The Pakistan Development Review
28 : 4 Part II (Winter 1989) pp. 661–669

Service vs Survey Statistics: An Evaluation of Contraceptive Use in Pakistan†

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INTRODUCTION

Contraceptive use rates estimated from service statistics and contraceptive prevalence surveys often disagree particularly in larger populations. This disagreement is more pronounced in traditional societies where under-reporting of contraceptive use is a common feature not only because of methodological problems in sample surveys and deficient reporting and recording systems of family planning programmes but also because of socio-psychological reasons including social taboos, personal inhibition, shyness, lack of education and lack of openness to foreign ideas and mass disapproval by the society for cultural and religious reasons.

The disparity in contraceptive use rates based on these two sources of information is also acknowledged in countries with strong family planning programmes and efficient reporting and recording systems. Indonesia, which is often cited as a prime example of operating a successful family planning programme and is also quoted to be the one with "very strong reporting, recording and research component" [ESCAP (1989), p. 4] is not an exception. Comparative studies undertaken there reveal that service statistics estimates exceed that of surveys by 24 percent for IUD, 28 percent for pill and 110 percent for Condom [Streatfield (1985), p. 45]. Similar inconsistencies were found in India and Bangladesh [Koening *et al.* (1984) and Ahmed *et al.* (1987)].

In Pakistan wide differences have been observed in contraceptive use rates based on service statistics and those revealed by surveys [Syed (1981); Rukanuddin *et al.* (1985) and Sultan (1987)]. The deficient recording and reporting system of contraceptive use, the inappropriateness of the usage assumptions, continuation rates of different methods and the lack of necessary information on method effectiveness and use effectiveness cast doubt on the estimates of service statistics. Table 1 shows reported contraceptive use rates in the 1975 Pakistan Fertility Survey (PFS) and 1984-85 Pakistan Contraceptive Prevalence Survey (PCPS) together with estimated use rates based on serivce statistics for the corresponding reference periods. (See Table 1).

†Comments on this paper have not been received.

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Table 1

Reported and Estimated Contraceptive Use Rates by Source, Pakistan 1975 and 1984

Source	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PFS (1975)	0.6	0.9	0.9	1.1	–	3.5	5.3
Services Statistics Estimates (1975)	3.0	1.1	3.2	9.5	–	16.8	–
PCPS (1984)	0.8	2.6	1.4	2.2	0.6	7.6	9.1
Services Statistics Estimates (1984)	2.0	1.6	5.8	10.2	0.2	19.8	–

(1 = IUD, 2 = Sterilization, 3 = Pill, 4 = Conventional Contraceptives, 5 = Injectable, 6 = All Programme Methods, 7 = All Methods).
*For service statistics estimates of 1975 and 1984. [See Syed (1981) and Sultan (1987)] respectively.

The above table indicates gross disparities between the estimates of the two sources both in 1975 and 1984. The difference is enormous for pill and IUD. While the 1975 service statistics estimates are higher for all methods, the 1984 PCPS results show higher rates for sterilization and injectables.

Service and survey statistics could both be doubted for accuracy. It is also misleading to accept either of the two sources as a standard while evaluating the other. In such a situation, the need is to explore some other method which may provide more reliable estimates. The basic aim of this paper is to examine the possibilities of an indirect technique for arriving at a more probable rate of contraceptive use independent of service and survey statistics.

DATA AND THEIR LIMITATIONS

For estimation of contraceptive use in 1975 and 1984, the Population Welfare Programme adjusted service statistics have been used. For 1975 the method of Couple Years Protection (CYP) was used whereas for 1984 Component Projection Approach II[1] (CPA) was applied. Service statistics for conventional contraceptives and the pill represent sales reported by service outlets and not actual use. The denominators used for estimating use rates are based on the projected number of married women of reproductive age. Any under or over assessment of this number can lead to inaccurate estimation of use rates.

[1]For details of these methods see U. N. Manual IX.

Table 2

Values of n(a) and v(a) by 5 Year of Age Groups

	Age Groups						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
$n(a)$	0.411	0.460	0.431	0.395	0.322	0.167	0.214
$v(a)$	0.0	0.0	−0.279	−0.667	−1.042	−1.414	1.671

Source: [Coale and Trussell (1978), p. 205].

the Equation 2 is found to be a linear equation in the form of

$$y = c + mx.$$

Least square regression was used to estimate *"M"* and *"m"* values for the following schedules and are presented in Appendix A.

