

STERILIZATION

A Case of Extensive Practice in a Developing Nation

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In December, 1967 and January, 1968, interviews were held with 960 women in Bangkhen, Thailand. Bangkhen is a suburb of Bangkok, located 15 kilometers north of the city just off the superhighway that furnishes access to the international airport and is also the main connecting link with the northern and northeastern regions of the country. The sample was drawn at random from the universe of married women 15–44 years of age who were currently living with their husbands, as had previously been established by a complete census of the area taken in August, 1967. The sample originally drawn represented two-thirds of the universe, but shrinkage, chiefly from mobility of population, reduced the number of completed interviews to 60 per cent. It also developed that one of the women had recently been widowed, so she was dropped from the study, reducing the total to 959.

An unexpected result of the study was the finding that tubal ligation and vasectomy were the two most widely practiced methods of birth control within this population. A total of 142 women reported tubal ligations and 77 others reported that their husbands had had vasectomies; thus, 14.8 per cent of the

women had been sterilized and 8.0 had husbands who had been. Inasmuch as no duplications occurred within the same couple, it resulted in a total of 22.8 per cent of our sample of married women in their reproductive ages who were "currently practicing" birth control in the form of sterilization either of themselves or their husbands. Together, these constituted about 60 per cent of the total contraceptive practice at the time of the study, which revealed that 41 per cent of all of the couples were practicing some method of contraception. This was a surprisingly high rate of practice for a population within a developing country that at the time still did not have a formal population policy and, so far as could be determined, had not had any organized program to promote any form of family planning. But especially surprising was the finding that in almost one out of four couples one of the partners had been sterilized.

This rate of sterilization appeared to be quite unusual. Table 1 shows a comparison with rates reported in a few other places.

Bangkhen appeared to have the highest rate of any area included in the table except Puerto Rico, where the rate was relatively high in 1953 and had shown a dramatic increase to 30 per cent in 1965.

There was also reason to believe that this high rate in Bangkhen was not an isolated phenomenon. The rate shown for Bangkok could not really be considered a representative rate because it was merely a composite of four different sample areas of the city that individually had the following rates: 23.1, 35.2, 15.5 and 11.2. All of the areas were relatively high, however, and two of them even exceeded Bangkhen.¹ Evidence from interviews, documents and hospital records supported the conclusion that the rate of sterilization was unusually high for the whole Bangkok metropolitan area.²

However, the practice appeared to be limited to the metropolitan area. Hawley and Visid found tubal ligation and vasectomy to be the most widely known methods of contraception in rural Photharam, some 85 kilometers west of Bangkok; but the combined rate of actual practice was only 3.5 per cent.³

TABLE I. WOMEN OF CHILD-BEARING AGE REPORTING STERILIZATION OF SELVES OR HUSBANDS (SELECTED AREAS)

Area	Per Cent
Puerto Rico (female only, 1965)	30.0 ^a
Thailand, Bangkok	22.8
Thailand, Bangkok	19.3 ^b
Puerto Rico (female only, 1953)	16.5 ^c
United States	9.8 ^d
Thailand, Photharam (1967)	7.3 ^e
Japan	5.6 ^f
Thailand, Photharam (1964)	3.5 ^g
Thailand, Ban Pong	2.3 ^h

^a Research Unit, Department of Health of Puerto Rico, *Master Sample Survey of Health and Welfare*, July, 1967. Reported by Vazquez, J. L., *Fertility Decline in Puerto Rico: Extent and Causes*, *Demography*, 5, 864, 1968.

^b Keovichit, S., *Attitude Toward Family Planning in Four Areas of Bangkok: Preliminary Findings*, unpublished manuscript at Faculty of Public Health, Mahidol University, Bangkok, p. 17.

^c Hill, R., Stycos, J. M. and Back, K., *THE FAMILY AND POPULATION CONTROL: A PUERTO RICAN EXPERIMENT IN SOCIAL CHANGE*, Chapel Hill, University of North Carolina Press, 1959, pp. 166-167.

