EDUCATION AND CONTRACEPTIVE KNOWLEDGE IN RURAL AREAS OF FOUR LATIN AMERICAN NATIONS

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Résumé — Dans cette étude, on s'efforce d'expliquer l'influence de l'éducation sur la connaissance de la contraception dans les régions rurales et les petites agglomérations urbaines de quatre pays de l'Amérique Latine nommément: La Colombie, la Costa Rica, le Mexique et le Pérou. L'enquête est basée sur un modèle concernant la circulation de l'information dans lequel la scolarisation de la répondante, celle de son mari et le niveau général de scolarité de la communauté dans laquelle le répondant vit, sont considérés comme étant des sources de connaissance indépendantes. La lecture des journeaux est introduite comme une variable d'intermédiaire entre l'éducation formelle et la connaissance de la contraception. Ces quatre variables indépendantes présdisent toute la connaissance des contraceptifs, mais l'éducation de l'épouse vient en tête. Le degré de scolarisation de la communauté du répondant est un important indicateur de la diffusion de l'information. Au Pérou la connaissance de la contraception est, en grande partie, limitée à une minorité de femmes ayant un niveau d'instruction relativement élevé et vivant dans des communautés moyennement ou très scolarisées. Au Mexique et en Colombie, les femmes ayant reçu une instruction au-dessus de la moyenne ont tendance à connaître les contraceptifs, quel soit de degré de scolarité de la communauté où elles vivent. En Costa Rica, presque tout le monde a une certaine connaissance de la contraception. C'est pour la situation péruvienne que le modèle donne les meilleurs résultats, montrant ainsi son efficacité pour décrire les étapes naissantes de la diffusion de la connaissance contraceptive. Ces résultats comportent certaines implications pour les gouvernements et les administrateurs de programmes de planification familiale qui voudraient améliorer la connaissance contraceptive au moyen de campagnes de publicité dans les média.

Abstract—This paper seeks to explain the influence of education on contraceptive knowledge in rural and small urban areas of four Latin American nations: Colombia, Costa Rica, Mexico and Peru. The investigation is based on an information flow model in which the respondent's own schooling, her husband's schooling, and the general level of schooling in the community where she lives are considered independent sources of knowledge. Newspaper reading is introduced as a variable mediating between formal education and contraceptive knowledge. All four independent variables predict knowledge of contraceptives although the wife's education is by itself the best predictor. The level of education in the respondent's community is an important indicator of information spread. In Peru contraceptive knowledge is largely confined to a minority of women who have relatively high levels of schooling and who live in communities with moderate or high levels of schooling. In Mexico and Colombia, women with above average education tend to know about contraceptives, regardless of the level of general education in the community where they live. In Costa Rica almost everyone has some contraceptive knowledge. The information flow model serves best for Peru, thus showing its function in incipient stages of the diffusion of contraceptive knowledge. These results imply certain conclusions for governments and family planning programme administrators who may wish to change levels of contraceptive knowledge through directed media campaigns.

Key Words—contraceptive knowledge, information flow model, schooling

The relationship between socio-economic development and fertility decline is an extremely complicated one, involving many separate features of institutional change, such as urbanization, increased levels of literacy and shifts in the costs and benefits of large families.

Figure 1 describes the relationship between selected elements in this broad hypothesis. Arrows in this model suggest that antecedent variables may influence consequent variables both directly and indirectly. For example, level of community education may influence a woman's contraceptive knowledge directly (the lower arrow in the model) or indirectly through its relationship with her husband's education (the upper arrow in the model).
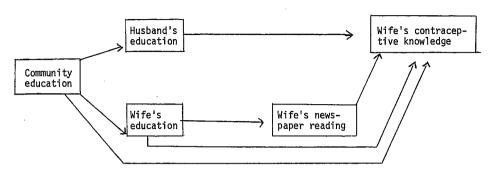

FIGURE 1   AN INFORMATION FLOW MODEL OF CONTRACEPTIVE KNOWLEDGE

The first part of the paper describes the sample and the measures developed for our analysis. Particular attention is given here to the development of a measure of educational level for the wider community in which the respondent lives. A second part of the paper describes the correlations between education of the wife, of the husband and of the wider community, and how these in turn are correlated with other indicators of information flow, such as newspaper reading, and with indicators of socio-economic development, such as the existence of running water and electric light in the house. A third part of the paper analyzes the relationship between some of these variables. A key issue here is whether husband's and community's educational levels are independent predictors of contraceptive knowledge and practice once the wife's education has been controlled. The final section of the paper discusses the principal findings.

