) the impact of age misreporting could be very important. However, while distortion in the data at single years of age may appear to be significant, where the data are used in five-year age groups, the effect may be minimal.

Displacement of events in time may result in an increase in the frequency of these events for particular periods in the past. This could give a false impression with regard to fertility trends or the age pattern of infant mortality.

An upward transference of age will affect the fertility rates. If, for example, there was a tendency for women aged 45-49 to understate their age at the expense of those aged 40-44, there would be a downward bias of the fertility of women aged 40-44 years because women aged 45-49 would in general have lower rates than those who reported their ages correctly.

Should ages be misreported but events of births and union history be correctly reported then the interval-related estimation will be affected. If, for example, a woman understates her age but the dates of her first union and first live birth are correct, the effect would be to show a younger age at her first union, which in turn would affect the mean age at first union. Age at first birth would be similarly affected. Note, however, the interval between the union and the birth would not have been affected.

Omissions

Omissions of births in the remote or recent past can result in a gross misrepresentation of fertility rates. Where there is failure to report infant deaths, the results on the infant and child mortality rates are similar.

Data on nuptiality suffers from a similar problem when certain unions are omitted. Unions which are most often under-reported are the visiting unions. This reflects both their instability and the impreciseness of the definition which individual respondents may interpret according to their own perception of the relationship. It is thus difficult to relate union status to fertility or infant mortality rates.

1.7 EFFECTS OF ERRORS ON EVALUATION OF DATA

There are problems in evaluating the quality of data of retrospective surveys. First of all it is difficult to determine the source of error and, secondly, there is the problem of errors inter-relating. This second aspect is important, for example, in the detection of errors relating to misreporting of age and dates, nuptiality, fertility and mortality.

While internal comparisons are useful in themselves, in the evaluation of the data a comparison with other sources of data such as censuses and other surveys is often required. However, these other sources are themselves also subject to the same types of error. The dilemma of deciding which one is correct, or perhaps which one has a smaller margin of error, remains.

There is a school of thought which contends that well-executed surveys yield better data than those collected in a census. In addition, the detailed type of questioning that takes place in a survey is not possible in a census; hence the survey is likely to be more accurate. Nevertheless, the interpretation of the data collected will depend largely on its quality.

2 Age Reporting

2.1 INTRODUCTION

Age misreporting has always been a source of concern in both censuses and surveys and it persists despite various techniques which have been employed to eliminate it. It has long been recognized that many respondents prefer certain terminal digits when giving data on age, whether in completed years or by date of birth. The same problem occurs when giving information on dates in general. This may be due to prevailing customs, lack of knowledge or other reasons. The problem is further compounded when the respondent is giving information on someone else.

In a survey such as the Trinidad and Tobago Fertility Survey (TTFS) where the number of respondents is relatively small, it is important that such data are as accurate as possible, since many age-specific fertility rates will be calculated. Erroneous data can lead to incorrect rates which would result in bias.

In evaluating the data on age reporting in the TTFS, while emphasis is placed on women aged 15–49 years (almost all of the data collected relate to this group), attention is paid to all members of the household, both male and female. Data from the 1970 and 1980 censuses are used for comparison. The data are also compared with a projected population based on the West family of the Coale–Demeny model life tables. Finally a check is made for consistency of age reporting for women aged 15–49

between the household schedule and individual questionnaire. In some instances the data on the household schedule were not supplied by the individual concerned and as a result may be very inconsistent.

Percentage distribution of age by single-years as well as by five-year groups were the main measures used. Comparisons were made between males and females, urban and rural areas, as well as educational groups. Attention is also paid to sex ratios for the various age groups.

This report uses a graphical presentation as the major tool of evaluation, together with other techniques such as the Myers' index and the United Nations' index.

2.2 SINGLE YEARS OF AGE

The pattern of age reporting in the household questionnaire was very similar for both males and females (see figure 1). There appears to be heaping at ages ending in zero or five, especially for people aged 40 years and over and the heaping is more pronounced for females. This pattern was very much the same for the 1970 census. It is interesting to note that at the younger ages there are two additional preferred digits, two and eight. The pronounced shifting to the ages 50 and 52, especially for women, could be due to the fact that the age limit for inclusion on the individual questionnaire was 49 years.

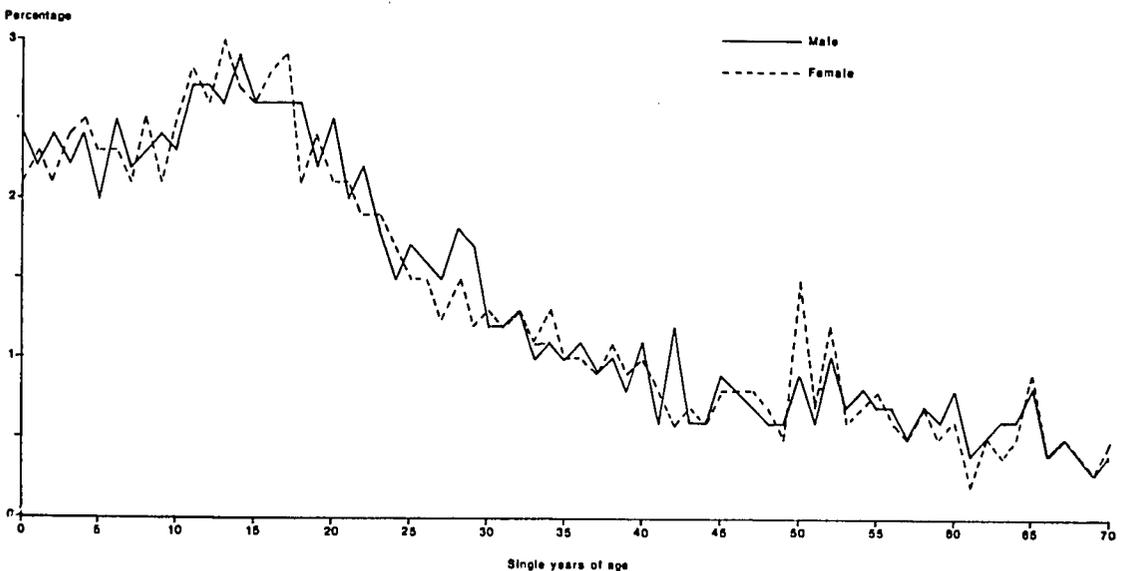


Figure 1 Percentage distribution of the population by sex and single years of age, household survey

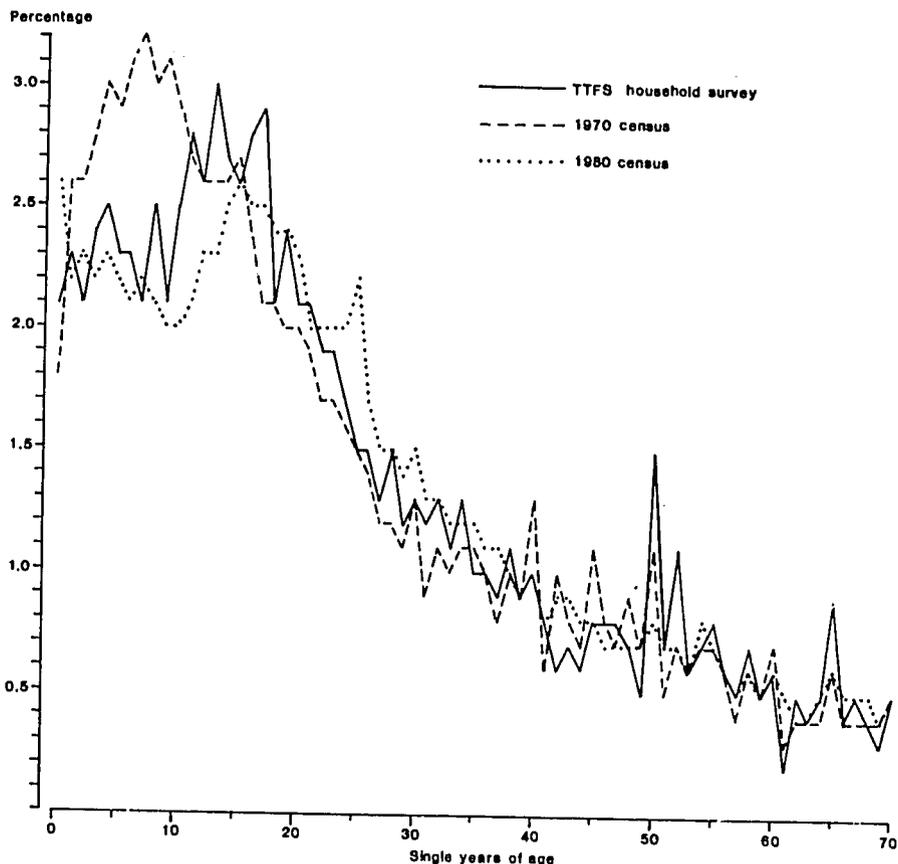


Figure 2 Percentage distribution of all women by single years of age, household survey, 1970 census and 1980 census

A comparison of the 1970 census and the TTFS household data for females by single years is shown in figure 2. Heaping is more pronounced in the census at ages below 50 and more in the survey at ages 50 and above. The figure also gives the percentage distribution for the 1980 census which shows less heaping except at age 25.

The Myers' blended index can be applied to indicate the degree of digit preference and takes on values between zero (no preference) and 180. The results indicate less digit preference in the TTFS household schedule data than in the 1970 census, but greater than for the 1980 census (table 1). Digit preference is greater among males in the TTFS. The difference between males and females is more marked in

Table 1 Myers' blended index by sex for the 1970 census and the TTFS household survey

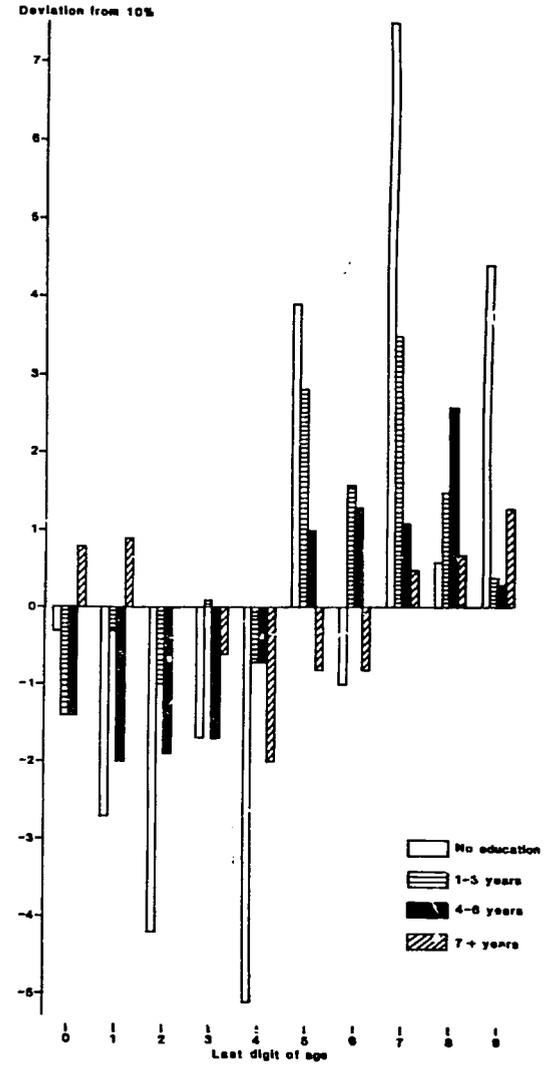
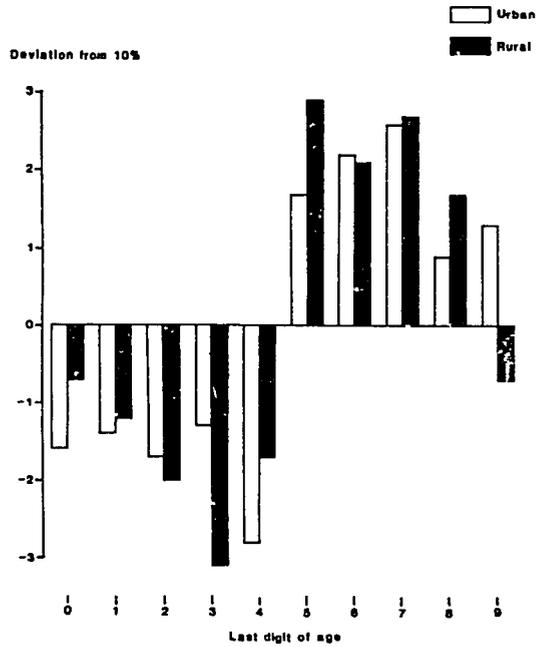
	Males	Females
1970 census	8.2	8.4
1980 census	3.7	3.7
TTFS household schedule	7.8	5.1
Urban (TTFS)	8.0	4.2
Rural (TTFS)	7.7	7.7

the urban areas than in the rural areas where there is no difference. However, there is a strong preference for ages ending in two and eight, in addition to zero and five, among males as opposed to an almost exclusive preference for zero and five for females. This pattern is much the same when area of residence, urban and rural, is also considered in the analysis, except that males in urban areas avoid the digit one while females in rural areas show a dislike for ages ending in nine (see table 2).

In looking at the individual questionnaire data, the index, which was not blended, shows a greater degree of digit preference among rural women than among urban women. This could be attributed to differences in education, as there is more likely to be a higher proportion of women with low education in the rural areas (table 2 and figure 3).

A comparison of digit preference by education reveals that this is the case. Women with no education have an index almost two and a half times greater than those with one to six years of education and four times as great as those with seven or more years of education. The smaller numbers with no education in the sample, while not invalidating the results, would have affected them.

Among women with no education, there are strong



15 Figure 3 Digit preference by residence and education, individual survey

Table 2 Digit preference (deviation from 10 per cent) and Myers' index for women in the individual questionnaire (15-49 years) by type of place of residence and by education

Digit	Total	Type of place of residence		Education			
		Urban	Rural	No education	1-3 years'	4-6 years'	7+ years'
0	-1.2	-1.6	-0.7	-0.3	-1.4	-1.4	0.8
1	-1.3	-1.4	-1.2	-2.7	-0.3	-2.0	0.9
2	-1.8	-1.7	-2.0	-4.2	-1.0	-1.9	0.0
3	-2.0	-1.3	-3.1	-1.7	0.1	-1.7	-0.6
4	-2.4	-2.8	-1.7	-5.1	-0.7	-0.7	-2.0
5	2.2	1.7	2.9	3.9	2.8	1.0	-0.8
6	2.2	2.2	2.1	-1.0	1.6	1.3	-0.8
7	2.7	2.6	2.7	7.5	3.5	1.1	0.5
8	1.2	0.9	1.7	0.6	1.5	2.6	0.7
9	0.5	1.3	-0.7	4.4	0.4	0.3	1.3
Myers' index ^a	17.5	17.5	18.8	31.4	13.3	14.0	8.4

^a Not from a 'blended' population.

preferences for ages which end in five, seven and nine, with a marked preference for years ending in seven, which represents years of birth ending in zero.

Five-year age groups

A comparison of sex ratios by five-year age groups for the 1970 and 1980 censuses and the TTFS household data, given in table 3, shows in the TTFS a higher ratio of males in the successive age groups, 20-24 years and 25-29 years, as well as in the successive age groups 55-59 years and 60-64 years. The age group 50-54 years, however, shows a higher ratio of females, probably due to a shift from the younger age group 45-49 years. The results are graphically represented in figure 4. This pattern is in keeping with earlier findings using data by single years of age.

