Reduced adolescence pregnancy through education

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Summary

Adolescent pregnancy is major public health problem in low- and middle-income countries. The younger the age of the mother the higher the chance of developing pregnancy and childbearing complications including maternal and infant death. A cost-benefit analysis of providing structured school-based sexual and reproductive health education (SRHE) was conducted among a cohort of 1 million girls attending grade 4 to 8 in rural schools in Ethiopia. SRHE was delivered for one hour weekly for ten months in a year. Provision of SRHE cost 11 million USD with investment returns of 112 million USD, giving a Benefit-Cost ratio of 10.2. The estimated costs cover salary, educational materials and training. The benefits accumulate from reduced rates of maternal and infant mortalities, cost-savings from reduced incidence of pregnancy and birth-related complications and the value of time saved. The analysis did not include educational costs associated with increased school retention rates and benefits associated with increased future earnings due to more education and reduced rates of stillbirths and years lived with disability (YLD), which may underestimate the investment returns. Therefore, delaying pregnancy to a more appropriate age through SRHE has the potential to prevent undesirable and costly health, social and economic outcomes to the mother and the baby. However, despite the demonstrated good return to investment, there are controversies and disagreements among stakeholders including parents about the contents of the SRHE curriculum, which could negatively affect scale-up plans in different countries.

The problem

About 17 million girls under the age of 19 years give birth every year, mostly in low- and middle-income countries (LMIC) [1]. Simply put, more than 20,000 girls under the age of 19 years give birth every day in LMIC, making adolescent pregnancy to be one of the major development challenges of our time. This problem is largely concentrated in the sub-Saharan Africa, with highest recorded annual birth rates that exceed 200 per 1000 adolescent girls aged between 15-19 years in countries such as Central African Republic, Niger and Chad[48]. The United Nations Development Fund reports that while the prevalence of adolescent pregnancy has decreased globally, unfortunately it has remained relatively unchanged in sub-Saharan Africa. By 2030, the population of adolescent girls in sub-Saharan Africa will grow by 50%; hence, increasing the magnitude of the problem [2]. Ethiopia has a population of about 105 million people, and closer to one million women aged 20-24 years were reported to have given births by age 18. This puts Ethiopia among the top 10 countries with largest number of adolescent pregnancies, and second in Africa after Nigeria [2].

Adolescent pregnancy has far-reaching adverse health, social and economic consequences both to the mother, child and the society. First, adolescents are at much higher risk of pregnancy and childbearing complications such as low-birth-weight, eclampsia and preterm births. Adolescent mothers and their infants are more than three-times likely to die due to pregnancy and birth-related complications compared to older women and their infants [3, 4]. The complications arising from pregnancy and childbirths are the second leading cause of death among adolescent girls aged between 15-19 years in LMIC [1]. Adolescent pregnancy is also the cause of school drop-outs which, in the long-term, may result in lost productivity and income, and is also considered to be the main cause of the pre-existing gender inequality, poor economic prospects of women and poverty [5].

[48] https://data.unicef.org/topic/maternal-health/adolescent-health/

Adolescent pregnancy is attributed to a complex interaction of various factors, hence there are many interventions that have been tested to reduce child marriage and pregnancy. They include conditional or unconditional cash transfers to keep girls in school, community sensitization to address cultural norms, provision of contraceptives, counselling and school-based programs [5, 6]. However, WHO strongly recommends the provision of sexuality and health education, life building skills, curriculum-based sexuality education combined with promotion of contraceptive among others [7, 8]. Cash transfers are considered to be effective, but they are expensive to scale-up to large populations especially in poor countries [9, 10].

The proposed solution

Comprehensive sexual and reproductive health education is a curriculum-based process of teaching and learning about the cognitive, emotional, physical and social aspects of sexuality. It addresses SRH issues, including sexual and reproductive anatomy, puberty and menstruation, delay of sexual debut, use of modern contraception, training in life skill training (decision making skills, setting goals for life and how to say no to sex), pregnancy and childbirth, STIs, including HIV and AIDS etc. School-based SRHE enhances self-efficacy related to refusing sex or condom use, improving use of contraceptives, reducing number of sexual partners and delaying the initiation of first sex [11, 12].

To demonstrate economic impact of SRHE, we modelled a cohort of one million girls as they transition from grade 4 to 8 in primary schools in rural Ethiopia. A lot of these girls are overage, hence we assumed that 3% were already sexually active in the 4th grade[49]. At each level the girls receive age-appropriate SRHE. Thus, the time horizon of this analysis is five years. Costs and benefits except mortalities are discounted at 5%. Comprehensive SRHE will be delivered by Health Extension Workers each week for one hour over 10 months of school time.

