Introduction

South Africa has experienced one of the fastest fertility transitions in sub – Saharan Africa. Total fertility rate (TFR) has declined from 6.0 births per woman in the 1970s to a current estimate of 2.9 births per woman at the end of her reproductive period (Garenne et al., 2000). This decline has been attributed to delayed entry into marriage coupled with high contraceptive use. At the same time, South Africa records one of the highest premarital fertility rates in the region. For instance, in 1996 the average TFR for Black women who had never married or who were cohabiting was estimated at 3.9, while that of women who were married was 4.3 births per woman at the end of childbearing period (Chimere-Dan, 1999). Garenne and colleagues (2000) also showed that premarital births accounted for 21% of all births among Black South Africans. This is also evident from high teenage pregnancies where about 48% of Blacks girls would have their first by age 20 (Seedat and Swingewood, 1996; Garenne and Zwang, 2003).

The huge fertility decline in South Africa has been ascribed to large birth intervals between the first birth and the second birth (Garenne et al., 2000). As such, Black South Africans present a bimodal age specific fertility distribution. This fertility pattern suggests low contraceptive use before first birth, especially among adolescents, and high contraceptive use thereafter. Therefore, persistent high adolescent fertility cannot be divorced from the broader trend of declining fertility in South Africa. In order to understand fertility patterns and the effect of birth intervals in South Africa, it is important to consider the context within which both the first and second births occurred.

On the other hand, adolescent child bearing is often associated with school drop out for girls. This consequence is sometimes dictated by policy, sometimes social norms or material conditions (Singh and Samara, 1996). Contrary to many developing countries, school girls in South Africa are not expelled from school if they become pregnant; rather they are allowed to resume their studies once the baby is born (Kaufman et al., 2001). In their previous work, it was reported that about 35% of young black mothers aged 19 and younger were currently in school in 1996 (Kaufman et al, 1998). Thus high returns to school by teenage mothers plays an important role in explaining timing of second birth in South Africa as possibility of returning to school may lead some women to postpone their second birth. Nonetheless, although a substantial proportion of the girls continue their education following first birth, many do not. Household and family characteristics that facilitate access to childcare and economic support of an additional child are important in determining return to school by young mothers (Grant and Hallman, 2006). Some young mothers are forced to drop out of school in order to care and support their children, while others drop out to marry the father of the child (Kaufman et al., 2001).

Research objectives

The aim of this research is two fold: To

- Model transition to second birth among Black women in South Africa, and
- Analyze how much marital status influence transition to second birth

Research Hypotheses

Based on the statement of the problem above, this research poses the following research hypotheses to understand timing of second birth in South Africa:

- The hazard of second birth is higher for women with first birth in marriage than women with non-marital first births

Data and Methods

This research uses data from the Agincourt Demographic and Health Surveillance System (ADSS), South Africa. The Agincourt sub-district is a rural region of Limpopo province, near the country's eastern border with Mozambique. This region is one of the poorest in the country and is predominantly Black South Africans and Mozambican refugees. Since 1992 to date, the ADSS has been conducting annual census rounds within 21 villages of approximately 70, 000 people. The paper only uses a 10% representative sample (student data set) of the whole data set. This data is available from 1992 to 2005. The main variables measured are births, deaths, in and out migration, as well as other socio-economic characteristics. Births were recorded by updating maternity histories for women in the reproductive ages (12-50 years). Data on marital status was collected retrospectively in 2005 for every woman aged 12-50 years. The marital status data contains start and end dates of each union. This information is then contrasted with the time of first and second births to establish the marital status of the mother at the time of these births.

I apply a discrete time hazard model of the length of time between first and the conception leading to the second live birth. This model specification allows for a flexible baseline hazard, so there is no need to assume a functional form of the effect of duration. As indicated earlier, the duration months will be divided into different periods during which the risk of giving birth to a second child is assumed to constant for individuals with the same values of covariates. However, it is important to note that the degree of flexibility of the baseline hazard depends on the number of duration periods in the model. The discrete time hazard model in this analysis uses a logistic function form. This is because the data is reorganized into person-months format such that the model likelihood has exactly the same form as that for a standard binary logit regression model (Allison, 1995). In addition, this model also allows for censoring in the data. The hazard rate is therefore defined as:

$$h(t_i|x)/[1-h(t_i|x)] = \{h_0(t_i)/[1-h_0(t_i)]\} \exp(X\beta)$$

where $h(t_i|x)$ is the conditional probability of having the second child at t_i for a given covariate vector X.

