

REPRODUCTIVITY AND AGE-SPECIFIC FERTILITY RATES IN PAKISTAN AFTER 1981

Jamal Abdul Nasir¹ Munir Akhtar² and M.H. Tahir³

^{1,3}Department of Statistics, The Islamia University of Bahawalpur, Pakistan

²COMSATS Institute of Information Technology, Attock, Pakistan

Email: ¹njamal76@yahoo.com

²munir_stat@yahoo.com

³mtahir_stat@yahoo.com

ABSTRACT

The purpose of this study is to observe the trends and the patterns of reproductivity in Pakistan using the secondary data on age-specific fertility rates after 1981. Also, the fertility pattern in Pakistan has been described since 1960s. To experience the modest change in reproductivity, the estimated total fertility rate, gross reproduction rate and mean age of childbearing are computed for the above-mentioned period corresponding to the data available for the different years. Further, models have been fitted to the data on age-specific fertility rate and its forward and backward cumulative distributions. Finally, the cross validity prediction power technique has been used to check the validity of these models.

KEY WORDS

Age specific fertility rate; cross validity prediction power; statistical modeling; reproductivity.

1. INTRODUCTION

The study of reproductivity is primarily concerned to model fertility curves. Therefore, for many years, modeling fertility curves has attracted the interest of demographers and remains the area of research. The controversy of actual reproductivity experience by natural process for a population over some period of time requires the calculation of some major reproductivity measures and fertility models. In literature, a variety of reproductivity measures and mathematical models have been proposed which have described the reproductivity pattern; see Pollard et al. (1990), Islam and Ali (2004), Peristera and Kostaki (2007) and Nasir et al. (2007). Some of these mathematical models have been shown to provide excellent fits to age-specific fertility rate distributions of human population described in Hoem et al. (1981). Some useful references to assess the fertility pattern in Pakistan are Sathar et al. (1988), Sathar and Kazi (1990), Sathar (1993), Sathar and Casterline (1998), Hussain and Bitles (1999) and Hagan et al. (1999). The existing literature to assess the fertility in Pakistan is lacking the modeling approach to study the reproductivity. This provides a rationale for the present study. In short, to assess the fertility behavior of a population, the different measures of reproductivity can

Table 2:
Age Specific Fertility Rates (ASFR) per 1000 woman of Pakistan during 1980s-2000s

Age group (z-z+5)	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1984	65.76	268.33	367.57	314.42	226.07	109.56	37.88
1985	59.15	272.98	350.79	326.98	235.29	108.57	47.88
1986	54.31	265.75	360.26	303.12	226.22	125.98	52.16
1988	66.00	263.60	333.00	278.30	203.30	111.20	41.80
1989	75.70	265.80	323.40	274.30	197.10	102.00	41.60
1990	75.50	274.80	313.20	276.00	175.90	97.00	30.50
1991	69.00	258.20	315.40	259.00	186.50	82.30	27.40
1992	73.30	261.40	312.90	254.50	162.60	74.50	27.80
1995	59.10	243.40	305.10	241.90	148.10	90.10	29.60
1996	54.7 0	258.2 0	295.90	255.40	143.00	65.50	23.20
1997	52.3 0	231 00	273.20	211.20	142.90	68.40	30.70
1999	36.20	205.60	256.90	203.60	118.30	61.70	25.80
2000	32.90	195.10	244.20	203.80	114.50	54.40	22.90
2001	24.20	162.00	242.90	197.20	118.50	57.90	21.90
2003	23.70	163.10	229.60	190.00	112.70	49.00	18.80
2005	20.30	157.60	225.50	179.90	106.60	50.10	18.10

Source: Pakistan Demographic Surveys 1984-2005

3.2 Reproductivity Measures

Before presenting the reproductivity measures, we considered a fertility index, TFR due to its close connection with the reproductivity measures.

- i) The TFR has been estimated using the formula of

$$TFR = 5 \sum_{\alpha}^{\beta} ASFR \quad (3.1)$$

$$\text{and } TFR = \int_{\alpha}^{\beta} f_y dy, \quad (3.2)$$

where ' α ' and ' β ' are the minimum and maximum years of reproductive life span of a woman. Generally ' α ' shows the age of woman at minarchi which is taken to be 15 years and ' β ' is taken to be 49 years.

- ii) Gross reproduction rate (GRR) is estimated using the formula

$$GRR = \frac{B^T}{B^T} \int_{\alpha}^{\beta} f_y dy. \quad (3.3)$$

This can be approximated as