(i) The marital age-specific fertility schedule observed in the 1963–65 Population Growth Experiment (PGE) Survey (average of longitudinal and Chandra and Deming method estimates), assumed to be potential fertility in this analysis;
(ii) The marital age-specific fertility schedule of the 1975 PFS; and
(iii) The marital age-specific fertility schedule estimated on the basis of contraceptive use in 1985 by taking the PGE schedule as potential fertility.

According to Coale and Trussell (1978) the reliability of the marital fertility schedule with respect to *"m"* values can be determined by examining the mean square error of the logarithmic regression of the optimal values of parameters. They proposed that a mean square error of zero will signify a perfect fit, a value of 0.005 will give a mediocre fit and that of a 0.01 will show a poor fit. As per this criterion, the fertility schedule of the 1975 PFS is very close to a perfect fit and the 1985 estimated marital schedule is better than mediocre and the PGE lies between mediocre and a poor fit (see Appendix A).

Conversion of *"m"* into Contraceptive Use

The estimated parameter *"m"* (0.254) for the marital fertility schedule of PFS indicates a degree of fertility control in Pakistan in 1975. We know that the value of *"m"* at 0.256 for the 1985 estimated fertility schedule is associated with 19.8

percent contraceptive use. For converting *'m'* values into contraceptive use, two second degree polynomial regression equations were analysed, taking *'m'* values as independent variable and contraceptive use being the dependent variable. The first equation included 26 countries while the second included 16 countries having comparatively more reliable data on contraceptive use and fertility.

RESULTS

Equation (1) explains almost 90 percent of the variance in the contraceptive use and the association is found to be highly significant. The standardized regression coefficient is 0.95.

The polynomial association from the origin is:

$$Y = 87.631\,(x) - 26.873\,(x)^2$$

The estimated contraceptive use on the basis of this association is given in Table 3. The estimated use in Pakistan in 1975 is 20.5 percent against the *"m"* value of 0.254, whereas the reported use corresponding to this period is 5.3 percent and the estimated contraceptive use on the basis of service statistics is 16.8[2] percent [Syed (1981)].

Since the value of *"m"* describes a degree of deliberate fertility control in a population, the predicted value on the basis of *"m"* value includes modern and traditional methods. Assuming that the fertility schedule for Pakistan is correct the reported contraceptive use in the 1975 PFS appears to be substantially under-reported.

Equation (2) explains 98 percent of variation in contraceptive use. The polynomial association found in this regression is:

$$Y = 86.776\,(x) - 27.286\,(x)^2$$

The standardized regression coefficient is 0.99. The association is found to be highly significant. The predicted rates of contraceptive use are also close to the reported contraceptive use in these countries (Table 4). On the basis of Equation (2) the level of contraceptive use in Pakistan against the value of *"m"* of 0.254 for 1975 is 20.3 percent. It is observed that with the increase in variance explained from 0.90 in Equation (1) to 0.98 in Equation (2), the estimated contraceptive use for Pakistan decreased marginally from 20.5 to 20.3 percent. Predicted contraceptive

[2]Service statistics estimates for 1975 were derived using wastage factor of 0.5 to conventional contraceptives and 0.25 to pills.

Table 3

Reported Contraceptive Use and Estimated Use on the Basis of Regression I (26 Countries)

Country	*'m'* Values	Reported Contraceptive Use	Estimated Contraceptive Use
1. Bangladesh	0.326	07.9	25.7
2. Colombia	0.420	42.4	32.1
3. Costa Rica	0.512	64.4	44.9
4. Dominican Republic	0.437	31.8	33.2
5. Egypt	0.698	24.0	48.1
6. Fiji	0.795	41.5	52.7
7. Guyana	0.878	30.8	56.2
8. Hong Kong	1.569	72.4	71.3
9. Infonrdis	0.482	26.3	36.0
10. Jamaica	0.538	38.4	39.4
11. Jordon	0.453	25.2	34.2
12. Kenya	0.042	09.0	3.6
13. Korea	1.077	54.5	63.2
14. Malaysia	0.817	33.0	53.7
15. Mexico	0.375	30.4	29.1
16. Nepal	0.133	2.4	11.2
17. Pakistan	0.254	5.3	20.5
18. Panama	0.768	54.0	51.5
19. Peru	0.318	31.4	25.1
20. Philippines	0.365	36.2	28.4
21. Singapore	2.010	71.0	67.6
22. Sri Lanka	0.681	32.0	47.2
23. Syria	0.103	20.0	8.7
24. Thailand	0.363	33.3	28.3
25. Trinidad and Tobago	0.669	52.0	46.6
26. Turkey	0.789	50.0	52.0
27. Pakistan *	0.256	19.8	20.7

