

*Short Report*

## Validating the Self-Reported Fertility Status of Rural Malawian Women

JANINE BARDEN-O'FALLON,<sup>1\*</sup> CHIRAYATH SUCHINDRAN,<sup>2</sup> AND AMY O. TSUI<sup>3</sup><sup>1</sup>MEASURE/Evaluation, Carolina Population Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina<sup>2</sup>Department of Biostatistics, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina<sup>3</sup>Population & Family Health Sciences, Johns Hopkins University, Baltimore, Maryland

**ABSTRACT** This study uses data from a population-based survey to examine the fertility schedules of 704 women in a rural district of Malawi. The main objective is to assess self-reported fecundity status as a measure of fertility impairment. Life tables are used to examine the timing and tempo of births for women reporting difficulty getting pregnant as compared to women with no reported fecundity difficulties. Results of the analysis indicate that women with self-reported fecundity difficulties are older at each birth and have longer median birth intervals than do women with no reported difficulties. Cox proportional hazards models show that the report of a difficulty getting pregnant is significantly associated with at least a 30% lower likelihood of a first, second, or third birth. The relationships are not modified when accounting for demographic characteristics, previous sexual behaviors, or STI status. *Am. J. Hum. Biol.* 18:214–218, 2006. © 2006 Wiley-Liss, Inc.

Demographic estimates of the prevalence of fertility problems in the sub-Saharan region are usually based on indirect measures obtained from birth history information found in large surveys, including the Demographic and Health Survey (DHS) and World Fertility Survey (WFS) (Erickson and Brunette, 1996; Larsen and Ragger, 2001). One main problem with estimates of fertility impairment that rely only on birth-history data is that there is no way to determine whether individuals feel and act according to how their fertility status has been defined by the researcher. In fact, it has been suggested that they often do not (Leonard, 2002). An alternative method for obtaining population-based estimates of fertility impairment is to use a direct measure, namely, self-reported fecundity status (i.e., the perceived ability to become pregnant). Reports of fecundity status may provide a more accurate picture of the true burden of fertility problems as experienced by members of the population, because there is no way to determine whether infertility assessed by indirect methods is capturing what is locally recognized as problematic fertility. To the extent that an individual's perceived fecundity status can influence decisions on marital status, sexual practices, contraceptive use, and treatment-seeking behavior, a direct measure may also

provide better information on the impact of fertility problems on many reproductive behaviors. This study examines the fertility schedules of two groups of women in a rural district of Malawi: those who reported ever having a difficulty getting pregnant and those who did not.

## DATA

The data for this study come from the Malawi Pregnancy and STI Risk Perception and Avoidance Study, conducted by the Carolina Population Center, University of North Carolina, Chapel Hill (UNC-CH) and Save the Children Federation/USA in conjunction with the Center for Social Research at the University of Malawi. The Malawi study used a prospective cohort design to collect data in three

Contract grant sponsor: USAID-funded MEASURE/Evaluation Project; Contract grant number: Cooperative Agreement HRN-A-00-97-00018-00.

\*Correspondence to: Janine Barden-O'Fallon, MEASURE/Evaluation, Carolina Population Center, CB#8120, University of North Carolina at Chapel Hill, 206 W. Franklin St., Chapel Hill, North Carolina 27516.  
E-mail: bardenof@email.unc.edu

Received 24 March 2005; Revision received 24 October 2005; Accepted 2 November 2005

Published online in Wiley InterScience (www.interscience.wiley.com). DOI 10.1002/ajhb.20485

waves from June 2000 to June 2002. A multi-stage probability sampling design was used to select the respondents. Eligible participants were women of age 15–34 at baseline. This study uses survey information from the first and third waves and biomarker test results from the first wave of data collection. In the first week of the study, 1,013 women were interviewed, while in the third wave of data collection, 728 women (72% of the original sample) were interviewed. The study received approval from the Institutional Review Board at the UNC-CH School of Public Health and was approved locally by the National Health Sciences Research Committee in April 2000 and August 2001. For details of the study design, see Center for Social Research et al. (2004).

## METHODS

Self-reports of fecundity difficulties were collected by asking respondents whether they had ever had difficulty or had to try for a long time to become pregnant. The measure of a difficult time getting pregnant is made for all surveyed women exposed to pregnancy, despite intent to become pregnant ( $n = 704$ ) (a multivariate logistic regression conducted to assess selectivity bias in the third wave of data collection showed that participation was not significantly predicted by reported fecundity status). Child rosters were used to obtain complete birth-history information from each woman. The analysis uses information on the first five births only, as there were too few women at higher parities to make valid statistical comparisons. There were 1,849 first through fifth births accounted for by the child rosters.

