

## FERTILITY DECLINE IN PUERTO RICO: EXTENT AND CAUSES

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### BIRTH REGISTRATION IN PUERTO RICO

In 1885 a Civil Register was established in Puerto Rico and a local registrar was placed at each of the municipalities of the island under the supervision of political authorities. Only summary tabulations of the vital events recorded (birth, deaths, and marriages) were sent by the local registrar to a central office at the Department of Health. With very few changes this procedure continued until 1931 when a centralized system was established. Under the new system the local registrar was completely separated from the municipal government and placed under the supervision of a central office at the Department of Health.

Instead of receiving summary tabulations as under the former organization, the central office now receives, on a monthly basis, the original of each certificate forwarded by the local registrars. All certificates written in a given month are sent during the first five days of the next month to the central office. A simple account of the number and type of certificates sent is also required.

The advantages of this system over the previous one are numerous, the most important being, 1) political influences and manipulations with the statistical data were reduced to a minimal level, and 2) only skilled personnel with mechanical aids (not possible at a local level) handle the processing and analysis of the data.

As a result of this change the registration of births improved considerably since 1931. During the 1940 census a study to test the completeness of birth registration in the island was carried out.

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According to this study birth registration was 86 percent complete. The procedure was repeated in the 1950 census and accordingly birth registration was found to be 96 percent complete. All the evidence suggest that birth registration has improved very little since 1950.<sup>1</sup>

To estimate birth registration completeness prior to 1940 the author resorted to the "backward survival method". He utilized the census population 5-9 years old to obtain an estimate of the number of births occurring during a period of 5 to 10 years prior to the census date. This procedure seems highly reliable due to the fact that death registration in Puerto Rico has been fairly complete for a long time. As many authors have pointed out, cultural factors have made this possible.<sup>2</sup>

According to this procedure, birth registration was found to be 55 percent complete during the last decade of the nineteenth century but improved considerably during the present century.

### FERTILITY CHANGES IN PUERTO RICO 1899 TO 1940

The recorded crude birth rates show an increasing trend during the first forty years of the present century. According to these data the average crude birth rate for the period of 1900-1909 was 31 births per 1,000 population but increased consistently during the next three decades reaching a high of 39 in 1930-1939. This trend puzzled many social scientists and

<sup>1</sup> José L. Vazquez, "The Demographic Evolution of Puerto Rico" (unpublished doctoral dissertation, The University of Chicago, 1964), Chapter V.

<sup>2</sup> See for example, José L. Janer, "Population Growth in Puerto Rico and its Relation to Time Changes in Vital Statistics," *Human Biology*, Vol. 17, No. 4 (December, 1939).

demographers and forced many elaborate and intricate explanations.

When improvements in birth registration completeness is taken into account a different picture emerges—the crude birth rate shows a slowly declining trend during the period of 1900–1940.

This declining trend in the crude birth rate is corroborated by the child-woman ratio<sup>3</sup> computed from census data. As Table 3 shows there was a five percent

<sup>3</sup> Number of children under 5 years of age per 1,000 females 15–44 years old.

Table 1.—ESTIMATED COMPLETENESS OF BIRTH REGISTRATION FOR SEVERAL PERIODS, PUERTO RICO, 1888–98 TO 1950–67

Period	Percent completeness of birth registration
1888-1898.....	55
1900-1909.....	66
1910-1919.....	78
1920-1929.....	83
1930-1939.....	87
1940-1949.....	91
1950-1967.....	96

Source: Jose L. Vazquez, *The Demographic Evolution of Puerto Rico*, pp.165-71.

decline in these ratios between 1899 and 1940 in spite of the considerable decline observed in infant and childhood mortality during this period. All other things being equal, a reduction in infant and childhood mortality will tend to increase the child-woman ratios.

It is a well known fact that both the crude birth rate and the child-woman ratios are very poor indexes of fertility (the reproductive performances of the exposed to the risk population) as they are affected by changes in the composition of the population, especially by those occurring in the age and marital structures.

Very little change occurred in the age structure of the island's population between 1899 and 1940. During this period

Table 3.—CHILD-WOMAN RATIOS AND INFANT MORTALITY, PUERTO RICO, 1899 TO 1940

Census year	Child-woman ratios	Infant mortality
1899.....	683	204 <sup>(a)</sup>
1910.....	721	173
1920.....	682	152
1930.....	638	138
1940.....	653	115

(a) Fiscal Year 1902-03.

