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Learner pregnancy in South Africa's Eastern Cape: The Factors affecting adolescent girls' school withdrawal during pregnancy

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ABSTRACT

An early pregnancy often puts an end to a girls' education. However, few studies have investigated which factors affect adolescents' school discontinuation during pregnancy. This study interviewed 1,046 adolescent mothers from the Eastern Cape province in South Africa. The results showed that a quarter of school-going adolescent girls withdrew from school during the pregnancy - many as early as the first trimester. School withdrawal was associated with higher poverty, higher grade repetition, an unplanned and unwanted pregnancy, and greater lack of information about the pregnancy. Given the high enrolment rates at the onset of the pregnancy, school-based services may provide an opportunity to identify which girls require substantial support to remain in education throughout pregnancy, using a history of poor school performance as an indicator for dropout.

1. Introduction

Globally, approximately 16 million girls between the ages of 15 and 19, and two million girls younger than 15 years, become pregnant each year (Blum and Gates, 2015). School dropout has been found to be a cause (Glynn et al., 2018; Gunawardena et al., 2019; Kassa et al., 2018; Rosenberg et al., 2015) and consequence of early pregnancies (Grant and Hallman, 2008; Stoner et al., 2019) across Sub-Saharan Africa where the majority of adolescent births occur (UN, 2020). Despite the high number of school-girl pregnancy across the continent, countries vary greatly in the extent to which they protect pregnant girls' right to education with laws and policies (Martinez and Odhiambo, 2018). In 2018, only four countries – Cape Verde, Ivory Coast, Gabon, and Rwanda – had policies or strategies that allow pregnant girls to remain in school without prescribing a mandatory absence after birth. Conversely, other countries still expel pregnant girls or require them to attend either night classes or alternative schools (Birungi et al., 2015; Salvi, 2018).

Even in countries that strive for an enabling policy environment like South Africa, described in detail below, pregnant adolescents likely experience a range of intertwined barriers that limit their ability to continue their education (Birchall, 2018). For instance, self-reports from South Africa, Kenya, Nigeria, and Malawi show that economic challenges, poor school performance, and low interest in school are often

among the main reasons for girls' school dropout (Chikhungu et al., 2020; Erulkar and Matheka, 2007; Rutenberg et al., 2001; Uche, 2013; Morara and Chemwei, 2013). These factors are also drivers of adolescent pregnancy (Gunawardena et al., 2019; Kassa et al., 2018; Mchunu et al., 2012; Yakubu and Salisu, 2018) and previous research suggest that a pregnancy might catalyze a school dropout among girls who are particularly economically disadvantaged or already behind in school (Grant and Hallman, 2008; Oruko et al., 2015; Willian, 2013). The pregnancy period potentially bears other medical and social challenges which can impair school enrolment. For instance, pregnant girls often fall victim to stigma and discrimination from fellow-learners, teachers, or other members of the community (Atuyambe et al., 2005; Leerlooijer et al., 2013; Levandowski et al., 2012; Morrell et al., 2012; Nkwemu et al., 2019; Bhana et al., 2010; Ruzibiza, 2021; Wedekind and Milingo, 2015) which may cause them to retract from social spaces, including the school, unless the girl receives targeted attention or support.

This study aims to examine the factors associated with school withdrawal among pregnant adolescent girls in South Africa. We examine hypothesised associations between school withdrawal during pregnancy and hypothesised individual-level, family and household-level, and school-level factors. Based on our investigation of these associations, we also examine school discontinuation patterns over the course of pregnancy within different groups of adolescent mothers.

