

# EFFECT OF INDUCED ABORTION ON THE REDUCTION OF BIRTHS IN JAPAN<sup>1</sup>

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## HISTORICAL FOREWORD

**P**ROBLEMS arising from the pressure of human numbers on the limited amount of natural resources available are not a new phenomenon suddenly appearing after the last war in Japan. Even as early as in 1930, the national leaders were seriously concerned about the problems. When the possibility of improving the level of living was threatened by a rising population even to a slight degree, it became a matter of concern among the Japanese people.

The growth of the population of Japan became phenomenal soon after the last War as a result of the combination of the unusually high natural increase rate together with the increase from repatriation and demobilization. There was wide public awareness that the economy of Japan would have great difficulty in making the necessary postwar recovery and in expanding rapidly enough to support the increasing population.

Thus, an intense desire to limit family size became widespread. The predominant means frequently used by the average married couple for the regulation of fertility was induced abortion. It is to be noted, however, that what has drawn the attention of those interested in human fertility throughout the world to Japan is not the simple fact of stated wishes for smaller families. This exists to varying degree in many countries. The extraordinary fact is that the Japanese people used the means available to them and actually had the smaller families that were their stated goals. The rapid fall in the birth rate since the end of the War can be easily noted in Table 1. In 1947 the number of births per 1,000 population was 34.3; in 1957, it was

<sup>1</sup> The present work was conducted by the author while he was with the Maternal and Child Health Division, Department of Public Health Administration, School of Hygiene and Public Health, The Johns Hopkins University. Acknowledgments are particularly due Drs. Paul A. Harper and Rowland V. Rider for suggestions and assistance. Discussions and interpretations of the findings presented in the present article are entirely the author's own responsibility.

17.2. This was a reduction of 50 per cent within a decade. It is recognized that the 1947 rate was unduly high. Nonetheless, the decline was phenomenal.

Admittedly there are several factors responsible for the rapid spread of family planning throughout Japan in the postwar years. The official sanction for birth limitation expressed by the Government in 1948 may be one example. It is to be emphasized, however, that the really significant factor in the intensified efforts of the Japanese to adjust the numbers of their offspring to the environment in which they found themselves was the strength of the motivations in the general public.

The focus of current discussions in Japan is on the problem of means to achieve the ends of family limitation rather than the ends themselves. How can we shift from induced abortion to the prevention of conception? This arouses vigorous discussion, particularly among those concerned with the medical aspect of the situation. There is an expectation of progress toward the goal of altered means in the future, though it is recognized that progress may be rather slow.

#### INTRODUCTION

After the enactment of the Eugenic Protection Law in 1948 in Japan, which deals with the regulations concerning the performance of induced abortion and sterilization operations, there was a precipitous increase in the number of induced abor-

Table 1. Rates of birth, death, and natural increase per 1,000 population, Japan, 1920-1957.

YEAR	BIRTH RATE	DEATH RATE	NATURAL INCREASE RATE
1920	36.2	25.4	10.8
1925	34.9	20.3	14.7
1930	32.4	18.2	14.2
1935	31.6	16.8	14.9
1940	29.4	16.5	12.9
1947	34.3	14.6	19.7
1949	33.0	11.6	21.4
1951	25.3	9.9	15.4
1953	21.5	8.9	12.6
1955	19.4	7.8	11.6
1957	17.2	8.3	8.9

SOURCE: ANNUAL REPORTS OF VITAL STATISTICS, Ministry of Welfare, The Japanese Government. A summary presentation can be found in the statistical journal, *Kosei No Shihyo—Annual Summary for 1957*, published by the Statistical Division of the Ministry of Welfare.

tions performed legally and reported officially to the health authorities. (Table 2.) Although the upward trend of induced abortion seems to have reached a maximum point in recent years, the role it plays in the reduction of births is believed to be significantly great.

There have been to date a small number of studies conducted in Japan with regard to the extent to which induced abortions were responsible for the reduction of births in recent years. All were based upon a direct estimation of all the induced abortions, including those not officially reported, developing from there an estimate of the number of live births prevented by induced abortion.

The present study has a similar aim. The procedures followed, however, are somewhat different and are designed to arrive at this estimate on the basis of research data obtained so far in Japan as well as in other countries, without depending upon the direct estimation of total number of induced abortions performed.

