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Birth preparedness and place of birth in rural Mysore, India: A prospective cohort study

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ABSTRACT

Background: India accounts for almost a third of the global deaths among newborns on their first day of birth. In spite of making significant progress in increasing institutional births, large numbers of rural Indian women are still electing to give birth at home. The aim of this study was to identify factors associated with place of birth among women who had recently given birth in rural Mysore, India.

Methods: Between January 2009 and 2011, 1675 rural pregnant women enrolled in a prospective cohort study in Mysore District completed interviewer-administered questionnaires on maternity care services. Ethical approval of the original study was obtained from the Institutional Review Boards of Vikram Hospital and Florida International University. Logistic regression analyses were conducted to identify factors associated with place of birth among the 1654 (99%) women that were successfully followed up after childbirth.

Findings: The median age of the women was 20 years; the majority were educated (87%), low-income (52%), and multiparous (56%). The prevalence of home births was low (4%). Half of the women giving birth at home did not adequately plan for transportation (55%), finances (48%), or birthing with a skilled provider (55%). Multiparous women had greater odds of giving birth at home compared to public (adjusted odds ratio [AOR]=7.83, $p<0.001$) and private institutions (AOR=7.05, $p<0.001$). Women attending ≥ 4 antenatal consultations had greater odds of giving birth at public (AOR=2.53, $p=0.036$) and private institutions (AOR=3.58, $p=0.010$). Those with higher scores of birth preparedness also had greater odds of giving birth at public (AOR=2.53, $p<0.001$) and private institutions (AOR=3.00, $p<0.001$).

Conclusions and implications: As a means to reduce newborn mortality, maternal health interventions in India and similar populations should focus on increasing birth preparedness and institutional births among rural women, particularly among those from lower socio-economic status.

Introduction

Globally over 85% of neonatal mortality can be attributed to complications of preterm birth; birth asphyxia; intrapartum and neonatal infections (World Health Organization [WHO], 2014). Efforts have focused on reducing infant deaths by encouraging women to have skilled birth (Campbell and Graham, 2006; United Nations Secretary-General, 2010). This has resulted in modest progress in developing countries over the last several decades.

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According to the United Nations (U.N.), skilled births increased from 56% in 1990 to 68% in 2012 (United Nations (UN), 2014). Although India's neonatal mortality rate has declined by almost half during roughly the same period (from 53 to 29 per 1000 live births from 1990 to 2013), India remains among the top 10 countries for neonatal deaths (World Bank, 2011; Upadhyay et al., 2012; United Nations International Children's Emergency Fund [UNICEF], 2013). The U.N. Millennium Development Goal 4 called for a two-thirds reduction in under-5 mortality by the end of 2015; this goal would be largely unattainable in India without a significant reduction in neonatal mortality.

Birthing in an institutional setting has also been found to reduce the risk of infant death. A large meta-analysis showed that giving birth in a health-care facility reduced neonatal mortality by 29% in low and middle-income countries (Tura et al., 2013). In addition, Birth Preparedness and Complication Readiness (BPCR) interventions have been successful in reducing maternal and neonatal health risks in many developing countries (Soubeiga et al., 2014). As part of its effort to promote institutional births, the Government of India established the National Rural Health Mission (NRHM) in 2005. Among other things, the NRHM supports outreach by rural health workers to educate mothers about the risks of home birthing, planning for birth, and the importance of hospital birthing (Singh et al., 2012). Institutional births have since risen from 39% in 2006 to 47% in 2008 (Vora et al., 2009; Office of Registrar General, 2009; Tuncalp et al., 2015). In spite of this progress however, at least one in every two births continues to take place at home and about half of all births occur without skilled care (2007–2008) (Gupta et al., 2012). This suggests that there may be obstacles preventing many rural women from birthing at an institution (UNICEF, 2013). Designing effective interventions will require additional knowledge about the reasons women are selecting home births in spite of apparently high levels of knowledge about the dangers of not birthing in a hospital (Tiwari, n.d.).