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2. Background and context

2.1. In-school adolescent pregnancy

Whilst significant progress has been made for girls' education across Sub-Saharan Africa, the high number of pregnancy-related school dropouts among adolescent girls likely contributes to the ongoing educational disadvantage, particularly at the secondary school level, experienced by girls in the region (UNESCO, 2019). Concerns about permanent school withdrawal due to pregnancy (Bhana et al. 2010; Morrell et al., 2012; Nkosi and Pretorius, 2019) are warranted because incomplete education has been identified as an important predictor for various negative health (Balmer et al., 1997; Davies et al. 2018; Freudenberg and Ruglis, 2007) and socioeconomic outcomes (Branson, 2018; Branson et al., 2019; Lansford et al., 2016; Psacharopoulos and Patrinos, 2018) in the international literature. Within sub-Saharan Africa, adolescent pregnancy and motherhood also occurs in the context of high HIV rates (UNAIDS, 2018). Young women who attend more school days and stay in school have a lower risk of incident HIV and HSV-2 infection, leading some authors to suggest that interventions to increase frequency of school attendance and prevent dropout should be promoted to reduce risk of infection (Stoner et al., 2017). In addition, parental education, particularly maternal education, is strongly linked to lasting improvements in child health and life expectancy, and child mortality (Mensch et al., 2019; Huebener, 2019), and might mediate the negative relationship between the mothers' age and children's IQ later in life (Khatun et al., 2017).

In South Africa, about a fifth of young women have had their first pregnancy before the age of 20 (Jonas et al., 2016; Mchunu et al., 2012) and pregnancy and motherhood are common reasons for school dropout among adolescent girls in the country (Branson et al., 2014; Gustafsson and Worku, 2007). For young women in South Africa, school dropout has not only been associated with subsequent pregnancy (Stoner et al., 2019), increased sexual risk behaviors (Hargreaves et al., 2008; Stroeken et al., 2012) and almost three times higher risk for HIV infection (Stoner et al., 2017), but higher educational levels are also protective of rapid repeat pregnancies among adolescent mothers (Govender et al., 2019). Before 1994, exclusionary practices were a common approach to handle pregnant school-going girls. However, a number of legislative advances that directly affect young pregnant women have been passed since then. The South African Schools Act (No. 84 of 1996) and the Promotion of Equality and Prevention of Unfair Discrimination Act (No. 4 of 2000) stipulate that learners who become pregnant should not be unfairly discriminated against. In 2007, the National Department of Education, drawing from the Schools Act, implemented guidelines ('Measures for the Prevention and Management of Learner Pregnancy'; South African Department of Education, 2007) set out that students can remain in school throughout their pregnancy unless there are health concerns (Panday et al., 2009). Despite the longevity of these law and policy frameworks, they continue to be unclear to teachers (Runhare and Vandeyar, 2012) and appear to be inconsistently implemented (Ngabaza and Shefer, 2013), with recent examples of pregnant girls being expelled from school (Matlala, 2012; Makgalemele, 2012). Other studies suggest that lacking or clear guidelines for teachers leaves the policy open to interpretation so that its implementation is often influenced by discriminatory attitudes, beliefs, stereotypes, and concerns that babies will be delivered in school (Zweigenthal et al., 2020; Runhare and Vandeyar, 2012; Ngabaza and Shefer, 2013).

Even in an enabling policy environment, it is likely that there are other barriers that limit pregnant adolescents to claim their rightful place in the classroom. Ideally, the development of programs to support pregnant girls is grounded in research that have identified risk and protective factors of school withdrawal (Graig et al., 2006). Yet, quantitative evidence on the breadth of enabling and hindering factors associated with school enrolment throughout pregnancy in South Africa is almost

non-existent. Most studies investigate the effect of pregnancy on school dropout (Ardington et al., 2015; Grant and Hallman, 2008; Madhavan and Thomas, 2005; Marteleto et al., 2006; Stoner et al., 2019; Timaeus and Moultrie, 2015), finding that pregnancy increases the odds of school dropout both during pregnancy and in the postpartum period. While this is valuable knowledge, it is also important to understand the factors that affect pregnant adolescents' continued schooling throughout pregnancy, particularly because previous studies suggest that discontinuing school early during pregnancy could affect postpartum schooling (Grant and Hallman, 2008; Oxford et al., 2006). Whilst pregnant girls do not yet face the childcare responsibilities which frequently interfere with schooling, the pregnancy period is likely to bear other challenges which can affect schooling in addition to school's application of the South Africa's national learner policy. Differentiating the factors relevant to discontinuing school during pregnancy from those affecting postpartum schooling may not only allow for a more nuanced understanding of the particular risk factors for school withdrawal but also offer insights into when educational disadvantages emerge for pregnant adolescents (UNESCO, 2019).