^d Whelpton, P. K., Campbell, A. A. and Patterson, J. E., *FERTILITY AND FAMILY PLANNING IN THE UNITED STATES*, Princeton, Princeton University Press, 1966, p. 134.

^e Prachuabmoh, V. and Fawcett, J. T., *Fertility Control in Rural Thailand: Some Results of a Demonstration Project in Photharam District*, *Proceedings of the International Union for the Scientific Study of Population*, Sydney, Australia, August 21-26, 1967.

^f Tietze, C., *Induced Abortion and Sterilization as Methods of Fertility Control*, in Sheps, M. C. and Ridley, J. C., *PUBLIC HEALTH AND POPULATION CHANGE*, Pittsburgh, University of Pittsburgh Press, 1965, p. 415.

^g Hawley, A. H. and Prachuabmoh, V., *Family Growth and Family Planning in a Rural District of Thailand*, in Berelson, B. (Editor), *FAMILY PLANNING AND POPULATION PROGRAMS*, Chicago, University of Chicago Press, 1965, p. 541.

^h McDaniel, E. B., *Short Summary of a Family Planning Survey of a Village in Northern Thailand (Ban Pong)*, mimeographed, September, 1967, Table 62.

However, increased sterilization appeared to have been one of the by-products of an intensive family planning program in this area. Three years later, in 1967, the sterilization rate had increased to 7.3 per cent.⁴ In a more remote rural community in northern Thailand, McDaniel found a rate of only 2.3 per cent in 1967.⁵

Nor was the rate high only in terms of the standards of developing countries; it also appeared to be higher than those of developed countries, if Japan and the United States could be taken as representative of the latter group.

In Thailand, this high rate of sterilization was definitely an urban phenomenon, but this appeared not to be the case in the United States. Whelpton, Campbell and Patterson reported that

sterilization was rare in the large cities and was most prevalent among the farmers.⁶ Furthermore, the rates were much lower in Latin American cities, ranging from 1.0 in Bogota to 6.1 in Rio de Janeiro.⁷

Thus the rate of sterilization found in Bangkhen appeared to be exceptionally high either for a developing or a developed country. In the belief that such a phenomenon deserved special study, a careful and intensive analysis of all of the data on this subject in the study in Bangkhen was carried out along with an inquiry into the historical background of the practice in Thailand.

HISTORICAL BACKGROUND

No one appears to know how sterilization got started in Thailand or how it became so extensive. The earliest legislation on the subject appears to be the Leprosy Control Act of 1943 providing for the compulsory sterilization of lepers.⁸ Perhaps this was indicative of a readiness to use such a drastic method, at least for eugenic purposes; it is probably symptomatic of a generally permissive attitude toward it. Certainly no indication is found of a general moral or religious taboo against it.

By 1957, it had become so extensive that the Minister of Public Health issued a regulation to the hospitals under his jurisdiction limiting sterilization to cases approved by the director and at least three other doctors. Subsequently, a committee of directors of provincial hospitals worked out guidelines to be followed in approving applications; under these guidelines tubal ligations could be approved for women with five children or, in cases of extreme poverty, for those with four children or, in cases of poor health, at any parity level.⁹ The reason for the regulation was that "such a widespread practice of sterilization without any control will be harmful to the nation both in economic and social viewpoints."¹⁰

But this was prior to the census of 1960 and during a period when the officials were pronatalist in outlook. At that time, the

concern was about insufficient manpower rather than about "population explosion." The rapid rate of growth revealed by the census of 1960 served for the first time to alert the nation to the possibility of the latter.