The present article is intended to show the extent to which induced abortions have reduced births in recent years in Japan, taking 1955 as the year of observation. Whether or not induced abortion is a *good* way of limiting the size of family is entirely a different matter. It involves many considerations, such as moral, medical, psychological, and social factors bearing upon

Table 2. Reported induced abortions and registered live births, Japan, 1949-1957.

YEAR	INDUCED ABORTIONS	LIVE BIRTHS	ABORTIONS PER 100 LIVE BIRTHS
1949	246,104	2,696,638	9.1
1950	489,111	2,337,507	20.9
1951	638,350	2,137,689	29.9
1952	798,193	2,005,162	39.8
1953	1,068,066	1,868,040	57.2
1954	1,143,059	1,769,580	64.6
1955	1,170,143	1,730,692	67.6
1956	1,159,288	1,665,278	69.6
1957	1,122,316	1,566,713	71.6

SOURCE: Statistics concerning the Eugenic Protection Law, published by the Ministry of Welfare, and ANNUAL REPORTS OF VITAL STATISTICS, Ministry of Welfare, The Japanese Government.

the performance of induced abortion for the purpose of family limitation.

### GENERAL PRINCIPLES OF PROCEDURES

1. Using available data on the prevalence of contraceptive practice in Japan, its effectiveness and also the prevalence of sterilization operations performed among Japanese women, estimate the number of married women who did not participate in reproductive activities because of contraceptive practice or sterilization in 1955.

2. To the remaining group of married women who could participate in reproductive activities in 1955, apply theoretically derived estimates of the live birth rates to be expected in

Table 3. Estimated number of married women with successful practice of contraception, by age, Japan, 1955.

AGE	NUMBER OF MARRIED WOMEN, IN THOUSANDS <sup>a</sup>	PER CENT OF MARRIED WOMEN WITH CONTRACEPTIVE PRACTICE <sup>b</sup>	PER CENT EFFECTIVENESS OF CONTRACEPTIVE PRACTICE <sup>c</sup>	ESTIMATED NUMBER OF MARRIED WOMEN WITH SUCCESSFUL CONTRACEPTION, IN THOUSANDS (1) × (2) × (3)
	(1)	(2)	(3)	
15-19	74	20.7	50	8
20-24	1,374	31.7	50	218
25-29	2,930	38.7	50	568
30-34	2,831	41.1	50	583
35-39	2,349	38.1	50	449
40-44	2,107	24.5	50	259
45-49	1,736	10.2	50	89

NOTES: <sup>a</sup> National Census, 1955.

<sup>b</sup> Data obtained in the CONCEPTION CONTROL SURVEY by the Ministry of Welfare, The Japanese Government, 1954. A random sampling method was employed in this Survey, the sampling ratio being 1/100, and the findings were based upon the replies from 93,938 couples in which the wife was under 50 years old. (Muramatsu, Minoru: SOME FACTS ABOUT FAMILY PLANNING IN JAPAN. Tokyo: The Mainichi Newspapers, 1955, pp. 87, ff.)

<sup>c</sup> Based on the data obtained in a survey of induced abortion by the Institute of Public Health, Tokyo, 1952. In this survey personal interviews were conducted with women who had had at least one induced abortion, and some detailed questioning was made as to their health and demographic experiences before and after the abortion. The effectiveness ratio was obtained by the comparison of two pregnancy rates, one without contraceptive practice and the other with such practice observed among some 600 women. (Muramatsu, Minoru, et al.: A Survey of Health and Demographic Aspects of Induced Abortion in Japan—Special Report No. 5. *Bulletin of the Institute of Public Health*, Tokyo, April, 1956, 5, No. 3.)

The Institute of Population Problems in Tokyo also reported their finding in this respect as about 50 per cent. (*The World of Obstetrics and Gynecology*, 1955, 7, No. 2, p. 89.)

Matthew Tayback et al. found approximately the same level of effectiveness of contraception in a recently conducted survey in Puerto Rico. (Tayback, Matthew, et al.: Birth Control in a Rural Area of Puerto Rico. *Eugenics Quarterly*, 1958, 5, No. 3, pp. 154-161.)

the absence of fertility control practices. The results would indicate the expected number of legitimate live births in 1955 if there were no induced abortion.