The costs and benefits

The annual cost of providing SRHE in rural Ethiopia was 2 USD per girl, which covers the cost of training materials, training of HEW and allowances[50]. The benefits associated with SRHE are complex and multidimensional and most of them are difficult to measure. For example, it may take an average of 20 years for lives of infants saved to enter labour force. In this analysis the benefits included are statistical value of years of lives saved (YLL) due to deaths averted, cost-savings from pregnancy and birth-related complications and value of caretaker's time saved. This study indicates that provision of SRHE in rural Ethiopia has a BCR of 10.2. Other studies with different interventions but targeting adolescents have reported comparable BCRs. For example, interventions to reduce child marriage in sub-Saharan African countries found the BCR of 9 or more [13].

Costs	Value (USD$)
Salaries of providers of SRHE	250,000
Cost of training materials per year	23,000
Training of Trainers (TOT)	36,000
Training of SRHE providers	3,300,000

Benefits	Value (USD$)
519 avoided maternal deaths (26,980 Years of Life Lost averted)	27,708,460
978 avoided infant deaths (59,640 Years of Life Lost averted)	61,249,972
Reduced healthcare costs	23,067,177
342 years saved for taking care of patients	90,243

Discussion

Adolescent pregnancy significantly contributes on infant and maternal morbidity and mortality rates and reduced future earning for women in LMIC countries. However, efforts to address

[49] This is based on the DHS 2017 data, which indicated that 6.3% of 15-year old girls had initiated sex

[50] Rahima S, Cost-effectiveness of sexual and reproductive health education and access to modern contraceptives to prevent unintended adolescent pregnancy in rural Ethiopia: an economic evaluation. Master thesis, 2019, University of Bergen.

this problem must consider the complex relationship between early pregnancy, marriage and school drop-out that varies between settings [14]. Early pregnancy and marriage are both the cause and consequence of school drop-out. So, while in Ethiopia about 83% of early pregnancy are estimated to occur within marriage[51], it is unknown whether the girls dropped out of school before they got married or they never attended school. Evidence shows that girls who are out of school are more likely to engage in sexual relationships, marry or get pregnant compared to those in school [15, 16]. Besides longstanding and deep-rooted traditions in Ethiopia [17, 18], poverty plays an important role for early sex, pregnancy, school drop-out and child marriage in LMIC [8, 19]. This complexity and interrelation of factors underscores the importance of empowering girls with SRHE.

It is estimated that by reducing adolescent pregnancy by 10% would reduce maternal mortality in a country by about 70% [20]. While saved earning loss was not included in our analysis, evidence shows that child marriage and childbearing reduce future earnings of a woman by 9% due to lower economic productivity [21]. Welfare benefits of reduced population growth by ending early childbearing for 106 countries was estimated to reach USD 566 billion [22] while economic benefits due to reduced under-five mortality rates and malnutrition is estimated at USD 100 billion by 2030 [23]. Therefore, scale-up of SRHE could be of great benefit in LMIC [52]. However, provision of comprehensive SRHE in schools is controversial in some places because of religious, social and cultural value embedded in it [24-26]. Thus, more research is needed on the acceptability of SRHE, cost and more efficient approach of delivering it in schools. In Ethiopia we considered the use of Health Extension Workers, but a more affordable and cost-effective approach will be to use the teachers.

References

1. WHO, *Adolescent pregnancy: Fact sheet N° 364*. 2014, World Health Organization: Geneva.

2. Loaiza E and Liang M, *Adolescence Pregnancy: A Review of Evidence*. 2013, United Nations Population Fund New York.

3. Murphy E and Carr D, *Powerful Partners: Adolescent Girls' Education and Delayed Childbearing.* PRB brief, 2007.

4. Weldearegawi, B., et al., *Infant mortality and causes of infant deaths in rural Ethiopia: a population-based cohort of 3684 births.* BMC Public Health, 2015. **15**: p. 770.

5. McQueston, K., R. Silverman, and A. Glassman, *The efficacy of interventions to reduce adolescent childbearing in low- and middle-income countries: a systematic review.* Stud Fam Plann, 2013. **44**(4): p. 369-88.

6. Goesling, B., et al., *Programs to reduce teen pregnancy, sexually transmitted infections, and associated sexual risk behaviors: a systematic review.* J Adolesc Health, 2014. **54**(5): p. 499-507.

