



Teenage pregnancy in South Africa: Reducing prevalence and lowering maternal mortality rates

Summary

Teenage pregnancy is common in South Africa (prevalence of 47 births per 1 000 girls aged 15–19 per annum) and has an unacceptably high mortality (institutional maternal mortality rate [iMMR] of 97.7 deaths per 100 000 live births among teenagers in 2011–2013). Determinants of the leading causes of maternal death include antenatal clinic attendance, adherence to antiretroviral (ARV) therapy, treatment for tuberculosis (TB), management of pre-eclampsia, and time of identification and referral of high-risk pregnancies to secondary and tertiary health centres.

Interventions are needed in the health, education and social development sectors in order to lower the prevalence of teenage pregnancy in South Africa, and to provide better prenatal care for teenagers who are pregnant in order to reduce their mortality. While striving to delay the onset of sexual activity, intervention programmes for young people should also emphasise safer sexual behaviour, such as reduction in partner numbers and correct and consistent condom use. Contraception

should be made available to those who are already sexually active. Education regarding the risks of substance use and abuse is also needed. Teenage girls should be kept in school so that they retain access to education and to healthcare services through the Integrated School Health Programme (ISHP). In addition, continuous professional development (CPD) should be made compulsory for both registered midwives and registered nurses to maintain and increase their levels of knowledge, and thereby improve their self-efficacy and intention to deliver high-quality maternal care services to pregnant teenagers.

Changes in policy in the health, education and social development sectors have the power to reduce the rate of teenage pregnancy, and to reduce the complications of teenage pregnancy that often result in death. This policy brief identifies a number of policy interventions that can (1) lower the prevalence of teenage pregnancy in South Africa and (2) provide better prenatal care for teenagers who are pregnant.

Background

Prevalence of teenage pregnancy

The South African teenage pregnancy prevalence of 47 births per 1 000 girls aged 15–19 per annum far exceeds that of high-income countries such as the UK and the USA, where the prevalence is 15 births per 1 000 girls and 24 births per 1 000 girls respectively (World Bank 2015). The South African Youth Risk Behaviour Survey (YRBS) conducted in 2002 reported that among learners aged 12–20 years who had ever had sex, 16.4% had been pregnant or made someone else pregnant (Reddy et al. 2003). This prevalence increased to 19% in the 2008 YRBS (Reddy et al. 2010) and showed a slight decrease to 18% in the 2011 YRBS (Reddy et al. 2013).

The media often suggest that the increase in social grant recipients from 2 million in 1994 to 16 million today has been fuelled by young women falling pregnant intentionally in order to claim child-support grants. This has, however, been disproven by several studies (Makiwane et al. 2006). Nevertheless, the concern remains that high rates of teenage pregnancy imply high rates of unprotected sex with the attendant risks of HIV transmission and other sexually transmitted infections (STIs). Often, teen pregnancies are unwanted, and a large proportion end in abortions.

Interventions aimed at reducing teen pregnancy rates should therefore *target the factors associated with teen pregnancy*, such as reducing early sexual debut, reducing unprotected sex by promoting consistent condom and other contraceptive use, providing access to comprehensive life skills and sexual health education, equipping teenagers with skills to negotiate safer sex with their partners, and creating a social norm of responsible womanhood so that girls perceive getting pregnant as unfavourable to their future progress.

Risks associated with teenage pregnancy

Not only is teenage pregnancy common in South Africa, but it also carries a considerably high risk for both the young mother and child, with an institutional maternal mortality ratio (iMMR) of 97.7 deaths per 100 000 live births among South African teenagers in 2011–2012 (NCCEMD 2013). For all pregnant women in the country, the iMMR was 154.06 per 100 000 live births in 2011–2013 (DoH 2014). The maternal mortality rate is much lower in high-income countries: 17 per 100 000 live births among all pregnant women (WHO 2014).

Four leading causes account for 71.7% of maternal deaths among South African pregnant teenagers: hypertension (22.8%); non-pregnancy-related infections (HIV/AIDS-related, such as TB or pneumonia) (21.1%); obstetric haemorrhage (14.2%); and medical and surgical disorders (13.6%) (DoH 2014).

Determinants of the four leading causes of maternal death include antenatal clinic attendance, adherence to antiretroviral (ARV) therapy, treatment for tuberculosis (TB), management of pre-eclampsia, and time of identification and referral of high-risk pregnancies to secondary and tertiary health centres (DoH 2014).

