Girl-Child Marriage and Its Association with Morbidity and Mortality of Children under 5 Years of Age in a Nationally-Representative Sample of Pakistan

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Objective To determine the relationship between child marriage (before age 18 years) and morbidity and mortality of children under 5 years of age in Pakistan beyond those attributed to social vulnerabilities.

Study design Nationally-representative cross-sectional observational survey data from Pakistan Demographic and Health Survey, 2006-2007 was limited to children from the past 5 years, reported by ever-married women aged 15-24 years (n = 2630 births of n = 2138 mothers) to identify differences in infectious diseases in past 2 weeks (diarrhea, acute respiratory infection [ARI], ARI with fever), under 5 years of age and infant mortality, and low birth weight by early (<18) vs adult (≥18) age at marriage. Associations between child marriage and mortality and morbidity of children under 5 years of age were assessed by calculating adjusted OR using logistic regression models after controlling for maternal and child demographics.

Results Majority (74.5%) of births were from mothers aged <18 years. Marriage before age 18 years increased the likelihood of recent diarrhea among children born to young mothers (adjusted OR = 1.59; 95% CI: 1.18-2.14). Even though maternal child marriage was associated with infant mortality and mortality of children under 5 years of age in unadjusted models, association was lost in the adjusted models. We did not find a relation between girl-child marriage and low birth weight infants, and ARI.

Conclusions Girl-child marriage increases the likelihood of recent diarrhea among children born to young mothers. Further qualitative and prospective quantitative studies are needed to understand the factors that may drive child morbidity and mortality among those married as children vs adults in Pakistan. *(J Pediatr 2014;164:639-46)*.

Globally, approximately 21 000 children under 5 years of age died every day in 2010, with almost 70% of deaths occurring in only 15 countries, and about one-half in only 5 countries (ie, India [22.3%], Nigeria [11.3%], Democratic Republic of Congo [6.1%], Pakistan [5.6%], and China [4.1%]).[1] Pneumonia, diarrhea, preterm birth complications, and birth asphyxia are 4 major killers of children under 5 years of age worldwide that are preventable.[1] Although significant progress has been made in reducing infant and neonatal mortality in those under 5 years of age,[2,3] its burden is still substantially high across the globe. With some regions of the world having disproportionately higher risk of mortality under 5 years of age than others, United Nations Children's Fund underscores the need of reducing mortality in children under 5 years of age by two-thirds in these high-burden regions during 1990-2015 by pursuing the Millennium Development Goal-4.[4] However, with this meager progress, it is unlikely that Millennium Development Goal-4 will be achieved, especially by Sub-Saharan Africa and Southern Asian countries.[1]

Pakistan, one of the densely populated countries in Southern Asia, has the second highest rate (after India) of mortality among infants and neonates in the region.[1,5,6] Pneumonia and diarrhea, the highest killers among children under 5 years of age in the country,[7] are preventable by low-cost curative interventions,[7] however, insufficiently administered in Pakistan. Reports from United Nations Children's Fund[7,8] have shown that poverty, including poor home environments and malnutrition, significantly increase the risk of such infections among children, thus increasing the likelihood of their mortality. In addition to malnutrition and unhealthy living conditions, poverty also may create conditions that increase gender disparity, discrimination against female children, and denial of free choice of marriage and reproductive autonomy. Of particular concern is the high proportion of early marriages in Pakistan that predisposes young teen girls to high fertility and poor fertility outcomes, including repeated childbirth in less than 24 months, unwanted pregnancy, and pregnancy termination.[9] In Pakistan, 50% of women aged 20-24 years were married before the age of 18 years by 2007, and 74.9% had at least 1 child birth, with 31.6% of these women having childbirth during the first year of their

ARI	Acute respiratory infection
BMI	Body mass index
PDHS	Pakistan Demographic and Health Survey

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marriage.[9] Such early marriages also were shown to be associated with increased low birth weight infants, and child and infant morbidity and mortality in studies from other countries.[10-12] This disproportionate risk of high morbidity and mortality among children seems to be related to social, cultural, and structural vulnerabilities, such as increased poverty, lack of access to quality health care, and restricted mobility in rural areas. Such vulnerabilities are further aggravated because of underdeveloped health-related infrastructure, limited decision-making power of women within the household, and their restricted access to resources.[8,13,14]