This led to the liberalization of the regulation on sterilization in 1962, when the requirement that women must have five or more children was rescinded and the decision was entirely in the hands of the director of each hospital. However, many of the directors were either unaware of the change, or, without new guidelines, tended to follow the most conservative policy, still insisting that a woman must have five children to qualify. It was apparently in the effort to overcome this conservatism that the Cabinet on February 12, 1968 adopted a resolution sanctioning contraception for a woman with four children. "For those who have had four children and wish to stop having children, contraceptive measures should be available to them. If expansion of the Photharam project is desired, there will be no objection, but information should be given only to those who have had children."¹¹ Whether in passing this resolution they overrode the flexible policy of the Ministry of Public Health toward sterilization and in effect established a new rule prohibiting sterilization to those with less than four children is a moot point. Apparently some directors think that this is true and act accordingly whereas others assume that the regulation of the Ministry is still in effect.

Meanwhile, never has any restriction been placed on vasectomy and, inasmuch as hospitalization is not required even less information is available on the frequency with which this operation is performed. However, data from several surveys, including this one, are quite consistent in indicating about one vasectomy for every two tubal ligations.

In sum, it appears that both Thai policy and opinion are quite permissive in reference to sterilization, and in the absence of other means of contraception both men and women in the metropolitan area of Bangkok have resorted to sterilization with considerable frequency.

TABLE 2. STERILIZATION OF WOMEN, BY AGE*

Age	Total	Sterilized		Not Sterilized	
		Number	Per Cent	Number	Per Cent
Total	959	142	14.8	817	85.2
15-19	44	0	0.0	44	100.0
20-24	158	2	1.3	156	98.7
25-29	233	21	9.0	212	91.0
30-34	216	50	23.2	166	76.8
35-39	175	37	21.1	138	78.9
40-44	133	32	24.1	101	75.9

* This is age at the time of the interview, not at the time of the operation.

CHARACTERISTICS OF WOMEN WITH TUBAL LIGATIONS

In the survey, it appeared that tubal ligation took place at a relatively late age, after many years of marriage, and after the woman had borne four or five children. Nearly 85 per cent of the women in the Bangkhen sample who had been sterilized were over 30 years old as compared with only about half of the total sample. Table 2 shows the age distribution of the women and the proportions of each group who had been sterilized. None of those under 20 had had the operation. In the late twenties, 25-29, the percentage increased to nine per cent and in the early thirties it rose to 23 per cent. This appeared to represent a kind of plateau in this population; the percentages in the two higher age groups remained at about this same level, 21 for those 35-39 years of age, and 24 for those 40-44. Thus it appeared that eventually almost one-fourth of the women obtained tubal ligations and they usually did so in their early thirties. Included among the 817 women who were not sterilized were 138 who were pregnant at the time of the study.

The fact that female sterilization has been linked to parity in the policies of Thailand is indicated in Table 3. Very few women with two children or less had been sterilized and only 14 per cent of those with three children had had tubal ligations, but nearly one-third of those with four children had had the operation and the peak percentage was reached with five children; at this family size, nearly 35 per cent of the women had

been sterilized.¹² These figures no doubt reflected the policies prior to 1962 under which sterilizations were permitted for women with five children and the more recent tendency to deny them to women with less than four children. This was further indicated by the fact that the proportions of sterilizations dropped for women with six or more children.

Sterilization was linked not only with age and parity but also with duration of marriage, as shown in Table 4. Only one woman who had been married less than five years had had a tubal ligation, but the rate of sterilization was higher for those who had been married five years or more and among those

TABLE 3. STERILIZATION OF WOMEN, BY NUMBER OF CHILDREN

<i>Number of Children</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	142	14.8	817	85.2
None	105	3	2.9	102	97.1
One	149	1	0.7	148	99.3
Two	172	9	5.2	163	94.8
Three	148	21	14.2	127	85.8
Four	143	43	30.1	100	69.9
Five	101	35	34.7	66	65.3
Six	72	17	23.6	55	76.4
Seven and over	69	13	18.8	56	81.2

