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Analysis of WFS Data in Colombia, Panama, Paraguay and Peru

Highlights from the CELADE Research and Training Seminar

OCCASIONAL PAPERS

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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.

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Highlights from the CELADE Research and Training Seminar

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CELADE

Note on authorship

Part One, Description of the CELADE Seminar, was written by Arthur M. Conning

Part Two, Summaries of the Seminar Monographs, was written by Albert M. Marckwardt

Contents

PREFACE 5

1 DESCRIPTION OF THE CELADE SEMINAR 7

Introduction 7
Objectives of the Seminar 9
Organization of the Seminar 9
Research Topics 11
In-service Training 13
Evaluation of the Seminar 14
Copies of the Reports 15

2 SUMMARIES OF THE SEMINAR MONOGRAPHS 17

Colombia
Edgar Baldión, *Socio-Demographic Factors Relevant in the Study of Infant Mortality and its Association with Fertility* 17
Elsa Gómez, *Family Formation and Female Labour Force Participation in Colombia* 20

Panama
Laura Gougain, *Fertility and Female Labour Force Participation in Panama* 22
Federico Guerra, *Determinants of Infant Mortality in Panama* 24

Paraguay
Juan Schoemaker, *Female Labour Force Participation and Fertility in Paraguay* 26

Peru
Nelly Mostajo, *Women's Attitudes to Fertility and the Use of Contraceptives* 29
Héctor Ramos, *Infant Mortality and Maternal and Infant Care in Peru* 31
Flor Suárez, *Family Formation and Female Labour Force Participation in Peru* 33

Preface

Ever since results of the first surveys conducted under the aegis of the World Fertility Survey programme became available, it has been WFS policy to encourage second-stage, in-depth analysis of these surveys. Over 300 projects of further analysis, most of them carried out by nationals of participating countries, have been completed or are in progress. Most of these analyses have been funded by our principal funding agencies, the United States Agency for International Development (USAID) and the United Nations Fund for Population Activities (UNFPA). The present publication is an account of an analysis seminar conducted by the United Nations in Santiago, Chile. Findings from the eight monographs prepared during the course of the seminar are highlighted, thereby bringing them to the attention of our non-Spanish speaking readers.

HALVOR GILLE
Project Director

1 Description of the CELADE Seminar

INTRODUCTION

The World Fertility Survey (WFS) is an international research programme which has utilized internationally comparable, nationally representative, sample surveys to study fertility behaviour in as many countries as possible, giving attention to the developing world. The programme, with the collaboration of the United Nations, is conducted by the International Statistical Institute (ISI) in co-operation with the International Union for the Scientific Study of Population (IUSSP). The major financial support has been provided by the United Nations Fund for Population Activities (UNFPA) and the United States Agency for International Development. Of the total of 64 developed and developing countries that have conducted surveys within the WFS programme or in association with it, 14 are in the Latin American and Caribbean region (see the list in table 1).

Each participating country, after computer editing of the data and production of the basic tabulations common to all countries, writes a fairly standardized First Country Report summarizing the data collection process and the results of the basic tabulations. Subsequently, the country may carry out 'second stage', in-depth analyses of their data to meet specific needs for information.

While the goals of the WFS programme are to help countries obtain fertility and related information to facilitate economic, social and health planning and to increase national capabilities for undertaking this type of population survey research, many Latin American governmental agencies face a series of difficulties in undertaking second-stage, policy-oriented studies to obtain the expected benefits from their WFS data and in institutionalizing such research.

The difficulties likely to be encountered by the country agencies include (a) identification of relevant questions that in-depth analysis of the WFS data might help answer; (b) the design of the studies; (c) funding; (d) selection and utilization of the most appropriate research methodology and techniques; (e) computer data manipulation and processing; and (f) report editing and publication.

To aid WFS participating countries to overcome these problems while improving national research capabilities, the Latin American Demographic Centre (CELADE), which

Table 1 Latin American and Caribbean countries participating in the WFS

Country	Responsible institution[a]	Sample			Fieldwork		Date of report[b]
		Number of women	Universe		Start of	Duration (months)	
			Age range	Marital status			
Colombia	CCRP	5378	15–49	All	May 1976	4	April 1978
Costa Rica	DGEC	3935	20–49	All	July 1976	5	Oct. 1978
Dominican Rep.	CONAPOFA	3115	15–49	All	April 1975	3	Nov. 1976
Ecuador	INEC	7029	15–49	All	Aug. 1979	5	Not yet
Guadaloupe and Martinique	INED	2800	15–49	All	Dec. 1975	3	July 1980
Guyana	BOS	4642	20–49 15–19	All Not in school	May 1975	3	Sept. 1979
Haiti	IHS	3351	15–49	All	July 1977	5	July 1981
Jamaica	DOS	3096	20–49 15–19	All Not in school	Nov. 1975	3	Dec. 1979
Mexico	DGE	7310	20–49 15–19	All EM or fertile	July 1976	7	Feb. 1979
Panama	OEP (M de S)	3701	20–49	All	Dec. 1975	3	Mar. 1978
Paraguay	DGE + MSP	4622	15–49	All	Feb. 1979	2	Jan. 1981
Peru	INE	5640	15–49	EM	July 1977	11	Mar. 1979
Trinidad and Tobago	CSO	4355	20–49 15–19	All Not in school	Mar. 1977	3	Dec. 1980
Venezuela	DGE	4361	15–44	All	Mar. 1977	5	Nov. 1980

[a] BOS: Bureau of Statistics
CCRP: Corporación Centro Regional de Población
CONAPOFA: Consejo Nacional de Población y Familia
CSO: Central Statistical Office
DGE: Dirección General de Estadística
DGEC: Dirección General de Estadística y Censos
DOS: Department of Statistics
IHS: Institut Haïtien de Statistique
INE: Instituto Nacional de Estadística
INEC: Instituto Nacional de Estadística y Censos
INED: Institut National d'Etudes Démographiques
M de S: Ministerio de Salud
MSP: Ministerio de Salud Pública
OEP: Oficina de Estudios de Población.

