

Adolescent motherhood and neonatal mortality in sub-Saharan Africa: Evidence from 31 countries

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Introduction

Each year, an estimated 16 million young women give birth between the ages of 15 and 19 years, and up to a further 2 million give birth before the age of 15 years. Around 95% of these births are in low or middle income countries, and many of the countries with the highest rates are in sub-Saharan Africa. Adolescent motherhood is associated with a range of adverse outcomes for both mother and infant and one of the most widely reported risks is that of increased neonatal mortality, which has been demonstrated in a range of settings in both developed and developing countries (1–7). Neonatal deaths now make up over 40% of all deaths in children under five years globally, and reducing mortality in this age group is essential if we are to make further progress in lowering preventable child mortality.

What is less well understood, however, is the extent to which the increased risk of neonatal mortality is concentrated in, or confined to, younger adolescence. A number of studies suggest that the risk is greater in the younger age group while risks still remain for older adolescents (2), whereas others only report risk at the lower end of the adolescent spectrum (5,8). Many studies that disaggregate by early or late adolescent maternal age are difficult to compare directly as they use different cut-offs for age groups, and most are focussed on either a single country or a small group of countries which does not allow comparison across geographical regions.

What is also unclear is whether poor pregnancy outcomes in adolescence are a result of biological or physiological processes, or reflect other confounding socio-economic and health care utilisation factors which also increase risks for mothers and their babies. Women who give birth during adolescence are more likely to be poorer and have received less education (9) and in some cultures may make less use of health services. In addition it is more likely to be their first birth, which carries increased risks. Some researchers suggest an inherent biological risk that is not mitigated by adjusting for socio-economic, bio-demographic and health systems variables (2,3,10) whereas a number of other studies find no increased risk for adolescent mothers once adjustment has been made for such confounding factors (11,12).

This study provides a comprehensive, multi-country analysis of the association between adolescent age and neonatal mortality in sub-Saharan Africa. In particular we wish to focus on how risk patterns differ for younger and older adolescents. We also carry out separate analysis adjusting for a range of possible confounding factors in order to ascertain whether the association is driven by biological or physiological factors, or socio-economic, biodemographic and health service utilisation determinants.

Methodology

The study is based on analysis of Demographic and Household Surveys (DHS) from 31 sub-Saharan countries carried out since 2005. These are large, nationally representative surveys that collect data on a range of demographic and health variables that can normally be compared across time and countries.

Initial bivariate binary logistic regression was used to estimate unadjusted odds ratios (ORs) with separate models with neonatal and early neonatal death defined as the dependant variable. For the explanatory variable age at birth was grouped as <16 years, 16/17 years and 18/19 years with a reference category of 20-29 years. Individual models were run for each country, as well as for data pooled at the regional and aggregate regional level in order to increase the sample size. Further models were run with maternal age at birth in individual years (e.g. <15, 15, 16, 17, 18 and 19 years) for the aggregate regional level to examine patterns in more detail.

In addition ORs were also calculated for models based on the aggregate regional level adjusted for a range of socio-economic, demographic and health service utilisation factors that are known to be associated with both adolescent motherhood, and the risk of neonatal death. These include urban / rural residence, maternal education, parity, birth order, antenatal care (ANC) and place of birth. Wealth quintiles were not included as they are not comparable across countries, and might introduce bias within the model.

Findings

When we examine unadjusted ORs resulting from logistic regression at the individual country level few of the estimates show statistically increased ORs of neonatal mortality for any of the adolescent age groups (<16, 16/17 and 18/19 years) compared with the reference group of 20-29 years. However we see a very clear trend in most countries with markedly increased ORs for the <16 years grouping, with ORs then decreasing in size for the 16/16 and 18/19 age groups. In some cases the increased OR for the <16 grouping is very large e.g. Ethiopia (although CIs are wide). In some countries there are still large increased CIs for the 18/19 year age groups (Malawi), but in some these are negligible or even reduced. Patterns between early neonatal and neonatal mortality are generally similar.

When we look at the pooled estimates by regions within sub-Saharan Africa, we find clear and statistically significant patterns of high ORs for neonatal deaths for infants born to mothers under the age of 16 years decreasing with increasing maternal age for East Africa and West Africa. When all countries are pooled ORs, there are statistically increased odds for neonatal death for all the adolescent age groups compared with women aged 20-29 (although there is a gradient that decreases with increasing age). The multivariate models decrease the size of the ORs once socio-economic status and parity is adjusted for, but they remain significant.

Discussion

The bivariate analysis points to clearly higher risks of mortality to neonates born to young adolescent mothers. These risks remain after adjusting for potential confounding factors, which suggests that there is a true physiological risk of neonatal mortality associated with adolescent motherhood that is particularly concentrated among the younger teens. In some cases these increased risks can be marked: for instance risks of neonatal mortality in South and South East Asia are over 100% greater for mothers under the age of 16 after adjusting for other confounding factors.

Conclusions

There is clear evidence that neonates born to adolescent mothers have increased risks of mortality compared to infants with mothers in their 20s in sub-Saharan Africa. These risks are greatest for the

younger age groups, and cannot be explained fully by socio-economic, biodemographic and health service utilisation factors.

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