THE SAMPLE AND THE MEASURES

The analysis is based on data from the Programme of Comparative Fertility Surveys in Latin America (PECFAL-Rural) in which representative samples of 2,100 to 3,000 women between 15 and 49 years of age who lived in the rural parts or places of less than 20,000 inhabitants of Colombia, Costa Rica, Mexico and Peru were interviewed. Although the original data refer to single and married women, for this study we only included "women in union" (married or consensually mated) at the moment of interview.

The variables used and their distributions are shown in Table 1. The following paragraphs describe the rationale for choosing these measures and some of the limitations of each measure.

Education

The measures of education of husband and wife were constructed from the question: "Which year (grade level) of schooling (of education) did you finish?" The responses were coded in years of schooling completed. Table 1 shows the distribution of respondents by education in three categories: without schooling, some primary schooling, primary schooling completed or more. For regression and path analysis the exact number of years of schooling of each respondent was used.

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they as individuals were exposed. For classification purposes the PSUs were divided into quartiles; the "communities" where average years schooling was in the top quartile (25 per cent of all communities in the four countries together) were coded as "very high" on community education, the next 25 per cent were coded as "high" and so on. Distributions of respondents in the PSUs classified by level of community education are shown by nation in Table 1.

The adequacy of our measure of "community education" rests on the extent to which the sample in each PSU really represents the population living there. In order to assess the representativeness of the sample estimates derived from the survey, Torrealba (1973) used census data to calculate the proportion of residents with running water, radio and electricity in their homes, for each of the census regions corresponding to the PSU in the PECFAL-Rural sample. The survey itself contained questions to determine, for example, whether or not the respondent had running water in the home. Survey estimates of the proportion of respondents with running water in each region correlate rather well with estimates derived from the census data. For example, for running water the correlation (Pearson r) for Costa Rica is .86; for Colombia, .52; and for Mexico it is .65. Other correlations are, in general, somewhat lower but never fall below $r = .41$ (Torrealba, 1973; Table 1). An independent analysis carried out for the present paper indicates that aggregate measures of education (per cent with some schooling) for each "community" derived from the survey data also correlated rather well with the census estimates. For example, the correlation (Pearson r) in Colombia, a country for which corresponding census data were readily available, was .59. The magnitude of all these correlations is surprisingly high when one considers that the census data were collected five to eight years (depending on the nation) before the survey data, and that many changes may have occurred in the "communities" over this period. Moreover, even with corrections, the census and survey data do not always correspond to precisely the same geographical area. We take this as positive support for the representativeness of the survey and for the accuracy of the aggregate estimates of education based on it.

Mass Communication

Newspaper reading was used as the measure of mass communication. The question was asked: "Do you read newspapers" and in the affirmative case, "How often?" For correlational analysis this variable in correlations was coded in two categories: never reads; reads sometimes, or daily.

Contraceptive Knowledge

Various measures of contraceptive knowledge exist in the questionnaire. One question asked: "Do you know whether a man and his wife can do anything to prevent pregnancies (not to have children)?" Another asked: "There are things which are very distinct from an abortion which a doctor or a nurse can teach you in order not to have more children and thus have them when you want them. Did you hear of such things?" Another series of questions provides information on each scientific contraceptive method separately and asks the respondent whether she has ever heard of the method. Analysis of the data indicated that some women had heard of contraceptive methods which, because of embarrassment or lack of familiarity with their correct names, they hesitated to describe to the interviewer in response to open-ended questions (Ponce, 1973). In the present analysis contraceptive knowledge is defined as the recognition of at least one contraceptive method named by the interviewer. It should be kept in mind that approximately 90 per cent of these women independently named or described at least one contraceptive method before the list was read to them.

TABLE 3   PER CENT DISTRIBUTION OF WIFE'S EDUCATION BY
EDUCATIONAL LEVEL OF HER "COMMUNITY"

District's educational level a /	Costa Rica					Colombia					Mexico					Peru				
	1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total
Wife's education:																				
without schooling	10	17	25	33	18	10	18	26	54	27	17	18	31	59	37	17	31	35	68	46
primary incomplete	59	67	64	56	63	53	63	62	39	56	56	65	60	39	52	39	49	46	26	34
primary complete or more	31	16	11	11	18	37	19	12	7	17	27	17	17	2	11	44	20	19	6	20
Number of cases	283	704	250	36	1,273	283	390	705	329	1,707	187	309	786	689	1,971	412	77	369	873	1,731

a/ 1: educational level of the district is based on quartile distribution of the total sample.
   1 = very high (upper 25 percent of the districts);
   2 = high;
   3 = (low);
   4 = very low (lowest 25 percent of the districts).

information to people of all age groups and as such may have a direct impact on adult knowledge in specific fields. To show the interrelations between the information flow variables a correlation matrix for all four countries together is given in Table 4. All these variables are related with other measures of integration in the modern community, such as the existence of running water and/or electric light in the respondent's house. The wife's education correlates (Pearson r) at .65 with her husband's education, at .56 with her own newspaper reading; and at .40 with both "community" education and "community" services (proportion of homes with light and/or running water).