Previous studies from South Africa and elsewhere in sub-Saharan Africa suggest several factors including a history of poor school performance, that might affect whether or not a pregnancy-related dropout occurs (Grant and Hallman, 2008). Upon discovering the pregnancy, girls frequently report being stressed and upset (Kaye, 2008; Mkhwanazi, 2010; Ngabaza, 2011; Sodi and Sodi, 2012) or considering a termination of the pregnancy (Mkhwanazi, 2010) which may impair their focus for school. Pregnant women in low- and middle-income countries show a higher risk of developing certain medical conditions (WHO, 2004), but adolescent mothers are less likely to address these through maternal health services (Hackett et al., 2019; Magadi et al., 2007). Untreated medical problems could affect the ability to continue schooling, especially since South Africa's national policy prescribes that medically unfit learners can be asked to take leave at any point during their pregnancy (South African Department of Education, 2007). Particularly under consideration of the integrated school health policy in South Africa (South African Department of Health, 2012) which sets out that schools should provide or facilitate access to health and social services (South African Department of Basic Education, 2018), schools' provision of pregnancy-related information may facilitate girls' continued schooling. Lastly, mothers' social environment, including their caregivers and partners may affect whether or not a withdrawal from school occurs (Assini-Meytin et al., 2018; Lynch and Cicchetti, 1992; Osterman, 2002; Protheroe, 2007).

2.2. Conceptual framework: Schooling and adolescent motherhood

Our study of pregnant learners was guided by a conceptual framework which builds on Rumberger (2011) who applied a bioecological models of human development to school dropout (Bronfenbrenner and Morris, 2006; Shonkoff et al., 2012; Steinberg and Morris, 2001). Hence, the design, data collection, and analysis were guided by a conceptual framework which posits that adolescent behaviors – including adolescent pregnancy and school behaviors – are not only determined by individual-level factors. Instead, school enrolment during pregnancy is likely affected by multiple spheres of influence, including longer-term educational trajectories in addition to influences from multiple individual, household, school, and social factors (Blum et al., 2014; Blum and Gates, 2015).

Specifically, this study situates pregnant adolescents in the center of multiple factors which can affect their schooling during pregnancy. The most important component of a pregnant girls' mesosystem are her family, partner, school, and peers. Their influences can work protectively towards adolescent girls' school continuation when they provide needed care and support. However, other factors may "push and pull" (Singh and Mukherjee, 2018) a pregnant girl out of school, such as limited financial resources or health complications over the course of the pregnancy. Each of these influences can affect the lives of adolescent girls, and we

developed the study to capture pregnancy- and school-related factors at each level to investigate its effect on school withdrawal.

3. Method

3.1. Participants and procedures

Adolescent mothers ($N = 1,046$) aged 10 to 24 were recruited from urban and rural locations of two health districts in the Eastern Cape, South Africa between 2017 and 2019. All participating girls and young women had their first pregnancy before the age of 20. Our inclusion criteria therefore align with the World Health Organization definition of 'adolescence' (World Health Organization, 1998) and describes an adolescent pregnancy as the occurrence of a pregnancy among girls and young women at the age of 19 or below. Participants resided within one of the two health districts. Informed consent was sought from adolescents who were above the age of 18 and assent was provided by underage participants in addition to consent from their caregiver. All consent forms and questionnaires were available in English and the local language, Xhosa. Ethical clearance was provided by the University of Oxford and the University of Cape Town (R48876/RE001; R48876/RE002; HREC REF: 226/2017). Participants were interviewed in private spaces in and around their own home but they were given the option to conduct the interview in a local restaurant if the privacy in the home was compromised.

Assisted by trained interviewers, adolescents completed two complementary questionnaires, each taking about 60 minutes. The items in the questionnaire predominantly concerned the participants' lives at the time of the interview (e.g., access to necessities, rural/urban residency, living with a caregiver, government grant receipt) but a small number of retrospective questions aimed to capture events at the time during girls' pregnancy (e.g., medical problems or received support during this time). Confidentiality was maintained throughout the study except where participants requested help or were at risk of significant harm. In this study, 25 referrals were made to health or counselling services with follow-up support. There were no monetary incentives, but all participants received a certificate, refreshments, and a participant pack containing useful items (e.g., washcloth and soap).