Source: Official Censuses for Puerto Rico and Files of the Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico.

Table 2.—POPULATION, BIRTHS AND BIRTH RATES, PUERTO RICO, 1900-09 TO 1930-39

Period	Mid-term population	Annual average number of recorded births	Recorded crude birth rate	Corrected crude birth rate (a)
1900-1909.....	1,041,600	32,351	31.1	47.1
1910-1919.....	1,208,900	43,950	36.4	46.7
1920-1929.....	1,421,400	53,037	37.3	44.9
1930-1939.....	1,706,100	66,129	38.8	44.6

(a) Recorded crude birth rate corrected for under-registration (Table 1).

SOURCE: Censuses for Puerto Rico and Files of the Division of Demographic Registry, Department of Health of Puerto Rico.

the median age remained more or less unchanged while the proportion of females 15-44 years old to total female population increased slightly from 45.8 to 46.1 percent.

Significant changes, however, occurred in the marital composition of the population as a result of the profound social and economic changes brought about by the United States invasion and political domination of the island since 1898.<sup>4</sup>

According to census data the proportion of never married females 15 years of

in fertility (the reproductive performance of the exposed to the risk population) during the first forty years of the present century. The crude birth rate remained more or less stationary due to the increase observed in the exposed to the risk population (married population). The upward trend observed in the recorded crude birth rate was only the result of improvements in birth registration completeness, a fact that has been systematically overlooked by demographers and other social scientists.

Table 4.—PERCENT DISTRIBUTION OF THE FEMALE POPULATION  
15 YEARS OF AGE AND OVER, BY MARITAL STATUS,  
PUERTO RICO, 1899 TO 1940-

Year	Total	Never married	Presently married <sup>(a)</sup>	Other ever married
1899.....	100.0	43.8	44.0	12.2
1910.....	100.0	38.0	51.1	10.9
1920.....	100.0	34.0	53.4	12.6
1930.....	100.0	33.8	54.0	12.2
1940.....	100.0	31.4	55.4	13.2

(a) Including consensually married.

SOURCE: Official Censuses for Puerto Rico.

age and over dropped from 44 to 31 percent during the period of 1899 to 1940 while the percentage of presently married increased from 44 to 55. Similar changes are observed in the male group.

It is clearly evident that if the crude birth rate remained more or less stationary while the proportion of presently married females increased, marital fertility should have declined between 1899 and 1940. The child-woman ratios for presently married women and the age-marital standardized birth rates computed for these years corroborate this hypothesis. For both indexes there was a 25 percent decline during this period.

The evidence presented strongly suggests that there was a significant decline

Table 5.—CHILD-WOMAN RATIOS FOR MARRIED FEMALES AND AGE-MARITAL STANDARDIZED BIRTH-RATES, PUERTO RICO, 1899 TO 1940

Year	Child-woman ratio <sup>(a)</sup>	Standardized birth-rate <sup>(b)</sup>
1899.....	604	59.6
1910.....	547	49.3
1920.....	497	48.8
1930.....	462	44.9
1940.....	449	44.1

(a) Children under 5 years of age per 1,000 presently married women 15-44 years old.

(b) Indirectly standardized utilizing the 1950 schedule of age specific birth-rates per 1,000 presently married females as standard.

SOURCE: For child-woman ratios - Official Censuses for Puerto Rico.

<sup>4</sup> José L. Vazquez, *op. cit.*, pp. 64-67.

## 1940 TO THE PRESENT

A more sophisticated analysis of fertility changes is possible since 1940. First, a reliable estimate of birth registration completeness was obtained in connection with the 1940 census, a procedure that was repeated in the 1950 enumeration. Second since 1940 elaborate cross-tabulations of birth statistics are available.

The crude birth rate, which remained more or less stationary during the first four decades of the present century, was estimated in 45 births per 1,000 population in 1940, declining to 40 by 1950, and to 33 in 1960. In 1967 it was estimated in 27 birth per 1,000 population. In other words, the crude birth rate which declined scarcely 5 percent during the period of 1900 to 1940 has been reduced by 40 percent since 1940. As Table 6 shows, the rate of decline has accelerated with time. From 1940 to 1950 it declined 10 percent 16 percent between 1950 and 1960, and 20 percent during the last seven years. The greatest decline, however, has been observed during the last two years.