The United Nations' index is an index for measuring age reporting accuracy based on deviations from expected age

Table 3 Sex ratios for five-year age groups, 1970 and 1980 censuses and TTFS

Age group	Males per 100 females		
	1970 census	TTFS	1980 census
5-9	101.2	101.5	108.1
10-14	100.3	99.5	100.7
15-19	96.0	100.7	98.3
20-24	95.7	103.5	97.2
25-29	94.5	118.7	97.4
30-34	93.3	93.8	100.4
35-39	91.4	97.7	98.1
40-44	94.4	106.9	99.3
45-49	101.0	102.4	95.6
50-54	105.9	84.7	91.2
55-59	106.9	105.2	101.4
60-64	101.1	130.1	109.7
65-69	82.3	93.6	82.5

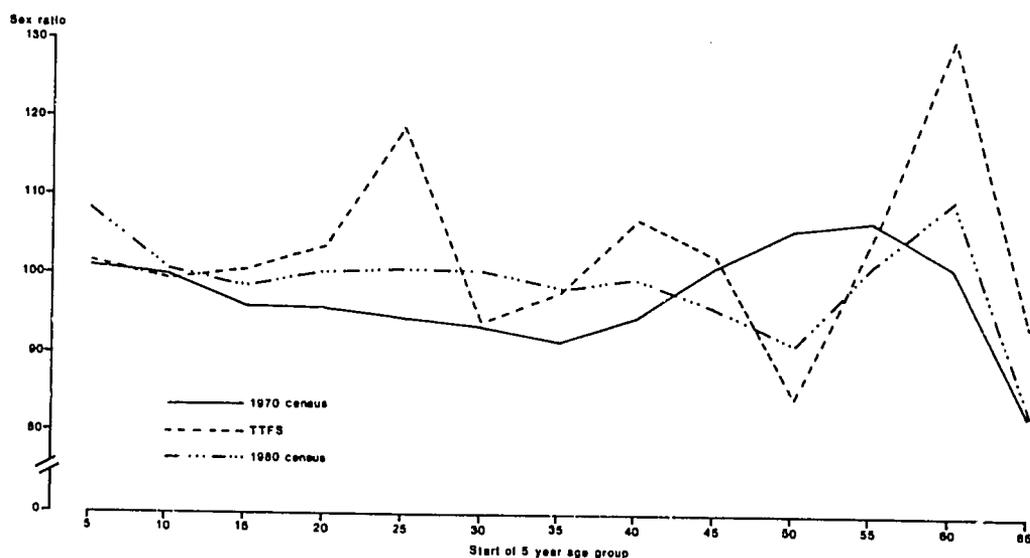


Figure 4 Sex ratios by five-year age group, household survey, 1970 census and 1980 census

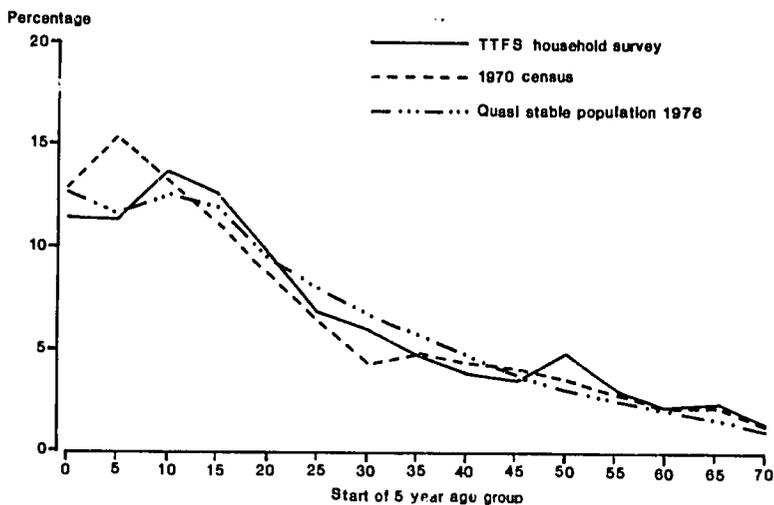


Figure 5 Percentage distribution of women by five-year age group, household survey, 1970 census and 1976 projection

group size and sex ratio for each age group. Unlike the Myers' index it takes into consideration sex ratios as well as the age ratios of both males and females in its calculation. Its value is the sum of (1) the mean absolute deviation from 100 of the age ratio for males, (2) the mean absolute deviation from 100 of the age ratio for females, and (3) three times the mean of the absolute difference in reported sex ratios from one age group to the next.

Based on the United Nations criteria which indicate that an index under 20 is 'accurate', 20–40 is 'inaccurate', and over 40 is 'highly inaccurate', the data from the 1960 and 1970 censuses are between 'accurate' and 'inaccurate' while the TTFS data are 'highly inaccurate'.

In both censuses the greatest contributor to the index was the 65–69 age group which, in turn, may have affected either the age group before or after it. This age group was

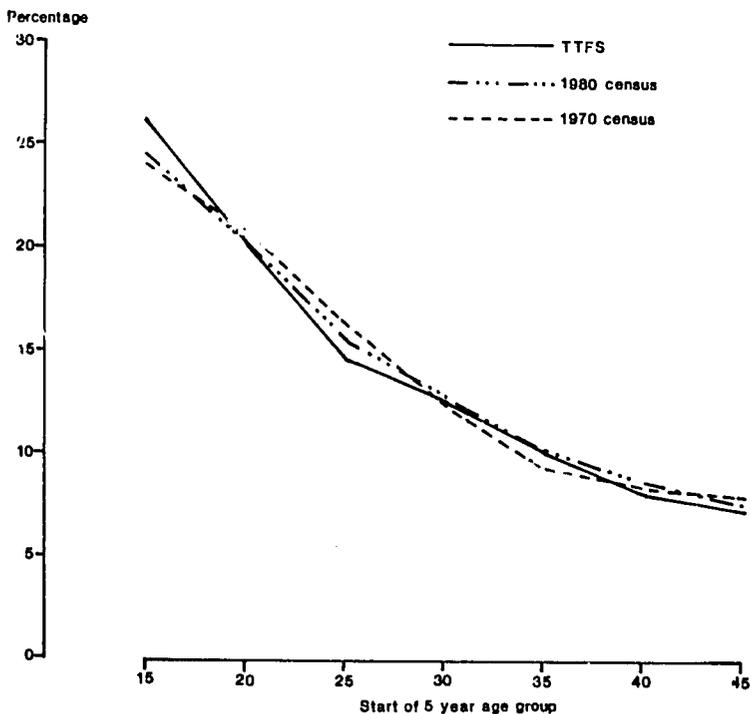


Figure 6 Percentage distribution of women aged 15–49 by five-year age group, TTFS and 1970 and 1980 censuses, reconstructed to 1977

also a great contributor to the TTrS index. Removal of this age group from computation of the index yields indices of 17.09, 16.42 and 43.62, as opposed to the original values of 24.18, 23.14 and 52.82 for the 1960 and 1970 censuses and the TTFS respectively. For the 1980 census the respective indices were 21.4 and 28.1.

The highest age ratio among males and females was the ratio for females aged 50–54 in the TTFS. As earlier indicated, this age group appears to have been affected by transference from the previous age group. This could have some bearing on both fertility and mortality rates.

Figure 5 shows the percentage distribution of women by five-year age group for the TTFS, the 1970 census and a projected population (1976). Indications are that there was under-reporting under five years (or fertility decline) and also between 25 and 40 years, and over-reporting between ages 10 and 15 years and at age 50–54 years during the survey. However, the overall pattern is similar to the projected population.

Figure 6 shows the percentage distribution of women aged 15–49 by five-year age group. Data are included from both the 1970 and 1980 censuses which are reconstructed to match that of the TTFS. Using the 1980 census as the standard, under-reporting is evident in the TTFS at ages 25–29, 40–44 and 45–49 and over-reporting emerges at

age 15–19. The 1970 census has under-reporting at ages 35–39 and over-reporting at ages 20–24 and 25–29.

It is possible, therefore, that women between 40 and 49 in some instances reported themselves younger than they were and in other instances older. Of course, the interviewer could have omitted some of these older women, particularly if they had a large number of children, in order to reduce the amount of interviewing to be done.

There is little difference between the household and individual survey data for both urban and rural women. However, there is a difference in reporting between urban and rural women in each data set (figure 7). There appears to be an upward transference of age by rural women aged 25–30 years. This could occur if estimation of age was done for some women from rural areas, as these women may have appeared older because of living conditions and the number of children they may have had.

In figure 8, the distribution is shown by year of birth, and while there are expected fluctuations due to sampling errors, there appears to be heaping at 1932, 1942, 1956 and 1960. This could be due to the usual preference for even-numbered digits. Only two years have any historical bearing, 1942 during the second World War and 1956 when the present government came to power.

Finally, the household and individual data were

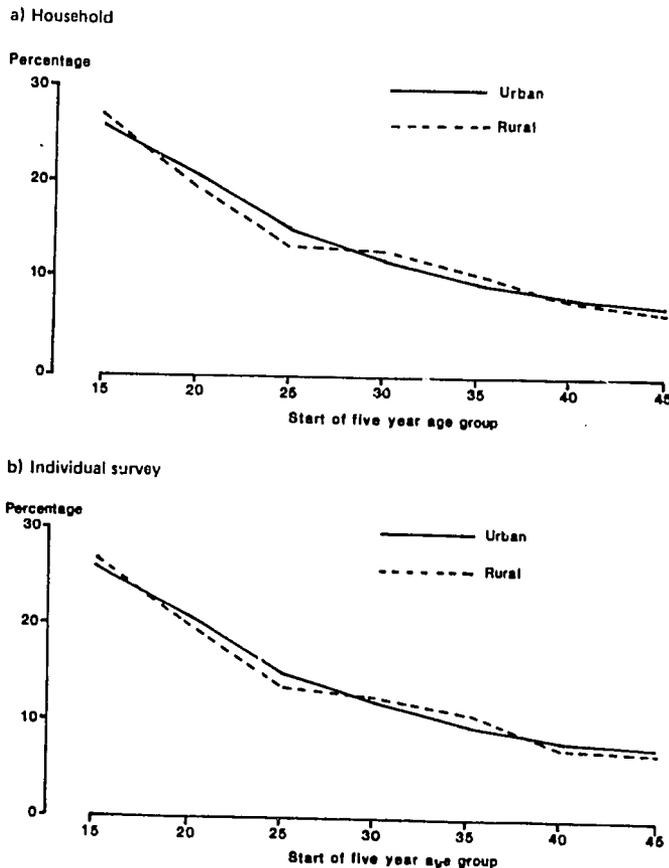


Figure 7 Percentage distribution of females in urban and rural areas by five-year age group, household and individual surveys

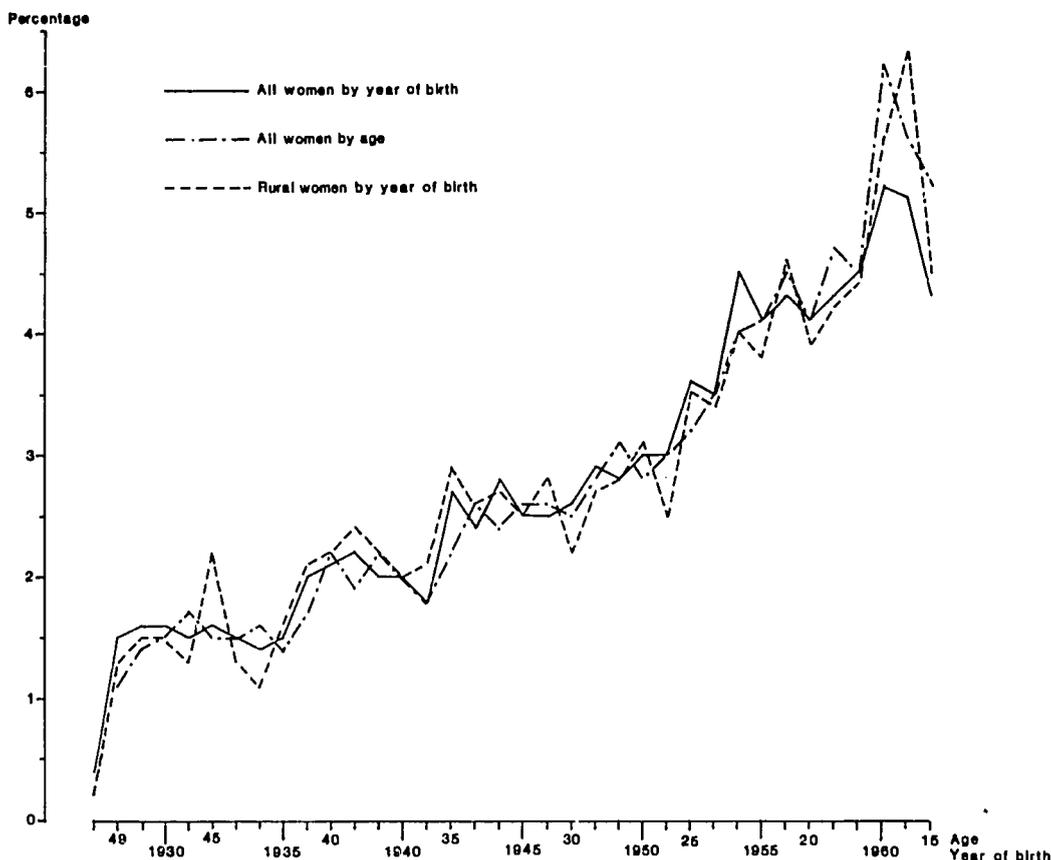


Figure 8 Percentage distribution of women aged 15-49 by year of birth and single years of age

Table 4 Consistency of age reporting, household and individual surveys

	Consistent	Within one age group
Total	97.9	99.7
<i>Age group</i>		
15-19	99.7	100.0
20-24	98.1	100.0
25-29	97.3	99.8
30-34	97.5	99.8
35-39	96.7	99.6
40-44	95.1	98.9
45-49	97.7	99.0
<i>Level of education</i>		
None	93.7	99.0
4 years primary	97.4	99.4
4-6 years primary	97.7	99.7
7+ years primary	98.3	100.0
Secondary +	97.4	99.8
<i>Union status</i>		
Married	97.2	99.6
Common law	98.2	99.7
Visiting	97.1	99.4

compared for consistency in age reporting by five-year age group (table 4). It should be borne in mind that on the household questionnaire the question asked related to age on last birthday as opposed to date of birth on the individual questionnaire.

The results shown in the table indicate near consistency in both sets of data, as, overall, 97.9 per cent of the data indicate consistent reporting of age. The highest levels are recorded for the 15-19 and 20-24 age groups (99.7 and 98.1 per cent respectively). Lowest was that for ages 40-44 (95.1 per cent) and 35-39 (96.7 per cent), but this is expected among older women who report current age with less consistency.

The data indicate as well that 99.7 per cent of reporting were within one age group as between the household schedule and individual questionnaire. The data for age groups 15-19 and 20-24 conform to this pattern 100 per cent, for all other age groups the range is 98.9-99.8 per cent.

When the level of education was considered there was less consistency between both sets of data for women with no education (93.7 per cent consistent) than for women at other levels (see table 4).

With regard to union status, the data from both sources were more consistent for women in common law unions (98.2 per cent) than for other unions.

3 Nuptiality

The study of nuptiality in the Caribbean region involves much more than the study of legal marriages. There are three types of union to consider: married union, in which the couple are legally married, common law union, where the couple are not legally married to each other but live together, and visiting union, where there is a regular sexual relationship but the couple do not live together.

The definition of visiting union status varies and is subjective. In the census, a union that is neither married nor common law is regarded as visiting only if there was a birth in the 12 months before the census. In the TTFS, this condition of a birth does not apply, which makes it difficult to compare the census data with those of the TTFS. The definition adopted for the other two unions is the same for both the census and the survey.

Care has thus to be taken in interpreting data relating to women 'ever in a union' since the respondent's concept of 'visiting' may very well depend on her social background and her level of education. The extent of influence of customs or norms upon older cohorts may not be the same as those of the younger cohorts. This may also lead to variations in the interpretation of a visiting union. Also such a union is likely to be forgotten because it may have occurred in the distant past and been of short duration.

The Family Planning Survey carried out in 1970 by the Institute of Social and Economic Research (ISER) of the University of the West Indies used definitions for the various unions similar to those adopted by the TTFS. However, this survey looked only at first and present unions, and is therefore limited for purposes of comparison.

Data from vital registration are of little use since they relate only to legal unions. In comparing the TTFS with the census data it was therefore necessary to reconstruct the data utilizing the census definition of visiting.

3.1 AGE DISTRIBUTION AND COMPARISON WITH CENSUS AND ISER DATA

Nuptiality data

The percentage distribution of women by age and union status at the time of the interview must be examined in evaluating nuptiality data.

As can be seen from table 5, panel A, there is a steady decline in the proportion of women never in a union as age increases. There is, however, an unexpected decline in the age group 40-44 years. This could have been brought about by age shifting, although there is not enough evidence to suggest this (unless the shift was to the 50-54 age group). This latter age group, as seen in the section dealing with age reporting, is very much overstated. It is also doubtful whether women would report themselves in a union if one never existed.

The distribution of union status by age, however, shows peculiarities (table 5, panel B and figure 9). Women in a visiting union seem to be overstated in the age group 35-39. Apparently a downward transference of age has occurred from the group aged 40-44. However, because of the small numbers involved, the overstatement could also have been produced by an upward transfer of only seven women in visiting unions.

The distribution of women who are no longer in a union shows a sharp increase after age 30-34 years. Thus, from another viewpoint, there would seem to be too small a percentage of women of this status in the age group 30-34 years. Age shifting resulting from women stating that they are older than they really are can produce this effect.