[b] Date when sent printer.

is the agency of the Economic Commission for Latin America in charge of the United Nations Latin American Regional Population Programme, obtained a grant from the UNFPA for a 'Research and Training Seminar for the In-depth Analysis of WFS Data'.[1] The seminar was conducted at CELADE during the period April to December, 1980.

CELADE was a logical institution to undertake such a project not only because of its long history as the UN agency in Latin America providing the region with population training, technical assistance, services and research, but also because of CELADE's participation in the WFS and experience with the data. Members of the CELADE staff took part in various of the WFS committees and are participating in the comparative analysis of the data. In addition, the CELADE computer programmers and systems analysts were responsible for providing the technical co-operation in the data editing, recoding and tabulation to the Latin American participating countries, conducting various missions to each country assisted. CELADE also had the experience of having conducted four research and training seminars in the early 1970s for the comparative analysis of rural fertility surveys.

OBJECTIVES OF THE SEMINAR

The WFS Research and Training Seminar Project endeavoured to enable various Latin American governmental agencies to use their WFS data to examine policy-relevant questions of specific interest to them, to increase the population survey analysis capabilities of these agencies, and to develop a general approach for providing countries with the assistance that they require to produce timely analyses from important data sets such as the WFS or national censuses.

The specific objectives of the seminar were to:

1 assist governmental agencies in WFS participating countries to design in-depth studies for specific policy or planning needs;
2 provide the conditions, resources, and guidance to insure that high quality studies conducted by national analysts for the participating agencies were produced on time and the corresponding reports published; and,
3 provide the in-service training to enable the analysts to use the most appropriate methodology and techniques for their specific analyses, to employ previous research results and existing complementary data, and to work interactively with their data through efficient computer processing.

ORGANIZATION OF THE SEMINAR

Prior to the seminar, the CELADE WFS Seminar Organizer, Dr Arthur M. Conning, visited and had extensive correspondence with governmental agencies in countries whose

[1] The seminar was known by its acronym 'SAC-EMF' (Seminario de Análisis y Capacitación con Datos de la Encuesta Mundial de Fecundidad).

Table 2 Country participation in the CELADE-WFS Research and Training Seminar

Country	Participating institution	Topic	National analyst	Institutional affiliation of the analyst[a]
Colombia	Departamento Nacional de Planeación	The inter-relations of fertility and infant mortality	Edgar Baldión	Corporación Centro Regional de Población
	Departamento Nacional de Planeación	Family formation and female labour force participation	Elsa Gómez	Universidad de los Andes
Panama	Ministerio de Planificación y Política Económica	Fertility and female labour force participation	Laura Gougain[b]	CELADE
	Ministerio de Salud	Determinants of infant mortality	Federico Guerra	Ministerio de Salud
Paraguay	Secretaría Técnica de Planificación de la Presidencia de la República	Female labour force participation and fertility	Juan Schoemaker	Secretaría Técnica de Planificación de la Presidencia de la República
Peru	Oficina Nacional de Estadística	Attitudes to fertility and the use of contraceptives	Nelly Mostajo	None
	Oficina Nacional de Estadística	Infant mortality and maternal and infant care	Héctor Ramos	Oficina Nacional de Estadística
	Ministerio de Trabajo	Family formation and female labour force participation	Flor Suárez	Ministerio de Trabajo

[a]At the time of the seminar.
[b]Laura Gougain, the seminar research assistant, secured permission to carry out the study from the Panamanian Sponsoring Agency.

edited WFS data would be available by the time the seminar began. As a result of this effort, governmental institutions from four countries, Colombia, Panama, Peru and Paraguay, selected topics and chose analysts to spend around eight months in CELADE, Santiago, working on the assigned topics. The list of participating institutions is given in table 2.

Bringing the analysts together in the seminar, instead of providing occasional technical assistance to each working in his or her own country, facilitated the training objective of the project and permitted the participants to share their experiences while benefiting from CELADE's population documentation and data processing infrastructure and from being in close contact with the regular staff of the Centre. Except when learning how to use the computer processing facilities and systems, there were no formal classes; the emphasis was on learning the art of research as well as new techniques through actually carrying out, with guidance, in-depth research requiring careful design and complex data manipulation and analysis.

The UN Technical Adviser for the WFS in Latin America, Dr Albert Marckwardt, posted by the UN Population Division to CELADE, acted as the Seminar Director. Because his position involved many other responsibilities unrelated to the seminar, the day-to-day guidance and training of the participants was carried out by a Seminar Co-ordinator, Dr Mauricio Culagovsky, who was invited to spend a year in CELADE for this purpose. The seminar research assistant, Laura Gougain, in addition to her other duties, also undertook an analysis for a national institution that was unable to release an investigator for travel to Santiago. The data processing and documentation specialists of CELADE provided services and assistance whenever needed. A complete list of participants and of the CELADE staff who had an active role in the seminar is given in table 3.

The participants, the Co-ordinator and the research assistant all had their offices in the same physical area to permit daily interaction. Around once a week they met to deal with administrative problems and for each to give a short report on the work accomplished during the previous week. At crucial points within the research cycle of each investigation (literature review, completion of the study design, data processing plan, initial results and final report), an extended substantive presentation was made by the analyst to which regular CELADE staff knowledgeable on the topic were invited.

RESEARCH TOPICS

No effort was made to pre-select the topics that would be studied, since a major objective of the project was to produce the specific analyses required by the participating institutions. However, since the investigations had to be directly relevant for policy or planning purposes, primarily formal demographic or methodological analyses were excluded, although, of course, these could be a part of a policy-oriented study.