As the age composition of the population of Puerto Rico has been significantly affected by mass emigration to the United States it is necessary to investigate to

what extent the decline observed in the crude birth rate is a result of these structural changes.<sup>5</sup> The proportion of women 15-44 years old to total female population, for example, declined from 46 percent in 1940, to 43 percent in 1950, and to 40 percent in 1960, to a great extent as a result of the age selectivity of mass emigration. Due to the sharp decline observed in the crude birth rate and the slow down of emigration since 1960 the proportion of women in the reproductive ages (15-44) increased again to 43 percent in 1967.<sup>6</sup>

An analysis of the age-specific fertility rates by age of the mother shows a significant decline among all age groups between 1940 and 1967. In the age groups 30 to 39 years fertility has been reduced in more than 50 percent during this 27 years period. Significant drops have been observed also among women 25-29 and 40-44 years of age. On the other hand,

<sup>5</sup> During the period of 1940 to 1960 the Island's population was reduced in one million persons by emigration. The 1960 enumerated population was 30 percent less than the expected population in the absence of emigration.

<sup>6</sup> Official censuses for Puerto Rico and Department of Health of Puerto Rico, *Annual Vital Statistics Report*, 1967, p. 3.

Table 6.—THE CRUDE BIRTH RATE IN PUERTO RICO, 1940-67

Year	Estimated number of births <sup>(a)</sup>	Mid-year population (in 1,000's)	Crude birth-rate	Percent decline in crude birth rate over previous date
1940.....	84,172	1,878	44.8	...
1950.....	88,873	2,218	40.1	10
1960.....	79,056	2,358	33.5	16
1967.....	73,112	2,713	26.9	20
1960.....	79,056	2,358	33.5	...
1961.....	78,586	2,414	32.6	3
1962.....	79,744	2,471	32.3	0
1963.....	80,477	2,528	31.8	2
1964.....	81,019	2,594	31.2	2
1965.....	82,769	2,646	31.3	0
1966.....	78,764	2,686	29.3	6
1967.....	73,112	2,713	26.9	8

<sup>(a)</sup> Recorded number of births corrected for under-registration.

SOURCES: Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico, *Annual Vital Statistics Report* (several issues).

very little change has occurred in the two extremes of the age continuum.

In general terms, it seems that the decline in the age specific fertility rates has accelerated with time, the greatest reductions occurring during the last seven years. An interesting feature of these changes is the fact that between 1940 and 1960 the reduction in fertility was more or less restricted to women between ages 25 to 39 years, while during the last seven years the rates in all age groups have been reduced in at least 20 percent.

To obtain an overall picture of these changes, two age-standardized measures have been computed: the gross reproduction rate and an age-adjusted birth rate in which the 1960 population was used as standard.<sup>7</sup> As Table 9 shows, both indexes clearly demonstrate that fertility

has declined at an accelerated pace since 1940: less than 10 percent during the 1940-50 decade, around 10 percent from 1950 to 1960, and 25 percent during the last seven years. These data also suggest that the radical decline observed in the crude birth rate during the 1950-60 decade was to a great extent a result of changes in the age structure of the population. During this period the crude birth rate declined 16 percent, but the age-standardized indexes declined only 10 percent. On the other hand, the decline since

<sup>7</sup> The gross reproduction rate is approximately equal to the sum of the age specific birth rates multiplied by the size of the age interval (5), and by the proportion of females at birth (0.49). The age-standardized birth rate was obtained by applying the age specific birth rates of the year to be adjusted by the 1960 age specific female population (standard).

Table 7.—SPECIFIC FERTILITY RATES BY AGE OF MOTHER, PUERTO RICO, 1940, 1950, 1960, AND 1967

Age of mother	Rates			
	1940	1950	1960	1967
Under 15 years..	0.2	0.4	0.8	0.9
15-19 years.....	92.7	105.1	101.6	81.7
20-24 years.....	294.9	291.6	287.2	208.1
25-29 years.....	311.6	265.3	243.2	189.7
30-34 years.....	255.9	201.8	157.5	117.8
35-39 years.....	166.7	146.7	110.0	79.1
40-44 years.....	51.5	51.9	51.1	29.7
45 years and over.....	10.6	11.2	9.6	7.5

SOURCE: Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico.