There is also the likelihood, however, that some of these women could have been in a visiting relationship at the

Table 5 Percentage distribution of women by age and union status

	Age							Total
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
A Union status								
Married	4.7	29.1	47.9	60.3	59.3	62.5	62.9	37.7
Common law	3.6	10.4	15.1	15.6	14.5	15.7	12.2	11.0
Visiting	10.1	21.3	19.4	12.7	12.6	6.3	6.8	13.7
No longer in union	2.2	7.5	7.7	6.7	10.5	13.8	15.7	7.4
Never in a union	79.4	31.7	9.9	4.7	3.1	1.7	2.4	30.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1310	1012	737	630	509	413	369	4986
B Age								
Married	3.2	15.6	18.8	20.2	16.1	13.7	12.3	100.0
Common law	8.6	19.2	20.3	17.9	13.6	11.9	8.2	100.0
Visiting	19.2	31.5	20.8	11.7	9.3	3.8	3.6	100.0
No longer in union	7.8	20.8	15.4	11.3	13.7	15.4	15.6	100.0
All women	26.3	20.3	14.8	12.7	10.2	8.3	7.4	100.0

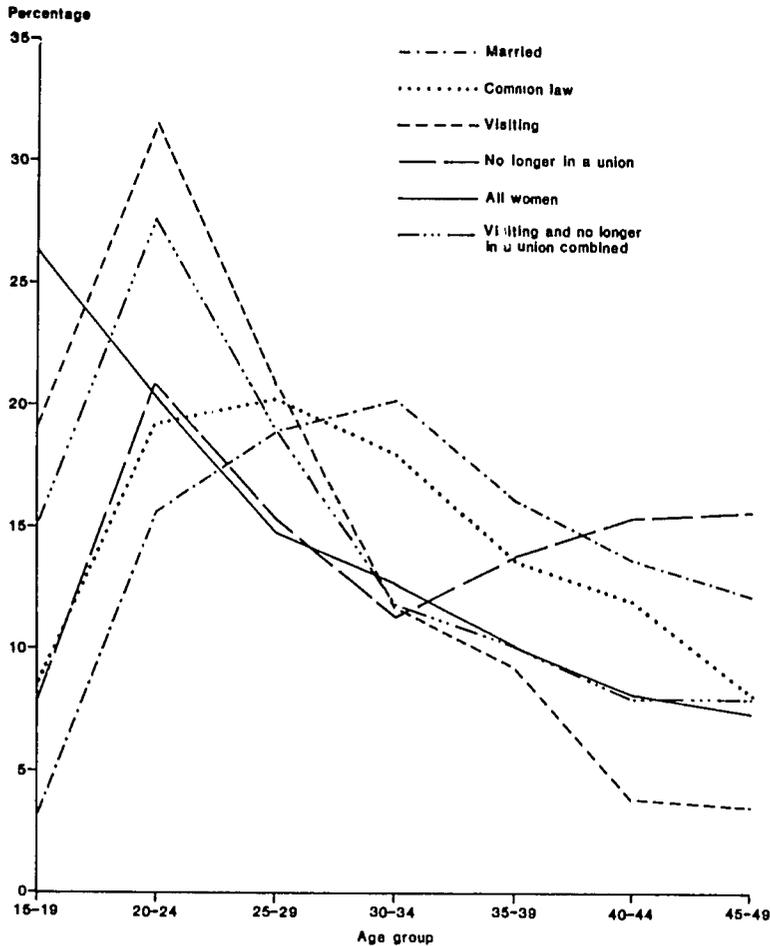


Figure 9 Percentage distribution of women aged 15-49 by five-year age group for each union status

time of the survey. Being previously married or in a common law relationship, they could have misinterpreted or overlooked their present visiting union. If this were the case, the effect would be to increase the number of women in a visiting union at the older ages.

The approach of combining women in a visiting union with those who are no longer in a union removes the effect noticed for women no longer in a union. A shifting

Table 6 Percentage distribution of women ever in a union by age and type of place of residence

Age	Total	Urban	Rural
15-19	7.7	7.4	8.3
20-24	19.9	20.7	18.6
25-29	19.1	20.0	17.6
30-34	17.2	16.5	18.3
35-39	14.1	13.3	15.3
40-44	11.6	11.7	11.5
45-49	10.4	10.4	10.3
Total	100.0	100.0	100.0

of age by ten women from 40-44 to 35-39 years would remove the peak at 35-39. From this it would appear that there was an understatement of age by some women aged 40-44 years.

Table 6 which compares the percentage distribution of women ever in a union by age and type of place of residence, shows a larger proportion of women at younger ages 20-29 living in urban areas being in a union. This distribution is reflected when we look at the distribution by type of union and type of residence (table 7). There

Table 7 Percentage distribution of women ever in a union by type of union and residence

Union status	Urban	Rural
Married	43.9	50.2
Common law	5.5	15.7
Visiting	38.4	22.7
No longer in a union	12.2	11.4
Total	100.0	100.0

Table 8 Percentage distribution of women by five-year age group and union status, TTFS (reconstructed to time of 1970 census and utilizing the census definition) and 1970 census

Union status	15-19		20-24		25-29		30-34		35-39		40-44	
	TTFS	Census										
Married	8.2	9.7	35.2	34.4	55.9	57.2	61.0	64.0	65.0	65.2	66.5	62.9
Common law	3.1	4.4	13.3	11.7	17.3	15.7	17.2	17.1	17.6	16.5	13.8	15.9
Visiting	2.6	2.8	2.4	3.4	1.2	1.8	1.4	1.0	1.1	0.7	-	0.3
No longer in a union	0.1	0.6	2.5	2.6	5.8	4.9	8.7	7.2	10.4	9.6	13.8	13.3
Never in a union	86.1	82.5	46.6	47.9	19.2	20.4	11.7	10.7	5.9	8.0	5.9	7.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9 Percentage distribution of women aged 15-34 by five-year age group, and women aged 35-44 by union status, ISER (1970) and TTFS (1977)

Union status	15-19		20-24		25-29		30-34		35-44	
	ISER	TTFS								
Married	7.0	4.7	35.7	29.1	54.7	47.9	62.0	60.3	59.0	60.7
Common law	4.7	3.6	11.2	10.4	16.6	15.1	20.5	15.6	18.2	15.1
Visiting	10.0	10.1	16.4	21.3	11.3	19.4	6.6	12.7	6.1	9.8
No longer in a union	3.5	2.2	9.3	7.5	7.7	7.7	8.6	6.7	14.3	11.7
Never in a union	74.8	79.4	27.4	31.7	9.7	9.9	2.3	4.7	2.4	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

is a much higher proportion of women in visiting unions in urban areas (38.4 per cent) than in rural areas (22.7 per cent).

The imprecise nature of the definition of a visiting union makes data comparison difficult. However, a reconstruction of the TTFS data to those of the 1970 census, utilizing the census definition, was compared with the 1970 census data. Except in the oldest age group, the results are very similar (table 8). There appears to be misreporting in the census for the cohort 40-44, where there is a drop in the percentage of married women, in comparison with those aged 35-39.

A comparison with the ISER survey (not reconstructed) shows no vast differences (table 9). However, in the first four age groups, the ISER shows higher proportions legally married, but there is no evidence from vital statistics, which recognize only legal marriages, that indicates a decline over the period 1970-7.

For common law and visiting unions there are large differences at the older ages. However, the data for those no longer in a union or never in a union appear to be consistent.

Considering that the definitions used in the reconstructed TTFS data and the ISER survey were the same, it is difficult to explain the observed differences. It is possible that the ISER survey, being carried out in 1970 just after the census and also at a time of internal strife, could have been affected by respondent bias. It was also a new type of survey and the quality of data may have been

affected by the quality of both the interviewer and respondent.

3.2 DIGIT PREFERENCE IN NUPTIALITY REPORTING

In all cases date of first union was given in month and year. Overall the reporting was quite good, any variations being due primarily to randomness. This is observed in both age at first union and year of first union.

However, a comparison of the data by type of place of residence, urban versus rural, shows heaping at years ending in zero and five (figure 10 and table 10). Heaping occurs in 1956, the year the ruling political party came into power, in the case of women in urban areas. It is more pronounced before 1965 for rural women and more pronounced after 1965 for urban women, particularly at 1970 and 1972. Tabulation of age at first union (not shown) indicated some heaping at age 16 for both urban and rural women. Otherwise the dates seem well reported.

There is a considerable heaping in 1950 for women whose education was less than four years of primary schooling. This results in reduced figures for the years 1951 and 1952. There also appears to be heaping for women in this group at 1960 and 1964. For women whose education was between 4-6 years of primary school, there is heaping at 1946, 1954, 1956 and 1965. However, heaping is more pronounced before 1960 for the women with less than four

Table 10 Percentage distribution by year of first union according to type of place of residence and education

Year	Residence			Education		
	Urban	Rural	Total	< 4 years' primary	4-6 years' primary	7+ years' primary
1939	0.0	0.1	0.0	0	0.1	0.0
1940	0.1	0.1	0.1	0.5	0.1	0.0
	0.0	0.1	0.0	0.2	0.0	0.0
	0.1	0.7	0.4	2.2	0.3	0.1
	0.7	0.6	0.7	3.6	0.6	0.2
	0.7	0.5	0.6	2.4	0.7	0.2
1945	1.1	1.7	1.3	3.6	1.7	0.7
	1.6	1.3	1.5	3.6	3.1	0.4
	1.3	1.4	1.3	3.9	1.5	0.8
	1.5	1.6	1.6	3.4	2.5	0.8
	1.1	1.9	1.5	3.6	2.5	0.6
1950	2.3	2.4	2.3	6.6	2.4	1.5
	1.6	1.7	1.7	3.4	1.6	1.3
	1.6	2.5	1.9	3.2	3.3	1.1
	2.5	2.2	2.4	5.4	3.9	1.2
	2.0	2.4	2.1	5.4	2.4	1.4
1955	2.2	2.8	2.4	3.6	2.5	2.2
	2.9	2.7	2.8	4.4	3.6	2.2
	2.2	2.3	2.3	4.1	3.4	1.4
	3.0	3.4	3.2	3.4	4.3	2.7
	2.5	2.6	2.5	2.9	3.1	2.2
1960	2.8	3.5	3.1	4.1	4.1	2.4
	3.3	2.4	2.9	3.4	4.2	2.2
	2.9	2.3	3.1	3.9	4.0	2.5
	2.3	2.5	2.4	1.9	3.0	2.2
	2.9	3.4	3.1	3.6	3.8	2.7
1965	3.6	3.5	3.6	2.4	4.3	3.5
	3.3	2.6	3.0	1.0	2.4	3.7
	3.7	3.6	3.6	1.5	3.1	4.3
	4.4	4.1	4.3	1.7	3.4	5.2
	4.4	4.7	4.5	0.2	3.3	5.9
1970	5.7	3.6	4.9	1.9	2.6	6.4
1971	4.8	4.8	4.8	0.7	3.5	6.2
	6.1	4.2	5.3	0.5	2.7	7.5
	5.5	4.7	5.2	1.5	4.1	6.3
	4.7	4.9	4.8	1.0	2.3	6.7
1975	4.8	4.3	4.6	0.2	3.3	6.0
	3.0	3.5	3.2	0.5	2.1	4.2
	0.7	1.1	0.9	0.5	0.5	1.1

years of primary schooling. For those respondents with the 4-6 years of primary education heaping is heavier after 1960 (figure 11 and table 10).

Women with an education above seven years of primary schooling reported more accurately the year of their first union. Nevertheless, there is some heaping at 1955, 1956 and 1972. There is no significant reason for such heaping other than digit preference for zero and five. The import-

ance of the years 1956 and 1972 in the history of the country may also have influenced heaping on these two years.

By age at first union, reporting is much better except for heaping at age 15 for the least educated and age 16 for those with 4-6 years of primary education. Slight heaping appears at age 18 at the expense of age 17 for those with 7+ years' primary schooling (figure 12 and table 11).

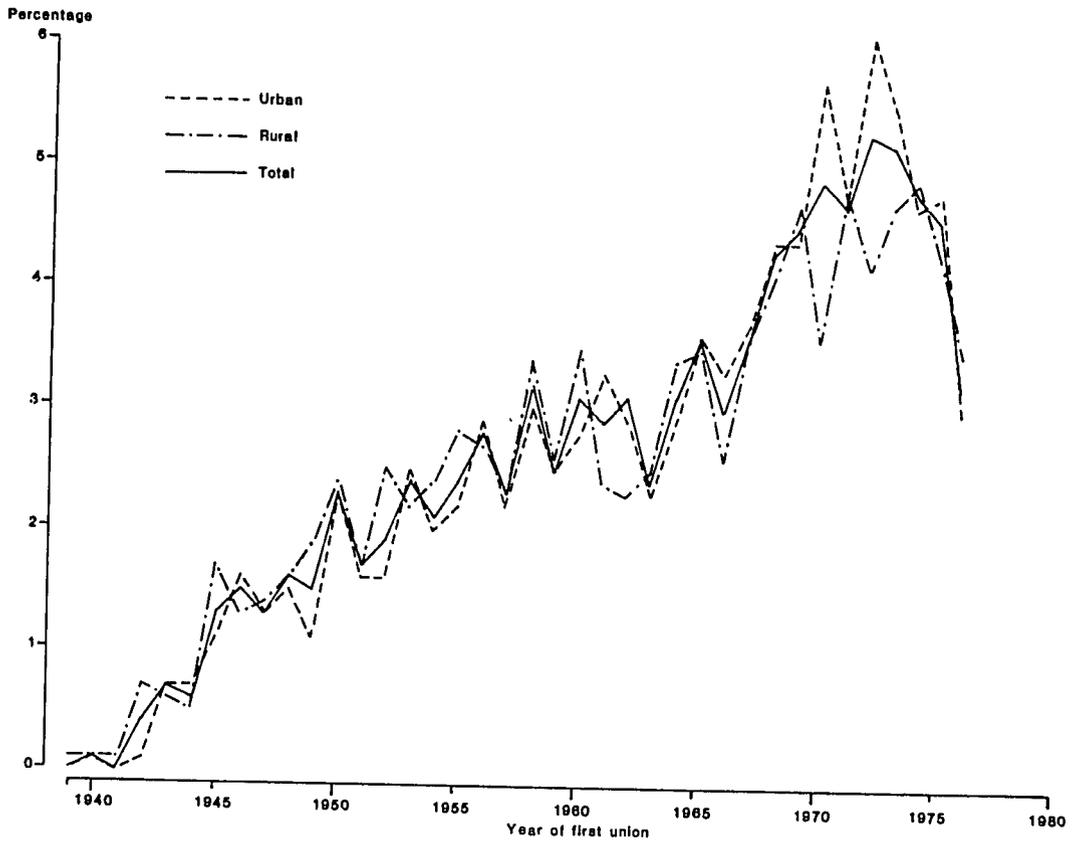


Figure 10 Percentage distribution of women by year of first union and residence

Table 11 Percentage distribution by age at first union according to type of place of residence and education

Age in years	Residence			Education		
	Urban	Rural	Total	< 4 years' primary	4-6 years' primary	7+ years' primary
10	0.3	0.4	0.4	1.0	0.4	0.2
11	0.6	1.0	0.8	2.4	0.7	0.4
12	1.6	2.5	2.0	5.3	2.1	1.3
13	3.3	5.2	4.0	9.7	4.8	2.6
14	7.0	9.4	7.9	15.1	9.4	5.9
15	10.7	12.0	11.2	16.1	12.8	9.5
16	13.3	13.7	13.4	12.9	15.0	12.8
17	12.2	12.1	12.2	9.7	13.7	11.9
18	11.7	10.0	11.1	7.5	9.8	12.3
19	10.6	8.6	9.8	7.8	9.2	10.5
20	6.9	7.6	7.2	2.7	7.3	8.0
21	5.4	4.4	5.0	2.4	3.2	6.3
22	4.0	3.3	3.7	1.7	3.4	4.2
23	3.7	3.1	3.4	2.7	2.1	4.2
24	2.1	2.5	2.2	0.7	2.3	2.5
25	1.7	1.1	1.7	0.2	1.0	1.8

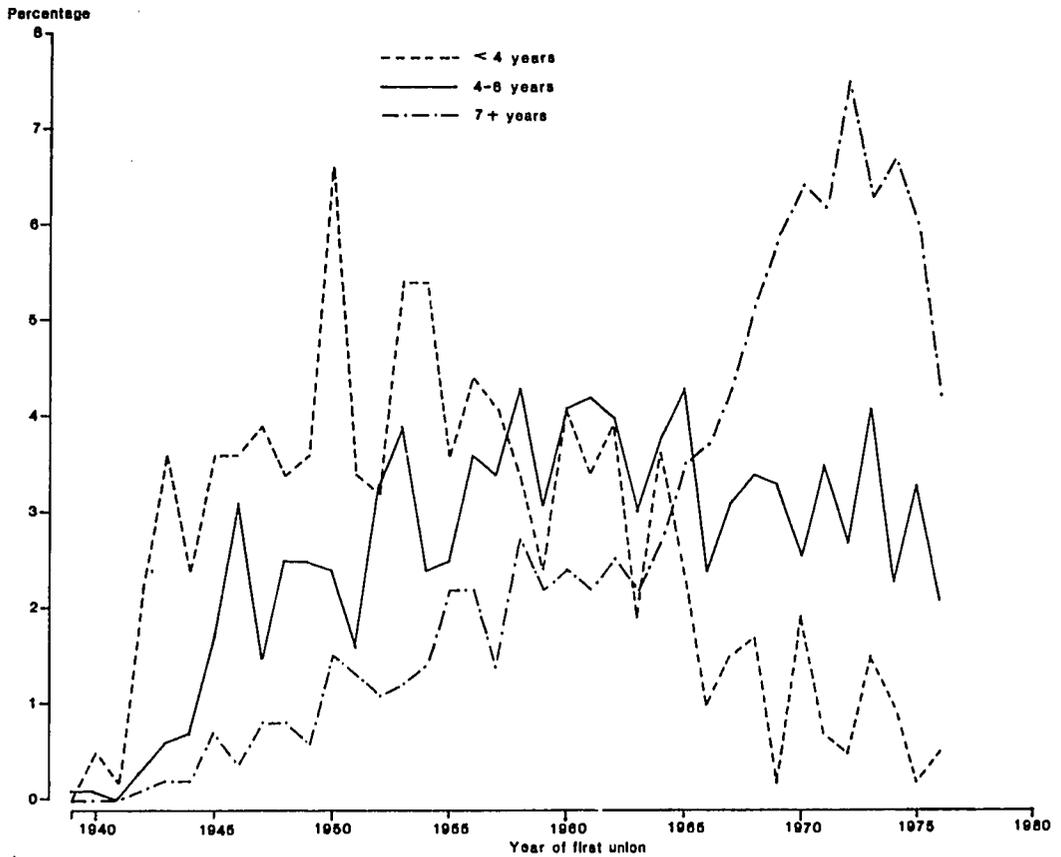


Figure 11 Percentage distribution of women by year of first union and education

Table 11 (cont.)