A number of demographic and behavioral characteristics are included in the multivariate proportional hazards model. These include age, categorized into age 30 and above versus all others; level of education, coded as any versus none; level of income, divided into quartiles; whether in a polygamous union, coded as yes/no; and whether the respondent has ever tried to delay a birth or use family planning, coded as yes/no. Reproductive and behavioral characteristics include whether the respondent has ever had a miscarriage, stillbirth, or abortion; whether the respondent reports having three or more lifetime sexual partners; whether the respondent's reported age at first sexual

intercourse is 14 or below; and whether the respondent has ever exchanged money or goods for sex; all coded as yes/no. A biomarker is used to assess positive status for gonorrhea and *Chlamydia* and is coded as yes/no. With the exception of current measures of age and level of education, the information for these variables is taken from the first wave of data collection only so that these variables are lagged 2 years from reported fertility status (assessed here with data from wave three).

Life tables are constructed to calculate the timing and tempo of fertility. Age at first sexual intercourse is the exposure event, while a failure event is defined as a birth during the interval ( $i, i+1$ ). Women who did not experience a birth during the interval are considered censored at the time of the survey. The life tables were run as a group analysis to examine differences according to reported fecundity difficulties. The log-rank  $\chi^2$  is used to test the equivalency of distributions for the two groups at each level of parity. A simple proportional hazards model is then run for the self-reported difficulty getting pregnant for each of the first five birth intervals (Model 1). A full model (Model 2) is run for each birth interval to determine the degree to which the effects of self-reported fecundity problems are modified after accounting for selected demographic and behavioral variables. Likelihood ratio tests are used to determine if Model 2 is an improvement over Model 1, using  $\chi^2$  at 95% confidence.

## RESULTS

A total of 133 women reported ever having a difficulty getting pregnant, leading to a prevalence of self-reported fecundity difficulties among women ever exposed to pregnancy of 18.9% (95% CI = 16.0–21.8%). Table 1 presents the results of life-table estimates for women's median age at birth for each of the first five births. The results show that the timing of fertility is indeed different between the two groups of women, in that those who reported having a difficulty getting pregnant have births at older ages than do other women. The results presented also clearly indicate a difference in the pace of child-bearing for women with self-reported fecundity difficulties: the proportion of women with self-reported fecundity problems who reach

TABLE 1. Results of life-table estimates for surveyed Malawian women.  $N = 704^*$ 

Median age at which women reach the next parity							
Birth	Total		Self-reported difficulty		No reported difficulty		Log-rank $\chi^2$ P value
	N	Age	n	Age	n	Age	
First	681	19.0	127	19.1	554	18.9	0.0237
Second	629	22.6	115	23.9	514	22.4	0.0010
Third	476	25.7	87	26.9	389	25.5	0.0160
Fourth	340	28.1	63	30.9	277	27.8	0.0309
Fifth	217	30.3	36	32.7	181	30.1	0.0085

  

Cumulative proportion of women reaching the next parity within 5 years after a preceding birth							
Parity	Total		Self-reported difficulty		No reported difficulty		Log-rank $\chi^2$ P value
	N	%	n	%	N	%	
FS-1 <sup>a</sup>	668	79.4	124	70.0	544	81.6	0.0005
1-2	625	83.0	115	69.1	510	86.6	0.0002
2-3	473	84.3	86	69.0	387	88.6	0.0087
3-4	333	83.3	59	76.5	274	84.6	0.3649
4-5	213	78.8	34	57.0	179	82.3	0.0031

  

Median birth intervals, in years							
Birth interval	Total		Self-reported difficulty		No reported difficulty		Log-rank $\chi^2$ P value
	N		n	Median	n	Median	
FS-1 <sup>a</sup>	668		124	3.88	544	2.66	N/A
1-2	625		115	4.09	510	3.44	
2-3	473		86	4.02	387	3.48	
3-4	333		59	3.68	274	3.46	
4-5	213		34	4.62	179	3.51	

\*Among women ever having sexual intercourse; 13 are missing information on birth date or age at birth of child, and 23 did not know date of birth for at least one child.

<sup>a</sup>FS = age at first sexual intercourse.

the next parity within 5 years is consistently lower than for all other women. Median birth intervals, or the length of time it takes half of each cohort to reach the next parity, are consistently longer than 3.5 years for women with reported difficulties getting pregnant.