Table 8.—PERCENT CHANGE IN SPECIFIC FERTILITY RATES, BY AGE OF MOTHER, PUERTO RICO, 1940-67

Age of mother	Percent change			
	1940-50	1950-60	1960-67	1940-67
15-19 years.....	+13.4	- 3.3	-19.6	-11.9
20-24 years.....	- 1.1	- 1.5	-27.5	-29.4
25-29 years.....	-14.9	- 8.3	-22.0	-39.1
30-34 years.....	-21.1	-22.0	-25.2	-54.0
35-39 years.....	-12.0	-25.0	-28.1	-52.5
40-44 years.....	+ 0.8	- 1.5	-41.9	-42.3
45-49 years.....	+ 5.7	-14.3	-21.9	-29.2

SOURCE: Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico.

1960 has been greater than what one may infer from the crude birth rate. Both the age-adjusted birth rate and the gross reproduction rate declined 25 percent between 1960 and 1967 while the corresponding reduction in the crude birth rate was only 20 percent. Utilizing any of the three measures presented on Tables 9 and 10, it seems that fertility declined around 40 percent during the last 27 years.

As it was discussed earlier, changes in the marital composition of the population obscured the trend of fertility during the first forty years of the present century. In order to investigate the effects of such structural changes since 1940, age specific fertility rates have been computed utilizing as denominator the number of presently married women (See Tables 11 and 12).<sup>8</sup>

<sup>8</sup> Presently married women data were obtained from the census for the years 1940, 1950, and 1960. For 1967 an unpublished estimate prepared by the Puerto Rico Planning Board has been used.

According to these data a substantial decline in marital fertility occurred among women 25 years of age and over from 1940 to 1967. In the age groups 30-34 and 35-39 the reduction amounted to more than 50 percent. A forty percent reduction or more was also recorded in the age categories 25-29, 40-44, and 45 years and over. A moderate decline occurred in the group 20-24 years, but no significant change was observed among women 15-19 years of age.

A breakdown of this 27 year period shows that during the 1940-50 decade the decline was more or less restricted to the age groups between 25 and 39 years. During the fifties substantial drops were recorded among women 30 years of age and over, but little change was observed under that age. Since 1960 the rates for all age groups have been reduced by at least 20 percent with the exception of the 15-19 years category.

To obtain an overall idea of these changes an age-marital standardized birth

Table 9.—CRUDE BIRTH RATES, AGE-STANDARDIZED BIRTH RATES, AND GROSS REPRODUCTION RATES, PUERTO RICO, 1940-67

Year	Rates		
	Crude birth rate	Age standard-ized birth rate	Gross repro-duction rate
1940.....	44.8	40.0	2.90
1950.....	40.1	37.0	2.63
1960 <sup>(a)</sup> .....	33.5	33.5	2.35
1967.....	26.9	25.2	1.75

(a) The crude birth rate and the adjusted rate are identical for the standard year (1960).

Table 10.—PERCENT DECLINE IN CRUDE BIRTH RATES, AND GROSS REPRODUCTION RATES, PUERTO RICO, 1940-67

Period	Percent decline		
	Crude birth rate	Age standard-ized birth rate	Gross repro-duction rate
1940-1950.....	10.5	7.5	9.3
1950-1960.....	16.5	9.5	10.6
1960-1967.....	19.7	24.8	25.5
1940-1960.....	25.2	16.3	19.0
1940-1967.....	40.0	37.0	39.7

rate was computed for the years 1940, 1950, and 1967 utilizing the 1960 presently married female population as standard.<sup>9</sup>

These adjusted rates show that the decline in marital fertility was very similar during the decades of 1940-50 and 1950-60—an 11 percent reduction during the forties against a 9 percent decline during the fifties. Between 1960 and 1967 the decline amounted to 20 percent which represents a radical deviation from the previous trend.

→ It seems evident that changes in the age

<sup>9</sup> Direct standardization applying the age-marital specific birth rates of the year to be adjusted to the 1960 presently married female population in each age.

and marital structures of the population had little effect upon the trend in the crude birth rate during the periods of 1940-50 and 1960-67. Both the crude birth rate and the adjusted rate declined more or less at the same pace during these two periods. However, about one-half of the reduction in the crude birth rate observed between 1950 and 1960 was a result of changes in the age and marital status structures of the population caused by mass emigration to the United States.<sup>10</sup> ←

<sup>10</sup> Another way in which the effect of mass emigration upon the crude birth rate can be determined is to estimate the total crude birth rate for Puerto Rican born population (resident in Puerto Rico and resident in the United States). Utilizing the 1960 age-specific fertility rates for the Puerto Rican born population resident in