Source: For reported contraceptive use see [Nortman (1985), pp. 56-57].

Note: The value of *'m'* is based on estimated MASFR for 1985 which is the result of 19.8 percent contraceptive use on the basis of service statistics.

*Not included in the regression.

Table 4

Reported Contraceptive Use and Estimated Use on the Basis of Regression II (16 Countries)

Country	*'m'* Values	Reported Contraceptive Use	Estimated Contraceptive Use
1. Dominican Republic	0.437	31.8	33.2
2. Fiji	0.795	41.5	52.7
3. Hong Kong	1.569	72.4	71.3
4. Indonesia	0.482	26.3	36.0
5. Jamaica	0.538	38.4	39.4
6. Jordon	0.453	25.2	34.2
7. Malaysia	0.817	33.0	53.7
8. Korea	1.077	54.5	61.8
9. Mexico	0.375	30.4	29.1
10. Peru	0.318	31.4	25.1
11. Philippines	0.365	36.2	28.4
12. Singapore	2.010	71.0	67.6
13. Sri Lanka	0.681	32.0	47.2
14. Panama	0.768	54.0	51.5
15. Thailand	0.363	33.3	28.3
16. Turkey	0.789	50.0	52.0
17. Pakistan*	0.256	19.8	20.7

Source: For reported contraceptive use see [Nortman (1985), pp. 56-57].

Note: The value of *'m'* is based on estimated MASFR for 1985 which is the result of 19.8 percent contraceptive use on the basis of service statistics.

*Not included in the regression.

use includes both programme and non-programme methods of contraception and represents an overall degree of fertility control in Pakistan. Contraceptive use in 1975 estimated by Equations (1) and (2) was much higher than the reported contraceptive use in the 1975 PFS and was even higher than the estimated contraceptive use for 1975 based on service statistics. The estimated contraceptive use levels in this analysis can also be substantiated from the findings of Nortman (1982) and Lee and Lucas (1986). They observed that with a Crude Birth Rate (CBR) of 40 per thousand in Pakistan (PFS 1975) the corresponding contraceptive prevalence should have been around 20 percent.

Validity of Regression Results

We know that marital age specific fertility rates estimated for 1985 are based on 19.8 percent contraceptive use for which the estimated value of *'m'* is 0.256. Against this value of *'m'*, Equation (1) and Equation (2) estimate a contraceptive use level of 20.7 and 20.4 percent respectively. The close agreement between the direct and indirect estimate of contraceptive use validate the application of the indirect method on any fertility schedule for arriving at reliable estimates of contraceptive use in Pakistan.

CONCLUSION

Both service statistics and survey statistics are found to be inadequate for estimating contraceptive use in Pakistan. Service statistics, if taken at face value, will highly overestimate contraceptive use, whereas, survey reports are underestimating contraceptive use in Pakistan. The indirect estimates using *'m'* values in the polynomial regression equation appears to be fairly reliable as they provide estimates closer to the one derived from adjusted service statistics.

Appendix

Appendix Table A

Marital Age-specific Fertility Rates

Age	PGE	PFS	Estimated Schedule 1985
20–24	0.362	0.355	0.336
25–29	0.349	0.362	0.282
30–34	0.331	0.286	0.265
35–39	0.233	0.221	0.165
40–44	0.110	0.104	0.087
45–49	0.066	0.009	0.056
M	0.782	0.887	0.728
m	0.074	0.254	0.256
Percent Error	10.6624	5.5568	8.0996
Mean Square Error	0.0067	0.0003	0.0036

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