A number of studies have examined socio-economic, pregnancy, and geographical factors that affect a mother's decision to birth in a hospital (see Supplementary table: Factors that affect a mother's decision to birth in an institution) (Elo, 1992; Timyan, 1993; Das et al., 2001; Celik, 2000; Chowdhury et al., 2006; Idris et al., 2006; Vora et al., 2009; Kesterton et al., 2010; Adamson et al., 2012; Amano et al., 2012; Fikre and Demissie, 2012; Nair et al., 2012). Utilising data from the National Family Health Survey (NFHS-1, 1992–1993), two studies concluded that institutional births in India are mainly driven by economic factors rather than proximity to health services (Chowdhury et al., 2006; Das et al., 2001). However, Kumar (2013), using data from the District Level Household Survey (DLHS-3, 2007–2008) found that being closer to a hospital increased the probability of an institutional birth (Kumar, 2013). Their data showed that each additional kilometre away from a health-care facility decreased the probability of institutional birth by 4.4%. This paper describes the determinants of place of birth among 1675 women who had recently given birth and were living in the rural Mysore District of India.

Methods

Study setting

The data for these analyses came from a longitudinal cohort study conducted between January 2009 and 2011 in Mysore District, Karnataka (population, 2,994,744; 50% female; 86% belonging to Hindu religion). About 59% of the district's population resides in rural villages. Rural women have an estimated annual per capita income of Indian Rupees (INR) 16,086 [United States dollars (USD) $322] and a literacy rate of 63%; low compared to the all-India annual per capita income of INR 38,005 [USD $760] and literacy rate of 74% (Rajeev, 2008; Shiddalingaswami and Raghavendra, 2010; Press Information Bureau, 2012). According to statistics provided by the India Department of Health and Family Welfare, there were an estimated 40,510 live births in the Mysore District during 2012/2013 (Mohammed, 2013). This study was conducted in Mysore *Taluk* (an administrative sub-district), the most populous of the eight *Talukas* in Mysore District. All villages ($n = 144$) 10 or more kilometres outside of Mysore city, the administrative capital of the district, were included in this study.

Ethical approval

The protocol for the study was reviewed and approved by the Institutional Review Boards of Vikram Hospital and Florida International University. Confidentiality of all women in the study was maintained by using a study identification number on all study records. Permissions were obtained from the District Acquired Immunodeficiency Syndrome (AIDS) Prevention and Control Officer, the District Health Officer, and the *Taluk* Medical Officer for Mysore District, prior to carrying out the study.

Study design

This study is a secondary analysis of data from Project *Kisalaya*, a two-year longitudinal study evaluating the feasibility and uptake of 'Integrated Mobile Antenatal Care and Human Immunodeficiency Virus (HIV) Counseling and Testing'. Project *Kisalaya* involved a three-day process that is described below.

Day one

On the first day, programme outreach workers identified all pregnant women in the target communities. Data were collected from door-to-door canvassing, key stakeholders, and the local Auxiliary Nurse Midwife (ANM) responsible for registering all pregnancies, births, and basic health indicators on behalf of the NRHM. Community education programs were then conducted on safe pregnancy and birthing in the local language of *Kannada*. They covered issues related to birthing preparedness, importance of antenatal care, and information about HIV, and HIV counselling and testing. At the end of each programme outreach workers invited all the pregnant women to mobile medical clinics offering antenatal care the following day.

Day two

Mobile medical vans set up a temporary clinic in the target villages. Women who arrived for consultations were screened using the following inclusion criteria: (a) being pregnant, (b) living in a target village at least six months of the year, and (c) being able to speak *Kannada*. If women were eligible, they were informed of the purpose of the study. If they showed interest in participating in the study, they underwent an informed consent process and completed an interviewer-administered questionnaire. Women who did not provide informed consent received all the antenatal care services, but were not followed-up. All pregnant women: (a) had a consultation and were examined by a physician; (b) underwent HIV pre-test counselling from a trained counsellor; and (c) were seen by a nurse phlebotomist who collected samples of blood and urine. Biological specimens were then transported to the Public Health Research Institute of India (PHRII) laboratory for antenatal investigations.

Day three

Test results were delivered to each woman by a trained HIV counsellor in a private location in the community that the woman