The results for the analysis of the risk of reaching the next parity for the first five birth intervals are shown in Table 2. The report of a difficulty getting pregnant is associated with a 30% reduced risk of a first birth, a 36% reduced risk of a second birth, and a 33% reduced risk of a third birth. Overall, the results of the multivariate models indicate that, even after accounting for selected demographic, reproductive, and behavioral variables, the relationship between reporting a fecundity difficulty and the risk of having a delayed subsequent birth does not change. Furthermore, the results of the likelihood ratio tests between the two models show that Model 2 is a decreasingly significant improvement over Model 1 as parity increases.

## DISCUSSION

The life-table analysis of fertility schedules for women who reported a difficult time getting pregnant shows a significant difference in both the timing and the tempo of births for these women as compared to other surveyed women. This indicates that self-reported fecundity status does produce accurate estimates of non-normative fertility patterns, i.e., fertility problems, within a population. One benefit of using this technique to assess fertility problems is that the definition of a "difficulty getting pregnant" and the concept of a "long" waiting time until pregnancy are left to individuals to define and are thus reflective of the local cultural context of fertility expectations. These results show that, even in contexts of high fertility demand, such as in the Mangochi district of Malawi, culturally relevant definitions of fecundity difficulties can be accurate indicators of slower fertility schedules. As a measure of problematic fertility, the self-reported difficulty getting preg-

TABLE 2. Likelihood of reaching the next parity during the birth interval (a, a+1) for surveyed Malawian women, using Cox proportional hazards models

Variables <sup>a</sup>	Birth intervals														
	0-1			1-2			2-3			3-4			4-5		
	N	HR		N	HR		N	HR		N	HR		N	HR	
Model 1	671			628			475			335			214		
Self-reported difficulty		0.70***			0.64***			0.67***			0.85			0.47***	
Log likelihood		-3479.5			-2567.3			-1697.7			-955.6			-558.5	
Prob. > $\chi^2$		0.0003			0.0001			0.0052			0.3999			0.0029	
Model 2	671			628			475			335			214		
Self-reported difficulty		0.74***			0.65***			0.64***			0.85			0.43***	
Age 30 or above		0.89			0.81**			1.35**			1.17			1.30	
Any education		0.93			0.81			1.06			0.69*			1.11	
Income in lowest quartile		1.00			1.04			0.85			0.93			0.96	
Income in highest quartile		0.93			1.14			0.71**			0.72			0.63*	
In a polygamous union		0.95			0.97			1.10			1.10			1.18	
Ever tried to delay a birth		1.30***			1.24**			0.89			1.51***			0.74	
Had abortion or stillbirth		1.01			1.02			1.03			1.05			0.87	
Had 3 or more sexual partners		0.83**			0.87			1.01			1.12			0.83	
Had first sexual intercourse at age 14 or below		0.76***			1.22*			1.22			1.07			0.64**	
Ever exchanged money for sex		0.89			0.93			0.90			1.32			1.29	
Positive STI test		1.12			1.60**			1.03			0.82			1.04	
Log likelihood		-3467.4			-2556.8			-1690.5			-946.5			-552.3	
Prob. > $\chi^2$		0.0002			0.0004			0.0339			0.3545			0.0469	
Likelihood ratio test, $\chi^2$ <sup>b</sup>		24.23**			20.85**			14.51			18.27*			12.38	

<sup>a</sup>All reference categories are null values.  
<sup>b</sup>Minus twice the difference between the log likelihoods of Model 1 and Model 2, using a  $\chi^2$  distribution with 11 degrees of freedom.

\* $P < 0.1$ .  
 \*\* $P < 0.05$ .  
 \*\*\* $P < 0.01$ .

nant can thus provide valuable estimates of the burden of fertility problems as perceived by a population.

#### LITERATURE CITED

- Center for Social Research, Save the Children Federation USA, Malawi Ministry of Health and Population, MEASURE Evaluation. 2004. Avoiding unwanted pregnancy and sexually transmitted infections: a rural Malawi district study. Chapel Hill, NC: MEASURE Evaluation.
- Ericksen K, Brunette T. 1996. Patterns and predictors of infertility among African women: a cross national survey of twenty-seven nations. *Soc Sci Med* 42:209–220.
- Larsen U, Raggars H. 2001. Levels and trends in infertility in sub-Saharan Africa. In Boerma JT, Mgalla Z, editors. *Women and infertility in sub-Saharan Africa: a multi-disciplinary perspective*. The Netherlands: KIT Publishers. p 25–69.
- Leonard L. 2002. Problematizing fertility: “scientific” accounts and Chadian women’s narratives. In: Inhorn MC, Van Balen F, editors. *Infertility around the globe: new thinking on childlessness, gender, and reproductive technologies*. Berkeley, CA: University of California Press. p 193–214.