Table 11.—AGE SPECIFIC FERTILITY RATES PER 1,000 PRESENTLY MARRIED (INCLUDING CONSENSUALLY MARRIED) WOMEN, PUERTO RICO, 1940, 1950, AND 1967

Age	Rates			
	1940	1950	1960	1967
15-19 years.....	540.9	565.7	587.7	574.7
20-24 years.....	494.9	470.6	495.2	371.3
25-29 years.....	403.9	331.3	300.5	236.8
30-34 years.....	313.8	245.2	182.7	138.1
35-39 years.....	205.0	176.9	123.7	93.3
40-44 years.....	67.9	70.8	56.6	35.2
45 years and over.....	15.6	15.8	11.6	9.1

SOURCE: Births Data-Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico.

Table 12.—PERCENT CHANGE IN AGE SPECIFIC FERTILITY RATES PER 1,000 PRESENTLY MARRIED (INCLUDING CONSENSUALLY MARRIED) WOMEN, PUERTO RICO, 1940-67

Age	Percent change			
	1940-50	1950-60	1960-67	1940-67
15-19 years.....	+ 4.6	+ 3.9	- 2.2	+ 6.2
20-24 years.....	- 4.9	+ 5.2	-25.0	-25.0
25-29 years.....	-18.0	- 9.3	-21.2	-41.4
30-34 years.....	-21.9	-25.5	-24.4	-56.0
35-39 years.....	-13.7	-30.1	-24.6	-54.5
40-44 years.....	+ 4.3	-20.1	-37.8	-48.2
45 years and over.....	+ 1.3	-26.6	-21.6	-41.7

SOURCE: Births Data - Division of Demographic Registry and Vital Statistics, Department of Health of Puerto Rico.

During the last 27 years the age-marital adjusted birth rate declined 36 percent in contrast with a 40 percent reduction in the crude birth rate. In other words, only 4 percent of the decline in the crude birth rate recorded since 1940 can be attributed to structural changes in the population. ✧ The analysis of the trend of fertility that has been carried out suggests that it has declined steadily since the beginning of the present century. The available information indicates that during the first 40 years the decline was more or less equivalent to 25 percent, or an average reduction of 6 percent per decade. During the last 27 years marital fertility have been reduced in 36 percent, at an average of 13 percent decline per decade.<sup>11</sup> In other words, the evidence presented here strongly suggests that fertility has declined at an accelerated rate during the present century.

New York City we were able to estimate the total number of expected births to Puerto Rican born mothers in the United States. (In 1960 seventy-four percent of all Puerto Rican born women 15-49 years of age, resident in the United States, lived in New York City.) After adding these births to the number recorded in Puerto Rico and dividing this total by the proper denominator, we obtained a total crude birth rate of 37.4 for 1960. When compared with the 40.1 recorded in Puerto Rico in 1950 we conclude that the "true" decline in fertility during the 1950-60 decade we only 7 percent.

<sup>11</sup> Averages per decade obtained by dividing the total percent decline by the number of decades in the period.

Table 13.—CRUDE BIRTH RATE AND AGE-MARITAL STANDARDIZED BIRTH RATE, PUERTO RICO, 1940, 1950, 1960, AND 1967

Year	Crude birth-rate	Standardized birth rate
1940.....	44.8	41.3
1950.....	40.1	36.7
1960 <sup>(a)</sup> .....	33.5	33.5
1967.....	26.9	26.5

(a) The crude birth rate and the adjusted rate are identical for the standard year (1960).

#### CAUSES OF THIS DECLINE

The accumulated knowledge in the area of the reproductive behavior of human populations indicates that a decline in marital fertility can be brought about by a limited set of factors, namely:

- 1) changes in the reproductive capacity of the population exposed to the child bearing risk (declining fecundity).
- 2) radical alterations in the sexual behavior of the married couples (decrease in the frequency of the coitus).
- 3) the utilization of birth control practices.