3. To the expected number of legitimate live births, apply the ratio of illegitimate live births to legitimate live births that was actually observed in 1920 in Japan. The results would be an estimate of the number of illegitimate live births to be expected in 1955 if there were no induced abortion.

4. Sum up the expected numbers of legitimate and illegitimate live births in order to obtain the expected total live births in 1955.

5. The difference between the expected total live births and the actually registered live births in 1955 can be regarded as the effect of induced abortion on the reduction of births. If we know the number of induced abortions required to prevent the number of births estimated this way, then we may, by comparing the number of actually reported induced abortions with the number of abortions required, find the level of completeness in the reporting of induced abortions in 1955.

#### COMPUTATIONS

1. Table 3 shows the procedures by which the numbers of married women with successful practice of contraception in 1955 can be estimated.

2. Table 4 shows the estimation of the numbers of married women who had had a sterilization operation performed in 1955.

3. If we subtract the numbers of married women by 5-year age group who did not participate in reproductive activities because of contraception or sterilization as estimated above from the total numbers of married women in 1955, the results would indicate the estimated numbers of married women who could participate in reproductive activities in that year.

4. The next step is to find estimates of the age-specific live birth rates to be expected in the absence of fertility control practices and to apply them to those married women who could

participate in reproductive activities in 1955 as estimated above.

This estimation involves two factors. One is the proportions of women who are capable of bearing living offspring among all the married at various ages. The other is the frequency of live births per fecund woman per year when there is no effort to control childbearing.

It is generally regarded as reasonable among demographers to assume that the frequency of live births per fecund woman per year remains almost constant at all ages.<sup>2</sup> Therefore, if we could find some reasonable estimates of these two factors, then an estimate of the age-specific live birth rate per married woman per year among those practicing no fertility control could be obtained for any given age by combining the two factors.

In regard to the proportions of women who are capable of bearing living offspring at successive ages, Frank Lorimer has developed a hypothetical model which seems to serve the purpose of the present estimation.<sup>3</sup> Briefly, this model was con-

Table 4. Estimated number of married women who had had a sterilization operation performed, by age, Japan, 1955.

AGE	NUMBER OF MARRIED WOMEN, IN THOUSANDS (1)	PER CENT OF MARRIED WOMEN STERILIZED <sup>a</sup> (2)	ESTIMATED NUMBER OF MARRIED WOMEN STERILIZED, IN THOUSANDS (1) × (2)
15-19	74	0.2	0
20-24	1,374	0.4	5
25-29	2,930	1.4	41
30-34	2,831	3.1	88
35-39	2,349	4.4	103
40-44	2,107	4.6	97
45-49	1,736	4.7	82

NOTE: <sup>a</sup> Based on the data obtained in a survey conducted by the Population Problems Research Council, The Mainichi Newspapers, Tokyo, in 1955. This survey aimed to cover some 3,800 couples as a representative sample of couples in which the age of the wife was under 50 years, its sampling ratio being 1/3,700. The figures used in the present study are a modification of the original data published by the investigators, since they did not provide information as to the frequency of female sterilization by each 5-year age group but only by a broader age grouping. (THIRD PUBLIC OPINION SURVEY ON BIRTH CONTROL IN JAPAN. The Population Problems Research Council, The Mainichi Newspapers, Tokyo, 1955.)

<sup>2</sup> Lorimer, Frank, *et al.*: CULTURE AND HUMAN FERTILITY. UNESCO, 1954, p. 51.

<sup>3</sup> *Ibid.*, pp. 52-53.

structed by combining three elements involved in the procreative capacity of human females. They are (1) the variation in the maturation of procreative capacity with age, (2) the degree of losing the capacity due to the accumulation of impairments to fecundity with advance in age, and (3) the influence of aging upon fecundity in association with the menopause. Thus, the proportion of women capable of procreation of living offspring can be computed for any given age by taking into consideration these three elements altogether. (The influence of concomitant variations in the procreative capacity of males is assumed to be taken into consideration in the formulation of this model.)

As for the frequency of live births per fecund woman per year, Lorimer gives an arbitrary figure of 0.36 births in his hypothetical model of fecundity.<sup>4</sup> This figure, if combined with the proportions of women capable of procreation mentioned above, would give a total of 8.3 live births per woman for a period from 14 to 53 years of age, if she was fully exposed to the risk of conception continuously.