7. WHO, *WHO Guidelines on Preventing Early Pregnancy and Poor Reproductive Health Outcomes Among Adolescents in Developing Countries*. 2011, World Health Organization Geneva.

8. Yakubu, I. and W.J. Salisu, *Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review.* Reprod Health, 2018. **15**(1): p. 15.

9. Muthengi E and Erulkar A, *Building programs to address child marriage: The Berhane Hewan*

[51] https://www.rutgers.international/sites/rutgersorg/files/PDF/RHRN-HLPF_A4leaflet_Ethiopia.pdf

[52] Countries with highest annual incidence of adolescent livebirths above 150 per 1000 adolescent population include Central African Republic (229), Niger (210), Chad (203), Angola (191), Mali (178), Mozambique (166), South Sudan (158) and Guinea (154) have more potential to benefit from SRHE. These are closely followed with Madagascar (147), DR Congo (135), Zambia (145), Malawi (143), Burkina Faso (136), Tanzania (128), Somalia (123) and Sierra Leone (121): Sources: Most recent estimates for each country taken from 2015 Update for the MDG Database: Adolescent Birth Rate (UNFPA/UN Population Division)

experience in Ethiopia. 2011, Population Council: Addis Ababa.

10. Erulkar A, Medhin G, and Weissman E, *The Impact and Cost of Child Marriage Prevention in Three African Settings*. 2017, Population Council: Addis Ababa.

11. Sani, A.S., et al., *School-based sexual health education interventions to prevent STI/HIV in sub-Saharan Africa: a systematic review and meta-analysis.* BMC Public Health, 2016. **16**(1): p. 1069.

12. Fonner, V.A., et al., *School based sex education and HIV prevention in low- and middle-income countries: a systematic review and meta-analysis.* PLoS One, 2014. **9**(3): p. e89692.

13. Rasmussen, B., et al., *Evaluating the Employment Benefits of Education and Targeted Interventions to Reduce Child Marriage.* J Adolesc Health, 2019. **65**(1s): p. S16-s24.

14. UNESCO, *Early and unintended pregnancy and the education sector: Evidence review and recommendations*. 2017, United Nations Educational, Scientific and Cultural Organization,: Paris, France.

15. Lloyd, C.B. and B.S. Mensch, *Marriage and childbirth as factors in dropping out from school: an analysis of DHS data from sub-Saharan Africa.* Popul Stud (Camb), 2008. **62**(1): p. 1-13.

16. Gordon B, *Out of wedlock, into school: combating child marriage through education*. 2012, Office of Sarah and Gordon Brown: London

17. Jones N, et al., *One size does not fit all: The patterning and drivers of child marriage in Ethiopia's hotspot districts*. 2016, UNICEF Ethiopia, Overseas Development Institute,: Addis Ababa.

18. Mengistu MM, *Early Marriage in Ethiopia: So Little Done but So Much to Do.* Arts and Social Science Journal, 2015. **6**(140).

19. Sandoy, I.F., et al., *Effectiveness of a girls' empowerment programme on early childbearing, marriage and school dropout among adolescent girls in rural Zambia: study protocol for a cluster randomized trial.* Trials, 2016. **17**(1): p. 588.

20. Raj, A. and U. Boehmer, *Girl child marriage and its association with national rates of HIV, maternal health, and infant mortality across 97 countries.* Violence Against Women, 2013. **19**(4): p. 536-51.

21. World Bank, *Economic impacts of child marriage: Global synthesis report*. 2017, World Bank: Washington, DC.

22. Wodon Q, *A Note on Child Marriage, Early Childbirths, and Maternal Mortality. Education Global Practice.* . 2017b, The World Bank.: Washington, DC.

23. Wodon Q, *Global Cost of Under-five Mortality and Malnutrition Due to Child Marriage.* , in *Education Global Practice.* 2017d, The World Bank: Washington, DC.

24. Achora, S., et al., *Perceptions of adolescents and teachers on school-based sexuality education in rural primary schools in Uganda.* Sex Reprod Healthc, 2018. **17**: p. 12-18.

25. Vanwesenbeeck I, et al., *Lessons learned from a decade implementing Comprehensive Sexuality Education in resource poor settings: The World Starts With Me.* Sex Education, 2016. **16**(5): p. 471-486.

26. Huaynoca S, et al., *Scaling up comprehensive sexuality education in Nigeria: from national policy to nationwide application* Sex Education, 2014. **14**(2): p. 191-209.