Table 3 List of national participants and CELADE personnel who assisted in the work of the seminar

National participants	
Edgar Baldión	Colombia
Elsa Gómez	Colombia
Federico Guerra	Panama
Nelly Mostajo	Peru
Héctor Ramos	Peru
Juan Schoemaker	Paraguay
Flor Suárez	Peru
CELADE: Regularly participating staff	
Albert Marckwardt	Seminar Director (United Nations Technical Adviser for the WFS in Latin America, posted to CELADE by the UN Population Division, NY)
Mauricio Culagovski	Seminar Co-ordinator
Arthur M. Conning	Project Organizer (Head, Population Documentation and Data Processing Programme)
Laura Gougain	Research assistant
CELADE: Occasionally participating staff	
Omar Argüello	
Juan Chackiel	
Margarita María Errázuriz	
Gerardo González	
Johanna Nordam	
Erica Taucher	
Raúl Urzúa	
CELADE: Data Processing and Population Documentation	
Population Data Processing: Personnel	
Abel Packer, Head	
Sergio Acevedo	
Jorge Balzo	
Carlos Howes	
Nelson Piro	
Pedro Sust	
Mariano Vásquez	
Latin American Population Documentation System (DOCPAL): Personnel	
Betty Johnson, Head	
Sandra Acuña	
Texia Iglesias	
María Cristina Sateler	

The organization of the seminar was facilitated by the fact that seven of the eight topics selected (see table 2) fell into two major categories: female labour force participation and fertility, and infant and child mortality. Only one analyst worked on a different topic: contraceptive use. A summary of each study is given in the second part of this publication and basic characteristics of the WFS data sets utilized are shown in table 1.

IN-SERVICE TRAINING

In addition to learning to employ the most appropriate techniques of analysis for each of their specific studies, the participants received training in two important instrumental components of most population research and for which CELADE has developed systems to meet Latin American needs and conditions: (a) the utilization of a documentation system for examining the existing literature on specific topics throughout the research; and (b) use of investigator-oriented computer data processing systems.

Each of the participants learned how to carry out interactive literature searches on a video terminal of the CELADE Latin American Population Documentation System (CELADE/DOCPAL) data base, which has information on around 15 000 books, reports, journal articles, conference papers and other documents on population written in or about Latin America or the Caribbean. The printed output of the searches provided specialized bibliographies with detailed abstracts for the country of study and for the other countries of the region; copies of all documents cited were available in CELADE.[2]

The training of the seminar participants in data processing was based on the assumption that in-depth survey analysis almost always requires complex manipulation of the data, the construction of derived variables, and the generation of new tabulations or statistics to meet the specific needs of the investigator. Rather than work with a limited subset of the variables and make a large number of tabulations at the beginning of a study as is often done to reduce costs when working with the processing systems usually available in the region, it is preferable for the investigator to go back and forth between the data and the theory or problem, clarifying what is being asked of the data as understanding increases. Since programmer and financial resources in Latin America are scarce, such an approach is reasonable only if the computer program packages utilized permit the investigator to write his or her own recoding, tabulation and statistical specifications without having to employ the services of a programmer, and are sufficiently efficient to allow the user to make a few tabulations at a time using any of the variables in the original data set.

[2] These search and document copy services of CELADE/DOCPAL are available on request to all persons in the Latin American region and elsewhere, and a subscription to the journal *DOCPAL Latin American Population Abstracts* can be obtained to keep up to date on new published and unpublished material.

After a few days of training, the participants using video terminals in CELADE connected to an external computer were able to do their own data manipulation and to generate their own tabulations and statistical outputs with the 'user-oriented' Statistical Package for the Social Sciences (SPSS), which is widely available in Latin America and has most of the statistical procedures and data manipulation features required for social demographic analyses. However, the seminar utilized a system in which CELADE interfaced SPSS to the statistical data base management system RAPID, developed by Statistics Canada.[3] RAPID is almost invisible to the researcher who need know little more than the normal SPSS instructions, but allows the production of a few tabulations from the entire set of variables at a cost that is often one-third to one-tenth that of using SPSS alone, and which permits work with hierarchical files under some circumstances.

EVALUATION OF THE SEMINAR

The participants each completed a high-quality, in-depth study for a governmental institution of their country and the reports were edited, printed and distributed within around three months of the end of the seminar. While the analyses vary with the previous knowledge and experience of the participants, in all probability each produced an analysis and report that was more sophisticated and complete than he or she had ever done before or could have done without the guidance and infrastructure provided in CELADE. In addition, all learned to use a computerized documentation system for literature reviews and hypothesis refinement and become proficient in employing the computer creatively for in-depth research with little or no dependence on programmers.

It is instructive to consider organizational differences that appear to explain why the present WFS seminar had a higher completion rate (100 per cent) and higher quality reports than earlier fertility research and training seminars conducted in CELADE. Unlike the previous seminars, the participants were each sponsored by a governmental institution for which they had to analyse a specific research problem that was defined *before* their arrival in CELADE (in the earlier seminars the participants were permitted to choose their *own* topics *after* arrival in CELADE), had eight months (rather than six) to complete their work, were held to fairly rigid deadlines for each stage of their research, and had the PRODUCE (RAPID-SPSS) system that allowed rapid correction of errors in tabulations and the introduction of new variables without generating new work tapes (the earlier seminar used SPSS alone). Another major factor influencing the completion rate was the fact that in the earlier seminars each participant conducted a comparative analysis of four fertility surveys which complicated the analysis and the data processing; in the WFS seminar each person was working on his or her own country.

[3] This system known as PRODUCE (RAPID-SPSS) requires a mainframe IBM computer; it is available from CELADE if the requesting institution has an up-to-date licence from SPSS, Inc.

While few of the participants could have completed their studies in less than the eight months allocated to the WFS seminar, a shorter period would have greatly facilitated the recruitment of national analysts. Various institutions expressed strong interest in the opportunity to undertake WFS studies within the context of the seminar, but could not release an analyst for as long as eight months. In some cases it was possible for them to find a suitable person in another institution.