3.2. Measures

School withdrawal assessed if the participant continued schooling throughout pregnancy (0: no withdrawal; 1: withdrawal). Time of withdrawal assessed the months that participants continued to go to school during the pregnancy.

3.2.1. Sociodemographic characteristics

Most sociodemographic variables assessed girls' circumstances and events at the time of the interview. This includes adolescent mothers' age, place of residency (0: urban; 1: rural), living with a caregiver (such as parents, grandparents, family-member, or another caregiver) (0: no; 1: yes). Access to necessities was used as an indicator for poverty which was assessed by measuring access to the top eight socially-perceived necessities for children, such as clothes to keep warm in the winter or soap to wash (Barnes and Wright, 2012). Items were summed to create a poverty index (range 0-8) with lower numbers reflecting higher levels of poverty. Government grant receipt was assessed by enquiring if the household received any form of government provided financial assistance, including the child support grant, foster care grant, disability grant, care dependency grant, or a pension grant (0: no; 1: yes). In addition, adolescent mothers' age at the beginning of the pregnancy were assessed.

3.2.2. Educational characteristics

Grade delay at pregnancy onset was assessed by comparing the self-reported grade participants were enrolled in when they got pregnant against the appropriate grade determined by the South African Schools Act of 1996 (Republic of South Africa 1996). Delay was calculated following the approach taken in previous studies on grade delay in South African adolescents (Herrero Romero et al., 2018) where the correct age norm per grade follows Grade 1 + 6 = age 7; Grade 9 + 6 = age 15; Grade 12 + 6 = age 18. Adolescents who were enrolled in the age-appropriate grade or above were classed as not delayed (0: not delayed; 1: delayed).

3.2.3. Pregnancy intentions

If the pregnancy was unplanned and unwanted was assessed by two separate items, one asking the participant if they had planned the pregnancy (0: no; 1: yes), the other asking if she wanted the pregnancy (0: no; 1: yes). These two variables were recoded into one item to capture particularly vulnerable participants whose pregnancy was unplanned and unwanted (0: no; 1: yes). The intention to terminate the pregnancy was assessed (0: no; 1: yes).

3.2.4. Health characteristics

Medical problems were assessed as experience of any of the following symptoms during pregnancy: High blood pressure, seizures, bleeding, fever, or yellow palms (a symptom of cholestasis) (0: no; 1: yes).

3.2.5. Support and advice during pregnancy

The child's father's supportive reaction to the pregnancy was assessed through one item that enquired if the father of the child had reacted supportively to the pregnancy (0: not supportive; 1: supportive). Lack of information during pregnancy captured adolescents' reports of receiving pregnancy-related information and self-care advice from their caregiver or the school, respectively (0: received information; 1: lack of information).

3.3. Statistical analysis

Participants were eligible for inclusion in analysis if they were enrolled in school at the time of discovering the pregnancy ($n = 110$ excluded). Thirteen participants were excluded because they completed early versions of the questionnaire that did not include questions on schooling, seven participants were excluded because they were older than 19 at the onset of their pregnancy, and one participant was excluded due to over 20% missing data. Analyses were based on 915 participants and there were no missing values on any of the included variables. The analyses focused on adolescent mothers' schooling during their first pregnancy (even though 8.4% of mothers had subsequent pregnancies) in order to ensure that the analyses are conducted within a homogeneous group.

All analyses were completed in Stata 15.1. and R. First, included participants were compared with participants excluded from analyses because they were not enrolled in school at the onset of their pregnancy. Second, descriptive statistics for all outcomes, associated factors, and socioeconomic background variables were calculated for the whole sample and disaggregated by school discontinuation-status. Third, the associations between independent variables with any school discontinuation during pregnancy were tested with a hierarchical logistic regression approach. Model 1 included only relevant socioeconomic and demographic variables; Model 2 added information on grade delay at the onset of the pregnancy; Model 3 added information on reaction towards the pregnancy; Model 4 added information on mothers' medical

problems; Model 5 included information on sources of support and the provision of pregnancy-related information. Fourth, factors that had emerged as significant were used for subsequent time-to-event analyses for which additional 18 participants were excluded because information on the timings of school continuation were missing. That is, all significant indicators from model 5 were included in a Cox regression model, controlling for all variables included in model 5 as follows:

$$h(t, X) = h_0(t)e^{\sum_{j=1}^p \beta_j X_j}$$

This model aimed to understand the time-to-event hazards at time *t* of different groups of mothers given the set of explanatory variables *X*.

