

Pregnancy and child health outcomes among adolescents in Ethiopia

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Abstract

Background: Adolescent mothers and their children in developing countries fare less in most social and economic outcomes of early childbearing. Clinic-based non-representative data is the mainstream source of our current knowledge on these outcomes.

Objectives: The study compared teenage (below 20 years of age) and adult (20-34 years of age) mothers on socio-demographic characteristics, pregnancy outcomes, and child survival from a population-based national data.

Methods: Demographic and health survey (DHS) data was used to conduct the comparison. A total of 663 teenage and 721 adult mothers who gave birth to their first child within five years preceding the survey were identified from the dataset.

Results: Significantly larger proportion of the teenage mothers, were from rural areas, were poorer, less educated, and gave a history of no marriage. Controlling for potential socio-demographic confounders cancelled the difference between teenage and adult mothers in the rate of pre-natal care attendance, and operative and low birth weight deliveries. A larger percentage of home delivery was reported among teenage mothers. Children of teenage and adult mothers were likely to have comparable vaccination and morbidity status and received equivalent level of care during illness episodes. Maternal age was strongly associated with child survival. The result was contrasted with recent DHS data from Kenya and Uganda, which also showed similar pattern of pregnancy and child health outcomes.

Conclusions: Most factors affecting child survival might be associated with the poor socio-economic achievements of teenage mothers than with their age at childbirth. [*Ethiop.J.Health Dev.* 2004;18(2):90-95]

Introduction

Most literature supports the notion that teenage childbearing is generally associated with higher risk of adverse reproductive outcomes. There is however continued debate on whether this association is mainly a factor of unfavorable socio-demographic conditions of adolescent mothers or due solely to their biological immaturity. Inconsistencies related to study design and analytic methods (i.e. adjusting for all potential confounders), form the crux of this divergence.

Hospital-based studies employing less-rigorous analytic methods mostly reveal that young maternal age alone is 'causally' associated with poor obstetric outcome indicators such as antenatal care attendance delivery by skilled personnel, and perinatal death (1-7). The independent effect of maternal age on the frequency of preterm delivery, low birth weight and neonatal mortality could nevertheless be significant as age at first childbirth falls below 16 years of age (8-10).

After controlling for the effect of socio-economic confounders, most other studies found no increased obstetric and child health outcome risks among teenagers compared with adult mothers (11-16). Such comparability of obstetric outcomes between teenage and adult mothers for the developed world is partly related to important advances in obstetric care and social contexts of pregnancy (17).

There is dearth of systematic documentation of how the obstetric outcomes among adolescents compare with that of older women in countries of Sub-Saharan Africa, and to what extent this pattern is consistent across countries.

According to a recent demographic and health survey (18), 16.3% of the Ethiopian women aged 15-19 years were already mothers or pregnant with their first child at the time of the survey. The little of what was documented on the consequences of teenage pregnancy in Ethiopia focused on short-term obstetric complications (3, 19). Despite failures to account for major independent variables that influence this outcome, the above studies did not investigate the effects of teenage parenthood on child survival. The current study aims to compare teenage (below 20 years of age) and adult (20-34 years of age) mothers on socio-demographic characters, pregnancy outcomes and child survival status five years after the birth of their first child. The result from Ethiopia was compared with two other East African nations, namely Kenya and Uganda to obtain a sub-regional picture.

Methods

Demographic and health survey (DHS) datasets from Ethiopia 2000, Uganda 2000-2001 and Kenya 1998 were analyzed to answer the stated research question. These surveys use nationally representative samples and

standardized questionnaire, which facilitate cross-country comparison.

Maternal and child files of the mother DHS dataset were merged to form a new file that contained all the variables included in the current analysis. A child file was created from each dataset where each child was made the unit of analysis. Subtracting the century-moth code (CMC) date of birth of the mother from the CMC date of birth of the child and dividing it by twelve yielded the mother's age at the birth of each child. To get the first birth for women whose age at the childbirth's was less than 35 years, only those cases where the number of children ever born as well as the number of births in the last five years was equal to one, were selected. The recall period for the index pregnancy, delivery, and child health outcomes was determined to lie within five years before the survey period.

To generate the socio-economic index, principal component analysis, a procedure that linearly transforms a large set of socio-economic variables into a smaller number of uncorrelated variables, was employed. Possession of household durable assets and amenities, such as radio, television, refrigerator, bicycle, motorcycles, car, telephone electricity, etc was used to construct the index. All individuals were then divided into quartiles based on the first component given that the ordering of the components is such that the first one has the largest amount of information common to all the variables.