COPIES OF THE REPORTS

Copies of the reports summarized in the next section may be obtained by writing to Publications, CELADE, Casilla 91, Santiago, Chile. The reports are written in Spanish.

2 Summaries of the Seminar Monographs

COLOMBIA

Edgar Baldión, Corporación Centro Regional de Población
Socio-Demographic Factors Relevant in the Study of Infant Mortality and its Association with Fertility

CELADE, Series D, no. 102, February 1981 (60 pp)

Sponsored by: Departamento Nacional de Planeación, Colombia

INTRODUCTION

The first part of this monograph is concerned with the determinants of infant mortality. Not only are socio-economic and environmental factors considered, but also the more immediate variables such as birth order, the length of the birth interval, and the duration of lactation.

The second part examines the effects of infant mortality on the birth rate. Mortality can increase fertility in three ways: (a) biological effect, exercised through the cutting off of lactation and the consequent shortening of the birth interval to the following child; (b) the replacement effect, whereby women consciously try to replace a child that has died; and (c) the protection effect, whereby women have more children in areas of high mortality than they do elsewhere, because they expect that one or more of their children will die. The biological effect is studied by examining the length of the last closed birth interval among women who did not use contraception in that interval. The replacement effect is studied by looking at the cumulative fertility of women disposed to using contraception, whose last child was wanted and has survived, and who have reached their desired family size. Finally, the protection effect is studied through an examination of the desired family size of fecund women who have not experienced the death of a child and who have knowledge of and access to contraceptives, living in environments of varying levels of child mortality.

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PRINCIPAL FINDINGS

1 The most important determinant of levels of infant and child mortality is the socio-economic status of the family (measured by the level of education of the wife). The differences in mortality between the lowest and highest levels of socio-economic status are considerable, even after controlling for age of the mother, rural-urban residence, and the length of the birth interval. Infant mortality varies inversely with the length of the birth interval which produced the infant, and directly with birth order. The length of birth intervals varies directly with age of the woman and the duration of lactation. The duration of lactation varies directly with age and parity, and inversely with level of education and degree of urbanization. While these intermediate variables (lactation, parity and interval length) vary as expected with infant mortality, their importance pales in comparision with the net effects of socio-economic status.

2 With respect to the biological effect of infant mortality on fertility, there are three principal findings. First, the death of a child prior to completing six months accelerates the birth of the following child by about ten months – a vigorous response to infant mortality. Secondly, despite this response, the overall effect it might have on general fertility levels is almost nil. Thirdly, it would appear that the duration of lactation has a greater impact on fertility levels than does infant mortality.

3 There are also three main findings concerning the replacement effect. First, among the population susceptible to the operation of this effect, ie planners, there appears to be almost 100 per cent replacement of children who die, and this elevates total fertility by about 10 per cent in this population. Secondly, inasmuch as this population has in the past represented only a small fraction of the total population, the impact of the replacement effect on the fertility rate of the total population has been small. Thirdly, given the growing diffusion of family planning technology, future reductions in child mortality can be expected to have an impact in reducing fertility levels.

4 The protection effect appears not to be operative. It was expected that desired family size would correlate positively with infant and child mortality rates across regions, but this did not prove to be the case. (Had the sample been larger, other tests of the protection effect could have been tried, such as completed family size.)

CONCLUSIONS AND RECOMMENDATIONS

Inasmuch as infant mortality rates are determined, to a large extent, by socio-economic status, it is possible to suggest the obvious: the State must raise the general socio-economic level. However, there are also indirect ways in which infant mortality can be reduced: by reducing completed family size and the time taken to achieve this size, and by raising the age at which women begin childbearing. These measures would reduce the mortality

attributable to high parity and mother's advanced age. To reduce completed family size, it is necessary to increase the length of birth intervals, or to increase age at marriage. The first of these can be achieved through use of effective contraceptive methods, and to a lesser degree, by extending the period of lactation. Clearly, then, resources devoted to family planning programmes can have an effect in reducing infant mortality.

If reductions in infant and child mortality can be brought about, this will have a concomitant effect on fertility levels. It is demonstrable that a reduction of 50 per cent in current child mortality rates will, in the future, signify a reduction in the total fertility rate of 5 per cent, independent of desired final family size. While this may appear to be of not great significance, it would imply a yearly reduction of 40 000 births, given current annual fertility rates. If births are viewed as a cost to the State, it is in the national interest to achieve this reduction.

COLOMBIA

Elsa Gómez, Universidad de Los Andes
Family Formation and Female Labour Force Participation in Colombia

CELADE, Series D, no 104, May 1981 (107 pp)

Sponsored by: Departamento Nacional de Planeación, Colombia

INTRODUCTION

The theoretical perspective orienting this study is that the *relation* of labour force participation to fertility is itself a variable, subject to both socio-economic and temporal influences. Attention is focussed on the first birth interval, on the relative timing of subsequent births, on the timing of commencement of contraceptive use, and on cumulative fertility, all in relation to the work history of women. Some use is made of multiple classification analysis.

PRINCIPAL FINDINGS

1 In general, it is found that in urban market-economy settings the participation-fertility relation is negative while in rural and marginal urban settings the relation is either inexistent or positive. The participation-fertility relation also appears to vary depending on the life-cycle stage under consideration.

2 Neither labour force participation nor any other type of socio-economic variable appears to exercise an influence on the duration of the first birth interval (ie the interval between marriage and the birth of the first child). The birth of the first child appears to be virtually a random event in time.

3 Differentials in fertility begin to appear after the birth of the first child. Educational level and occuption affect both the timing of subsequent births and completed family size. The better educated women and those in professional or clerical occupations tend to concentrate their childbearing in the early years of marriage, and to end up having fewer children than others. Women in unskilled and domestic service occupations have children at a slow rate in the early years of marriage, but in the end have nearly as many children as those who never worked.