Further, studies have shown that women with early marriages (age <18 years), also called child marriages,[9-11] compared with those married as adults (age ≥18 years) are mostly poor and uneducated, reside in rural areas, and have low access to healthcare services, which all contribute to high infant and child morbidity and mortality.[10,11] It is, therefore, critical to understand the impact of early marriage on morbidity and mortality of children beyond those attributed to social vulnerabilities to clarify whether it is a consequence of early marriage and related early child birth or increased social and structural vulnerabilities of these young mothers that make their children highly susceptible to health risks. The aim of this population-based study is, therefore, to determine the relationship between girl-child marriage and morbidity and mortality of children under 5 years of age in Pakistan beyond that attributed to social vulnerabilities (women economic status, education, ethnicity, and place of residence).

Methods

Participants were selected from Pakistan Demographic and Health Survey (PDHS), which was conducted by the National Institute of Population Studies, Islamabad, Pakistan and Macro International Inc, Calverton, Maryland, USA during September 2006-February 2007.[15] PDHS is the fifth national survey on demographic and health issues in Pakistan and is one of the largest in the country.[15] A nationally-representative household-based sample was obtained by a 2-stage, stratified, random sample design excluding the Federally Administered Northern Areas, Federally Administered Tribal Areas, and restricted military and protected areas. During the first stage, clusters were selected based on probability proportional to size with oversampling of smaller provinces and urban areas. During the second stage, households were selected in both rural and urban areas by systematic random sampling technique. In the 9255 households, a total of 10 601 ever-married women aged 15-49 years were identified, of whom 10 023 were successfully interviewed, yielding a response rate of 95%. The detailed methodology of survey design, data collection, and management has been described elsewhere.[15] The participants were asked about childbirths in the past 5 years (n = 39 049), the sample from which data were obtained for this current study. For this study, the sample was limited to children from the past 5 years, as reported by ever-married women aged 15-24 years (n = 2630 births of n = 2138 mothers) to determine the associations between women married as children (age <18 years) and poor infant and child health outcomes. A subsample of live births was used (n = 1991 living children under 5 years of age born to n = 1315 mothers) for child health indicators related to the current health of child. Our sample focuses on 15- to 24-year-old mothers to ensure inclusion of a population that reflects current marriage of girls and infant and child health in Pakistan.[16]

The demographic health survey procedures were approved by International Classification of Functioning, Disability, and Health, Macro International institutional review board, and the ethics review boards of the government of Pakistan. Because this manuscript involved secondary data analysis of a publically available dataset, ethical approval from our respective institutions was not required.

Survey Instrument and Data Management

Maternal demographics were assessed by questions regarding age at interview, age at the time of first birth, level of education, area of residence, national region of residence, and ethnicity. Area of residence was categorized into urban and rural areas. Urban areas were classified into large cities (capital cities and cities with over 1 million population), small cities (population 50 000-1 million), and towns (population <50 000), and all rural areas were assumed to be countryside.[15] A wealth index was calculated in quintiles based on ownership of consumer items and dwelling characteristics between 1 (poorest) and 5 (wealthiest). Demographic Health Survey uses the SPSS (SPSS Inc, Chicago, Illinois) factor analysis procedure for the construction of the index. This procedure first standardizes the indicator variables (calculating z-scores); then the factor coefficient scores (factor loadings) are calculated; and finally, for each household, the indicator values are multiplied by the loadings and summed to produce the household's index value.[17] We defined child marriage as marriage of the participant before the age of 18 years. Antenatal visits were dichotomized whether mother received antenatal care during the pregnancy or not. Breastfeeding practice among mothers was assessed by a question whether mothers were either currently breastfeeding, had breastfed in the past, or never breastfed their children. The variable was dichotomized whether mothers breastfed their child (currently breastfeeding, had breastfed in the past) vs never.

The child health indicators were limited to live births in the past 5 years in Pakistan to ever-married women aged 15-24 years. For each live birth, questions were asked about the current age of the child, sex, and whether the child was born as a multiparous birth. All outcomes were computed to assess whether children under 5 years of age had a specific health concern when alive or dead during this time period. Whether the child had diarrhea was assessed by a question if the child had diarrhea in the last 24 hours and within the last 2 weeks. Acute respiratory infection (ARI) was assessed by 2 questions (ie, whether the child had suffered from a cough and rapid breathing in the last 2 weeks). ARI with fever was assessed