According to Christopher Tietze, the highest level of human fertility ever observed is found in the data obtained from the 1941 census of Canada. Among those married women in rural areas of Catholic Quebec who had experienced no or little effort of birth limitation, the average total number of live births per woman for a period from 18 to 45 years of age was found to be 10.6.<sup>5</sup> If the proportions of women capable of procreation as estimated in the hypothetical model described above were applied, the 10.6 total births for a period of 27 years of marriage before menopause would represent 0.49 live births per fecund woman per year.

In one of the reports of the findings obtained in the Indianapolis fertility study which covered some 1,100 couples, the reproductive capacity of the "relatively fecund" couples was

<sup>4</sup> *Ibid.*, p. 51.

<sup>5</sup> Tietze, Christopher: *The Clinical Effectiveness of Contraception. THIRD INTERNATIONAL CONFERENCE ON PLANNED PARENTHOOD, REPORT OF THE PROCEEDINGS.* Bombay, India, 1952.

estimated at 0.45 births per year during the first 13 years of married life, if there was no effort to control fertility at all.<sup>6</sup>

When the present writer conducted a field survey of induced abortion in Japan in 1952, one of the analyses revealed that the pregnancy rate (i.e., the number of pregnancies which occurred per 100 woman-years of exposure to the risk of pregnancy) was about 75 for the period during which no voluntary limitation of fertility was exercised among those women who had had at least one induced abortion prior to the personal interview. This finding is based on the reproductive histories given by some 600 women the majority of whom belonged to the age group 35 to 39 years and whose capacity of reproduction was demonstrated by the fact that they all became pregnant and had an induced abortion shortly before the interview.<sup>7</sup> If this preg-

Table 5. Expected number of legitimate births in the absence of induced abortion, by five-year age group, Japan, 1955. (On the three possible assumptions of fecundity level.)

AGE	ESTIMATED NUMBER OF MARRIED WOMEN WHO COULD PARTICIPATE IN REPRODUCTIVE ACTIVITIES, IN THOUSANDS <sup>a</sup> (1)	WOMEN CAPABLE OF PROCREATION, PER CENT OF ALL WOMEN <sup>b</sup>	EXPECTED LIVE BIRTH RATE, PER 100 WOMEN <sup>c</sup> (2)			EXPECTED NUMBER OF LIVE BIRTHS, IN THOUSANDS (1) × (2)		
			High Est.	Medium Est.	Low Est.	High Est.	Medium Est.	Low Est.
15-19	66	33.9	15.3	13.9	12.5	10	9	8
20-24	1,151	93.0	41.9	38.1	34.4	482	439	396
25-29	2,321	90.0	40.5	36.9	33.3	940	856	773
30-34	2,160	84.8	38.2	34.8	31.4	825	752	678
35-39	1,797	77.0	34.7	31.6	28.5	624	568	512
40-44	1,751	62.5	28.1	25.6	23.1	492	448	404
45-49	1,565	14.6	6.6	6.0	5.4	103	94	85
(TOTAL LIVE BIRTHS PER WOMAN, 15-49 YEARS)			(10.3)	(9.3)	(8.4)	3,476	3,166	2,856

NOTES: <sup>a</sup> (Number of married women)—(Estimated number of married women with successful practice of contraception, Table 3)—(Estimated number of married women sterilized, Table 4).

<sup>b</sup> Lorimer, Frank, *et al.*, CULTURE AND HUMAN FERTILITY, UNESCO, 1954, pp. 52-53.

<sup>c</sup> (Number of live births per fecund woman per year) × (Proportion of women capable of procreation) × 100. The number of live births per fecund woman per year was assumed to be 0.45, 0.41, or 0.37 respectively for the high, medium, or low estimate.

<sup>6</sup> Lorimer, F., *et al.*: *op. cit.*, p. 40.

<sup>7</sup> Muramatsu, Minoru, *et al.*: A Survey of Health and Demographic Aspects of Induced Abortion in Japan—Special Report No. 5. *Bulletin of the Institute of Public Health*, Tokyo, April, 1956, 5, No. 3.



nancy rate of 75 was converted into the number of live births per woman per year, it would represent 0.41 births.