TABLE 4. STERILIZATION OF WOMEN, BY DURATION OF MARRIAGE*

<i>Duration of Marriage</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	142	14.8	817	85.2
Under					
5 years	267	1	0.4	266	99.6
5-9 years	219	24	11.0	195	89.0
10-14 years	233	55	23.6	178	76.4
15-19 years	141	39	27.7	102	72.3
20-24 years	77	16	20.8	61	79.2
25 years and over	17	6	35.3	11	64.7
Unknown	5	1	20.0	4	80.0

* This is duration of marriage at the time of the interview, not at the time of the operation.

married ten to fourteen years almost one-fourth had been sterilized. Because the date of the operation was not obtained in the survey it was not possible from that data to calculate the average duration of marriage prior to the operation. A study of 10,000 cases on a nation-wide basis in 1962 found a median duration of marriage of only 8.7 years.¹³ The pattern was quite similar to that relating sterilization to age in that beyond ten years of marriage a kind of plateau was reached in the rate, which held to a level of about one-fourth of the women. Only for women married for 25 years or longer did the rate increase still further, but this rate was based on rather small numbers.

In spite of the fact that the younger women in this sample were better educated than the older ones, and in spite of the fact that sterilization took place rather late in the woman's reproductive career and thus the sterilization rate was higher for the older women than for the younger, still a positive relation was seen between the rate of sterilization and education (see Table 5). The rate of tubal ligation was quite low for women with no formal education (9.4 per cent) and increased with the amount of education until almost one-fourth (23.1 per cent) of those with 11 to 13 years of education were sterilized. This was more than double the rate for those with no education. The rate was somewhat lower for those with 14 years and more of education, but these college educated women may well have relied on methods of contraception other than sterilization. The same kind of correlation emerged when the education of the husband was taken as the independent variable, but the variation was not as great. It is probable that this latter correlation was mainly an indirect reflection of the positive relation between the educational levels of husbands and wives.

It was difficult to discern any such relation between sterilization and occupation, whether the occupation of the woman herself or that of her husband was considered. Among the women it appeared that those in unskilled labor and farm labor had the lowest rates, whereas the shopkeepers, clerical and semiprofessional persons had the highest rates and skilled

TABLE 5. STERILIZATION OF WOMEN, BY EDUCATION

<i>Years of School Completed</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	142	14.8	817	85.2
None	64	6	9.4	58	90.6
1-4	685	94	13.7	591	86.3
5-10	131	26	19.8	105	80.2
11-13	39	9	23.1	30	76.9
14 and over	38	6	15.8	32	84.2
Unknown	2	1	50.0	1	50.0

TABLE 6. STERILIZATION OF WOMEN, BY MATERIAL POSSESSIONS SCORE

<i>Material Possessions Score</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	142	14.8	817	85.2
Under 5	54	2	3.7	52	96.3
5-9	128	10	7.8	118	92.2
10-14	201	24	11.9	177	88.1
15-19	148	18	12.2	130	87.8
20-24	96	16	16.7	80	83.3
25-29	76	10	13.2	66	86.8
30-34	68	13	19.1	55	80.9
35-39	52	13	25.0	39	75.0
40-44	31	8	25.8	23	74.2
45-49	23	4	17.4	19	82.6
50 and over	82	24	29.3	58	70.7

TABLE 7. STERILIZATION OF HUSBAND, BY AGE OF HUSBAND*

<i>Husband's Age</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	77	8.0	882	92.0
Under 25	67	1	1.5	66	98.5
25-29	180	7	3.9	173	96.1
30-34	223	14	6.3	209	93.7
35-39	212	32	15.1	180	84.9
40-44	146	16	11.0	130	89.0
45-49	75	2	2.7	73	97.3
50 and over	51	5	9.8	46	90.2
Unknown	5	0	0.0	5	100.0
Median		37.6		35.1	

* This is age at the time of the interview, not at the time of the operation.

craftsmen and housewives fell in between. This was the expected positive relation, but some troublesome variations occurred. The rates were considerably higher for the semiprofessional and farm labor categories when the classification was according to the husband's occupation. The reasons for this are not clear, but it is probable that occupation is not a very good index of socioeconomic status in this community.