4 The long-term effect of employment during marriage is to reduce fertility in almost all sectors of the population. The alternative hypothesis that involuntary subfecundity

permits women to work, and that this is the cause of the negative participation-fertility relation, may be rejected. The data indicate that women who work begin use of contraceptives at an earlier stage in their life cycle than non-workers, and that they use them in greater proportion.

5 In the poorest sectors of the population both in urban and rural areas, labour market participation by women is positively correlated with fertility. It is in these sectors that women most often begin working after marriage, rather than before marriage, as is the case in the middle and upper strata of urban areas. This lends support to the thesis that this labour force participation is a response to the economic necessities created by prior childbearing – a survival strategy.

6 The labour force participation rate of women in the middle and upper urban strata tends to be lowest if they have children under five years of age at home. It tends to be highest if the children are teenagers. It is hypothesized that the burden of caring for very young children inhibits labour force participation, while the increased consumption associated with the presence of teenagers encourages mothers to return to remunerated employment.

CONCLUSIONS AND RECOMMENDATIONS

The significant relationships that level of education and labour force participation bear to fertility are evidence in support of the proposition that among the most effective population policies are precisely those programmes aimed at enhancing the role of women in society. In this context, the following policy recommendations are made:

1 Increase the budget for education at all levels. This will not only facilitate the entry of both males and females into the labour force, but also increase the degree of rationality in the society, an element which underlies all planning behaviour.

2 Carry out a study of educational content with the aim of detecting and correcting elements which lead to a stereotyped vision of the sexes. An advance was made in this sphere when a commission was created in 1978 by presidential decree to review school texts; unfortunately the commission never functioned.

3 Incorporate in programmes of family and sex education concrete notions of sexual equality which legitimize and promote the extension of women's roles to spheres other than the domestic, and which legitimize the inclusion of domestic activities in men's roles.

4 Promote by legislation the creation of nurseries in business and industry. Some progress has already been made on this front, but more can be done. In the short run, this promises to be the most effective programme for not only enhancing the role of women, but also for bettering the quality of life of new generations.

PANAMA

Laura Gougain, CELADE
Fertility and Female Labour Force Participation in Panama

CELADE, Series D, no 105, forthcoming

Sponsored by: Ministerio de Planificación y Política Económica de Panamá

INTRODUCTION

The stated purpose of this monograph is to introduce new dimensions in delimiting the types of female insertion into the labour force, the goal being to contribute to the elaboration of a global conceptual framework for analysing the phenomenon. Special attention is devoted to the relationship between fertility and female labour force participation, on the one hand, and to identifying the labour markets to which women have access depending on their individual family and social characteristics, on the other. Cross-tabular analysis is used to determine the timing of labour force activity with respect to matrimony, and to identify the labour markets into which women enter. Later, multivariate analysis is employed to construct explanatory models of female labour force participation.

PRINCIPAL FINDINGS

1 Some characteristics are related to female labour force participation regardless of when this takes place, while others are differentiated according to the timing of such participation. Among the former are current place of residence (city size), residence in childhood, and family size.

2 Work only *after* marriage is related: (a) directly with age and with fertility; (b) in the form of a U with age of the youngest child; and (c) in the form of an inverted U with socio-occupational status. It is unrelated to level of education. These findings suggest that the traditional inverse relationship between fertility and labour force participation is valid only in certain circumstances. Work only after marriage is probably generally motivated by economic considerations, and is therefore conditioned by neither education nor fertility, except in so far as the latter serves as a proxy for economic necessity.

3 Labour markets may be classed as informal and formal, and the latter as low level, and medium or high level. The characteristics of married women entering these markets

are distinct. Women engaged in the formal medium or high-level market tend to be better educated, of metropolitan residence, and are characterized by a lower than average fertility. The only outstanding characteristic of women in the low-level formal market is that of high fertility. Women in the informal market have generally little education, tend to live in non-metropolitan areas and are characterized by higher than average fertility.

4 According to a multivariate analysis, marital female employment rates are highest among women who worked before marriage in the medium or high-level labour market, among the better educated, among those of medium socio-occupational status, and among those in families with a domestic servant.

DISCUSSION

Based on the findings of this study, it is evident that any effort to modify female labour force participation – whether to increase or decrease its intensity – must be based on a detailed analysis of the labour markets and of the socio-occupation strata to be affected. Contrary to what might have been expected, it seems likely that lowered fertility, brought about by a successful family planning programme, will not, in itself, bring about important changes in female labour force participation.

PANAMA

Federico Guerra, Ministerio de Salud
Determinants of Infant Mortality in Panama

CELADE, Series D, no 99, February 1981 (87 pp)

Sponsored by: Oficina de Estudios de Población, Ministerio de Salud, Panama

PRINCIPAL FINDINGS

1 Between the two periods 1955–9 and 1970–4, the rate of infant mortality in Panama declined from 58 to 35 per thousand. Most of the decline is attributable to declining rates of post-neonatal mortality, due to reductions in infectious and parasitic diseases.

2 The age of the mother at giving birth, her parity, the length of the birth interval, and the sex of the child all play a role in determining the likely survivorship of an infant. Over a 35-year period (1940–74), infant mortality rates for children of mothers under age 20 (62 per thousand) and of age 30 or more (56 per thousand) have been much higher than for those children of mothers in their 20s (41 per thousand). As in many countries (but not universally), infant mortality bears a J-shaped relation to parity: it has been lowest for second and third order births (44 per thousand), intermediate for the first order births (51 per thousand), and highest for births of order four or above (56 per thousand). Infant mortality rates are approximately four times greater for children the product of a birth interval of less than 12 months than for others. The infant mortality of males is 17 per cent higher than of females (54 vs 46 per thousand).