The proportional hazards assumption was tested via graphical examination of the Kaplan-Meier curves for each variable. In addition, Schoenfeld residuals were to check that the proportional hazards assumption was met in the final model, which was the case ($\chi^2(12) = 11.34, p = 0.50$). In addition, all possible interaction terms were tested to confirm that they are not significant and can, thus, be excluded from the model. Lastly, the goodness of fit of the model was assessed using Cos-Snell residuals and the Nelson-Aalen cumulative hazard function which confirmed good model fit.

Finally, the calculated hazard ratios were subsequently visualized using adjusted survival curves:

$$S(t|X) = [S_0(t)]e^{-\sum_{j=1}^p \beta_j X_j}$$

4. Results

The analyses were based on 915 adolescent mothers in the sample. An initial comparison of included participants and participants excluded from analyses because they were not enrolled in school at the onset of their pregnancy showed that excluded participants were slightly older at the time of interview and at the time of their pregnancy, could afford slightly fewer necessities, were less likely to live with a caregiver, had completed slightly fewer grades, and were more likely to have planned or wanted the pregnancy (Table 1).

Out of the 915 included participants, 236 withdrew from school during pregnancy while 679 continued schooling until the end of the pregnancy. Table 2 shows that the mean age of participants was 18.09 years (*SD* 1.75). About 93% came from families receiving at least one social security grant. Most respondents lived with a caregiver (93.1%) and only four participants were married (0.4%). Mothers' mean age at the pregnancy of their oldest child was 16.46 years (*SD* 1.51) and 8.4% of mothers had more than one child. Over half of the mothers were classed as grade delayed at the time of the pregnancy (55.9%). Most pregnancies were unplanned and unwanted (95.7%) but only 8.2% indicated that they had considered terminating the pregnancy. Of all mothers, 14.1% had experienced any medical problems during pregnancy and 10.5% indicated that the child's father had reacted supportively to the pregnancy. About 35% of participants had not received information about their pregnancy from their caregivers and 97.9% of participants had not received information on the pregnancy from their schools.

Multiple regression analyses of pre-pregnancy and pregnancy factors on school withdrawal (Table 3) showed that increased odds to withdraw from school during pregnancy were associated with the ability to afford fewer necessities (OR 0.92; 95% CI [0.86, 0.98]), being grade delayed at the onset of the pregnancy (OR 3.26, 95% CI [2.25, 4.72]), an unplanned and unwanted pregnancy (OR 3.93, 95% CI [1.17, 13.23]), and greater lack of information from the caregiver during pregnancy (OR 1.59, 95% CI [1.15, 2.21]). By contrast, school discontinuation was not associated with the intention to terminate the pregnancy (OR 1.47, 95% CI [0.87, 2.51]), experiencing any medical problems (OR 1.44, 95% CI [0.94, 2.00]), the child's father's supportive reaction to the pregnancy (OR

Table 1

Characteristics for the sample of adolescent mothers from the Eastern Cape, South Africa (*n* = 1,016), disaggregated by school enrolment at the beginning of the pregnancy

	Included participants: Enrolled in school at the onset of the pregnancy (<i>n</i> = 915)	Excluded participants: Not enrolled in school at the onset of the pregnancy (<i>n</i> = 101)	<i>p</i>
Characteristic	<i>n</i> (%); <i>M</i> (<i>SD</i>)	<i>n</i> (%); <i>M</i> (<i>SD</i>)	
Socio-demographics			
Adolescent mothers' age	18.09 (1.75)	19.50 (0.16)	<.001
Adolescent mothers' age at the begin of the pregnancy	16.46 (1.51)	17.98 (1.08)	<.001
Necessities afforded in household	5.29 (2.20)	4.43 (2.28)	<.001
Rural residency	271 (29.6%)	26 (25.7%)	.489
Lives with caregiver	852 (93.1%)	79 (78.2%)	<.001
Government grant receipt	850 (92.9%)	90 (89.1%)	.165
Educational characteristics			
Highest grade completed	9.71 (1.53)	9.25 (2.47)	.009
Pregnancy intention			
Unplanned and unwanted pregnancy	876 (95.7%)	90 (89.1%)	.012
Intentions to terminate the pregnancy	75 (8.2%)	5 (4.9%)	.330
Health characteristics			
Any medical problems during pregnancy	129 (14.1%)	16 (15.8%)	.653
Pregnancy support			
Child's father supportive reaction to pregnancy	96 (10.5%)	10 (9.9%)	.99
Lack of information from caregiver	316 (34.5%)	40 (39.6%)	.324
Lack of information from school	896 (97.9%)	100 (99%)	.712