Several factors place pregnant teenage girls at high risk for mortality: they have little prenatal knowledge; they lack preparedness; and their bodies are not fully developed, resulting in the possibility of prolonged, obstructed labour due to their small pelvises (Chopra et al. 2009; DoH 2014; South Africa Every Death Counts Writing Group 2008). Pregnant teenagers often neglect to attend antenatal care sessions, and thus potential complications in their pregnancy or delivery may be missed until it is too late to refer them

to specialist units. Teenagers often continue to smoke during pregnancy, increasing the risk of intrauterine growth restriction resulting in small babies at birth (Bhutta et al. 2005; Hofhuis et al. 2003).

Moreover, teenage pregnancy often results in infant mortality, with considerable racial disparities in South Africa, where infant mortality is 34.4 per 1 000 live births overall in 2015 (Stats SA 2015). In 1998 (the latest time period for which racially disaggregated data are available), infant mortality was 11/1 000 for white infants, 19/1 000 for coloured infants, and 47/1 000 for black African infants (DoH et al. 2003). However, specific data on infant mortality and stillbirths among teenage mothers are lacking. A large proportion of infant deaths are due to preventable factors that include poor use of healthcare facilities, pregnant women presenting for healthcare services late in their pregnancy, lack of access to emergency transport services, and the poor quality of healthcare services generally (Say et al. 2014).

General health behaviour and prenatal health practices of pregnant women affect pregnancy outcomes. For example, substance use during pregnancy, including tobacco, alcohol and drug use, is strongly associated with health complications for both the mother and the newborn (Bhutta et al. 2005; Hofhuis et al. 2003). Foetal tobacco exposure is a risk factor for low birthweight and intrauterine growth restriction, with the decreasing birthweight shown to be related to the number of cigarettes smoked (Horta et al. 1997). Alcohol consumption during pregnancy causes growth retardation, and is a feature of foetal alcohol syndrome (Sterling et al. 1978).

Given that teenagers have less prenatal knowledge and their bodies are less developed, resulting in biologically

higher-risk pregnancies, interventions are needed to enable *provision of better prenatal care for teenagers who fall pregnant*. This includes education about pregnancy care, increased antenatal clinic attendance, healthcare workers at clinics being more sensitive and caring to the needs of pregnant teenagers, and early bookings for delivery, so as to ensure healthy pregnancy outcomes.

Research context

Vital to informing comprehensive policy regarding teenage pregnancy, research and surveillance are necessary in order to quantify the scale of the problem, detect changes over time, identify vulnerable target groups, monitor and evaluate the impact of existing intervention programmes, and make

necessary adaptations such as tailoring interventions for maximum impact.

Three South African National Youth Risk Behaviour Surveys (YRBSs) were conducted in 2002, 2008 and 2011 (Reddy et al. 2003; Reddy et al. 2010; Reddy et al. 2013). These were nationally representative, cross-sectional surveys of health-risk behaviours, with each survey conducted among more than 10 000 enrolled learners from Grades 8 to 11 in over 180 participating schools. Learners completed a self-administered questionnaire on a range of risk-behaviour variables, including sexual risk behaviours.

The Out of School Youth Risk Behaviour Survey, conducted in Gauteng, Mpumalanga, KwaZulu-Natal and the Western Cape in 2010, was a cross-sectional survey on the risk behaviours of 12–20-year-olds who had dropped out of the schooling system (Reddy et al. 2011).

Additionally, the study of the Maternal and Infant Morbidity and Mortality Surveillance System of South Africa (MIMMS) surveyed rural and urban facilities, including clinics, community health centres and hospitals conducting maternal and obstetric services. Nurses, midwives and other support staff, along with pregnant women attending these facilities, were interviewed (HSRC 2015).

Key research findings

Prevalence and trends in teenage pregnancy

In 2002, the YRBS showed that almost one in five (19.1%) female high school learners who had ever had sex had ever been pregnant (Reddy et al. 2003). As shown in Table 1, the prevalence has remained considerably high, at 24.4% in the 2008 and 22.2% in the 2011 YRBS surveys (Reddy et al. 2010; Reddy et al. 2013).