In view of these somewhat different values observed for the number of live births per woman per year in a fecund conjugal union, three different levels of fecundity may be tried in the present study in order to obtain the high, medium, and low estimates of the number of live births to be expected among those Japanese married women who could participate in the reproductive activities in 1955 if there were no induced abortion at all. Thus, it may be suggested to use the three figures of 0.45, 0.41, and 0.37 live births. (0.45 and 0.37 are 10 per cent above and below 0.41 respectively.) Once these figures are set, it is possible to determine the expected rate of live births at any age by the use of proportions of women capable of procreation as discussed above.

Table 5 shows the procedures through which the three possible estimations have been made in regard to the number of live births to be expected among the married women in 1955. The average age of each 5-year age group was assumed to be its mid point. It is noted that some 3.5 to 2.9 million legitimate births would have occurred in 1955 if there were no induced abortion at all.

5. The estimation of illegitimate births to be expected in 1955 in the absence of induced abortion presents considerable difficulties. It appears that the only possible approach we may use with certain reasonableness is to review the trend of illegitimate births that occurred in the past in Japan.

The first year for which the officially published data are available in this regard is 1920. In 1920, 8.2 per cent of all live births were illegitimate. The proportion then decreased to 6.4 in 1930, 4.1 in 1940, 2.5 in 1950, and less than 2 per cent in 1955. It is reported that fertility control practices have been particularly significant in the elimination of illegitimate births in recent years.

In such early years as 1920, we may assume that induced abortions used to prevent illegitimate births were not so preva-

lent. However, it is estimated that some of the illegitimate births did not appear as such in the official data in those years as the women who were desperate may have resorted to infanticide or other means to avoid registering illegitimate births. Also, it is probable that some primitive contraceptive methods were used to some extent even in those early years to prevent the conception of illegitimate births.

With these reservations in mind, the earliest reliable statistic available in regard to the frequency of illegitimate births in Japan is used in the present estimation, namely, the 8.2 per cent among all births. Thus, the objective here is to see how many illegitimate births we would expect if the 1920 figure is applied to 1955. It is admitted that this may yield a rather conservative estimation of the number of illegitimate births prevented by induced abortion in 1955.

The assumption of 8.2 per cent illegitimate births among all births corresponds to a ratio of 8.9 illegitimate births to 100 legitimate births. Therefore, the expected number of illegitimate births in the absence of induced abortion in 1955 would be 309, 282, or 254 thousand respectively for the high, medium, or low estimation discussed in the preceding paragraph.

6. Thus, the number of all live births to be expected in 1955 if there were no induced abortion at all, would be 3,785, 3,448, or 3,110 thousand respectively for the high, medium, or low estimation.

7. The number of live births actually registered in 1955 was 1,731 thousand. Thus, it is estimated that 2,054, 1,717, or 1,379 thousand births would have been prevented by the induced abortions performed in 1955.<sup>8</sup>

8. In a recent survey conducted by the present writer and his colleagues in Tokyo which covered some 2,400 women who visited the out-patient department of a Red Cross maternity

<sup>8</sup> More precisely, induced abortions which served to prevent live births from actually occurring in 1955 are those which were performed from July, 1954, through June, 1955, if the average month of pregnancy when an induced abortion is performed is assumed to be the end of the third month. In the present computation, however, this point was not taken into consideration as the difference between 1954 and 1955 in regard to the number of reported induced abortions was rather small.

hospital in 1954, 1955 and 1956, it was found that among women having at least one induced abortion in a given calendar year, the average number of such abortions was actually 1.1.

It follows, then, that in order to prevent the 2,054, 1,717, or 1,379 thousand births, there would have been required 2,259, 1,889, or 1,517 thousand induced abortions performed in 1955, according to the high, medium, or low estimation respectively. The number actually reported was 1,170 thousand induced abortions. Consequently, the completeness of reporting of induced abortions in 1955 may be estimated at 51.8, 61.9, or 77.1 per cent respectively.

#### DISCUSSION

The three estimates were developed by placing an arbitrary 10 per cent range around 0.41, the value from the author's work selected as the probable number of live births per fecund woman per year. Ranges could have been applied in similar fashion to the several other indices on which the final estimates were based. It must be emphasized, therefore, that the range of the estimates is possibly too small. However, it was decided not to attempt an elaborate use of ranges for each intermediate index or ratio. The following considerations deal with the question as to which one of the three estimates may be closer to the actual situation which prevailed in Japan in 1955.