A more delicate and reliable index appeared to be a composite measure of household possessions, which is called the Material Possessions Score.¹⁴ Table 6 shows the relation between this index and the rate of sterilization of women in Bangkhen. Here the rate of sterilization tends to go up markedly with the increase in the economic level of the family. Whereas less than four per cent of those at the lowest level had been sterilized, nearly one-third of those at the highest level had had a tubal ligation.¹⁵

CHARACTERISTICS OF HUSBANDS WITH VASECTOMIES

In many ways the characteristics of husbands who had had vasectomies paralleled those of the women who had had tubal ligations. The operation appeared to be resorted to at about the same stage of the family cycle. But inasmuch as the cases were mutually exclusive—no couples were encountered in which both husband and wife had been sterilized—one might expect to find some differences that might give some clues as to why certain couples elected vasectomy in lieu of ligation.

As with female sterilization, the rate of vasectomy increased with age, but the males were generally older than their female counterparts. Table 7 shows that only one case of sterilization was found in a male under twenty-five years of age, but the rate increased up to the late thirties in which group 15 per cent were sterilized. In the higher age groups, somewhat lower proportions had had vasectomies.

This means that the modal age group for sterilized men was five years older than for women, but husbands in this sample

TABLE 8. STERILIZATION OF HUSBAND, BY NUMBER OF CHILDREN

<i>Total Number of Children</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	77	8.0	882	92.0
None	105	0	0.0	105	100.0
1	149	2	1.3	147	98.7
2	170	16	9.4	154	90.6
3	152	16	10.5	136	89.5
4	142	21	14.8	121	85.2
5	100	15	15.0	85	85.0
6	73	5	6.8	68	93.2
7 and over	68	2	2.9	66	97.1

were about four years older than their wives so vasectomies probably were being sought at about the same stage in the marriage and of the family cycle as were ligations. Whether this supposition is accurate should become evident later in this analysis. The fact that the rate was lower for those aged 40 and over suggests that vasectomy had become popular only in recent years.

Table 8 indicates, however, that some of the men who obtained vasectomies may have been doing so because their wives could not obtain ligations, that the men tended to get vasectomies a bit earlier in the process of family formation; i.e., at earlier parities. Although men, as well as women, had the highest rates of sterilization after five children, the rate for men was almost as high after only four children and it was proportionally much higher than for women after two or three children. In fact, it should be noted that even though the rate of tubal ligation in the population as a whole was twice as high as the rate of vasectomy, after only two children the rate was actually higher for vasectomy. This suggests that the reluctance either by policy or by practice to sterilize women with less than four or five children apparently caused the husbands of these women to seek vasectomies when relief was denied their wives.

The same possibility is indicated in Table 9, which shows the rate of vasectomy by duration of marriage. Again, almost no

TABLE 9. STERILIZATION OF HUSBAND, BY DURATION OF MARRIAGE*

<i>Duration of Present Marriage</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	959	77	8.0	882	92.0
Under 5 years	267	1	0.4	266	99.6
5-9 years	219	18	8.2	201	91.8
10-14 years	233	26	11.2	207	88.8
15-19 years	141	21	14.9	120	85.1
20-24 years	77	11	14.3	66	85.7
25 and over	17	0	0.0	17	100.0
Unknown	5	0	0.0	5	100.0

* This is duration of marriage at the time of the interview, not at the time of the operation.