Table 1: Sexual risk behaviour and pregnancy experience among in-school youth: Youth Risk Behaviour Surveys 2002¹, 2008² and 2011³

		2002	2008	2011
Sexual behaviour and pregnancy				
Ever had sex ⁴	Male	50.1%	45.2%	44.4%
	Female	34.1%	30.2%	28.6%
	Total	41.1%	37.5%	36.3%
First had sex before age 14	Male	25.4%	21.2%	20.2%
	Female	5.6%	4.3%	4.2%
	Total	14.4%	12.6%	12.0%
Of those who ever had sex (n = over 3 000 in each survey year)				
Have been pregnant or made someone pregnant ⁵	Male	13.9%	15.2%	15.1%
	Female	19.1%	24.4%	22.2%
	Total	16.4%	19.0%	18.0%
Had ≥2 sexual partners in their lifetime ⁵	Male	66.4%	→ 51.6%	55.2%
	Female	38.1%	→ 26.3%	→ 36.0%
	Total	54.0%	→ 41.1%	→ 47.4%
Had ≥1 sexual partner (past 3months) ^{5,6}	Male	67.9%	→ 51.4%	56.7%
	Female	73.1%	→ 53.6%	59.8%
	Total	70.2%	→ 52.3%	→ 58.0%
Used alcohol before sex ^{5,7}	Male	–	19.5%	20.0%
	Female	–	11.6%	13.9%
	Total	–	16.2%	17.5%
Used drugs before sex ^{5,8}	Male	–	15.9%	13.6%
	Female	–	12.0%	12.4%
	Total	–	14.3%	13.1%
Always use a condom ⁵	Male	27.2%	29.4%	31.2%
	Female	30.8%	32.7%	35.3%
	Total	28.8%	30.7%	32.9%

→ Significant % change in the favourable/less risk direction at the 95% confidence level
 → Significant % change in the unfavourable/higher risk direction at the 95% confidence level

1. YRBS 2002: 10 699 participants, Grades 8–11, 188 public schools, 9 provinces.
2. YRBS 2008: 10 270 participants, Grades 8–11, 192 public schools, 9 provinces.
3. YRBS 2011: 10 997 participants, Grades 8–11, 196 public schools, 9 provinces.
4. Penetrative sexual intercourse.
5. Of those who had ever had sex.
6. In the three months preceding the survey.
7. Drank alcohol before the last time they had sex.
8. Used drugs (e.g. Mandrax, dagga, Ecstasy) before the last time they had sex.

During this time period, the prevalence of young people who had ever had sex declined from 41.1% to 36.3%. Consistent condom use increased, but only marginally from 28.8% to 32.9%.

In 2011, significantly more females (18.3%) than males (11.1%) reported having their own child/children (Reddy et al. 2013). The prevalence of females who had ever been pregnant (22.2%) was significantly higher than that of males who had ever made someone pregnant (15.1%).

The prevalence of teenage pregnancy and risky sexual behaviour is considerably higher among South African teenagers who have dropped out of school compared with teenagers who stay in school. The Out of School Youth Risk Behaviour Survey ($n = 4\,432$) found that among youth who were out of school and had ever had sex, 57.6% of girls had ever been pregnant and 29.7% of boys had ever made someone pregnant (Reddy et al. 2011). Furthermore, 30.8% of girls and 9.5% of boys reported that one of the main reasons they dropped out of school was because they fell pregnant or made someone pregnant. When comparing out-of-school with in-school youth, consistent condom use was lower for out-of-school youth than for in-school youth: 25.0% for boys and 19.1% for girls who had ever had sex and had dropped out of school. In addition, of those who reported ever having had sex, more than half (54.1%) reported having multiple sexual partners during their lifetime and over a third had used drugs or alcohol before the last time they had sex.

Factors associated with teenage pregnancy

Secondary analysis of the YRBS 2011 data shows that the factors influencing pregnancy experience among youth who had ever had sex differed between males and females and between older (≥ 17

years) and younger (≤ 16 years) learners. Hence, effective pregnancy-prevention programmes should be tailored to address risk factors for pregnancy by age and gender subgroups.

Among female in-school youth who had ever had sex, the prevalence of having ever been pregnant was 14% for girls aged ≤ 16 and 27% for girls aged ≥ 17 . Having been assaulted by a partner (adjusted odds ratio [AOR] = 3.42; CI [confidence interval] 95%: 1.47–7.93) and ever using any drugs (AOR = 3.19; CI 95%: 1.90–5.37) were significantly associated with having been pregnant among younger female learners, aged 16 and below. However, for older female learners, aged 17 and above, having first had sex before age 14 (AOR = 3.64; CI 95%: 1.68–7.89) was significantly associated with pregnancy experience.