TABLE 4   CORRELATIONS BETWEEN MEASURES OF EDUCATION, LEVEL OF
LIVING AND MASS MEDIA CONTACT

	1	2	3	4	5	6 a/
1. District's educational level	–	.29	.40	.36	.46	.32
2. Husband's education	.29	–	.65	.36	.34	.23
3. Wife's education	.40	.65	–	.56	.40	.34
4. Newspaper reading	.36	.36	.56	–	.33	.34
5. Water or electric light in the house b/	.46	.34	.40	.33	–	.33
6. Contraceptive knowledge	.32	.23	.34	.34	.33	–

a/ Numbers refer to the variables of the first column.

b/ Electric light/water: 1) nothing; 2) electric light; 3) water; 4) electric light and water.

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respondents live. In such a setting, a woman has a better chance of learning about contraceptives if she receives "news" from outside.

Community education and wife's own education also are independently related to contraceptive knowledge in all four nations (Table 6). Together they permit a better prediction of wife's contraceptive knowledge than either variable considered alone. However, as with the other patterns of relationship described in this section, the influences of the two independent variables (community education and wife's education) on contraceptive knowledge varies somewhat from one nation to another, which in itself is interesting. For example, the wife's own education has a fairly weak independent influence on contraceptive knowledge among women in those Costa Rican communities where overall educational levels are high. It would appear that general levels of contraceptive knowledge are sufficiently high in Costa Rica that a woman need not have much schooling in order to obtain information on this topic. The presence of urban family planning programmes in Costa Rica prior to 1969, and the gradual expansion of these into rural areas around the time of the survey, may have helped to spread knowledge. Peru provides a contrasting case where a high level of community education is not enough to bring a poorly educated member of the community into contact with information about contraception. In contrast to the results for the other nations, Peruvian women with no schooling resident in communities with very high average levels of educational attainment are still ignorant of contraceptives. The strength of the relationship between education (of the wife or of the community) and contraceptive knowledge declines as the overall average level of education in the country increases. Thus, the relationship between education and contraceptive knowledge is strong in Peru and weak in Costa Rica.

TABLE 6   PER CENT DISTRIBUTION OF WOMEN WITH CONTRACEPTIVE KNOWLEDGE
BY DISTRICT'S EDUCATION LEVEL AND WIFE'S EDUCATION

District's educational level a/	Costa Rica				Colombia				Mexico				Peru			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Wife's education:																
Without schooling	85	73	73	(67)b/	72	54	43	50	58	60	37	39	19	18	11	11
Primary incomplete	90	85	77	85	78	71	65	65	60	68	51	52	55	48	22	15
Primary complete or more	99	95	93	*c/	88	87	87	74	90	89	87	(88)	68	(75)	69	48
Number of cases	283	704	250	36	283	390	705	329	187	309	780	689	412	77	369	873

a/ 1: Very high education level;
   2: High;
   3: Low;
   4: Very low.

b/ Data between brackets refer to categories from five to twenty cases.

c/ Less than five cases.

The previous indicates that husband's education, community education, and wife's newspaper reading each has an independent influence beyond that of wife's education in predicting her contraceptive knowledge. In order to establish both the relative importance of each predictor and the predictive power of each of them over and above the prediction provided by the other predictor variables, several multiple regressions were carried out on the data for each country.

In the regression analysis, as in the path analysis used in the next section, it is assumed that the variables are normally distributed and that the independent variables are linear and

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TABLE 7   STEPWISE MULTIPLE REGRESSIONS ON CONTRACEPTIVE KNOWLEDGE

Predictor variable	Costa Rica			Colombia			Mexico			Peru		
	Beta a/	r b/	R c/	Beta	r	R	Beta	r	R	Beta	r	R
Wife's education	.12	.19	.19	.18	.25	.25	.20	.29	.29	.23	.45	.45
Husband's education	.09	.18	.21	.06	.21	.26	.09	.24	.30	.15	.40	.46
Educational level of the district	.09	.13	.22	.10	.17	.27	.07	.18	.31	.24	.40	.51
Husband's education	.09	.18	.18	.06	.21	.21	.09	.24	.24	.15	.40	.40
Wife's education	.12	.19	.21	.18	.25	.26	.20	.29	.30	.23	.45	.46
Educational level of the district	.09	.13	.22	.10	.17	.27	.07	.18	.31	.24	.40	.51
Newspaper reading	.11	.18	.18	.21	.29	.29	.15	.26	.26	.21	.46	.46
Wife's education	.12	.19	.22	.12	.25	.31	.19	.29	.32	.21	.45	.49
Educational level of the district	.09	.13	.24	.07	.17	.32	.07	.18	.33	.20	.40	.52

a/ Beta: Coefficient which indicates the net influence in the dependent variable, holding constant the other
predictor variables entered in the analysis.