Age in years	Residence			Education		
	Urban	Rural	Total	< 4 years' primary	4-6 years' primary	7+ years' primary
26	1.6	0.6	1.2	0.2	0.8	1.6
27	0.7	0.7	0.7	0.4	0.6	0.8
28	0.6	0.7	0.6	0.2	0.2	0.9
29	0.5	0.3	0.4	0.0	0.0	0.7
30	0.4	0.3	0.4	0.0	0.5	0.4
31	0.3	0.3	0.3	0.2	0.2	0.3
32	0.3	0.0	0.2	0.0	0.1	0.2
33	0.3	0.1	0.2	0.2	0.2	0.2
34	0.1	0.0	0.0	0.0	0.0	0.1
35	0.0	0.1	0.0	0.0	0.0	0.1
36	0.1	0.0	0.0	0.0	0.0	0.1
37	0.0	0.1	0.0	0.0	0.1	0.0
38	0.0	0.0	0.0	0.0	0.0	0.0
39	0.0	0.0	0.0	0.0	0.0	0.0
40	0.0	0.1	0.0	0.0	0.0	0.0

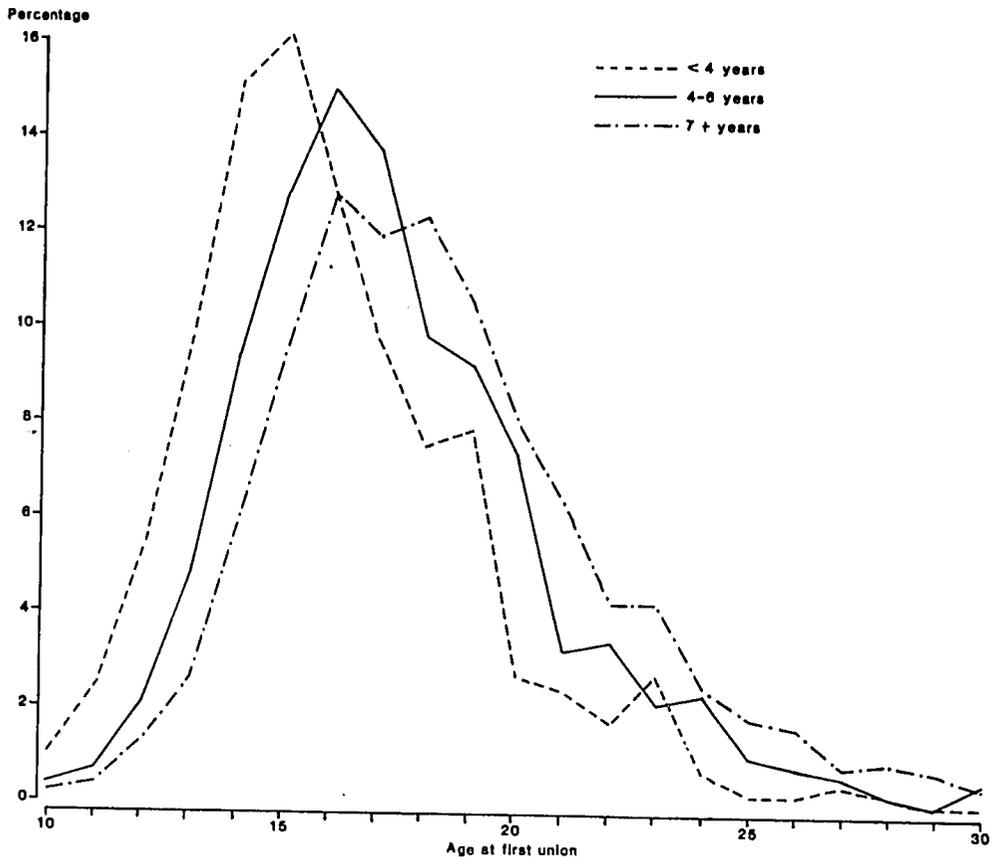


Figure 12 Percentage distribution of women by age at first union and education

3.3 MEAN AGE AT FIRST UNION

In the demographic analysis of nuptiality, the mean age at first union is one of the most important variables. In the TTFS mean age at first union was calculated from the date of birth and date of first union. An analysis can therefore be made of the patterns of age at first union as well as possible changes by cohorts of women defined by age at time of the survey.

Table 12 reconstructs the nuptiality experience of each cohort. It gives the cumulative proportion ever in a union of all women in the cohort. These proportions are cut off at the initial exact age of the cohort since all the women would not have experienced the same number of years in the cohort. For example, for the cohort currently aged 15-19, the cut-off age is 15 exactly.

From all indications women entered first unions at much younger ages in the past. For example, by age 20, ten per cent more women of the cohort now aged 40 and over had entered a union when compared with women of 20-24 years. This pattern is consistent throughout for almost every age of entry into a first union.

However, there are errors in date reporting among women aged 45-49 where the first union took place 20 years or more ago. This could also be due to randomness because of the small number of women involved.

Another way of analysing the data is by looking at the percentage of a cohort ever in a union by years before the interview (figure 13). The pattern is much the same except for further inconsistency of reporting for the cohort now aged 45-59 at 25-30 years before the survey.

The percentage ever in a union for the cohort 45-49 at 25-30 years before the survey is 80.8 as compared with 82.8 per cent for the cohort 40-45 years at a period 20-25 years before the survey. The percentage ever in a union 30-35 years before the survey for the cohort 45-49 appears too high at 47.2 per cent. This could be due to a shifting of the date of the union to an earlier date.

The women of the cohort aged 25-29 appear to be pulling their date of first union closer to the date of interview. The proportion ever in a union is higher than the 30-34 years cohort at the corresponding age in two instances, 0-4 and 5-9 years before the survey. At 10-14 years before the survey, the proportion for this age cohort is much too small.

Table 12 Cumulative proportions of women entering a union by specified age, by cohort

Exact age	Cohort						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
10	.001	.000	.004	.010	.002	.000	.005
11	.004	.002	.007	.017	.008	.010	.022
12	.013	.004	.022	.035	.025	.041	.043
13	.018	.033	.043	.068	.053	.087	.090
14	.037	.089	.093	.117	.118	.182	.171
15	.046	.181	.160	.206	.216	.281	.313
16		.280	.254	.310	.345	.429	.429
17		.375	.369	.422	.449	.545	.519
18		.474	.478	.521	.561	.627	.603
19		.564	.602	.592	.651	.719	.674
20		.621	.685	.676	.727	.760	.755
21			.754	.729	.763	.794	.796
22			.793	.771	.810	.835	.832
23			.832	.817	.853	.872	.867
24			.861	.844	.878	.908	.894
25			.887	.870	.888	.932	.905
26				.895	.906	.942	.916
27				.908	.914	.944	.935
28				.924	.925	.944	.946
29				.937	.933	.947	.951
30				.943	.941	.956	.957
31					.949	.961	.962
32					.953	.964	.967
33					.955	.971	.973
34					.957	.971	.973
35					.957	.971	.976

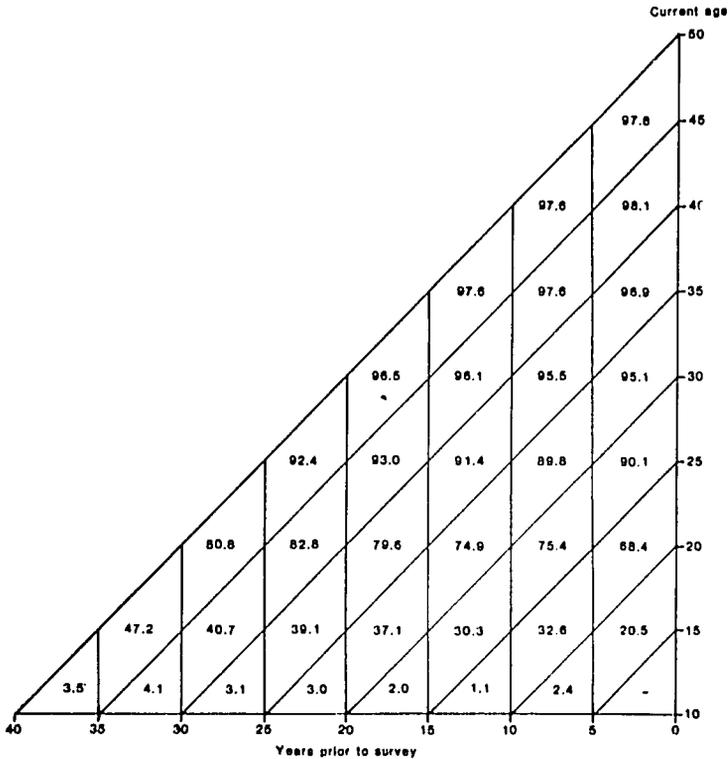


Figure 13 Percentage of women ever in a union by current age for given years prior to the survey

Table 13 Mean age at first union and proportion eventually in a union by cohort, estimated from Coale's nuptiality model

Age at survey	Mean age at first union	Estimated parameters			C fixed at 0.980
		A ₀	K	C	Mean age at first union
20-24	19.56	12.03	0.663	0.894	22.32
25-29	20.24	11.47	0.772	1.004	20.02
30-34	19.92	10.65	0.816	0.985	19.87
35-39	19.21	11.45	0.584	0.972	19.25
40-44	18.56	11.05	0.661	0.982	18.56
45-49	18.68	10.70	0.701	0.976	18.66

3.4 COALE'S NUPTIALITY MODEL FOR ESTIMATION OF AGE AT FIRST UNION

Coale (1971), utilizing data from the mid-1800s to the early 1900s for the USA, Hungary, Taiwan and some European countries, found that the distribution of age at first marriage (union) in a female cohort takes the same basic form. The observed differences were in the location and scale of the age at marriage curve and in the proportion eventually marrying. He further found that, by adjusting the data for differences in the proportion eventually marrying and plotting on an age axis standardized for location and scale, similar patterns were obtained.

Further work led to the formulation of a mathematical expression to describe the pattern of marriage based on three parameters: A₀ - initial age at first marriage, K - the scale parameter which describes the rate at which marriage occurs with age and C - the proportion eventually marrying.

Table 13 gives the results of applying the model to the TTFS data for an all woman sample. The model did fit the data quite well except for the first two age groups, as is apparent from C for cohort 25-29.

Allowing C to vary results in the mean age at first union increasing with time. There is a conflict with the mean age for the cohorts 45-49 and 40-44. This was also observed when the proportion marrying for each cohort at a given time before the survey was studied. These differences occurred 20-30 years before the survey and may be due primarily to errors in date reporting as well as randomness caused by the very small numbers observed.

For the younger cohort aged 25-29, the proportion eventually marrying exceeds 1.000, and for the cohort 20-24 it is 0.894. In the former case the proportion is much too high and, in the latter, too low. This would suggest that the model does not describe the data very closely.

With C fixed at 0.980, the trend is similar, an increasing age at first union except once again for the two oldest cohorts. This pattern of increasing age at first marriage has also been found in Guyana (Balkaran 1982) whose population is similar in composition to that of Trinidad and Tobago.

3.5 MEAN NUMBER OF UNIONS

The mean number of unions of each cohort of women can be used as a means to test the omission of early relationships (table 14).

Examination of the mean number of unions for women ever in a union by age cohort reveals, as might be expected, a steady increase from the youngest to the oldest cohort. The mean moved from 1.60 to 2.18 unions with an overall average of 2.00 unions. For all women the mean for the youngest cohort was 0.32 while for the oldest it was 2.14 unions.

However, there was little change from the 35-39 cohort to the 45-49 cohort, indicating the possibility of omission of unions by the older cohorts. This is not unique for the TTFS data. Similar findings were reported in Jamaica where the pattern of nuptiality has characteristics in common with that of Trinidad and Tobago (Singh 1982), and in the Dominican Republic (Guzmán 1980).

Mean number of unions by educational level shows an unusual pattern. Women with an education of less than four years of primary schooling have a mean number of 1.79. This compares with 2.07 unions for other women with primary education and 1.95 unions among women with

Table 14 Mean number of unions for women ever in a union by current age, education and current union status

Current age	Mean number of unions
15-19	1.60
20-24	1.79
25-29	2.01
30-34	2.06
35-39	2.14
40-44	2.17
45-49	2.18
Education	
< 4 years' primary	1.79
4-6 years' primary	2.07
7+ years' primary	2.07
Secondary +	1.95
Current union status	
Married	1.80
Common law	2.30
Visiting	2.45
No longer in a union	1.96
Overall	2.00

secondary education or above. This discrepancy could be due to reporting omissions among women with less than four years' primary education, 66.2 per cent of whom are over 35 years old. This would be in keeping with earlier findings.

On the basis of current union status, married women reported a mean of 1.80 for number of unions. Since married women have fewer unions on average, this was an expected result. Women currently in a visting union had a mean of 2.45 unions.

3.6 CONCLUSIONS

Overall, the nuptiality data of the TTFS appear to be of high quality. The trends in age at first union appear to be real, as seen by both the proportions ever in union or by using the Coale nuptiality model to estimate mean age at first union. Comparison with the 1970 census shows almost identical marital status distributions by age and type of union, when the TTFS data are reconstructed to the date of the census and are adjusted to the census definitions.

The slight discrepancies found seem due to a small preference for digits in reporting the dates of unions and to some small age misreporting.

4 Fertility

This chapter focuses on measures of fertility to evaluate levels and recent trends in fertility. This was one of the main objectives of the World Fertility Survey programme, particularly for developing countries which lack proper vital statistics records and good quality data on fertility levels and trends. Data on fertility from the survey was obtained by means of detailed maternity histories for each of the women interviewed in the individual questionnaire. For each live birth, data were collected on the date of occurrence as well as date of death, if that occurred.

The accuracy of the data will depend on the reliability of the dates given for the events under consideration. Vital statistics rates will also be affected by the accuracy of the age reporting of the mother as well as by sampling error. It is recognized that events in the distant past tend to be misreported, even omitted (Potter 1977; Brass 1978). There is also the possibility that births in the more recent past can also be misreported (Brass 1978). These will be considered in the evaluation of the data.

The evaluation therefore will assess the internal consistency of the data as well as make comparisons with external sources (censuses and ISER survey). Trends in fertility will be examined by cohorts and periods for the entire population, as well as subpopulations (residence, ethnic groups and education).

4.1 CHILDREN EVER BORN

One of the simpler and more common ways of looking at fertility is by examining data on children ever born by age group as well as over the entire childbearing period. Such data are available from both the TTFS and the censuses.