Among male learners who had ever had sex, 11.5% of the ≤ 16 years age group reported having made someone pregnant, while 17.5% aged ≥ 17 years had made someone pregnant. Among the younger age group of male learners (aged ≤ 16 years), non-consistent use of condoms (AOR = 4.17; CI 95%: 1.62–10.73) and having been assaulted by their partners (AOR = 2.17; CI 95%: 1.27–3.70) were significantly associated with having made someone pregnant. For the older male learners, aged 17 and above, the use of alcohol before sex (AOR = 2.28; CI 95%: 1.14–4.55) and use of drugs before sex (AOR = 1.81; CI 95%: 1.04–3.14) were significantly associated with having made someone pregnant. Having ever been forced to have sex was significantly associated with having made someone pregnant among male learners in both age groups.

Maternal care services at public health facilities

The study of the MIMMS identified less-than-optimal knowledge scores in conducting maternal care services

among some nurses and midwives working in obstetric care at clinics and hospitals. Overall, 55.3% scored very high on an 18-item knowledge score and 5.9% scored low ($n = 195$) (HSRC 2015). The study also found low levels of continuous professional development (CPD) training among nurses and midwives. During the preceding 12 months, less than half (44.4%) had attended CPD training in antenatal care; 38.8% received training in hypertensive disorders of pregnancy (which is one of the leading causes of maternal mortality in teenagers); 26.2% received training in pregnancy problems; 56.3% received training on prevention of mother-to-child transmission (PMTCT) and HIV training; and 37% received training on the implementation of the Department of Health (DoH) guidelines on child and maternal services (HSRC 2015). Furthermore, the study found that a small proportion (under 5%) of healthcare workers had negative attitudes towards providing family-planning services to teenagers.

Recommendations

Policy actions in the health, education and social development sectors have the power to reduce both the rate of teenage pregnancy and the high mortality often associated with pregnancy in teenagers. Suggested policy interventions are given below.

1. Behavioural interventions

Preventive and care interventions should be developed that target the determinants of teenage pregnancy among South African adolescents. These interventions require efforts from policy-makers and intervention planning experts in the health, education and social development sectors. The findings from the three YRBS studies demonstrate the association or coexistence of teenage pregnancy with a range of other risky behaviours.

Gaining an understanding of these behavioural determinants is important for families and educators to be able to identify adolescent girls who have a higher likelihood of becoming pregnant during adolescence. Tailored, culturally sensitive interventions need to be developed to prevent these girls from becoming pregnant and to ensure they are enrolled in antenatal care if they do fall pregnant.

Behaviours that place both boys and girls at risk tend to cluster within individuals (Reddy et al. 2010), and therefore behavioural interventions should address a group of risky behaviours and not just one.

For all age groups, risky behaviours were more prevalent among male than female learners. Hence tailored interventions to reduce teenage pregnancy should be developed for couples.

The YRBS secondary analysis found that the factors influencing pregnancy experience differed between males and females, and between the older (≥ 17 years) and younger (≤ 16 years) learners, showing that effective pregnancy prevention programmes should be tailored to address risk factors for pregnancy by age and gender subgroups.

A large proportion of learners reported using alcohol or drugs before the last time they had sex. Interventions are needed to prevent substance use and abuse among teenagers, and to educate them about the risks of using alcohol and drugs. Increased efforts need to be made to reduce availability of these substances to young people.

2. Use of mobile technologies to provide healthcare solutions: M-health strategies

Novel health education and health promotion delivery mechanisms are being tested, such as using social

media or cellphones to communicate with pregnant teenagers, transmitting reminders about antenatal clinic appointments and providing relevant health education messages. A similar strategy may be used to update and educate healthcare workers who interact with pregnant teenagers. The MomConnect SMS platform (Bateman 2015), an initiative of the DoH, currently uses SMSs to communicate messages about pregnancy and appointments to pregnant women registered on the service. Awareness of MomConnect should be increased throughout the country, especially for pregnant teenagers, as uptake of cellphone technologies for health education has been shown to be most effective among young people, who are a fast-growing population of cellphone users in South Africa. The MomConnect messages can be adapted to be age-appropriate for pregnant teenagers.