The original DHS sample included 15,367 women of age 15-49 years in Ethiopia, 3,531 in Kenya and 7,246 in Uganda. A total of 663 teenage and 721 adult mothers from the Ethiopian dataset fall in the age category defined by the study. Four hundred thirty teenage and 446 adult mothers from the Kenyan; and 559 teenage and 273 adult mothers from the Ugandan dataset were also identified accordingly. Data were analyzed using SPSS 10.0 for windows. Adjusted odds ratios were calculated using logistic regression to compare mothers on reproductive behavior and child health outcomes. Cox regression was used to assess the socio-economic determinants of child survival since this method takes account of differences in the duration of exposure risks.

Results

The Ethiopian dataset

Socio-demographic and reproductive health behaviors of teenage and adult mothers are compared in Table 1. Odds ratios for most of these variables were calculated after adjustment for place of residence, wealth index and educational level. Significantly higher percentage of teenage mothers lived in rural areas; were illiterate or did not have education beyond primary school level; and belonged to the poorest two quartiles of the economic index compared with adult mothers. Table 1 also shows that teenage mothers were more likely to have never been in marital union or have experienced divorce-separation compared with adult mothers. About one-half and a third of both mothers belonged to Orthodox Christianity and Muslim religions respectively ($P>0.05$).

Table 1: Comparison of teenage and adult mothers on socio-demographic characteristics and reproductive behaviors (Ethiopian dataset)

Variables	Teenage mothers 663 (100%)	Adult mothers 721 (100%)	P-value Adjusted OR 95% CI
Residence			
Rural	510 (76.9)	455 (63.1)	1.95** (1.54, 2.47)
Urban	153 (23.1)	266 (36.9)	
Religion			
Orthodox Christian	336 (50.7)	339 (47.0)	$P>0.05$
Muslim	219 (33.0)	242 (33.6)	$P>0.05$
Others	108 (16.3)	140 (19.4)	
Educational level			
No/primary	631 (95.2)	563 (78.1)	0.2** (0.13, 0.31)
Secondary & above	32 (4.8)	158 (21.9)	
Wealth Index			
Poorer	365 (55.1)	352 (45.1)	$P>0.05$
Less poor	298 (44.9)	396 (54.9)	
Current marital status			
Married	552 (83.2)	563 (78.1)	0.19** (0.12, 0.30)
Never/separated	111 (16.8)	158 (21.9)	
ANC attended			
Yes	242 (36.5)	333 (46.2)	$P>0.05$
No	421 (63.5)	388 (53.8)	
Delivered at Health Facility			
Yes	115 (17.3)	215 (29.8)	$P>0.05$
No	548 (82.7)	506 (70.2)	

** - $P<0.001$

Age at sexual debut was obtained for 340 teenage and 295 adult mothers. Of these, 57.1% and 22.7% respectively were sexually active by the age of 15 years (O=4.52;95% CI=3.15, 6.5).

About 5% of the 663 teenage mothers were ≤ 15 years old at the time of the index pregnancy. As high as 60% of them reported that they wanted this pregnancy. Less proportion of them compared with the adult mothers (36.5% versus 46.2%) actually had antenatal visit. Larger proportion (70-80%) of both groups of mothers gave birth at home. However, their differences in antenatal care utilization and rate of delivery in health facilities were cancelled when adjusted for educational level, place of residence and wealth index (Table 1). The rate of operational delivery in both groups (4.1% versus 6.2% among teenage and adult mothers respectively) was comparable.

Based on maternal estimates, 37.7% and 33.4% of children born to teenage and adult mothers respectively had below average sizes at birth ($P > 0.05$). About a third of the surviving children for both mothers completed immunization programs. Teenage mothers breastfed their children for a median duration of 14 months (range 0-58) while adult mothers reported 12 months ($F = 6.0$; $P < 0.005$). Chronic malnutrition (weight-for age) was particularly high among children of teenage than adult mothers (OR=1.43; 95% CI 1.10, 1.85). The proportion of children born to teenage and adult mothers who had diarrhea (26.1% versus 24.0% respectively), fever (34.1% versus 28.9% respectively) and cough (32.6% versus 30.8% respectively) two weeks preceding the survey date were comparable ($P > 0.05$). About 40% of

the reportedly ill children received some form of treatment and a quarter of those who had diarrhea were given oral re-hydration salts in both groups ($P > 0.05$).