b/ r: Correlation coefficient.

c/ R: Multiple correlation coefficient which indicates the cumulative predictive power of the "explanatory"
variables.

community education is the only exogenous variable. In second place are the *endogenous;*
these are variables which are at least in part dependent on other variables within the system.
Contraceptive knowledge is an endogenous variable in our model, as are: wife's education,
newspaper reading, and husband's education. Finally, we may distinguish several *residual*
variables; these are hypothetical variables introduced in the model to account for the residual
variance in the endogenous variables (that is, to account for the variance unexplained by the
exogenous and endogenous variables). By definition, all variance in the model is explained by
some combination of these three variables.

Path Analysis Results for Peru

We examined our causal model with the data for Peru, since it is in this country that we
find the highest relationships between wife's education and contraceptive knowledge. Some of
the results for this analysis are shown in Figure 2 (three explicative variables) and Figure 3
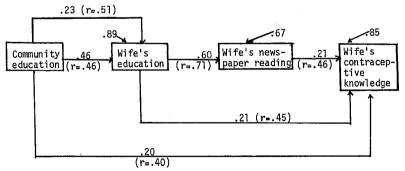

FIGURE 2   A PATH MODEL OF CONTRACEPTIVE KNOWLEDGE IN PERU —
USING THREE EXPLICATIVE VARIABLES

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contribute any new findings to those outlined above. For example, the existence of running water and electric light in the house as a second exogenous variable (in addition to community education) does not change the total prediction nor the pattern of interrelationships greatly.

Path Analysis Results for Costa Rica, Colombia and Mexico

The model described above does not serve as well in the other nations, hence we do not present the detailed path analysis results for them. For example, in Costa Rica, the combination of all predictor variables (including husband's education and running water/electric light in the house) explain only a small proportion of the variance in contraceptive knowledge. Newspaper reading is of little importance in this model. The variable with the highest explicative contribution is the presence of running water and electric light in the home, although the direct path coefficient of this variable on contraceptive knowledge is only .11. In Colombia and Mexico the levels of prediction are somewhat better, but do not reach the level shown previously for the Peruvian data. In both of these countries the influence of wife's education on contraceptive knowledge goes partially through newspaper reading, but the effect is not as strong as it is in Peru.

DISCUSSION

In this paper we have sought to describe the influence of various measures of education and associated variables on contraceptive knowledge among women living in rural and small urban settlements in four Latin American nations. It was found that education of husband and wife apparently make a contribution to predict contraceptive knowledge. However, in regression and path analyses, it turns out clearly that wife's education is the single best predictor of knowledge. The data suggest that when the diffusion of knowledge is at a very early stage, as it is in rural Peru, a great part of the relationship between wife's education and contraceptive knowledge is mediated by newspaper readers (better educated women read more) and is related to the fact that better educated women tend to live in communities where average levels of education are higher such that contraceptive knowledge is more readily available from friends, relations and neighbours. As contraceptive knowledge becomes more widespread, as is the case in rural Costa Rica, factors other than schooling account for the differences in contraceptive knowledge. We do not know what these factors are in the case of Costa Rica, but they appear unrelated to the spread of education, mass media and modern services, such as electricity and running water. We conclude that the information flow model which prompted the investigation in this paper serves best for the early stage of contraceptive diffusion such as we find in Peru, and to a lesser degree in Colombia and Mexico.

It should be recalled that the data on which this analysis is based were collected in 1969. At that date family planning activities at the national level with rural outreach had been under way for only a few years in Costa Rica; they were about to be initiated in Colombia but had not yet been actually started; and they had not been initiated at all in Mexico and Peru (Mexico began a family planning programme three years later; Peru still has none). Thus, with the partial exception of Costa Rica, the findings in this paper refer to a period in which family planning knowledge has been spreading "naturally" without the benefit of any organized mass media or family planning clinic campaign.

The findings support an information flow model which argues that family planning knowledge will gradually diffuse throughout women in rural communities as development takes place and levels of education and mass media consumption rise. However, in the early stages of development it appears that information about contraception will be largely restricted to a minority of relatively highly educated women. Even in exceptional communities of such countries where overall education levels are relatively high, less educated women will remain

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