3 The most significant social differentials of infant mortality are the mother's educational level and the father's occupation. During the period 1940–74, the infant mortality rate for mothers having less than six years of schooling averaged 66 per thousand, as compared to 37 per thousand for those with six or more years of formal education. The infant mortality rate for children of white collar fathers was 34 per thousand; for blue collar workers, 46 per thousand; and for farmers and labourers, 66 per thousand. The place of residence is also important: infant mortality rates were 40 per cent higher in rural areas than in urban areas.

4 Housing conditions such as type of water supply, sewage disposal and number of persons per room are in varying degrees related to infant mortality rates. Women living in dwellings without piped water have experienced 40 per cent higher infant mortality than

others; those living in residences without a private bathroom connected to a sewage system have had 63 per cent higher infant mortality than others; and those living in crowded conditions, more than three persons per room, have experienced 12 per cent higher infant mortality than others. The magnitude of the differentials by water supply and sewage disposal are much greater in rural than in urban areas. On the other hand, the degree of crowding is of importance only in urban areas.

5 When infant mortality is examined taking into account both housing conditions and characteristics of the mother (education, age and parity), it is these latter that are of greater importance. The educational level of the mother is of overriding significance, particularly when housing conditions are not optimal. Age and parity assume importance only if the housing conditions are very good. Evidently, schooling beyond a certain minimal level prepares a mother to cope with unfavourable environmental conditions in bringing up her children. While the characteristics of the mother are, in general, of greater importance than housing conditions in determining levels of infant mortality, this is especially so in the case of neo-natal mortality. But housing conditions are of almost equal importance with the mother's characteristics in the case of post-neonatal mortality.

CONCLUSIONS AND RECOMMENDATIONS

The author contends that the decline over time of the infant mortality rate in Panama can be explained by improvements in housing conditions and in the levels of education achieved by mothers, on the one hand, and, on the other, by expansion in the coverage and quality of the mother-child programmes that the Ministry of Health has been carrying out. To reduce infant mortality still further, the following measures should be taken:

1 Orientation programmes for future mothers should be created with a view to advising them concerning the risks of pregnancy at very young ages and at advanced ages; concerning the negative effect on the health of both mother and children if she has many children; concerning the importance of adequately spacing her children; and concerning the importance of adequate diets for both mother and child.

2 Educational programmes should be developed at the primary school level to teach children the basic principles of sanitation and hygiene: this is important inasmuch as many girls, even now, do not go on to secondary school.

3 Continue with programmes for the provision of piped potable water and sewage systems to communities where these do not yet exist. In this regard it should be noted that since 1979 the Ministry of Health has been implementing a plan to bring potable water to all villages of 500 or more inhabitants. But attention must also be paid to instructing villagers in basic sanitation measures in those smaller communities where water and sewage installations are not yet available.

PARAGUAY

Juan Schoemaker, La Secretaría Técnica de Planificación, Presidencia de la República
Female Labour Force Participation and Fertility in Paraguay

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Sponsored by: La Secretaría Técnica de Planificación, Presidencia de la República, Paraguay

INTRODUCTION

The study of the relationship between female labour force participation and fertility cannot be undertaken in abstract terms. The author's review of the literature reveals that both the nature of the work and its significance in different social strata must be taken into account. Such characteristics as level of education, socio-economic status, and rural-urban residence also undoubtedly intervene in the participation-fertility relationship. To disentangle this complex relationship, the author concentrates his analysis on four key dependent variables: age at first marriage, timing of the first birth, cumulative fertility, and births in the past five years. Extensive use is made of multiple classification analysis.

PRINCIPAL FINDINGS

1 The level of education of women appears to be the major explanatory factor in determining age at marriage. Women with a relatively high level of education tend to marry later than others. More or less the same relationship, albeit much weaker, exists between occupational level and age at marriage. Women in non-manual occupations marry later than those in manual or agricultural occupations, and much later than those who do not work. Age at marriage is, of course, one of the principal determinants of marital fertility.

2 Women who work after the start of their first marriage tend to postpone their first birth, in comparison with those who have not worked in this interval. This is especially true in urban areas, where the existence of a more complex and developed mode of production makes the dual roles of mother and worker less compatible.

3 The number of children women bear varies inversely with occupational level, educational level, and degree of urbanization. Women who work in non-agricultural occupations, especially if these are non-manual, those who have at least some secondary

education, and those who live in the capital, Asunción, have significantly fewer children than others. This appears to be related to a conscious effort to limit family size, inasmuch as an increase is noted in the frequency of use of contraceptives parallel to a decrease in fertility for women in the various categories of the afore-mentioned independent variables.

4 *Where* the woman works is apparently the most important factor in determining the fertility of working women. Those who work away from the home have appreciably fewer children than those who work at home, or on the family farm.

5 The foregoing findings lend support to the thesis that to the degree that the processes of modernization, urbanization and industrialization are under way, and to the extent that women are involved in these processes, fertility will exhibit a concomitant decline.

CONCLUSIONS AND RECOMMENDATIONS

Paraguary has no explicit official policy regarding fertility levels. Its demographic policy has three objectives: reduce congestion in areas of 'minifundios'; facilitate the repatriation of Paraguayans living in neighbouring countries; and promote the in-migration of foreigners. This policy arises from the fact that Paraguay has comparatively few inhabitants (fewer than three and a half million). The war of 1870 was very costly in lives, and later Paraguay did not experience the waves of European in-migration that did its Atlantic Coast neighbours. The current process of modernization and development is bringing about the inevitable decline in fertility, a decline which the author considers premature in view of the necessity of expanding the domestic market.

In an attempt to minimize the incompatibility between childbearing and female participation in the labour force, the following recommendations are made:

1 Labour legislation should be enacted requiring business and industrial establishments having a certain minimum number of employees to provide a nursery where mothers wanting to work can leave their children during working hours. These nurseries should be free, or at most cost less than alternative arrangements.

2 A governmental programme should be established to promote work at home, thus providing employment for the female labour force without forcing mothers to leave home.