Table 15 presents data for the TTFS as well as from the censuses and the ISER survey at given points in time. The TTFS data were reconstructed to the time of the census. There are no significant differences in the results, but the data for the 1970 census and the TTFS diverge at the older ages. Except for the first age group, the census data are lower than the TTFS data for all age groups, but again not significantly so.

The same pattern emerges when the TTFS data are reconstructed to 1960 and compared with data from the 1960 census. The small differences can probably be attributed to sampling error.

Looking at the data by number of children ever born distributed by number of years since their birth does not reveal any serious misreporting except for peaks at 4, 6 and 12 years before the survey (figure 14). This is in contrast to what one would expect since these births occurred much closer to the survey than early births for the older cohorts.

The peaks at the ages mentioned indicate some shifting in dates of births of children, with troughs occurring in the adjacent years. The examination of household age reporting

does not reveal any peaks coinciding with those from the birth history, which would have suggested that the variation could be a result of age misreporting of children. Nor are there any unusual points if the births are plotted by year of occurrence. Initially, therefore, the reporting of dates of births appears to be quite satisfactory.

The mean number of children ever born by single years of age is shown in figure 15. The first observation is the decline in parity for women in the oldest cohort for ages 48 and 49, indicating possible omission of births or misreporting of age. Should women report a younger age, this would have the effect of raising the mean parity of the preceding ages. Another explanation could be that some mothers at these ages may not have been included in the survey; heaping at 50 years and for the age group 50-54 years as a whole has been noted with regard to age reporting. Considering the nature of the survey, women with many children are more likely to have been erroneously reported as belonging to an ineligible age group. In other words, the shifting to a higher age group and the consequent exclusion from the survey, was selective, which could have the effect of lowering the reported parity of the age group 45-49.

Analysis of the data by five-year age group does not reveal any gross errors of omission or displacement of births. Table 16 gives data for children ever born by five-year age group of women for the entire population as well as various subpopulations.

The number of children ever born is higher among rural women than among urban women for every age group, and higher still among the less educated women. By ethnic origin the data reveal a slightly larger number of children to the two youngest age groups among women of African descent. The position is reversed for the next five groups in the higher age ranges. These findings are similar to those of the ISER survey except there it is only for the first age group that women of African descent have more children than East Indian women.

Table 15 Mean number of children ever born to women by age group, 1960 and 1970 censuses, ISER survey, and TTFS reconstructed data

Age	1960		1970		
	Census	TTFS	Census	TTFS	ISER
15-19	0.24	0.28	0.12	0.15	0.14
20-24	1.55	1.62	1.07	1.11	1.22
25-29	2.95	3.11	2.65	2.66	2.72
30-34	3.99	4.06	4.06	4.14	4.25
35-39	-	-	4.93	5.21	5.40 ^a
40-44	-	-	5.24	5.60	-

^a Age 35-44.

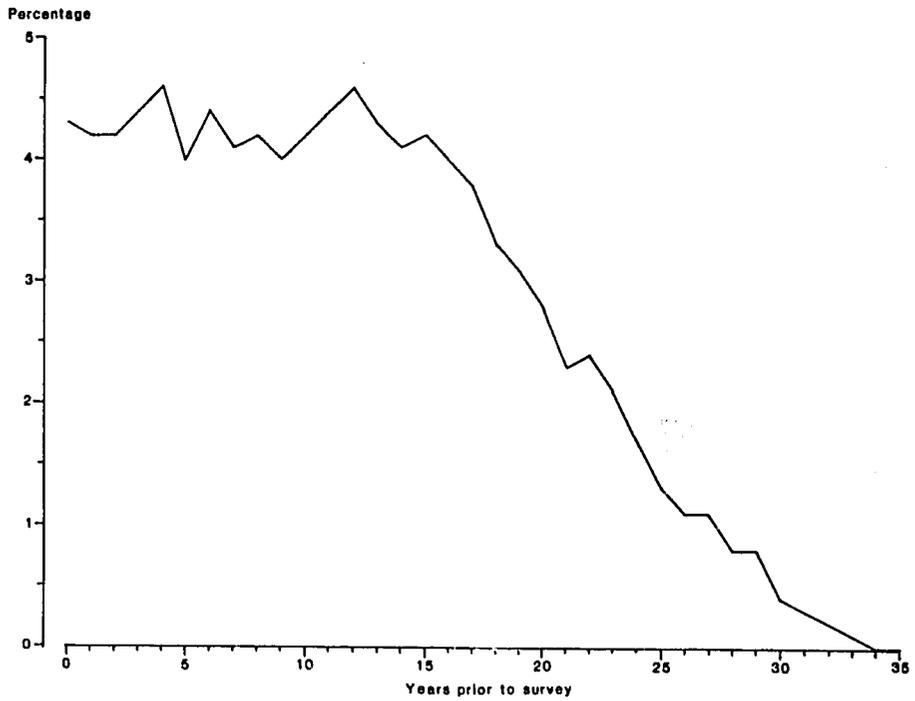


Figure 14 Percentage distribution of births by years prior to the survey

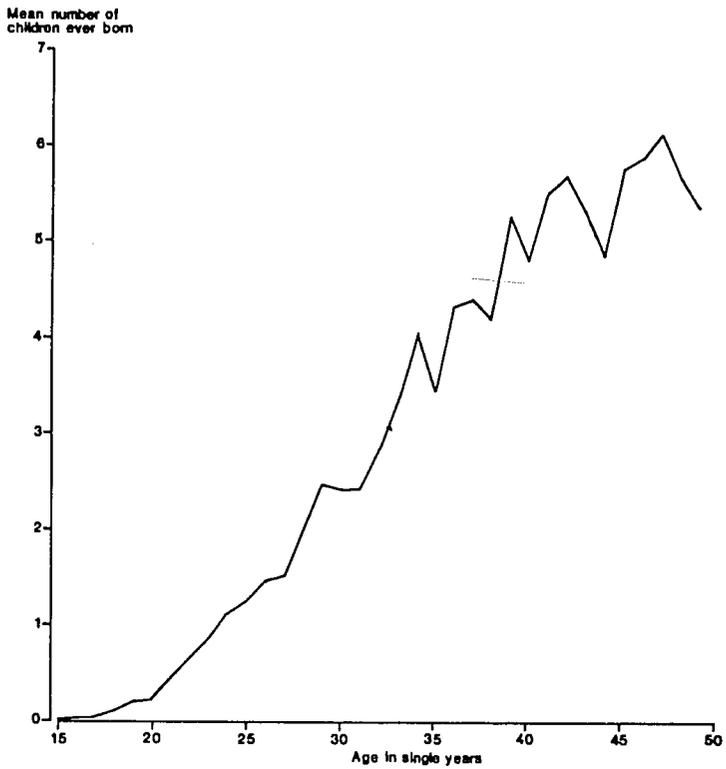


Figure 15 Mean number of children ever born by age of mother in single years

Table 16 Mean number of children ever born by cohort, residence, education and ethnic origin

Age group	Residence		Education: Years of primary school			Ethnic group			
	Total	Urban	Rural	Less than 4	4-6	7+	African	East Indian	Others
15-19	0.109	0.099	0.122	0.420	0.260	0.183	0.145	0.081	0.097
20-24	0.854	0.802	0.933	1.547	1.468	0.713	0.873	0.865	0.779
25-29	1.955	1.761	2.281	3.621	2.666	1.622	1.903	2.150	1.633
30-34	3.176	2.761	3.737	4.571	3.884	2.555	3.070	3.347	2.970
35-39	4.304	3.858	4.897	6.108	4.841	3.199	3.788	4.861	4.066
40-44	5.204	4.806	5.823	6.362	5.884	4.092	4.898	5.845	4.460
45-49	5.813	5.405	6.453	6.794	6.653	4.412	5.721	6.461	4.819
15-49	2.195	1.989	2.502	5.390	3.539	1.654	-	-	-

4.2 RECENT TRENDS AND CURRENT LEVELS OF FERTILITY

There has been a decline in fertility during the past 15 years; the extent and rate of this decline can be assessed according to survey data and comparisons can be made with other sources of data. However, before looking at the recent trends in fertility, it is necessary to review changes in conditions that have been responsible for a decline in fertility.

The first factor to be considered is the advent of family planning clinics. The first of these clinics was established in Point Fortin, a rural town in South Trinidad, in 1956. This clinic, however, became inactive after a few years. In 1959 a clinic was established in Port of Spain, the major urban city, followed by one in the second largest town, San Fernando, in 1961. With the establishment of the National Family Planning Programme by the government in 1967, there was an increase in the number of family planning clinics and in the number of participants in family planning.

The growth of urbanization and the raising of the level of education through an increase in the number of secondary school places were discussed in chapter 1 of the First Country Report. A decline in the level of fertility is not altogether surprising, when these factors are taken into account.

Table 17 presents total fertility rates for the years 1960-76 from the TTFS and vital statistics data. Both indicate a steady decline in fertility. Taking the average for the first three years and the last three, the TTFS shows a slightly greater decline, 47.3 per cent, than the vital statistics data, 40.3 per cent, over the period.

In almost every instance the TTFS rates are higher than those derived from the vital statistics data. One reason for this is the possibility of too high estimates being made for the number of women used to calculate the vital statistics rates. It is suspected that mid-year population estimates of the country were too high, possibly by about 5-10 per cent. Also under-registration of births would have also lowered these rates.

Age-specific fertility rates for the period 1950-76 are shown in table 18. Where data are missing for the higher age cohorts, estimates of the last three available years have been used to derive these rates for the calculation of the total fertility rates (TFR). Every age group has declined over the years. However, what is quite noticeable is that the fertility

rates of the three youngest age groups have been almost stationary, even rising at times.

For those aged 15-19, the rates are more or less the same for the first four years, rising for the next three and then returning to their former level up until 1961-2. It would therefore seem that these rates remained unchanged from 1950-62, with fluctuations occurring mainly through sampling error and possible shifting of births.

After 1962, however, there has been a dramatic and steady decrease by almost 50 per cent. This may have been due to the introduction of family planning, or more likely to the rising age at first union. The same pattern is seen for women aged 20-24 except that the decline does not take place until 1965 and is not as great, while for those aged 25-29, the decline is later still and again is not as great. The decline in fertility seems to have taken place earlier in the 30-34 and 35-39 age groups than in the 25-29. The timing of these declines coincides with the introduction of family planning and changes in levels of education.

Analysis of the data for 1962-76 is given in table 19 where a comparison is made of the average fertility rates for the periods 1962-6, 1967-71 and 1972-6 for each age group.

All age groups (except the 15-19 group) had declines of

Table 17 Total fertility rates per woman for calendar years 1960-76

Year	TTFS	Vital statistics
1960	6.49	5.58
1961	6.04	5.24
1962	5.86	5.19
1963	5.58	4.91
1964	5.41	4.76
1965	5.31	4.49
1966	4.93	4.10
1967	4.20	3.84
1968	4.54	3.78
1969	3.71	3.32
1970	3.96	3.39
1971	3.10	3.57
1972	3.86	3.73
1973	3.54	3.38
1974	3.44	3.30
1975	3.02	3.12
1976	3.23	3.15

Table 18 Age-specific fertility rates (per 1000 women) for calendar years and total fertility rates per woman

Year	Age						TFR ^a
	15-19	20-24	25-29	30-34	35-39	40-44	
1950	152.3	284.4					
1951	142.2	272.7					
1952	167.8	279.7					
1953	139.3	300.4					
1954	169.0	329.0					
1955	154.8	253.1	288.8				
1956	178.0	342.6	304.6				
1957	147.0	314.5	275.0				
1958	152.2	321.6	271.8				
1959	136.2	308.2	273.0				
1960	159.7	266.4	378.3	311.1			6.49
1961	148.8	317.2	316.7	241.9			6.04
1962	151.8	325.3	288.6	222.5			5.86
1963	117.4	302.9	278.6	234.8			5.58
1964	102.1	304.9	287.5	244.0			5.41
1965	107.7	279.2	282.2	183.4	162.3		5.31
1966	107.5	247.6	265.7	196.7	125.1		4.93
1967	95.6	228.3	185.7	159.2	110.1		4.20
1968	92.0	230.1	249.2	170.8	114.5		4.54
1969	92.7	208.7	209.2	167.8	103.3		3.71
1970	70.2	206.4	215.2	143.4	118.4	27.5	3.96
1971	87.4	197.8	141.0	168.2	73.0	41.2	3.10
1972	88.3	241.9	205.5	126.9	73.9	45.9	3.86
1973	84.9	194.8	158.5	119.4	110.4	26.1	3.54
1974	80.0	184.9	202.4	109.8	76.7	27.7	3.44
1975	65.0	174.8	136.7	117.0	76.5	23.3	3.02
1976	76.2	168.5	167.3	118.8	76.3	27.7	3.23

^a For years with incomplete data the total fertility rate has been obtained by completing the missing information with estimated rates, using the rates of the three previous calendar years. The assumption here is that fertility remained constant back in the time estimated. This is not valid and tends to underestimate the total fertility rate.

Table 19 Age-specific fertility rates (per 1000 women) and percentage decline in rates: 1962-6, 1967-71, 1972-6

Age group	Age-specific fertility rates			Percentage decline		
	1962-6	1967-71	1972-6	(1) and (2)	(2) and (3)	(1) and (3)
	(1)	(2)	(3)			
15-19	117.3	87.5	78.9	25.4	9.8	32.8
20-24	292.0	214.3	125.0	26.6	41.7	57.2
25-29	336.2	200.1	174.1	40.5	13.0	48.2
30-34	216.3	161.9	118.4	25.2	26.9	45.3
35-39	137.0	103.9	80.3	24.2	22.7	41.4
40-44	(39.9)	39.9	32.2	-	19.3	-
45-49	(10.5)	(10.5)	10.5	-	-	-
TFR (TTFS)	5.42	3.90	3.42	28.0	12.4	35.1
TFR						
Vital statistics	4.69	3.58	3.34	22.8	6.8	27.6

over 40 per cent over the entire period, with the age group 20-24, showing a decline of 57 per cent.

The rates of 1972-6 for those aged 20-24 and for 1967-71 for those aged 25-29 appear to be too low. However, examinations of the number of births for these groups do not reveal any evidence of omissions or date shifting.

For the 15-19 and 25-29 age groups, the decline was

most apparent between 1962-6 and 1967-71; while for those women aged 20-24 it took place in 1967-71. For other age groups, it was about the same for both periods. Overall, the total fertility rate declined by about 35 per cent over the entire period, with the decline in 1962-6 being twice as great as in 1967-71.

While the total rates differ for each year between the TTFS and vital statistics estimates, given a fixed error rate



Figure 16 Percentage distribution of births by calendar year of birth

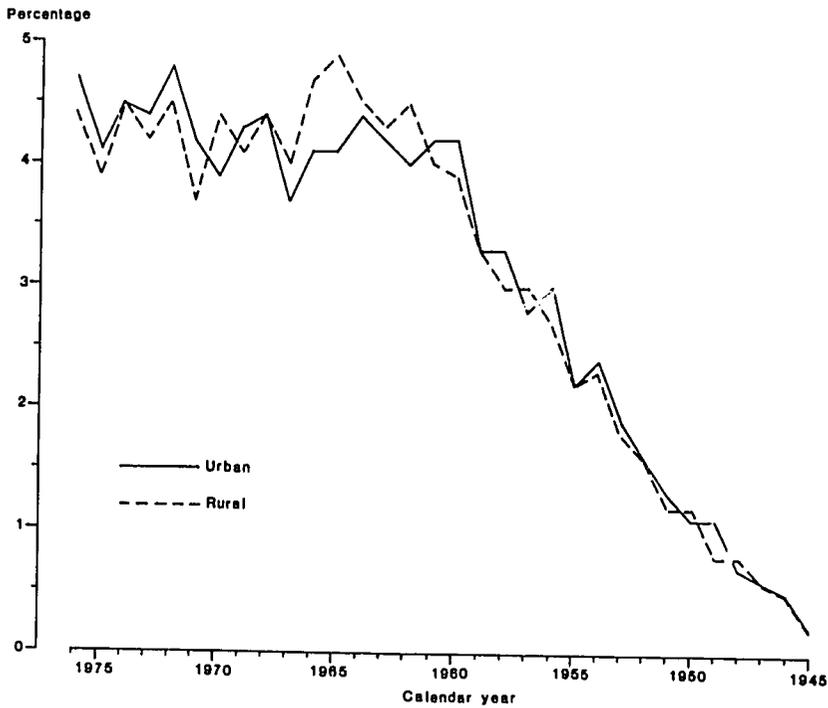


Figure 17 Percentage distribution of births by calendar year of birth for urban and rural women

for the vital statistics estimates the expected percentage decline should be similar, if not equal. This, however, is not the case. Decline in 1962-6 is 25 per cent higher for the TTFS than the vital statistics rates and almost 50 per cent higher during 1967-71. This is unusual and it is doubtful that this large difference can be attributed entirely to sampling error. Declining fertility would have made the estimates for the later age groups higher, resulting in a higher overall decline.