Teenage and adult mothers were found to be comparable for all child health indicators cited above (immunization, duration of breast feeding and level of malnutrition) after adjustment for differences in place of residence, educational level and economic index. Of the children born to teenage mothers, 9.7% were not alive during the survey period compared to 12.1% of those born to adult mothers ($P > 0.05$).

Comparing Ethiopia with Kenya and Uganda

Comparison of the three datasets on some maternal socio-demographic characteristics and reproductive behavior indicators adjusted for place of residence, education and marital status and economic index, is depicted in Table 2. Although more teenage than adult mothers belonged to the rural residence in all the three countries, relatively higher percentages of the study subjects in Uganda lived in urban centers (31% and 44% of teenage and adult mothers respectively). While 50% and 73.7% of teenage and adult mothers in Kenya had primary and above schooling, only 12.7% and 32.9% of them respectively reported similarly in Uganda. Both mothers in Ethiopia had the lowest literacy rate compared to Kenya and Uganda. Higher proportions of teenage than adult mothers in all the three countries gave history of separation, divorce and no marriage; belonged to the lower two quartiles of the economic index; and reported no current contraceptive use. This indifference was nullified for Ethiopia and Uganda upon controlled analysis.

Table 2: Comparison of teenage and adult mothers on socio-demographic characteristics and reproductive behaviors (Logistic regression)

Variables	Adjusted odds ratios (95% Confidence Interval)		
	Ethiopia	Kenya	Uganda
Maternal education			
No/Primary level	0.2 (0.13, 0.31)**	0.36 (0.27, 0.48)**	0.32 (0.22, 0.47)**
Marital status			
Not married/D/S***	1.27 (0.95, 1.71)	1.46 (0.75, 2.85)	1.1 (0.79, 1.58)
Partner's education			
No/Primary level	0.94 (0.74, 1.2)	1.28 (0.46, 3.55)	-----
Ever used family planning			
No	1.27 (0.92, 1.76)	0.57 (0.42, 0.75)**	0.7 (0.47, 1.06)
Antenatal care attended			
No	1.01 (0.79, 1.3)	0.45 (0.21, 0.96)*	1.02 (0.56, 1.85)
Place of delivery			
Home	0.67 (0.48, 0.92)*	0.47 (0.34, 0.65)**	0.69 (0.49, 0.97)

* $P < 0.05$

** $P < 0.01$

*** compared with divorced/separated

Over 90% of both teenage and adult mothers reported antenatal care attendances in Kenya and Uganda and this is double the proportion of those from Ethiopia. Half of the teenage and about 70% of the adult mothers in Kenya gave birth in health facilities (OR=0.47; 95% CI 0.34, 0.65). About similar proportions of both groups of Uganda mothers also gave birth in health facilities (OR=0.69; 95% CI 0.49, 0.97).

Adjusted odds ratios for child immunization, nutritional status and two-week prevalence of illness episodes for both groups of mothers in all the three countries did not show statistically significant differences. Of the children born to Kenyan teenage mothers, 10.7% were not alive during the survey period compare to 3.6% of those born to the adult mothers (Cox regression Beta=0.967; SE=0.290; P<0.001). The corresponding figure for Uganda was 10.6% and 7.3% for children of teenage and adult mothers respectively (P>0.05).

Of the 151 child deaths that took place between the two groups of Ethiopian mothers, 126 (83.4%) died during infancy. Similarly, 41 out of 62 deaths (66.1%) in Kenya, and 60 deaths out of 79 (76%) in Uganda occurred during infancy. Determinants of infant mortality were assessed for the three countries against most potential independent variables (place of residence, economic index, educational and marital status, antenatal care attendance, place of delivery and child sex) using Cox regression model (Table 3). Only maternal age remained strongly associated with child survival among the Ethiopian children. Maternal age and place of delivery were very important in Kenya whereas maternal education, antenatal care attendance, place of delivery and child sex remained as important determinants in Uganda. The place of residence emerged as the other strong determinant in the Ethiopia dataset when similar statistical model was run for under-five child mortality. The Kenyan and Ugandan datasets showed no change.