3 Given that the data suggest that the cost of children increases in parallel with increasing urbanization and modernization, due principally to pressures to dress and educate children better, thought should be given to creating a system of bonuses to working mothers for each child borne, thereby offsetting to some extent the cost of rearing that child.

4 The programme for agricultural development should include projects aimed at bettering the labour conditions of female agricultural workers. These women bear children at a lively pace. The object of bettering their working conditions, aside from humanitarian considerations, would be to slow down the process of rural to urban migration and the accompanying pressures to reduce fertility.

The implementation of these measures would probably not completely detain the process of declining fertility, since this is caused by a whole series of factors. But it might help slow down the process, thereby permitting expansion of the domestic market.

PERU

Nelly Mostajo
Women's Attitudes to Fertility and the Use of Contraceptives

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Sponsored by: Oficina Nacional de Estadística, Peru

PRINCIPAL FINDINGS

1 Based upon a comparison of data from a 1969 survey of rural and urban areas (excepting Lima) with those from comparable areas in the National Fertility Survey of 1977, it is shown that knowledge of contraceptives among ever-married women increased from roughly 50 per cent to over 80 per cent during that eight-year period. The knowledge of effective methods grew to the same extent as did knowledge of ineffective methods. During the same period, the proportion of women who had ever used a contraceptive method increased by 80 per cent (from 27 per cent to 48.5 per cent). The increase in the number of women who had used only ineffective methods was greater than the increase in the number who had used an effective method (93 vs 67 per cent). Most of the growth in knowledge and use of contraceptives occurred among women in the younger age groups (20–29).

2 Parallel to this expansion in knowledge and use of contraceptive methods, important changes occurred in the fertility preferences of women. (The following comparisons are restricted to women living in places of under 20 000 inhabitants, for reasons of data comparability.) The mean number of additional children desired, by women exposed to the risk of pregnancy with at least one living child, decreased from 0.61 to 0.55 between 1969 and 1977. The decrease is especially pronounced for women of higher parity. (In both years, roughly three-quarters of these same women wanted no additional children.) Another measure of fertility preferences is the 'ideal' number of children. Over the eight-year period this ideal decreased from 5.1 to 4.0 for all ever-married women. The decreases in ideal family size are especially notable among younger women and those of lesser parity. The ideal for women with two living children decreased from 4.8 to 3.1.

3 As a result of the foregoing findings, the question arose as to whether or not the decreasing ideal family size was responsible for increasing contraceptive use. This could be studied, using data from the 1977 survey, through two analyses: (a) relating the 'wantedness' of the last pregnancy to contraceptive use in the last closed birth interval; and (b) relating the desire for more children to current contraceptive use. The variable which proved to have the most explanatory power in predicting contraceptive use in the

last closed interval, more important even than educational level and other socio-economic indicators, was whether the last pregnancy was wanted. The incidence of contraceptive use was three times as great among women who had not wanted their last pregnancy as among the rest. However, current contraceptive use is not explained by whether or not women want to have more children. (The best predictor of current use is the educational level of women.) This is due to the fact that roughly one third of users are apparently 'spacing', ie they want another child someday but are nevertheless using contraception. The spacers tend to be young, of low parity, urban residents, of high educational level. The presence of these spacers tends to distort the relationship which otherwise might prevail between the desire for more children and contraceptive use.

4 The level of unwanted fertility in Peru is very high: 46 per cent of women did not want their last pregnancy. Based on this, it has been estimated (by Westoff) that a woman has an 80 per cent probability of having an unwanted child in the ten years following the birth of the last wanted child, leading, on average, to the birth of two unwanted children during that period. There are other measures of the unsatisfied need for contraceptives: 61 per cent of women exposed to the risk of pregnancy do not wish to bear a child; 54 per cent of the women who do not want another child are not currently using any form of contraception. Thus, nearly one-third of all exposed women are in the position of not wanting more children, yet not being protected by a contraceptive, a situation which will inevitably lead to the births of many unwanted children.

CONCLUSIONS

The increasing use of contraceptives, which has occurred in the absence of organized family planning programmes, demonstrates that the motivation for limiting or spacing births has increased appreciably in the last decade. The fact that the growth in use of ineffective contraceptive methods has been greater than the growth in use of effective methods indicates a lack of proper orientation of women with respect to family planning.

This situation was considered in the preparation of the document entitled *Guidelines for a Population Policy* (Executive Office of the President 1976). Among other objectives outlined is that of 'creating the subjective and objective conditions to assure the free choice of couples concerning the size of their family and the timing of their births'. More recently, in 1980, a National Population Council was created to promote and co-ordinate activities connected with the population policy. One of the aims of the Council, within the context of an integrated mother-child health care programme, is that of reducing the birth rate. It is planned to offer a wide range of contraceptives to couples who voluntarily decide to use them.

The author expresses the hope that the results of this study will be useful to policy-makers in the Ministry of Health in identifying those sectors of the population most in need of orientation with respect to the control of their fertility.

PERU

Héctor Ramos, Oficina Nacional de Estadística
Infant Mortality and Maternal and Infant Care in Peru

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Sponsored by: Oficina Nacional de Estadística, Peru

PRINCIPAL FINDINGS

1 The levels of infant and child mortality in Peru are high in comparison with those of most other Latin American countries. For the period 1971–5, the probability of dying before completing the first year of life was 103 per thousand, and of dying prior to age five, 156 per thousand. There have been some improvements over time: in the past 20–5 years the probability of dying before age one has declined by about 30 per cent, and of dying before age five by over 35 per cent. Infant and child mortality rates are 50–80 per cent higher in rural areas than in urban areas. Regional differences are pronounced: the probability of dying before age five is 50 per cent greater in the sierra than on the coast (excluding Lima), and 200 per cent greater than in Lima.