There is no doubt therefore that there has been a tremendous decline in fertility levels since the early 1960s. However, this decline, as would be expected, is slowing up.

An examination of births by years before the survey indicated peaks at 4 and 12 years, suggesting the possibility of heaping of births (see figure 14). Plotting the data by calendar year shows peaks at 1976 and 1972, and a trough at 1967 (see figure 16).

A detailed examination of births for each cohort by calendar year indicates an excess of births in 1972 for those

aged 25-29 years at the time of interview which is at the expense of births in 1971. The same also occurred for those aged 30-34 years, but to a lesser extent. The peak in all births at 1974 was also due mainly to these two age groups. In 1967 the 35-39 cohort appear to have shifted some births to 1968. These are the main areas of possible shifting of births, but they are not serious enough to be reflected in grouped data.

Analysis of the data by residence shows the same pattern for both urban and rural areas. Both areas are more or less the same except for a possible shifting of births to 1965 for rural women (see figure 17).

4.3 COHORT-PERIOD FERTILITY RATES

Errors in reporting the maternity history can often be detected by looking at the reported fertility of birth cohorts of women at given ages over their entire child-

Table 20 Cohort-period fertility rates, cumulative rates and P/F ratios

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	1310	0.022	0.000					
20-24	1012	0.137	0.033	0.000				
25-29	737	0.187	0.160	0.042	0.002			
30-34	630	0.142	0.211	0.215	0.065	0.003		
35-39	509	0.088	0.179	0.281	0.250	0.062	0.001	
40-44	413	0.051	0.123	0.234	0.322	0.245	0.063	0.003
45-49	369	0.019	0.076	0.177	0.277	0.302	0.242	0.068
B Cumulative fertility of real cohorts (P)								
15-19		0.109	0.001					
20-24		0.853	0.168	0.001				
25-29		1.955	1.018	0.217	0.008			
30-34		3.175	2.467	1.411	0.337	0.014		
35-39		4.304	3.865	2.969	1.562	0.313	0.004	
40-44		5.204	4.948	4.332	3.161	1.552	0.327	0.014
45-49		5.813	5.716	5.337	4.451	3.068	1.556	0.348
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.109	0.001					
20-24		0.794	0.168	0.001				
25-29		1.731	0.969	0.210	0.008			
30-34		2.440	2.024	1.284	0.330	0.014		
35-39		2.879	2.920	2.691	1.579	0.323	0.004	
40-44		3.136	3.536	3.862	3.187	1.548	0.318	0.014
45-49		3.233	3.915	4.748	4.570	3.060	1.525	0.355
D P/F ratios								
15-19		1.000	1.000					
20-24		1.075	1.000	1.000				
25-29		1.129	1.051	1.032	1.000			
30-34		1.302	1.218	1.098	1.020	1.000		
35-39		1.495	1.323	1.103	0.989	0.970	1.000	
40-44		1.660	1.399	1.122	0.992	1.003	1.030	1.000
45-49		1.798	1.460	1.124	0.974	1.003	1.020	0.982

bearing period. Unfortunately, only one cohort could have this experience, that is the cohort of women aged 45–49. The cohort aged 40–44 lacks one age group to be complete.

Age-specific fertility rates have the disadvantage of being the result of a mixture of information reported by respondents in two different age cohorts.

In table 20, cohorts of women by age at the time of the survey have been constructed. By utilizing births according to the age of the mother at the time of the survey and the time of the births for five-year periods before the survey, cohort and period-specific fertility rates can be obtained.

For each cohort, the rates at each central age can be compared in the upper panel by looking at the data horizontally, so that for the cohort aged 45–49, the rates at central ages 15–45 are 68, 242, 302 and so on until 19 at 45 years. For the cohort 40–44 the rates at the corresponding ages are 63 to 51, but only up to central age 40 and so on.

To compare the change over time for a specific age group it is necessary to look at the data diagonally. For the age group centred on 20, a large change can be seen by the decline in the rates from 242 to 137, which compares the change from 25–29 years ago to 0–4 years before the survey. At the same time it is possible to detect any 'Potter' effects for each cohort (Potter 1977). In figure 18, these rates are shown according to central age.

The cohort-period rates do not reveal anything substantially different from what has been previously seen. There is a general decrease in the rates over time at each central age with some fluctuation at central age 15 years, as shown in the data by single calendar years (table 18). At central age 20 and 25, the rates for the cohort 45–49 are lower than for the 40–44 cohort, possibly due to shifting of some births either to the earlier age group or to the later one. However, the differences are very small and may be due to sampling error.

The mean parity (P_i) of each cohort is also found by cumulating the age specific rates horizontally. The cumulation over cohorts for each period (vertically) gives the parity for the synthetic cohort (F_i). The ratio P_i/F_i is used as an indicator of possible errors in the data (Brass 1978). With constant fertility, P/F is equal to one. It can also be used as an indicator for changes in fertility. Similar tabulations are presented later for different subpopulations – urban, rural, ethnic groups – and education levels.

The cumulative rates also indicate nothing unusual. A decline in fertility is reflected by the fertility of the synthetic cohorts being much lower than that of real cohorts. They show a decline of 2.6 children per woman by age 45–49 and 2.1 by age 40–44. These declines are reflected in the P/F which increases with each successive age group.

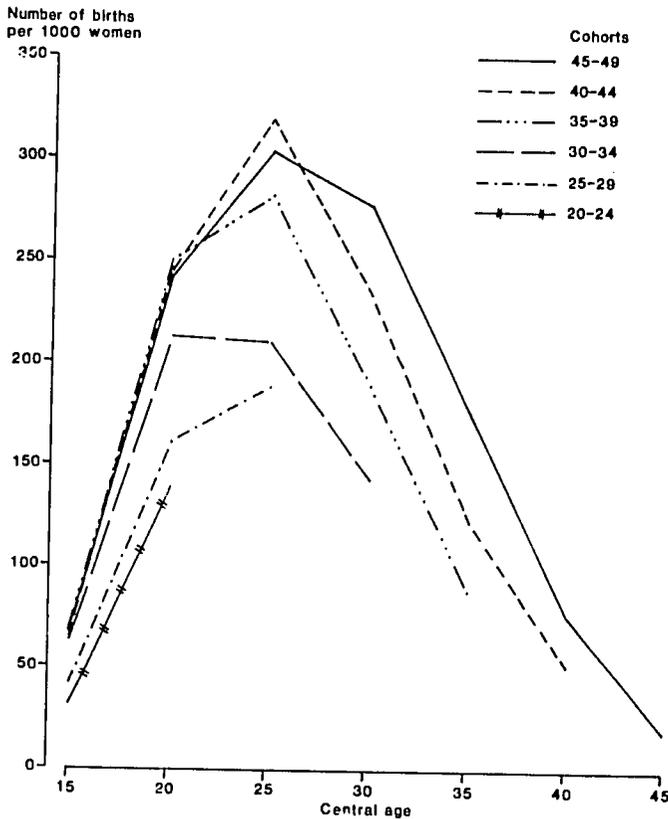


Figure 18 Birth cohort-period fertility rates for all women by central age

4.4 COHORT-PERIOD FERTILITY RATES OF SUB-POPULATIONS

Urban and rural areas

Tables 21 and 22 present cohort-period fertility rates for urban and rural areas respectively. The table for urban women reveals the same picture of decline over time as in the country as the whole, but the problem of misreporting of births previously noted in table 20 is not very pronounced.

For rural women (table 22) the difference between the oldest cohorts is much larger, being 0.352 for the 40-44 cohort at central age 25, as opposed to 0.316 for the 45-49 cohort. This could have been as a result of shifting of births forward by the cohort 45-49 years from 20-24 years before the survey, or a shifting back in time of some births by the 40-44 cohort to 15-19 years before the

survey. These distortions are seen in the P/F ratios which, while not indicating a large difference, do indicate the irregularities. The P/F ratios indicate the same large decline in fertility as previously seen.

Comparing the P and F values between the areas, it can be seen that urban women showed a decline of 2.4 births by age 45-49 and 1.9 by age 40-44 as compared with 2.8 and 2.3 births for rural women up to the same ages. The age pattern of fertility for both urban and rural women is similar to that of the overall population.

Ethnic group

Tables 23 and 24 give fertility rates for the two largest ethnic groups, women of African descent and women of East Indian descent. Misreporting is slightly greater among East Indian women. In the case of women of African descent, misreporting of just two births as having come

Table 21 Cohort-period fertility rates, cumulative rates and P/F ratios, urban women

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	772	0.020	0.000					
20-24	617	0.130	0.030	0.000				
25-29	463	0.174	0.143	0.034	0.001			
30-34	364	0.128	0.183	0.189	0.052	0.001		
35-39	291	0.076	0.173	0.254	0.227	0.043	0.000	
40-44	250	0.048	0.111	0.221	0.302	0.229	0.048	0.002
45-49	225	0.020	0.060	0.151	0.270	0.294	0.228	0.056
B Cumulative fertility of real cohorts (P)								
15-19		0.099	0.000					
20-24		0.803	0.151	0.000				
25-29		1.762	0.890	0.173	0.004			
30-34		2.764	2.124	1.209	0.264	0.005		
35-39		3.859	3.481	2.617	1.350	0.213	0.000	
40-44		4.801	4.562	4.006	2.902	1.392	0.247	0.009
45-49		5.404	5.303	5.003	4.249	2.897	1.427	0.287
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.099	0.000					
20-24		0.751	0.151	0.000				
25-29		1.623	0.868	0.169	0.004			
30-34		2.264	1.782	1.114	0.263	0.005		
35-39		2.642	2.646	2.381	1.400	0.218	0.000	
40-44		2.881	3.202	3.485	2.909	1.363	0.239	0.009
45-49		2.982	3.502	4.239	4.261	2.833	1.379	0.291
D P/F ratios								
20-24		1.068	1.000					
25-29		1.085	1.025	1.023				
30-34		1.221	1.191	1.086	1.004			
35-39		1.461	1.316	1.099	0.964	0.977		
40-44		1.666	1.425	1.149	0.997	1.021	1.036	
45-49		1.812	1.514	1.180	0.997	1.023	1.035	0.987

Table 22 Cohort-period fertility rates, cumulative rates and P/F ratios, rural women

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	538	0.024	0.000					
20-24	395	0.148	0.038	0.000				
25-29	274	0.209	0.188	0.056	0.003			
30-34	267	0.160	0.250	0.250	0.082	0.005		
35-39	218	0.104	0.188	0.319	0.279	0.087	0.002	
40-44	163	0.057	0.141	0.255	0.352	0.270	0.086	0.004
45-49	144	0.018	0.100	0.218	0.287	0.316	0.263	0.086
B Cumulative fertility of real cohorts (P)								
15-19		0.122	0.002					
20-24		0.933	0.195	0.002				
25-29		2.281	1.235	0.293	0.014			
30-34		3.737	2.934	1.686	0.436	0.027		
35-39		4.897	4.376	3.437	1.845	0.447	0.010	
40-44		5.823	5.540	4.832	3.558	1.798	0.450	0.022
45-49		6.453	6.362	5.859	4.769	3.336	1.758	0.444
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.122	0.002					
20-24		0.860	0.194	0.002				
25-29		1.906	1.137	0.281	0.014			
30-34		2.708	2.385	1.531	0.423	0.027		
35-39		3.229	3.324	3.123	1.820	0.464	0.010	
40-44		3.512	4.032	4.397	3.581	1.812	0.438	0.022
45-49		3.603	4.534	5.488	5.013	3.390	1.751	0.455
D P/F ratios								
20-24		1.085	1.002					
25-29		1.197	1.086	1.042				
30-34		1.380	1.230	1.101	1.030			
35-39		1.517	1.317	1.100	1.013	0.965		
40-44		1.658	1.374	1.099	0.994	0.992	1.027	
45-49		1.791	1.403	1.068	0.951	0.984	1.004	0.977

earlier would be enough to produce the distortions, while with East Indian women it would require a shift of three births to produce the same effect.

Declines have been much larger among East Indian women. Comparing the P and F ratios, the data reveal that there is a decline of 2.7 children by age 40-44 and a decline of 3.5 by age 45-49, compared with 1.6 and 2.4 children by women of the same age of African descent. Part of this large decline could be attributed to the changes in urbanization and levels of education which would have affected East Indian women to a greater extent.

Education

A comparison of fertility rates by level of education of women (tables 25, 26 and 27) shows the expected trend of decline in fertility with the increase in the level of

education over all cohorts. By age 35-39 women with a secondary education or higher have just 2.5 children on average, but a very high rate, 5.3 children, if their education is less than seven years at primary level. After that age the increase in cumulative fertility with age is slightly greater for the more educated women than for the less educated.

The pattern of fertility for those subgroups with less than seven years of education and those with more than seven years of primary education is similar to that seen for the total population. Women with a secondary education or higher, however, show an erratic pattern of fertility due to a small sample size.

The highest fertility occurred at central age 25 years. However, for women with a secondary education or higher from the 45-49 cohort, the highest fertility is at central age 30. This unusual occurrence is probably due to sampling error, the sample here being 66 women.

Table 23 Cohort-period fertility rates, women of African descent

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	503	0.029	0.000					
20-24	399	0.139	0.036	0.000				
25-29	303	0.186	0.155	0.038	0.001			
30-34	234	0.154	0.202	0.191	0.066	0.001		
35-39	198	0.080	0.175	0.242	0.209	0.052	0.000	
40-44	172	0.066	0.135	0.228	0.285	0.208	0.053	0.005
45-49	161	0.024	0.094	0.196	0.276	0.275	0.210	0.066
B Cumulative fertility of real cohorts (P)								
15-19		0.145	0.000					
20-24		0.873	0.178	0.000				
25-29		1.903	0.971	0.195	0.004			
30-34		3.070	2.299	1.289	0.333	0.004		
35-39		3.788	3.388	2.513	1.303	0.258	0.000	
40-44		4.898	4.569	3.892	2.754	1.327	0.286	0.023
45-49		5.721	5.599	5.128	4.148	2.770	1.393	0.342
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.145	0.000					
20-24		0.840	0.178	0.000				
25-29		1.772	0.953	0.192	0.004			
30-34		2.542	1.964	1.148	0.333	0.004		
35-39		2.943	2.838	2.359	1.378	0.261	0.000	
40-44		3.071	3.515	3.497	2.805	1.302	0.263	0.023
45-49		3.394	3.986	4.478	4.183	2.680	1.314	0.353
D P/F ratios								
20-24		1.039	1.000					
25-29		1.074	1.018	1.019				
30-34		1.208	1.171	1.123	1.000			
35-39		1.287	1.194	1.066	0.945	0.986		
40-44		1.595	1.300	1.113	0.982	1.019	1.088	
45-49		1.686	1.405	1.145	0.992	1.034	1.060	0.969

Table 24 Cohort-period fertility rates, women of East Indian descent

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	563	0.016	0.001					
20-24	442	0.139	0.034	0.000				
25-29	300	0.186	0.187	0.055	0.003			
30-34	281	0.132	0.219	0.247	0.068	0.004		
35-39	221	0.094	0.182	0.316	0.298	0.079	0.002	
40-44	168	0.044	0.115	0.250	0.360	0.314	0.084	0.001
45-49	135	0.016	0.080	0.169	0.287	0.346	0.304	0.090
B Cumulative fertility of real cohorts (P)								
15-19		0.084	0.004					
20-24		0.865	0.170	0.002				
25-29		2.150	1.222	0.289	0.015			
30-34		3.347	2.688	1.595	0.359	0.020		
35-39		4.861	4.389	3.480	1.899	0.407	0.010	
40-44		5.845	5.624	5.049	3.797	1.999	0.428	0.006
45-49		6.461	6.383	5.983	5.139	3.705	1.977	0.457
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.084	0.004					
20-24		0.779	0.172	0.002				
25-29		1.709	1.105	0.275	0.015			
30-34		2.369	2.198	1.511	0.355	0.020		
35-39		2.839	3.107	3.092	1.847	0.417	0.010	
40-44		3.059	3.683	4.343	3.645	1.988	0.432	0.006
45-49		3.139	4.083	5.187	5.079	3.716	1.952	0.457
D P/F ratios								
20-24		1.110	0.991					
25-29		1.258	1.105	1.048				
30-34		1.413	1.223	1.056	1.013			
35-39		1.712	1.413	1.126	1.028	0.977		
40-44		1.911	1.527	1.162	1.042	1.006	0.991	
45-49		2.058	1.563	1.154	1.012	0.997	1.013	1.001