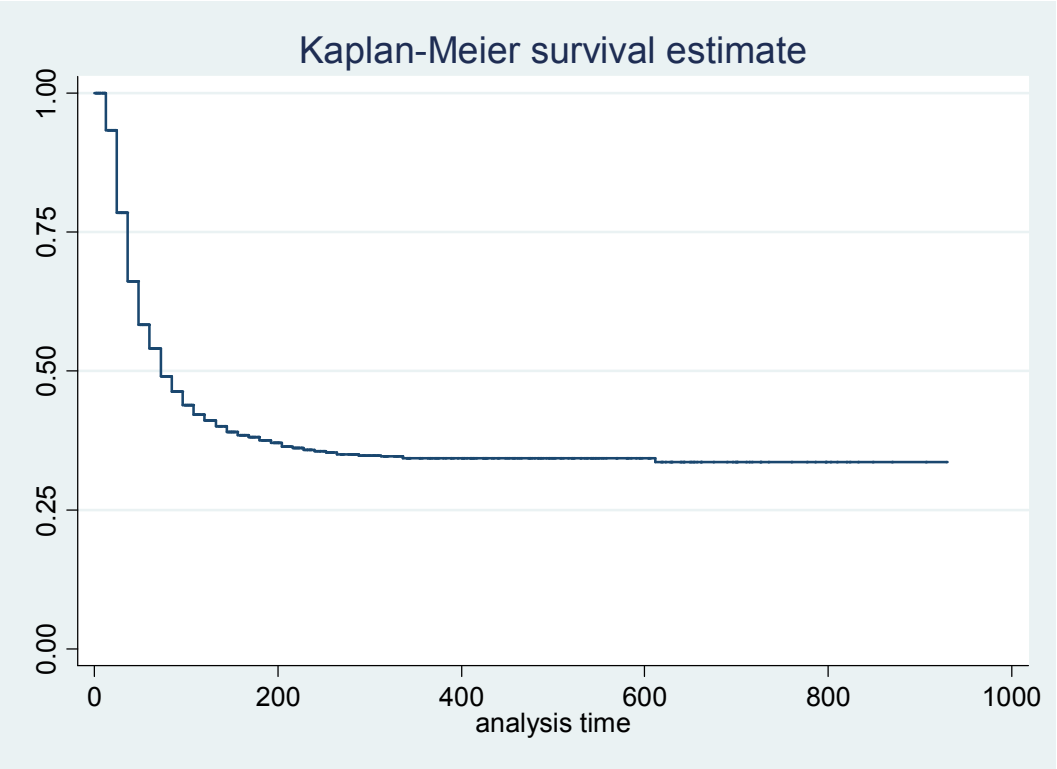
Descriptive Statistics

Table 1 below represents descriptive statistics for this analysis. When the sample of mothers is divided into cohorts, it shows that older age cohorts are well represented in the study, which allows for cohort variation in the risk of transition to second birth. Similar to previous studies, Black women in South Africa have children as early as 12 years old. In the current study, 46% of the women had their first child before age 20. Looking at marital status at the time of the first birth in Table 1, only 24% of the women had their first birth in a marital union, while 65% of these births occurred to never married women.

Table 1: Descriptive Statistics of the Variables, N = 2, 725		
Variables	**Frequency**	**Percentage**
Experienced Second Birth	1714	62.9
Cohort		
Born Before 1960	795	29.17
Born 1960-1970	599	21.98
Born 1970-1980	940	34.5
Born 1980+	391	14.35
Age at First Birth		
12-19	1266	46.45
20-24	809	29.67
25-30	272	9.98
30-34	123	4.5
35+	256	9.4
Marital Status at first birth		
Never Married	1,772	65.03
Married	641	23.5
Cohabiting	122	4.48
Divorced/Separated	186	6.83
Widowed	4	0.23
Education Status		
No Education	850	31.2
Some Education	1875	68.8
Ethnicity		
South African	1719	63.08
Mozambican	948	34.79
Other	58	2.13
Migration Status		
Migrant	282	10.35
Non-migrant	2443	89.65
Sex of first Child		
Male	1336	49.03
Female	1389	50.97
Contraceptive use after first child		
Yes	1,418	38.26
No	1,307	61.74

Looking at the Kaplan Meier survival function below, the curve shows that survival to second birth declines sharply during the first 50 months after the birth of the first child, with the median survival around 70 months (6 years). This is because second birth is still a common event for majority of the women. However, towards 200 months, risk of second birth becomes constant.

Figure 1. Kaplan-Meier Survival Function of experiencing Second Birth



References:

Bongaarts, J. (1982). "The Fertility Inhibiting Effects of the Intermediate Fertility Variables." **Studies in Family Planning**, Vol. 13, No. 6-7, pp. 178-189.

Chimere-Dan, O. (1998). "Non-Marital Teenage Childbearing in Southern Africa: A case of Namibia." **Union of African Population Studies**, Vol. 12, No. 2, pp. 20.

Chimere-Dan, O. (1999). "Marriage and the Fertility Transition in South Africa." Paper Presented at the Third African Population Conference: **The African Population in the 21st Century**. Durban.

Garenne, M., Tollman, S. and Kahn, S. (2000). "Premarital Fertility in Rural South Africa: A challenge to Existing Population Policy." **Studies in Family Planning**, Vol. 31, No. 1, pp. 47-54.

Grant, M. and Hallman, K. (2006). "Pregnancy-related School Dropout and Prior School Performance in South Africa." **Population Council**, Working Papers, No. 212.

Kaufman, C.E., de Wet, T. and Stadler, J. (2001). "Adolescent Pregnancy and Parenthood in South Africa." **Studies in Family Planning**, Vol. 32, No. 2, pp. 147-160.

Li, L. and Choe, M.K. (1997). "A mixture model for duration data: Analysis of Second birth in China." **Demography**, Vol. 34, No. 2, pp. 189-197.

Pebley, A.R. (1981). "The Age at first Birth and Timing of the Second in Costa Rica and Gautemala," **Population Studies**, Vol. 35, No. 3. pp. 387-392.

Rao, K.V. and Balakrishnan, T.R. (1989). "Timing of first and second birth spacing in Canada," **Journal of Biosoc Sci.,** Vol. 21, No. 3, pp. 293-300.

Singh, S. (1998). "Adolescent childbearing in developing countries: A global view." **Studies in Family Planning,** Vol. 29, No. 2, pp. 1029-1037.