3. Health education and health literacy

Learners need a guided approach to extensive school health education on human biology, reproductive health and contraception. While striving to reduce initiation of sexual intercourse, intervention programmes for young people also need to intensify the safer sexual behaviour education that emphasises reduction in partner numbers and correct and consistent condom use. Developing such comprehensive interventions that address all the factors that inhibit or facilitate healthy sexual behaviour requires a coordinated effort from the health, social development and education sectors.

In addition to educating young people, it is necessary to focus on parents, families and other caregivers in prevention programmes. This will not only reinforce information that is provided to teenagers but will also harmonise information between families

and their children with regard to sexual health matters.

4. Education regarding the legal framework

In South Africa sexual intercourse with a child younger than 16 years is defined as statutory rape. Furthermore, the Children's Act (No. 38 of 2005) prohibits sexual activity between children whose ages are more than four years apart. School learners need to be educated about these legal prescripts as rape in the school setting, either by another child or by an adult, is very common. In instances where the law is violated, such as a teacher raping a schoolgirl or making her pregnant, every effort should be made to ensure that justice is met.

5. Training of nurses and midwives

CPD needs to be mandatorily conducted on a regular basis for both registered midwives and registered nurses in order to maintain and increase their levels of knowledge, and thereby improve their self-efficacy and intention to conduct high-quality maternal care services for all pregnant women. This is in accord with the findings of the National Committee for Confidential Enquiries into Maternal Deaths (NCCEMD) that identified health-worker training as one of the five areas ('5 Hs') that need interventions in order to reduce maternal and infant mortality (DoH 2011).

Such CPD interventions are particularly critical in obstetric practice, where knowledge of correct protocols and referral criteria is essential for identifying high-risk pregnancies in antenatal care and making referrals to tertiary health facilities. In an emergency, the response of nurses or midwives with poor knowledge may be one of panic, with catastrophic results. Knowledge and the application thereof in practice are also

critical in identifying warning signs of impending crises during delivery.

6. Healthcare services

Condom and other contraceptive distribution schemes need to be available and accessible to the girls and boys who are already sexually active.

HIV counselling and ARVs need to be available and accessible to HIV-positive pregnant teenagers, whether in or out of school. This is critically important as ARV treatment given nearer to delivery significantly reduces the chance of the HI virus passing from the mother to the child.

Equally important is that all HIV-positive pregnant girls should be started on triple ARV therapy irrespective of CD4+ count, and this treatment should continue following delivery. HIV-positive pregnant teenagers are much more likely to suffer complications such as TB infection, pneumonia or haemorrhage, and therefore need close monitoring.

7. Retaining learners in school and reducing dropout candidates

Given that the prevalence of risky sexual behaviour and pregnancy experience is far higher among youth out of school than among those in school, one of the protective factors against teenage pregnancy (and other social ills such as substance abuse, heavy alcohol intake, smoking and violence) is being in school. This suggests that for as long as possible teenage girls should be kept in school, where they can access education, health education, vaccination programmes (such as rubella and the new HPV vaccine), school nurses and social workers – a strategy that augurs well with the introduction of the Integrated School Health Programme (ISHP) proposed by the DoH (DoH & DBE 2012).

Almost a third of the school-age girls in the Out of School Youth Risk Behaviour Survey reported pregnancy as a reason for leaving school. The right to education is enshrined in the Bill of Rights of the South African Constitution, and pregnant teenagers have the right to an education. Pregnant teenage girls who have dropped out of school have deprived themselves of access to healthcare services that would have been available to them through the ISHP (DoH & DBE 2012). Furthermore, by leaving school they exclude themselves from achieving a basic education that is necessary for developing into responsible adults who are educated and employed.