Table 25 Cohort-period fertility rates, women with less than seven years of education

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	180	0.053	0.001					
20-24	185	0.216	0.079	0.001				
25-29	199	0.217	0.258	0.095	0.003			
30-34	257	0.148	0.258	0.302	0.101	0.006		
35-39	273	0.104	0.213	0.338	0.310	0.084	0.002	
40-44	232	0.062	0.141	0.269	0.351	0.298	0.090	0.004
45-49	224	0.021	0.095	0.208	0.306	0.337	0.284	0.090
B Cumulative fertility of real cohorts (P)								
15-19		0.272	0.006					
20-24		1.479	0.400	0.005				
25-29		2.863	1.30	0.489	0.014			
30-34		4.074	3.332	2.042	0.533	0.028		
35-39		5.256	4.736	3.669	1.978	0.428	0.008	
40-44		6.074	5.765	5.059	3.714	1.961	0.471	0.020
45-49		6.720	6.616	6.143	5.101	3.571	1.884	0.462
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.272	0.006					
20-24		1.351	0.401	0.005				
25-29		2.434	1.692	0.480	0.014			
30-34		3.176	2.982	1.989	0.518	0.028		
35-39		3.696	4.049	3.680	2.068	0.448	0.008	
40-44		4.005	4.755	5.025	3.821	1.938	0.459	0.020
45-49		4.109	5.228	6.067	5.351	3.625	1.882	0.469
D P/F ratios								
15-19		1.000	1.000					
20-24		1.095	0.997	1.000				
25-29		1.176	1.052	1.019	1.000			
30-34		1.283	1.117	1.026	1.028	1.000		
35-39		1.422	1.169	0.997	0.956	0.955	1.000	
40-44		1.517	1.212	1.007	0.972	1.012	1.026	1.000
45-49		1.635	1.265	1.013	0.953	0.985	1.001	0.984

Table 26 Cohort-period fertility rates, women with seven or more years of primary education

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	278	0.039	0.000					
20-24	298	0.163	0.042	0.000				
25-29	221	0.211	0.172	0.031	0.002			
30-34	168	0.158	0.223	0.201	0.050	0.002		
35-39	133	0.078	0.146	0.247	0.227	0.053	0.000	
40-44	104	0.051	0.101	0.212	0.290	0.222	0.037	0.002
45-49	79	0.021	0.052	0.139	0.226	0.273	0.216	0.043
B Cumulative fertility of real cohorts (P)								
15-19		0.196	0.000					
20-24		1.028	0.212	0.000				
25-29		2.083	1.027	0.165	0.007			
30-34		3.175	2.383	1.268	0.263	0.010		
35-39		3.755	3.367	2.638	1.404	0.266	0.000	
40-44		4.570	4.316	3.813	2.753	1.303	0.196	0.011
45-49		4.851	4.744	4.485	3.790	2.660	1.297	0.216
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.196	0.000					
20-24		1.013	0.212	0.000				
25-29		2.068	1.074	0.156	0.007			
30-34		2.861	2.188	1.162	0.262	0.010		
35-39		3.249	2.917	2.396	1.399	0.276	0.000	
40-44		3.503	3.419	3.456	2.849	1.384	0.185	0.011
45-49		3.611	3.678	4.151	3.978	2.748	1.265	0.227
D P/F ratios								
15-19		1.000	0.000					
20-24		1.015	1.000	0.000				
25-29		1.007	0.957	1.061	1.000			
30-34		1.110	1.089	1.092	1.002	1.000		
35-39		1.156	1.154	1.101	1.003	0.963	0.000	
40-44		1.304	1.262	1.103	0.966	0.942	1.059	1.000
45-49		1.344	1.290	1.080	0.953	0.968	1.025	0.952

Table 27 Cohort-period fertility rates, women with secondary or more education

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	853	0.009	0.000					
20-24	528	0.095	0.012	0.000				
25-29	319	0.153	0.091	0.016	0.001			
30-34	205	0.120	0.143	0.117	0.030	0.000		
35-39	102	0.058	0.131	0.174	0.117	0.014	0.000	
40-44	78	0.021	0.100	0.160	0.278	0.118	0.015	0.000
45-49	66	0.012	0.041	0.116	0.238	0.219	0.126	0.024
B Cumulative fertility of real cohorts (P)								
15-19		0.046	0.000					
20-24		0.535	0.062	0.000				
25-29		1.303	0.540	0.085	0.003			
30-34		2.046	1.447	0.734	0.151	0.000		
35-39		2.472	2.184	1.527	0.656	0.068	0.000	
40-44		3.454	3.351	2.853	2.051	0.663	0.073	0.000
45-49		3.884	3.824	3.618	3.037	1.847	0.752	0.122
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.046	0.000					
20-24		0.519	0.062	0.000				
25-29		1.283	0.517	0.082	0.003			
30-34		1.882	1.229	0.665	0.154	0.000		
35-39		2.170	1.886	1.536	0.741	0.068	0.000	
40-44		2.273	2.384	2.338	2.130	0.658	0.073	0.000
45-49		2.334	2.590	2.919	3.319	1.752	0.704	0.122
D P/F ratios								
15-19		1.000	0.000					
20-24		1.031	1.000	0.000				
25-29		1.016	1.044	1.032	1.000			
30-34		1.087	1.177	1.104	0.983	0.000		
35-39		1.139	1.158	0.994	0.884	1.000	0.000	
40-44		1.519	1.406	1.220	0.963	1.008	1.000	0.000
45-49		1.664	1.477	1.239	0.915	1.054	1.069	1.000

4.5 FERTILITY ACCORDING TO BIRTH ORDER

Tables 28 and 29 present cohort-period fertility rates by birth order, for first births and fourth and higher order births. If the theory is correct that, as fertility changes, first birth rates change less than birth rates at higher orders, then it should be possible to distinguish between real changes in fertility and possible errors in the data.

Table 28 shows rates for first order births. It will be seen that the cumulative rates for real cohorts (proportion of women who are mothers) show little error, except for the fact that the proportion of women who are mothers for cohort 45-49 is slightly lower than for the cohort 40-44, 92.1 per cent as against 92.5 per cent. This is probably due to a transfer of mothers out of the cohort aged 45-49 to the higher cohort 50-54, as was noted in the chapter on age reporting.

The synthetic proportions, calculated for periods, do not appear to have any discrepancies, except for the period

10-14 years before the survey, where there are smaller proportions when cumulated to above age 30 than for the period 5-9 years before the survey, indicating a possible shifting of date of first birth. It is possible that they could have been pushed back into the past at variance with Potter's hypothesis (Potter 1977). However, the change in the pattern of first births, due to the postponement of first births, accounts for the great decline in the proportion of mothers. This decline is clearly reflected in the P/F ratios.

As can be seen in table 29, in the case of births of order four or more there is a very large decline over time. The P/F ratios move from 1.03 to 2.38 at 0-4 years before the survey for women aged from 15-19 to 45-49. There is a definite shift of the peak in the fertility rates towards younger ages. The two oldest cohorts reached their highest rates around age 30, while the cohorts 35-39 and 30-34 attained their highest rate around age 25 years; this is to be expected if contraceptive measures are being taken by the women in the older age groups.

Table 28 Cohort-period fertility rates for first births

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	1310	0.017	0.000					
20-24	1012	0.064	0.025	0.000				
25-29	737	0.045	0.071	0.029	0.001			
30-34	630	0.019	0.041	0.072	0.038	0.002		
35-39	509	0.004	0.015	0.038	0.085	0.039	0.001	
40-44	413	0.001	0.005	0.009	0.035	0.089	0.044	0.002
45-49	369	0.000	0.001	0.005	0.013	0.036	0.078	0.049
B Cumulative fertility of real cohorts (P)								
15-19		0.087	0.001					
20-24		0.445	0.124	0.001				
25-29		0.734	0.508	0.152	0.006			
30-34		0.857	0.763	0.560	0.203	0.011		
35-39		0.909	0.889	0.812	0.622	0.198	0.004	
40-44		0.925	0.920	0.895	0.850	0.674	0.230	0.012
45-49		0.921	0.919	0.913	0.886	0.821	0.640	0.250
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.087	0.001					
20-24		0.409	0.124	0.001				
25-29		0.635	0.480	0.146	0.006			
30-34		0.728	0.683	0.504	0.198	0.011		
35-39		0.748	0.760	0.694	0.622	0.205	0.004	
40-44		0.752	0.786	0.739	0.798	0.648	0.223	0.012
45-49		0.755	0.791	0.766	0.862	0.830	0.612	0.255
D P/F ratios								
20-24		1.090	1.001					
25-29		1.156	1.058	1.038				
30-34		1.177	1.118	1.112	1.025			
35-39		1.215	1.169	1.170	1.001	0.966		
40-44		1.229	1.171	1.211	1.065	1.039	1.034	
45-49		1.220	1.161	1.192	1.027	0.990	1.045	0.983

Table 29 Cohort-period fertility rates for births of order four or higher

Age at survey	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Birth-cohort fertility rates								
15-19	1310	0.017	0.025					
20-24	1012	0.022	0.014	0.020				
25-29	737	0.063	0.023	0.012	0.013			
30-34	630	0.081	0.090	0.048	0.012	0.002		
35-39	509	0.071	0.126	0.148	0.054	0.003	0.000	
40-44	413	0.049	0.109	0.180	0.164	0.039	0.003	0.000
45-49	369	0.022	0.067	0.160	0.216	0.161	0.039	0.002
B Cumulative fertility of real cohorts (P)								
15-19		0.914	0.829					
20-24		0.608	0.499	0.431				
25-29		0.607	0.292	0.179	0.121			
30-34		1.174	0.768	0.316	0.075	0.014		
35-39		2.009	1.656	1.025	0.286	0.015	0.002	
40-44		2.717	2.473	1.928	1.025	0.207	0.014	0.000
45-49		3.333	3.223	2.890	2.089	1.009	0.203	0.008
C Cumulative fertility of synthetic cohorts (F)								
15-19		0.208	0.123					
20-24		0.318	0.191	0.353				
25-29		0.633	0.303	0.411	0.540			
30-34		1.039	0.756	0.652	0.601	0.295		
35-39		1.392	1.387	1.391	0.872	0.308	0.080	
40-44		1.636	1.932	2.293	1.690	0.501	0.094	0.006
45-49		1.746	2.266	3.094	2.769	1.308	0.289	0.014
D P/F ratios								
25-29		0.959	0.962	0.435				
30-34		1.130	1.017	0.484	0.125			
35-39		1.444	1.194	0.737	0.328	0.049		
40-44		1.660	1.280	0.841	0.607	0.414	0.149	
45-49		1.909	1.423	0.934	0.754	0.772	0.701	0.569

Table 30 Fertility rates for periods, according to time since first union (marriage cohort) and time since first birth (motherhood cohort)

Years since first union	Number of women	Years before the survey						
		0-4	5-9	10-14	15-19	20-24	25-29	30-34
A Marriage-cohort fertility rates^a								
0-4	730	0.215						
5-9	814	0.237	0.265					
10-14	537	0.168	0.274	0.333				
15-19	495	0.103	0.203	0.342	0.354			
20-24	417	0.072	0.143	0.277	0.392	0.353		
25-29	294	0.043	0.106	0.215	0.333	0.368	0.320	
30-34	182	0.013	0.081	0.183	0.280	0.340	0.372	0.309
B Motherhood-cohort fertility rates^b								
0-4	677	0.201						
5-9	568	0.222	0.260					
10-14	459	0.142	0.250	0.299				
15-19	438	0.094	0.188	0.353	0.348			
20-24	356	0.058	0.123	0.262	0.398	0.312		
25-29	236	0.035	0.101	0.199	0.337	0.381	0.285	
30-34	94	0.009	0.078	0.183	0.229	0.345	0.388	0.244

^a Excludes births before first union.

^b Excludes first birth.

4.6 MARRIAGE AND MOTHERHOOD COHORT FERTILITY RATES

Marriage cohort and motherhood cohort fertility rates are other ways of assessing the levels and trends in fertility. The data given here account for all women ever in a union, or having a birth, respectively. Table 30 shows the marriage cohort (time since first marriage) fertility rates by years before the survey. At all periods, the highest fertility rate is achieved between 5-9 years after the first union. Table 31 also shows the fertility rates by time since the first birth (motherhood). Neither classification reveals important errors, but both show large declines.

4.7 BIRTH INTERVALS

Analysis of birth intervals should reveal displacements of births. For example, should births in the distant past have

been dated closer to the survey and been given a reasonable spacing, then births near to the survey will be compressed into a shorter interval of time. The reverse will hold if births close to the survey are pushed further back in time.

Table 31 gives data on mean intervals between births in months, for years before the survey and by current age group of women. According to Potter's theory (1977), births in the distant past are brought forward in time. With correct spacing of earlier births, a shortening of the intervals for the more recent births should be apparent. The data, on inspection, do not reveal any Potter effect. Neither do they show any defects according to Brass's theory (1978), which suggests that more recent births are pushed further away from the point of interview, resulting in compression of birth intervals in the past. Plotting of the data should reveal the defects, with extremely low values in periods where intervals have been compressed. However, the graphs (not shown) reveal nothing unusual, except for the interval at central age 20 for women aged 45-49 a

Table 31 Mean birth intervals in months by years before the survey for each cohort

Years before the survey	Cohort						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
0-4	20.0	23.3	31.4	40.6	43.7	48.6	65.6
5-9		16.8	23.2	27.7	31.7	39.2	44.5
10-14			17.7	21.2	24.9	29.9	33.6
15-19				17.7	20.3	25.0	28.9
20-24					18.1	21.4	26.0
25-29						19.4	23.0
30-34							18.4
Total	20.0	22.7	27.8	28.6	27.5	28.9	29.8

Table 32 Sex ratios at birth

Years before the survey	Type of place		Years of primary education			Order of birth		Current age group				
	Total	Urban	Rural	4 years	4-6 years	7+ years	First	4+	25	25-34	35-44	45+
0-4	103.4	98.4	110.2	130.0	102.7	100.4	99.7	103.8	105.6	100.2	104.9	143.8 ^a
5-9	102.0	104.0	99.8	104.4	98.3	104.1	96.8	98.8	95.2	101.5	103.7	109.0
10-14	98.0	98.4	97.4	108.7	96.1	103.1	110.0	98.3	-	101.0	96.9	94.7
15-19	105.5	101.5	110.4	108.9	101.4	103.1	97.3	108.4	-	103.0	105.4	106.5
20-24	103.8	105.1	102.6	108.5	105.2	98.0	97.8	98.4	-	-	106.9	101.1
25+	92.5	86.1	99.4	88.9	89.7	92.0	96.4	92.0 ^a	-	-	78.2 ^a	89.4
Total	101.6	100.0	103.5	107.4	99.9	101.7	99.7	100.7	104.1	101.1	102.1	100.9

^a Less than 200 births.

time of the survey. This one point is higher in the graph than would be expected. Also the point at age 15 for the same cohort appears too low.

4.8 CHECKS FOR OMISSION AND DISPLACEMENT OF LIVE BIRTHS

In retrospective surveys relating to maternity history, it is generally assumed that certain types of event are omitted, such as female births, children who have died and children living away from home, especially if these events occurred many years ago. To detect possible omissions it is necessary to study sex ratios at birth and the proportion of children who died.

Sex ratios at birth

The sex ratio of males per 100 females at birth in Trinidad and Tobago is in the order of 104 according to the vital statistics records. Table 32 shows the sex ratios at birth as

reported in the survey at periods before the survey for the entire population and by residence, educational level and age of mother at time of the survey, as well as for birth order. Overall the sex ratio is 101.6, which is lower than

Table 33 Proportion dead of children ever born, by sex and by current age of woman

Current Age Group	Proportion dead of children ever born		
	Total	Male	Female
15-19	.070	.076	.063
20-24	.043	.051	.035
25-29	.043	.045	.042
30-34	.059	.049	.070
35-39	.067	.073	.061
40-44	.070	.070	.070
45-49	.080	.090	.074
Total	.064	.066	.062

Table 34 Proportion dead at less than age five of children ever born by sex and years before the survey plus level in Coale-Demeny life tables

Years before the survey	Births	Deaths of children less than age five	Proportion dying	Level in Coale-Demeny life-tables ^a
Males				
25-30	272	28	.103	17.8
20-24	626	55	.088	18.7
15-19	1029	71	.069	19.8
10-14	1171	44	.038	22.0
5-9	1145	65	.057	20.0
Total	4243	263	.062	20.3
Females				
25-30	296	28	.095	17.4
20-24	603	37	.061	19.5
15-19	975	65	.067	19.1
10-14	1195	61	.051	20.2
5-9	1122	54	.048	20.4
Total	4191	245	.058	19.7

^a Coale and Demeny (1966).

expected, even though it is still within the 95 per cent confidence intervals of the standard error for a ratio of 104. Nevertheless, it suggests the possibility of omission of males at birth.