There is evidence which suggests that we may have underestimated the expected number of births, and, hence, the number of induced abortions. (1) The application of 1920 ratio of illegitimacy to 1955 as discussed before. (2) The assumption made in this study about the average age of married women in each 5-year age group. As noted in Computation Step 4 above, the average age of each 5-year age group was assumed to be its mid point. This certainly would have resulted in an underestimation of the proportion of women capable of procreation particularly in the youngest age group, 15-19 years, since the age of the majority of married women in this group was undoubtedly close to the end point of this interval.

Also, it is noted that the fecundity levels used in the high and medium estimates were more or less similar to those actually observed in recent years, whereas the figure used in the low estimate was lower than any of the observed values.

If all of these considerations were put together, one is inclined to think that the high or medium estimate would probably be more valid. On the other hand, one possible factor which makes the results overestimated is that it is apparently unrealistic to expect that all the married women were fully exposed to the risk of conception *continuously* during the year under observation. However, this factor does not seem very serious in the present considerations, since the computations were based on those women who reported themselves as being married at the time of census enumeration in October, 1955, and also the period of observation is only one year.

In view of these various conditions, the writer is under the impression that the medium or high estimation probably reflects more faithfully the actual situation which prevailed in 1955 in Japan.

#### CONCLUSIONS AND SUMMARY

An attempt was made to estimate the number of births that would have occurred in 1955 in Japan if there were no induced abortion.

From the total number of married women in 1955, those who did not participate in reproductive activities because of contraception or sterilization were subtracted. The estimates of the number of married women practicing contraception successfully and of those sterilized were made by the use of data obtained from sample studies conducted in Japan. Then, to those who could participate in reproduction, theoretically derived estimates of the age-specific birth rates to be expected in the absence of fertility control practices were applied. This estimate of birth rates was made by combining two factors involved in human fertility.

One is the proportions of women who are capable of bearing

living offspring at various ages. A hypothetical model developed by Frank Lorimer was used for this factor. The other is the expected number of live births per fecund woman per year when she is fully exposed to the risk of conception, which is assumed to remain almost constant during her childbearing ages. In view of the somewhat different levels of fecundity observed in the past in various parts of the world, three different assumptions were made in the present study in this regard in order to obtain high, medium, and low estimates, namely, 0.45, 0.41, and 0.37 live births per woman per year respectively.

According to these three estimates, the expected number of legitimate births in 1955 was about 3.5, 3.2, or 2.9 million respectively.

To these numbers of estimated legitimate births, the ratio of illegitimate births to legitimate births observed in 1920 in Japan was applied in order to estimate the number of illegitimate births to be expected in 1955 if there were no induced abortion. Presumably this procedure would yield a somewhat conservative result, since it is believed that in 1920 some fertility control practices were used to avoid illegitimacy. In any event, the estimates of illegitimate births derived this way are approximately 310, 280, and 250 thousand respectively for the high, medium, and low assumptions.

Thus, it was estimated that about 3.8, 3.4, or 3.1 million live births would have occurred in 1955, including both legitimate and illegitimate, if there were no induced abortions at all.

The actually registered number of live births in 1955 was 1.73 million. Therefore, it was estimated that about 2.1, 1.7, or 1.4 million births were prevented by the induced abortions performed in 1955. On the other hand, in a survey conducted in Japan recently it was found that among women having at least one induced abortion in a given calendar year, the average number of such abortions was actually 1.1. It follows, then, that in order to prevent the number of births estimated above, some 2.3, 1.9, or 1.5 million induced abortions would have been required as compared with the actually reported 1.17 million.

The completeness of reporting of induced abortions could therefore be estimated at about 52, 62, and 77 per cent respectively for the high, medium, and low assumptions.

Among these three different estimates, the writer is under the impression that probably the medium or high estimate of induced abortions reflects more faithfully the actual situation of 1955 in Japan. The low estimate may be somewhat too conservative, if we take into account the several conditions involved in the procedures which tended to underestimate the expected number of births in 1955.

In summary, it can be stated that the number of live births in 1955 in Japan would have amounted to twice (or more) the number actually registered, if there had been no induced abortion at all. And, the reporting of induced abortions to the health authorities probably included only 50 to 60 per cent of all cases actually performed.