TABLE 10. STERILIZATION OF HUSBAND, BY MATERIAL POSSESSIONS SCORE

<i>Material Possessions Score</i>	<i>Total</i>	<i>Sterilized</i>		<i>Not Sterilized</i>	
		<i>Number</i>	<i>Per Cent</i>	<i>Number</i>	<i>Per Cent</i>
Total	950	77	8.0	882	92.0
Under 5	54	0	0.0	54	100.0
5-9	128	4	3.1	124	96.9
10-14	201	8	4.0	193	96.0
15-19	148	15	10.1	133	89.9
20-24	96	16	16.7	80	83.3
25-29	76	8	10.5	68	89.5
30-34	68	9	13.2	59	86.8
35-39	52	6	11.5	46	88.5
40-44	31	2	6.5	29	93.5
45-49	23	2	8.7	21	91.3
50 and over	82	7	8.5	75	91.5

sterilization was seen in the first five years of marriage, but the rate of vasectomy went up proportionately faster. During the second five years of marriage, instead of the usual ratio of one vasectomy to two ligations, the ratio was eight to eleven. Again, it appeared probable that some husbands were seeking sterilization a little earlier in their marriages than were their wives.

The rate of vasectomy reached 15 per cent for the men who have been married 15 to 25 years, but again it was lower for those who have been married 25 years or more. This again

suggests the possibility that the popularity of vasectomy is a recent phenomenon having become popular only in the generation of men who are now in the late thirties and early forties and who have been married less than 25 years.

The rate of vasectomy was definitely related to socioeconomic status, but the relation appeared to be curvilinear. As shown in Table 10, the rate was zero for those at the lowest end of the economic scale and rose with increasing economic status to the middle of the scale then dropped again for those at the upper end of the scale. This drop was in contrast with the pattern for tubal ligation for which the rate increased continuously throughout the complete range of the material possessions score. The reason for this difference is not clear. One may only venture the hypothesis that the decrease in vasectomy at the upper end of the economic scale was related to ethnic composition of the community.¹⁶ The rate of vasectomy was much lower for Chinese men than for Thai men, although the rate of ligation was higher for Chinese women. Also, the Chinese men in this community were found mainly at the upper end of the material possessions score scale. This would tend to lower the rate of vasectomy in these brackets, whereas no such effect should be noted among the women. Lending further support to this supposition was the finding that the rate of vasectomy was very low in the occupational category "shopkeeper," a category that contained a high proportion of the Chinese in the community. As a matter of fact, this was the only significant statistic to emerge from the classification on occupation; little variation and no discernible pattern was found among the other occupational groups.

SUMMARY AND EVALUATION

A study of contraceptive practices in Bangkhen, a suburb of Bangkok, Thailand discovered a very high prevalence of both tubal ligation and vasectomy. The combined rate included 22.8 per cent of the couples in a representative sample of women

in their reproductive years. This high rate appeared to be general in the metropolitan area and apparently resulted from a very permissive attitude toward sterilization in this society, the only reluctance in the matter having been to perform tubal ligations on women with less than four or five children, and little restriction at all with reference to vasectomy.

During the recent period of rapid modernization, the populace of this urban area have become aware of the possibility of family limitation and considerable numbers have been motivated to practice such limitation even though for the time under consideration the only readily accessible and dependable methods were tubal ligation and vasectomy.

The women who had had such operations were mainly over 30 years of age, had had four or five children and had been married ten years or more. The rate of ligation was higher for those of high economic status and a high degree of education. The husbands who had had vasectomies were mainly between 35 and 44 years of age, had two to five children and had been married at least five years. However, the rate of vasectomy showed a curvilinear relation with economic status, probably because of the reluctance of Chinese men, who tended to be among the wealthier people in the community, to seek such an operation. It should be noted that no such reluctance is seen on the part of the Chinese women.

It appears probable that such a high rate of sterilization is a passing phase in this community, that as other reliable means of family limitation become accessible to the people they will substitute those methods for tubal ligation and vasectomy and furthermore that they will begin to practice such limitation earlier in their marriages, before they have four or five children.