There is no consistent pattern to confirm this suggestion. Quite unexpectedly the sex ratios for births reported by rural women and women with the least education are closer to the expected value. There is, however, a pattern in the low sex ratios that occurs for births occurring 10–14 years before the survey for almost all subpopulations.

Another oddity is the low sex ratio for first order births. For every period except 10–14 years before the survey, the ratios are below 100. There are no records to suggest that the sex ratio for first births should be different from the ratio for all births.

Overall, while the sex ratio is somewhat low, there is no firm evidence to suggest omission of births.

Proportions dead of children ever born

In general the proportions dead of children ever born increase with age of mother, except for the first cohort, and also with time in relation to the survey (tables 33 and 34). The proportion dead for males is slightly higher than for females as has been the trend in the past, except in two instances. These minor variations are, perhaps, due to sampling errors and cannot be said with any conviction to be the result of omissions.

4.9 CONCLUSIONS

The fertility of Trinidad and Tobago has declined considerably over the last 15 years, for both urban and rural women, as well as for women of African and East Indian descent, and women of different educational levels. The high quality of the TTFS data is shown by comparisons with the censuses of 1960 and 1970, in which the reconstructed and measured numbers of children ever born are about the same for the younger age groups at the time, but are higher from the TTFS at ages 35–39 and 40–44. However, the ISER survey of 1970 seems to indicate a higher level of fertility than either the census or the TTFS. Comparisons with vital statistics indicate higher levels of fertility in the TTFS, possibly due to too high estimates in the denominators of the vital rates, or to the under-registration of births.

Examination of the fertility of cohorts reveals neither the effects of omission nor misplacement, but reveals large and consistent declines. Examinations of first birth rates, rates for birth orders four and over, and according to time since first union and first birth reveal that the large decline in fertility is due to both a postponement of the first birth and the limitation of fertility thereafter.

5 Infant and Child Mortality

Detailed information was collected on the maternity history of each eligible woman in the TTFS. This information included the date of birth of each child, the sex, and, if the child died, the date of death. These data, therefore, enable estimates to be made of both infant and child mortality in the early years of life.

As with data on nuptiality and fertility, mortality estimates can be affected by omissions of both births and deaths, as well as misreporting of dates. Mortality estimates are also affected to a greater extent because they are unpleasant events and are, therefore, more likely to be omitted or seriously displaced in time. The reporting of infant mortality (deaths within the first year of life) is more subject to error than child mortality estimates (death within the first five years of life) for the same reasons, and also because it relates to a shorter period of time. With regard to fertility estimates, only one date is relevant for a child, but in the case of mortality two dates are required, the date of birth and the date of death. In addition, there is the problem of misreporting the date of birth of the mother.

For older women these events would have taken place much further back in the past, and here again the probability of misreporting of dates would be greater than for the younger women. Type of place of residence affects mortality rates because of living conditions and also because of available health facilities. The levels of education of mothers is also important. Finally, since the number of

deaths will be much smaller than the number of births, the errors in estimations are much greater. Hence wide fluctuations in these estimates will not be unexpected.

Using the available data from the survey, rates of infant mortality (1^q_0) and child mortality (5^q_0) have been estimated, as well as the probability of dying between the first and fifth birthdays (4^q_1). Table 35 presents infant and child mortality for each calendar year from 1950–75 for the TTFS, as well as infant mortality from vital statistics data.

Data from both sources show a decline in infant mortality and child mortality in the case of the TTFS. Comparing both sets of data it will be seen that, until 1964, the infant mortality rates compare favourably. After this period, however, the decline in the vital statistics data is much greater, resulting in a larger overall decrease for rates from this source. The rates from the TTFS declined from 90 deaths per 1000 between 1950–2 to 37 per 1000 for 1975–6. From the vital statistics data the figures fell from about 82 deaths per 1000 births to 26 per 1000 during the same period. The mortality under age five moved from about 96 per 1000 in 1950–2 to 54 per 1000 in 1970–1.

Using a three-year moving average to reduce random errors, the data were calculated and plotted (see figure 19). The probability of infant death shows a steady decline over the period. However, there are peaks at 1959, 1967 and 1972. There is a trough for 1958 indicating possible

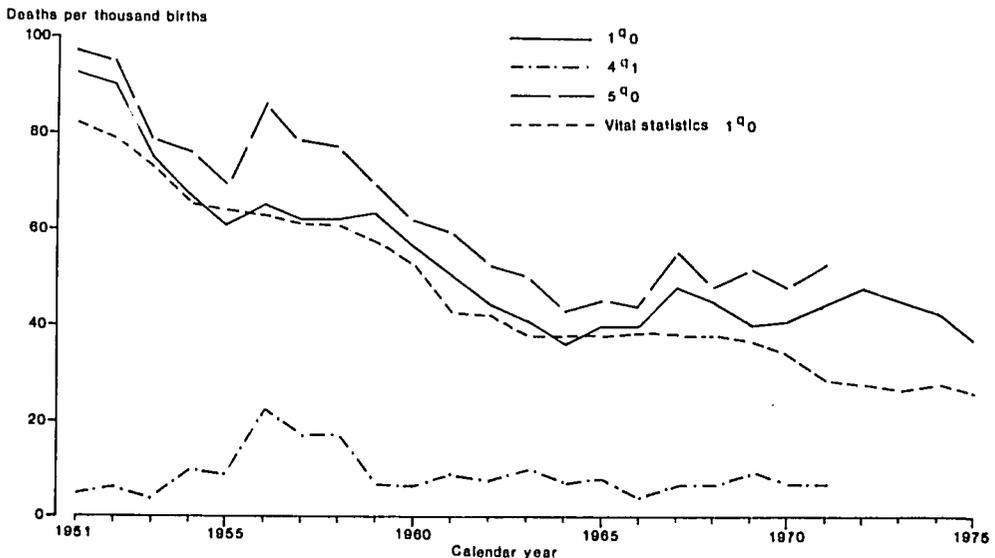


Figure 19 Mortality rates by calendar year (three-year moving averages), vital statistics and individual survey

Table 35 Probabilities of infant and child deaths for calendar years 1950–76, TTFS and vital statistics

Year	TTFS					Vital statistics
	Births	1/12q ₀	1q ₀	5q ₀	4q ₁	1q ₀
1950	138	.043	.087	.094	.008	.080
1951	138	.043	.087	.094	.008	.078
1952	179	.063	.103	.103	.000	.089
1953	202	.050	.079	.089	.011	.070
1954	254	.028	.043	.043	.000	.061
1955	239	.042	.079	.096	.018	.068
1956	312	.045	.061	.069	.009	.064
1957	317	.032	.054	.092	.040	.057
1958	348	.029	.069	.072	.003	.063
1959	362	.041	.061	.068	.009	.062
1960	444	.034	.059	.068	.010	.045
1961	449	.040	.051	.053	.002	.045
1962	467	.034	.043	.056	.014	.039
1963	465	.022	.039	.047	.008	.041
1964	484	.023	.041	.048	.007	.035
1965	487	.025	.029	.034	.005	.038
1966	478	.036	.048	.054	.006	.042
1967	418	.036	.041	.043	.002	.036
1968	480	.042	.054	.067	.014	.037
1969	461	.024	.029	.035	.006	.040
1970	454	.037	.046	.053	.007	.034
1971	437	.025	.048	.055	.007	.029
1972	514	.023	.043	*	*	.024
1973	470	.045	.053	*	*	.032
1974	488	.027	.039	*	*	.026
1975	441	.029	.036	*	*	.026

*Not available due to lack of exposure time.

shifting of deaths from 1958 to 1959, although this could also be due to sampling errors. Up until 1969, the pattern closely follows that of the vital statistics data although it is slightly above by about 8 per 1000 births. At 1970, there is a divergence and the difference increases to about 20 deaths per 1000 births, coming closer together again at 1975.

The pattern for under five mortality is similar to that of infant mortality, except for the year 1956 when it peaks much more than in the case of infant mortality.

Classification of infant and under five mortality rates by five-year periods before the survey (1953–76), for the entire country and also by type of place of residence and

education of mother shows many fluctuations (see table 36). Both infant and under five mortality show a decline and then rise after 1968. The same is seen for rates according to residence except for the infant mortality rate for urban women.

The rates for women living in rural areas are higher, except in one instance, than those for urban women. The decline of infant mortality of children born to urban women from the period 1968–72 to 1973–7 is higher than for any other two periods, declining by about 50 per cent.

By education, the mortality rates decline with the increasing education of the mother. However, there is an

Table 36 Probabilities of death in the first year (1q₀) and first five years (5q₀) of life for periods before the survey, 1953–76, total and by type of place of residence and education

Periods before the survey	Total		Type of place of residence				Level of education					
			Urban		Rural		< 4 years'		4–6 years'		7+ years'	
	1q ₀	5q ₀	1q ₀	5q ₀	1q ₀	5q ₀	1q ₀	5q ₀	1q ₀	5q ₀	1q ₀	5q ₀
1953–57	.062	.067	.051	.062	.075	.088	.090	.100	.069	.081	.033	.045
1958–62	.049	.059	.048	.058	.051	.059	.044	.063	.053	.061	.052	.058
1963–7	.042	.047	.043	.047	.040	.050	.070	.079	.041	.047	.028	.035
1968–72	.044	.053	.040	.051	.047	.053	.056	.062	.050	.063	.034	.039
1973–6	.036	*	.028	*	.046	*	.091 ^a	*	.045		.025	*

*Not available due to lack of exposure time.

^aBased on 143 births.

Table 37 Probability of death in the first year of life (${}_1q_0$) by years before the survey and age of mother at time of child's birth

Age at birth	Years before the survey						
	0-4	5-9	10-14	15-19	20-24	25-29	30-34
15-19	.046	.047	.031	.067	.081	.092	.13C
20-24	.033	.042	.038	.048	.051	.079	
25-29	.021	.042	.034	.053	.054		
30-34	.051	.050	.037	.050			
35-39	.085	.064	.042				
40-44	.041 ^a						

^a Less than 50 births.

unusual occurrence in 1958-62 with rates for the least educated mothers being much lower than the other two groups, indicating possible omission of deaths.

One of the characteristics of infant mortality is its U-shaped pattern when age of mother at time of the birth is considered, with the trough occurring between the ages of 20 and 30 years. The data in table 37 give a comparison of the pattern of infant mortality by age of mother at time of the birth for different periods in the past. For all periods, except at 10-14 years before the survey, the general U-shape is observed, indicating that the deaths

under one year were fairly well reported. The rate for women giving birth at age 15-19 for the period 10-14 years before the survey is too low. The variation could be due to sampling error.

Another period where the data appear faulty is at 0-4 years before the survey for women 40-44 years old at the time of the birth. Here the large fluctuation is most probably due to sampling error, since the sample size is less than 50 births. Overall, the data on mortality appear to be very well reported with fluctuation due mainly to sampling error.

6 Summary of Findings

The data from the TTFS are generally very good and will serve for much future analysis. The following conclusions may be drawn from the data evaluation workshop on the TTFS.

- 1 The average total fertility rate for the last three calendar years before the survey (1974-6) was 3.23 children per woman. There is no evidence that casts doubt on this figure. However, the provisional rates given in the First Country Report are substantially lower than those calculated for the present data evaluation report and those from vital statistics for the years 1975-6.
- 2 The survey shows a decline of 2.0 children (35 per cent) in the total fertility rate between the quinquena of 1962-6 and 1972-6. The present evaluation shows that there is no reason to believe that this decline is exaggerated; on the contrary, the decline may be somewhat understated because of the assumptions necessarily made for the oldest women due to truncation.
- 3 According to the survey, infant mortality stood at 36 deaths per 1000 live births for children born in 1975. Vital statistics for this year show a rate of only 26 per 1000. The present evaluation reveals that this discrepancy is due to the undercounting of neo-natal deaths in the vital statistics. The survey also shows levels of infant mortality that are little changed over the past 15 years, although the vital statistics show both lower and declining rates:

	1956-60	1961-5	1966-70	1971-5
Survey	61	41	44	44
Vital statistics	58	40	38	27

There is no evidence that the survey has overstated recent mortality, but may have understated mortality earlier than 1965 which may be due to the age limits of the respondents, rather than poor reporting.

- 4 At the time of the survey only 21 per cent of women aged 15-19 had ever been in a union, half the percentage 20 years earlier. This evaluation produced no evidence to invalidate the levels and trends of nuptiality, which are consistent with the increase over time in the educational level of the women.

Age reporting

In the analysis of data on age reporting the quality of data seemed quite good with little discrepancy between the reporting of women in urban and rural areas. There is a marked preference for the digits 0 and 5 as indicated by the Myers' index. The United Nations index, taking into consideration both age in five-year groups and sex ratios, shows that the 1970 and 1980 censuses can be described as more accurate, than the TTFS data.

Age shifting appears to have taken place between the age groups 20-24 and 25-29 with the first age group being lower, particularly among rural women. There is also an indication of under-reporting for the age group 45-49 years. This is reflected in an increase in the 50-54 age group.

A comparison between the data from the household schedule and the individual questionnaire, however, indicates a very high degree of consistency in age reporting (97.9 per cent).

Nuptiality

Evaluation of the data on nuptiality posed a problem because of the difference in definition of 'visiting union' in the survey and the censuses. However, reconstruction of the survey data, using the census definition, did not reveal any major discrepancies between the data from the various sources. Neither were there any serious differences between the survey data and the ISER survey carried out in 1970, in which the definitions were the same.

Analysis of age at first union indicated that women entered a union at an earlier age in the past. There was nothing unusual in the reporting of these data by any of the cohorts. Using Coale's nuptiality model also indicated the same pattern.

Fertility

A comparison of the number of children ever born from TTFS data (reconstructed) with those of the censuses indicated that the data were of good quality. Data on the number of children ever born by type of place of residence and age showed the expected increase in the number of children ever born with the age of the woman, and also a higher number for rural women at every age group. As might be predicted, the pattern of higher fertility rates at a lower educational level was evident. Analysis by birth interval did not reveal any discrepancies in the data.

Fertility rates from 1960 onwards were compared with data from the vital statistics records and the trends were similar in both cases. However, the vital statistics rates were lower in almost every instance. This discrepancy probably resulted from the high mid-year population estimates that were used in calculating the fertility rates for the vital statistics data.

Comparison of cohort-period fertility rates (P/F ratios) did not indicate anything unusual in the data. There does not appear to be any displacements of births. Omissions of births did not appear to have occurred, even though the sex ratios at birth were very large in two instances. All, however, were within the range of sampling error. Neither did there seem to be any omissions when infant death in the first year of life by sex was studied.

Infant and child mortality

The data on infant and child mortality were well reported. The mortality rates are quite comparable with the vital statistics data.

Both infant and child mortality rates appear to be lower in urban areas in the past, but with small discrepancies occurring recently. By education of the mother, however, these rates seem to be higher over all periods where the level of education of the mother is low.

References

- Balkaran, Sundat (1982). Evaluation of the Guyana Fertility Survey 1976. *WFS Scientific Reports* no 42.
- Brass, William (1978). Screening Procedures for Detecting Errors in Maternity History Data. WFS Technical Paper no 810 (draft).
- Central Statistical Office (various years). *Population and Vital Statistics Report*. Port of Spain.
- Central Statistical Office (ND). *1970 Population Census Report*. Port of Spain.
- Central Statistical Office (1980). Unpublished data: 1980 Census of Population.
- Central Statistical Office (1981). *Trinidad and Tobago Fertility Survey, 1977: Country Report*. Port of Spain.
- Coale, Ansley J. (1971). Age Patterns of Marriage. *Population Studies* 25: 193–214.
- Coale, Ansley J. and Paul Demeny (1966). *Regional Model Life Tables and Stable Populations*. Princeton, New Jersey: Princeton University Press.
- Guzmán, José M. (1980). Evaluation of the Dominican Republic National Fertility Survey 1975. *WFS Scientific Reports* no 14.
- Harewood, Jack (1978). *Female Fertility and Family Planning in Trinidad and Tobago* (1970 ISER Survey). Kingston, Jamaica: Institute of Social and Economic Research, University of the West Indies.
- Potter, Joseph E. (1977). Problems in Using Birth History Analysis to Estimate Trends in Fertility. *Population Studies* 31(2): 335–64.
- Singh, Susheela (1982). Evaluation of the Jamaica Fertility Survey 1975–6. *WFS Scientific Reports* no 34.