Table 3: Determinants of infant mortality (Cox regression)

Variables	Ethiopia (n=1362)			Kenya (n=688)			Uganda (n=778)		
	Beta	SE	95% CI	Beta	SE	95% CI	Beta	SE	95% CI
Maternal age***	0.051	0.022	1.0, 1.1*	-0.14	0.064	0.76, 0.98*	-0.008	0.05	0.9, 1.09
Economic index									
Poorest half	0.092	0.108	0.89, 1.35	-0.004	0.163	0.72, 1.37	0.27	0.146	0.57, 1.02
Maternal Education									
No/Primary level	0.224	0.208	0.83, 1.88	0.036	0.168	0.75, 1.44	0.511	0.25	1.01, 2.72*
Marital status									
Not married ^a	0.032	0.108	0.84, 1.27	-0.022	0.171	0.7, 1.37	-0.133	0.167	0.63, 1.21
Place of residence									
Rural	0.683	0.216	1.29, 3.02**	-0.16	0.244	0.53, 1.37	0.025	0.158	0.75, 1.4
Antenatal care									
No	0.108	0.107	0.9, 1.37	-0.051	0.312	0.52, 1.75	0.421	0.174	1.08, 2.14*
Place of delivery									
Home	0.003	0.162	0.73, 1.4	0.472	0.181	1.12, 2.3**	0.298	0.151	1.0, 1.81*
Child sex									
Female	-0.07	0.09	0.78, 1.11	-0.086	0.159	0.69, 1.25	0.313	0.141	1.04, 1.8*

* P<0.05

** P<0.01

*** Continuous variable

a = divorced/Separated

Discussion

Significantly larger proportion of teenage mothers in Ethiopia lived in rural areas; were largely uneducated, poorer, and gave history of divorce, separation or no marriage. Similar situation was observed in the Kenyan dataset. The Uganda dataset revealed half of this picture teenage and adult mothers were comparable on marriage and economic indices. Such observations point to the fact that teenage pregnancy is more associated with poor socio-economic background (12, 20).

Teenage mothers initiated unprotected sex early in life that exposed them to young parenthood. Over half of the sexual activity took place within marital union. This situation underscores the burden of reproductive health problems among rural adolescents as victims of harmful traditional practices.

Much of the comparison on reproductive behavior and pregnancy outcome of teenage and adult mothers in the three countries did not show marked differences. Maternal age independently explained the difference in educational achievement and the choice on place of delivery (21-24). In other words, failure to enroll in school or early dropout by teenage mothers affected obstetric care utilization, which in turn will exert direct impact on maternal health status and child survival. The study found less evidence of increased risk of operative delivery and low birth weight (below average baby size) among teenage women as a group (16).

According to these datasets, larger proportions of Ethiopian children had below age average size at birth than those in Kenya and Uganda. The rate of small child size at birth was also three-times higher than the rate found by another study in Addis Ababa (25). Low birth weight rates ranging from 9 to 17% were reported from studies in sub-Saharan Africa (26-29), which is comparable to the current datasets from Kenya and Uganda.

Child health outcome as defined by the rate of immunization, occurrence of morbidities and level of care provided at home during an illness episode, was found to be less dependent on age of the mother. Of the three countries, Ethiopia fared less in most socio-economic indices and coverage of maternal and child health care services. As a result, being a teenage mother and living in rural areas remained strongly associated with child survival. In the relatively 'urbanized' Uganda where coverage is also better, socio-economic variables and reproductive behavior came out as strong determinants of child survival. The dataset from Kenya depicted a mixed phenomenon.

The study generally implies that young mothers are more likely to show similar behavior to their adult counterparts during pregnancy and in child health care practices (14-15, 30). Children of young mothers might on the other

hand be prone to have severe forms of infections and likely to die of it. In poorer countries such as Ethiopia, where access to basic services is low, living in rural areas is a double disadvantage for teenagers. With better coverage of maternal and child health care services (Uganda and Kenya in this case), factors like education greatly influence the disparity in service utilization and hence the probability of survival for children born to teenage and adult mothers.