In our opinion fecundity (reproductive capacity) has increased in Puerto Rico as a result of the radical improvement of the the health conditions of the people. It seems sufficient to mention that the crude death rate declined from around 35 deaths per 1,000 population in 1900 to only 6 in 1967, and, as a result, life expectancy at birth increased from 33 to 70 years during the same time interval.<sup>12</sup>

The hypothesis that fecundity has increased with time tends to be corroborated by census data. A comparison between the 1950 and the 1960 censuses shows that sterility among married women, as measured by the proportion of childlessness, declined in all age groups during this period. Also the 1960 census indicates that

<sup>12</sup> José L. Vasquez, José L. Janer, and Nidia Morales, *Abridged Life Tables for Puerto Rico: 1894 to 1960*; (San Juan, Puerto Rico: June, 1963).

Table 14.—PERCENT DECLINE IN THE CRUDE BIRTH RATE AND AGE-MARITAL STANDARDIZED BIRTH RATE, PUERTO RICO, 1940, 1950, 1960, AND 1967

Period	Percent decline	
	Crude birth rate	Standardized birth rate
1940-1950.....	10.5	11.1
1950-1960.....	16.5	8.7
1960-1967.....	19.7	20.9
1940-1960.....	25.2	18.9
1940-1967.....	40.0	35.8



the older the married women the higher the proportion of childlessness (5 percent for married women 30-34 years of age increasing steadily to maximum of 9 percent among women 50 years and over). From these data one may infer that those women marrying during the first decades of this century had a higher incidence of sterility than those marrying later.<sup>13</sup>

Thus the available information indicates that if there has been any change in the reproductive capacity of the island's population this has been, in a way, favorable for an increase in fertility and not otherwise.

One of the most commonly utilized arguments in trying to explain how the process of "modernization" (urbanization, industrialization, etc.) operates toward a reduction of fertility is the hypothesis that these phenomena tend to alter in a significant way the sexual behavior of the people. It is argued that such "modernizing" forces diversify and increase the activity area of the people in such a way that the interest in and the time available for sexual satisfaction are considerably reduced. From this it follows that the frequency of coitus declines and thus fertility.

Although there is no such systematic research along this line to prove or to reject this hypothesis, the fact is that other relevant points to this argument are seldom mentioned. It is rarely taken into account for example, how illness, malnutrition, a hard and long work day, promiscuity, etc., operate among "non-modernized" groups to reduce sexual activity.

In addition, it still has to be demonstrated on empirical grounds in which way a reduction in the frequency of the coitus affects fertility. A few pieces of research in this area indicate that unless there are

considerable changes in sexual activity fertility might not be significantly affected.<sup>14</sup>

Thus, it seems that the factor mainly responsible for the decline in fertility in Puerto Rico has been diffusion and utilization of family limitation methods.

Studies carried out in the island demonstrate that prior to 1940 the most commonly used methods were coitus interruptus and the condom. A survey of about 2,000 indigent women attending a private family planning clinic in 1937 showed that 34 percent of the group had attempted some method of birth control before being admitted to the program. Of them 46 percent had used withdrawal, 17 the condom, and the rest several other methods.

In 1948 a sample of women attending the Department of Health clinics for venereal diseases, tuberculosis, pre-natal and post-natal services were studied by Emilio Cofresi with respect to family planning attitudes and practices. Obviously the females included in this study again represented class families. Of the 1,125 females interviewed 70 percent knew about birth control methods but only 34 percent had used them (39 percent for urban females and 29 percent for rural females). The practice of birth control ranged from a low of 20 percent for rural non-educated women to a high of 100 percent for women with college education (both rural and urban). Among the group of women who had utilized some kind of birth control method the condom, sterilization, the diaphragm and coitus interruptus were the most common. Rhythm was mentioned only in 2 percent of the cases.<sup>15</sup>

<sup>14</sup> See for example, Rigine K. Stix and Frank W. Notestein, *Controlled Fertility* (Baltimore, 1940), p. 34.

<sup>15</sup> Gilbert W. Beebe and José S. Belaval, "Fertility and Contraception in Puerto Rico," *The Puerto Rico Journal of Public Health and Tropical Medicine* (Sept., 1942).

<sup>16</sup> Emilio Cofresi, *Realidad Poblacional de Puerto Rico*, 1951), pp. 85-96.

<sup>13</sup> U.S. Bureau of the Census, *1960 U.S. Census of Population*, Vol. 1, Chapter 53, Puerto Rico, pp. 120-121 and U.S. Bureau of the Census, *U.S. Census of Population, 1960*, Vol. 1, Part 53, Puerto Rico, p. 275.