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¹ The senior author of this paper assumes complete responsibility for the rates cited here; they were computed from the raw data in Dr. Srisomang's paper. He especially wishes to absolve her of any complicity in the violation of standard statistical practice in the computation of the composite rate for Bangkok, which can be viewed only as a crude indicator of the probably approximate level of sterilization in the city. See Keovichit, S., *Attitude Toward Family Planning in Four Urban Areas of Bangkok: Preliminary Findings*, unpublished manuscript at the Faculty of Public Health, Mahidol University, Bangkok, no date (data collected January to June, 1965).

² Manasvi estimates that 10,000 females are sterilized in Thailand per year, and analysis indicates that about two-thirds of these are performed in Bangkok hospitals. Manasvi Unhanand, *A Demographic Study of Female Sterilization in Thailand*, *Journal of the Department of Medical Services*, 16, 2, September, 1967.

³ Hawley, A. H. and Prachuabmoh, V., *Family Growth and Family Planning: Response to a Family Planning Action Program in a Rural District of Thailand*, *Demography*, 3, 329, 1966.

⁴ Prachuabmoh, V. and Fawcett, J. T., *Fertility Control in Rural Thailand: Some Results of a Demonstration Project in Photharam District*, *Proceedings of the International Union for the Scientific Study of Population*, Sydney, Australia, August, 1967.

⁵ McDaniel, E. B., *Short Summary of a Family Planning Survey of a Village in Northern Thailand (Ban Pong)*, September 10, 1967, mimeographed, Table 62.

⁶ Whelpton, P. K., Campbell, A. A. and Patterson, J. E., *FERTILITY AND FAMILY PLANNING IN THE UNITED STATES*, Princeton, Princeton University Press, 1966, p. 146.

⁷ Miro, C., *Some Misconceptions Disproved: A Program of Comparative Fertility Surveys in Latin America*, in Berelson, B. (Editor), *FAMILY PLANNING AND POPULATION PROGRAMS*, Chicago, University of Chicago Press, 1965, p. 631.

⁸ Information supplied by Dr. Manasvi Unhanand, Inspector General of the Ministry of Public Health, Bangkok, Thailand.

⁹ From an interview with Dr. Sa-ngad Plengvanich who was Director of Provincial Hospitals at the time of the initial regulation and later became Under Secretary in the Ministry of Public Health.

¹⁰ Translation supplied by Dr. Manasvi Unhanand.

¹¹ Translation and interpretation by Dr. Manasvi Unhanand.

¹² Manasvi Unhanand found in an analysis of Siriraj Hospital records in 1962 that most tubal ligations occurred after five or six children. His work was originally published in Thai in the *Proceedings of the First National Seminar on Population of Thailand*. Later it was made available in English in an article by Sasidhorn, N. and Smythe, H. H., *Population Control in Thailand Through Female Sterilization*, *The American Journal of Economics and Sociology*, 24, 302-306, July, 1965.

¹³ Manasvi Unhanand's 1962 study was reported by Sasidhorn and Smythe, *op. cit.*, p. 304. Information concerning the later studies was supplied in a personal memorandum from Dr. Manasvi.

¹⁴ This scale was devised by Amos H. Hawley and Visid Prachuabmoh in their study of Photharam. Originally it consisted of the sum of the weights assigned to the following household possessions: Automobile, 15; motorcycle, 8; television, 7; well with pump, 6; electric fan, 6; electric iron, 6; sewing machine, 6; radio, 5; bicycle, 5; newspaper subscription, 4; well without pump, 3; sanitary latrine, 3; clock or watch, 2; thermos, 1. In adapting it to an urban population, the following additions were made: refrigerator, 7; gas stove, 5; ice box, 5. Ownership of these items was recorded either by observation or by questioning by the interviewer.

¹⁵ Dr. Mansvi suggests that the higher rate in the upper classes may be more related to the ability to pay for the operation than to any greater motivation.

¹⁶ Dr. Manasvi has suggested that the lower rate of vasectomy at the top of the socioeconomic scale may have been the result of the greater ability of these people to pay for tubal ligation, thus making vasectomy of the husband unnecessary.

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