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References

1. Anandalakshmy PN, Buckshee K. Teenage pregnancy and its effect on maternal and child health: a hospital experience. *Indian J Med Sci.* 1993;47(1):8-11.
2. LeGrand TK, Mbacke CS. Teenage pregnancy and child health in the urban Sahel. *Stud Fam Plan.* 1993;24(3):137-49.
3. Mohammed A, Sileshi L. Factors influencing adolescent birth outcomes. *Ethiop Med J.* 1997;53(1):35-42.
4. Botting B, Rosato M, Wood R. Teenage mothers and the health of their children. *Population Trends* 1998;93:19-28.
5. Orvos H, Nyirati I, Hajdu J, Pal A, Nyari T, Kovacs L. Is adolescent pregnancy associated with adverse perinatal outcome? *J Perinat Med.* 1999;27(3):199-203.
6. Alam N. Teenage motherhood and infant mortality in Bangladesh: maternal age-dependent effect of parity one. *J Biosoc Sci.* 2000;32(2):229-36.
7. Wasunna A, Mohammed K. Low birth weight babies: socio-demographic and obstetric characteristics of adolescent mothers at Kenyatta National Hospital, Nairobi. *East Afr Med J.* 2002;79(10):543-6.
8. Friede A, Baldwin W, Rhodes PH, Buehler JW, Strauss LT, Smith JC, Hogue CJ. Young maternity age and infant mortality: The role of low birth weight. *Public Health Rep.* 1987;102(2):192-9.
9. Lee MC, Suhng LA, Lu TH, Chou MC. Association of parental characteristics with adverse outcomes of adolescent pregnancy. *Family Practice.* 1998;15(4):336-42.
10. Phipps M, Sowers M. Defining Early Adolescent Childbearing. *Am J Pub Health* 2002;92(1):125-28.
11. Pillai VK, Bandyopadhyay S. Age effects on infant mortality controlling for race: a meta-analytical study. *Health Care Women International.* 1997;18(2):115-26.
12. Hoffman SD. Teenage childbearing is not so bad after all... Or is it? A review of the new literature. *Fam Plann Perspect.* 1998;30(5).

13. Roth J, Hendrickson J, Schilling M, Stowell DW. The risk of teen mothers having low birth weight babies: implications of recent medical research for school health personnel. *J Sch Health* 1998;68(7):271-5.
14. Jimenez MA, Martin AR, Garcia JR. Comparing the biological and psychological risks of pregnancy between groups of adolescents and adults. *Eur J Epidemiol.* 2000;16(6):527-32.
15. Tsai TS, Chen JY, Lee MC. Reproductive outcomes and infant health in adolescent pregnancy in Taichung city. *Acta Paediatr Taiwan* 2001;42(3):151-7.
16. Smith G, Pell J. Teenage pregnancy and risk of adverse prenatal outcomes associated with first and second births: population based retrospective cohort study. *BMJ* 2001;323(7311):476.
17. Foix-L'Helias L, Blondel B. Changes in risk factors of preterm delivery in France between 1981 and 1995. *Paediatr Perinat Epidemiol.* 2000;14(4):314-23.
18. Demographic and Health Survey, Ethiopia. Central Statistical Authority, Addis Ababa, Ethiopia and ORC Macro, Calverton, Maryland, USA, May 2001.
19. Solomon K, Isehak A. Obstetric outcome of teenage pregnancy in northwestern Ethiopia. *East Afr Med J.* 1999;76(3):138-40.
20. Buvinic M. The costs of adolescent childbearing: Evidence from Chile, Barbados, Guatemala, and Mexico. *Stud Fam Plan.* 1998;29(2):201-9.
21. Okafor CB. Availability and use of services for maternal and child health care in rural Nigeria. *Int J Gynecol Obstet.* 1991;34(4):331-46.
22. Becker S, Peters DH, Gray RH, Gultiano C, Black RE. The determinants of use of maternal and child health services in Metro Cebu, the Philippines. *Health Transit Rev.* 1993;3(1):77-89.
23. Addai L. Determinants of use of maternal-child health services in rural Ghana *J Biosol. Sci.* 2000;32(1):1-15.
24. Celik Y, Hotchkiss DR. The socio-economic determinants of maternal health care utilization in Turkey. *Soc Sci Med* 2000;50(12):1797-806.
25. Felke Y, Fikre E. Maternal age, parity and gestational age on the size of the newborn in Addis Ababa. *East Afr Med J* 1999;76(8):468-1.
26. Wendl-richter HU. Birth weight distribution in rural north-west Burkina Faso. *Trop Med Int Health* 1997;2(4):404-8.
27. Manji KP, Massawe AW, Myone JM. Birth weight and neonatal outcome at the Muhimbili Medical Center, Dares Salaam, Tanzania. *East Afr Med J* 1998;75(7):382-7.
28. Osman NB, Challis K, Cotiro M, Nordhal G, Begestrom S. Maternal and fetal characteristics in an obstetric cohort in Mozambique. *Afr J Reprod Health* 2000;4(1):110-9.
29. Verhoft FH, Brabin BJ, Van Buuren S, Chimsuku L, Kazembe P, Wit JM, et al. An analysis of intrauterine growth retardation in rural Malawi. *Eur J Clin Nutr* 2001;55(8):682-9.
30. Ruiz Linares J, Romero GE, Moreno H. Risk factors for maternal and infant health in adolescent mothers in Colombia. *Rev Panam Salud Publica.* 1998;4(2):80-6.