2 The decline over time of infant mortality rates is due more to declines in post-neonatal mortality than to declines in neo-natal mortality. This is undoubtedly due to improved sanitary conditions and public health measures. Infant mortality rates are higher for males than for females; they increase in a linear fashion with parity; they are lowest for women aged 20–29 at the time of giving birth. There has been almost no decline over time in infant mortality rates in coastal cities (excepting Lima), due probably to the effects of heavy in-migration from the sierra in the past two decades. The expected relationships between infant mortality and a series of variables representing socio-economic status are observed, ie educational level, occupational level, urban-rural residence, and the type of area in which the mother grew up (countryside, town, city).

3 The results of a multiple classification analysis, examining whether or not mothers have experienced the death of a child (controlling for parity), reveal that the two most important explanatory factors are the educational level of the mother and the region of residence. The sierra has by far the highest incidence of child mortality, followed by the jungle, with the coast having the lowest incidence. Of only secondary importance are the urban-rural and city size differentials, once account has been taken of parity, region and educational level.

4 With respect to maternal and infant care, only 51 per cent of mothers had pre-natal checks during their most recent pregnancy; 59 per cent delivered the baby at home, and only 48 per cent had professional attention during the delivery. The differentials are striking: 81 per cent of mothers in Lima received pre-natal checks vs 18 per cent in rural areas; 91 per cent of mothers with some secondary education had professional attention during the delivery vs 19 per cent of mothers with less than three years of schooling. As to infant care, 61 per cent of the most recent babies received medical attention during the first few months after birth, and 69 per cent were vaccinated. Again the differentials are strong: 86 per cent of babies in Lima received medical attention vs 34 per cent in rural areas; 75 per cent in the coast (excluding Lima) vs 43 per cent in the sierra. It is instructive to note that the differentials of maternal and infant care are the same as those of infant mortality, but of opposite sign.

CONCLUSIONS AND RECOMMENDATIONS

The most important conclusions to be drawn from the study are that level of education, region of residence, and urban-rural residence are the three most important characteristics determining levels of infant mortality as well as the quality of maternal and infant care. As a result, the following recommendations are made:

1 Vigorous campaigns must be undertaken to build schools in, and bring teachers to the outlying small towns and rural areas.

2 Another major task will be to widen the coverage of primary health care by building health posts and bringing doctors to the outlying areas.

3 It will be necessary to overcome the tradition of isolated sectoral actions, and assure that an integrated approach is taken to solving problems such as nourishment, health, environmental cleanliness, housing, employment, education and productive resources. These aspects of life are so interrelated that it will be impossible to improve one of them without simultaneously making advances with the others.

4 It is necessary to ensure that communities actively participate in health programmes. This can be achieved through lectures on basic sanitary measures; campaigns for piping waste waters; and campaigns to make pregnant women aware of the desirability of pre- and post-natal care.

Flor Suárez, Ministerio de Trabajo
Family Formation and Female Labour Force Participation in Peru

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Sponsored by: Dirección General del Empleo, Ministerio de Trabajo, Peru

INTRODUCTION

This monograph, prepared for the Ministry of Labour, has as its principal theme the prediction of female labour force participation. Attention is devoted to how childbearing affects participation rates, rather than vice versa. The principal dependent variables analysed are age at first marriage, timing of the first birth, abandonment of the labour force upon marriage or upon birth of the first child, and current female labour force participation rates in urban areas. Extensive use is made of multiple classification analysis.

PRINCIPAL FINDINGS

1 Participation in the labour force prior to marriage by women has an important effect on age at marriage. Women who worked have married, on average, 1.5 years later than those who did not. Other important factors intervening in the determination of age at marriage are the level of education and rural-urban childhood residence. Better educated women and those brought up in urban areas tend to marry later than others. Among working women, postponement of first marriage is most typical of the 'higher' occupational strata, namely professional, administrative and clerical occupations.

2 The timing of first birth appears to be a phenomenon completely unrelated to such characteristics of the mothers as labour force status and occupation prior to marriage, level of education, and work status during the first birth interval, among others. Only two per cent of the variance in the length of the first birth interval can be explained by a combination of these variables, using multiple classification analysis.

3 Looking at the relationship from the opposite angle, it was hypothesized that women who worked full time, especially those in the higher occupational strata, would be more likely to abandon the labour force upon marriage or the birth of their first child than women who worked part time or only seasonally. This hypothesis had to be rejected, also.

4 Looking at non-agricultural current labour force participation rates in urban areas among fecund women with at least one living child (36 per cent participation), it is found that the two most important determinants are city size and life-cycle stage. The highest participation rates are in the large cities, excluding Lima, and among women aged 35–44 or whose youngest child is at least six years old. Participation rates tend to be lower among women with more than three living children. Interestingly, they do not vary with social status (measured by an index of educational attainment of the couple).

5 With respect to the type of insertion in the labour market of this same population (urban, non-agricultural, fecund with at least one living child), only 39 per cent of working women can be characterized as simultaneously working full time, year around, and away from home. The major determinants of this type of participation are no longer city size or life-cycle stage, but rather the occupational stratum of the husband and the woman's educational level. The better educated women and those whose husbands are professional, administrative or clerical workers are most likely to have this type of major commitment to their employment.

CONCLUSIONS AND RECOMMENDATIONS

A majority of urban women workers are only marginally attached to the labour force, working seasonally, or part time, or at home. Generally this group is engaged in manual work, or in sales or services. It is apparent that these women, characterized by higher than average fertility, work out of necessity to supplement their family income. Their low level of education, supplemented by a heavy child-care burden, restricts their access to more productive employment.

One of the aims of Peru's population policy is to 'promote the incorporation of women to the labour force, eliminating socio-economic, cultural and legal barriers which complicate their incorporation'. To accomplish this it will not only be necessary to create new employment opportunities, but also to establish programmes directed at training women to occupy a productive role in the economy. Joint programmes should be worked out by the Ministries of Labour and Education.