In a study carried out by Hill, Stycos, and Back in 1953, only 3.5 percent of the island-wide representative sample appeared to be ignorant of all methods of birth control. The number of methods known was greater among urban residents than in the rural area and increased with increasing age and education. Eighty-five percent of the married household heads knew about the condom, 84 percent about sterilization, 62 percent about withdrawal, 44 percent about rhythm, etc.

With respect to birth control practices it was found that 41 percent had used or was using some method. The incidence was higher in the urban area than in the rural area and increased with education. In the sample 16.5 percent of all married women was found to be sterilized, 19.4 percent had used or was using mechanical or chemical methods, and 22.3 percent were ever users of natural methods (withdrawal, rhythm and abstinence).

Only 35 percent of the group was currently using some method. Of them 47 percent were sterilized, 17 percent were using the condom, 16 percent rhythm and abstinence, 11 percent withdrawal, and the rest all other methods.<sup>17</sup>

Unfortunately, since 1953 no other comprehensive study of birth control practices have been undertaken in Puerto Rico. However, in 1965 a few questions about female sterilization were included in the quarterly Master Sample Survey of the Department of Health of Puerto Rico.<sup>18</sup> According to this island-wide sample around 30 percent ever-married females 20-49 years of age were sterilized. A remarkable increase over the 16 percent found by Hill, Stycos, and Back twelve years earlier.

In our opinion (based on personal observations and conversations with informed people) the incidence of birth con-

trol practices has increased considerably since the introduction of the pill and IUCD's. In the two family planning programs operating in the island,<sup>19</sup> there are at present about 45,000 active patients of whom 24,000 are utilizing the "pill", 12,000 are using IUCD's and the rest all other methods. The total cases represent around 28 percent of the potential clientele of the free of charge programs.<sup>20</sup>

In the light of the high incidence of female sterilization (30 percent of all ever married women 20-49 years old) and the coverage of the two free-of-charge family planning programs (28 percent of the potential clientele) it seems safe to say that over 50 percent of the married female population in the reproductive ages in Puerto Rico are currently using some method of family limitation (including sterilization).

To what extent the increase in the practice of birth control is a result of the organized family planning efforts and to what extent a function of the influence of such "modernizing" factors as increased urbanization, improvements in the level of living of the people, progress in education, increased participation of the women in the labor force, etc., is a different task.

At present there is little doubt about the influence of these "modernizing" phenomena (urbanization, education, standard of living, etc.) upon the level of fertility. Almost all studies carried out in the island corroborate the existence of such

<sup>19</sup> One is a private group, The Family Planning Association of Puerto Rico, operating with funds from the Office of Economic Opportunities of the Government of the United States. The other which offers services in the Northeastern Region is sponsored by the School of Medicine of Puerto Rico with the assistance of the Department of Health of Puerto Rico.

<sup>20</sup> It is estimated that 30 percent of the families in Puerto Rico can pay for medical services including family planning. Of the remaining 70 percent, around 25 percent are sterilized, 6 percent are sterile, 10 percent want more children, etc.

<sup>17</sup> Reuben Hill, J. Mayone Stycos, Kurt W. Back, *The Family and Population Control* (University of North Carolina Press, 1959).

<sup>18</sup> Research Unit, Department of Health of Puerto Rico, *Master Sample Survey of Health and Welfare*, July, 1967.

relationships.<sup>21</sup> Demographic theory suggests that the way in which these "modernizing" factors affect fertility is through the modification of attitudes, values, and beliefs regarding family size which eventually lead to the adoption of family limitation practices.

On the other hand it is assumed, and to some extent empirically verified, that the adoption of favorable attitudes toward family limitation and its practice can be accelerated through the implementation of vigorous and well organized family planning programs.

Apparently the family planning activities carried out in the island from 1925 to 1956 or so were unable to offer birth control services to a sizable proportion of the clientele and thus they have

<sup>21</sup> José L. Vazquez, *The Demographic Evolution of Puerto Rico, op. cit.*, pp. 204-226.

little direct effect upon the decline of fertility. However their campaigns and publicity were able to increase knowledge and motivation toward family limitation. During this period the people depended heavily upon their own economic resources for practicing birth control, to some extent facilitated by improvements in the standard of living. Since 1956 the family planning programs have been able to reach a significant proportion of the target population. At present they are offering services to 28 percent of the potential clientele.

In the opinion of the author, the interplay of such factors as urbanization, education, standard of living, etc., as well as the family planning efforts made in Puerto Rico have been responsible for the significant decline in fertility observed during the present century.