References

- Bateman C (2015) Using basic technology – and corporate social responsibility – to save lives. *South African Medical Journal* 104(12): 839–840
- Bhutta ZA, Darmstadt GL, Hasan BS & Haws RA (2005) Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: A review of the evidence. *Pediatrics* 115 (Supplement 2): 519–617
- Chopra M, Daviaud E, Pattinson R, Fonn S & Lawn JE (2009) Saving the lives of South Africa's mothers, babies, and children: Can the health system deliver? *Lancet* 374 (9692): 835–846
- DoH (Department of Health) (2011) *Saving mothers: Fifth national committee for confidential enquiries into maternal deaths*. Pretoria: DoH
- DoH (2014) *Saving mothers: Sixth report on confidential enquiries into maternal deaths in South Africa 2011–2013*. Pretoria: DoH
- DoH & DBE (Department of Basic Education) (2012) *Integrated school health programme (ISHP)*. Pretoria: DoH and DBE. Accessed 2 November 2015, <http://www.education.gov.za/LinkClick.aspx?fileticket=pj7clv8qGMc%3D&tabid=390&mid=1125>
- DoH, Medical Research Council & Demographic and Health Surveys Macro International Inc. (2003) *South Africa demographic and health survey 1998*. Pretoria: DoH. Accessed 20 January 2016, <http://www.mrc.ac.za/bod/dhsfin1.pdf>
- Hofhuis W, De Jongste JC & Merkus PJFM (2003) Adverse health effects of prenatal and postnatal tobacco smoke exposure on children. *Archives of Disease in Childhood* 88(12): 1086–1090
- Horta BL, Victora CG, Menezes AM, Halpern R & Barros FC (1997) Low birthweight, preterm births and intrauterine growth retardation in relation to maternal smoking. *Paediatric and Perinatal Epidemiology* 11(2): 140–151
- HSRC (Human Sciences Research Council) (2015) *Healthcare worker behaviour in maternal and infant care: Findings from the study of the Maternal and Infant Morbidity and Mortality Surveillance System of South Africa*. Unpublished report
- Makiwane M, Udjo E, Richter L & Desmond C (2006) *Is the child support grant associated with an increase in teenage fertility in South Africa? Evidence from national surveys and administrative data*. Pretoria: HSRC
- NCCEMD (National Committee for Confidential Enquiries into Maternal Deaths) (2013) *Tenth interim report on confidential enquiries into maternal deaths in South Africa 2011 and 2012*. Pretoria: DoH
- Reddy SP, James S, Sewpaul R, Koopman F, Funani NI, Sifunda S, Josie J, Masuka P, Kambaran NS & Omardien RG (2010) *Umthente uhlaba usamila – the South African youth risk behaviour survey 2008*. Cape Town: South African Medical Research Council
- Reddy SP, James S, Sewpaul R, Koopman F, Sifunda S, Masuka P, Kambaran NS & Omardien RG (2011) *Health risk behaviours, life skills and socio-economic status survey of*

- out-of-school youth in South Africa: An investigation into sexual and other behaviours that place the next generation at risk.* Cape Town: South African Medical Research Council
- Reddy SP, James S, Sewpaul R, Sifunda S, Ellahebokus A, Kambaran NS & Omaidien RG (2013) *Umthente uhlaba usamila – the 3rd South African national youth risk behaviour survey 2011.* Cape Town: South African Medical Research Council
- Reddy SP, Panday S, Swart D, Jinabhai CC, Amosun SL, James S, Monyeki KD, Stevens G, Morejele N, Kambaran NS, Omaidien RG & Van den Borne HW (2003) *Umthente uhlaba usamila – the South African youth risk behaviour survey 2002.* Cape Town: South African Medical Research Council. Accessed 2 November 2015, http://www.gov.za/sites/www.gov.za/files/complete_4.pdf
- Say L, Chou D, Gemmill A, Tunçalp O, Moller A, Daniels J, Gülmezoglu AM, Temmerman M & Alkema L (2014) Global causes of maternal death: A WHO systematic analysis. *Lancet Global Health* 2: e323–333
- South Africa Every Death Counts Writing Group (2008) Every death counts: Use of mortality audit data for decision making to save the lives of mothers, babies, and children in South Africa. *Lancet* 371(9620): 1294–1304
- Stats SA (Statistics South Africa) (2015) *Mid-year population estimates.* Pretoria: Stats SA. Accessed 4 March 2016, <http://www.statssa.gov.za/publications/P0302/P03022015.pdf>
- Sterling K, Clarren MD & Smith DW (1978) The fetal alcohol syndrome. *New England Journal of Medicine* 298:1063–1067
- WHO (World Health Organization) (2014) *Trends in maternal mortality: 1990 to 2013. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division.* Geneva: WHO. Accessed 3 November 2015, http://apps.who.int/iris/bitstream/10665/112682/2/9789241507226_eng.pdf
- World Bank (2015) *World development indicators: Adolescent fertility rate (births per 1,000 women ages 15–19).* Washington, DC: World Bank. Accessed 24 February 2016, <http://data.worldbank.org/indicator/SP.ADO.TFRT>

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