0.88, 95% CI [0.53, 1.46]), nor receiving information on the pregnancy from the school (OR 1.56, 95% CI [0.43, 5.67]).

Table 4 provides results from a Cox proportional hazards regression model that tested for the differences in school withdrawal over the nine months of pregnancy within the groups that emerged as significant from the final logistic regression model (model 5), controlling for all variables in model 5. These analyses are complemented by Figs. 1a-c which visualize adjusted survival curves for the Cox proportional hazards model. School withdrawal for mothers who were grade delayed at the onset of pregnancy was almost three times as likely than for non-delayed mothers at any timepoint (hazard ratio [HR] = 2.72; 95% CI = 1.94, 3.81; Fig. 1a (top left)) and over three times as likely for mothers with an unplanned and unwanted pregnancy than for mothers with a planned or wanted pregnancy (HR = 3.16; 95% CI = 1.00, 9.89; Fig. 1b (bottom central)). Lastly, the hazard of school withdrawal was one and a half time higher for mothers who did not receive information on the pregnancy from their caregivers compared to those who did receive pregnancy-related information (HR = 1.45; 95% CI = 1.09, 1.91; Fig. 1c (top right)).

Table 2
Descriptive statistics for the sample of adolescent mothers, Eastern Cape, South Africa (n = 915). Sample characteristics are presented disaggregated by discontinuation during pregnancy

Characteristic	Total (n = 915) n (%); M (SD)	Withdrawal group (n = 236) n (%); M (SD)	Continuation group (n = 679) n (%); M (SD)	p
Socio-demographics				
Adolescent mothers' age	18.09 (1.75)	18.51 (1.80)	17.94 (1.71)	< .001
Adolescent mothers' age at the begin of the pregnancy	16.46 (1.51)	16.71 (1.56)	16.37 (1.48)	.003
Necessities afforded in household	5.29 (2.20)	4.90 (2.41)	5.43 (2.11)	< .001
Rural residency	271 (29.6%)	69 (29.2%)	202 (29.7%)	.934
Lives with caregiver	852 (93.1%)	211 (89.4%)	641 (94.4%)	.011
Government grant receipt	850 (92.9%)	217 (91.9%)	633 (93.2%)	.556
Educational characteristics				
Grade delay at pregnancy onset	512 (55.9%)	180 (76.3%)	332 (48.9%)	< .001
Highest grade completed at pregnancy	9.61 (1.48)	9.19 (1.63)	9.76 (1.40)	< .001
Pregnancy intention				
Unplanned and unwanted pregnancy	876 (95.7%)	233 (98.7%)	643 (94.7%)	.008
Intentions to terminate the pregnancy	75 (8.2%)	25 (10.6%)	50 (7.4%)	.130
Health characteristics				
Any medical problems during pregnancy	129 (14.1%)	42 (17.8%)	87 (12.8%)	.065
Pregnancy support				
Child's father supportive reaction to pregnancy	96 (10.5%)	24 (10.2%)	72 (10.6%)	.962
Lack of information from caregiver	316 (34.5%)	100 (42.4%)	216 (31.8%)	.004
Lack of information from school	896 (97.9%)	233 (98.7%)	663 (97.6%)	.430

5. Discussion

Adolescent mothers constitute a diverse group (Hamburg et al., 1986; Miller-Johnson et al., 1999) and this study reinforces previous international research showing that not all young mothers are at risk for negative outcomes (Raskin et al., 2019). This study showed that almost 75% of girls who were enrolled in school at the onset of the pregnancy continued schooling until birth – a promising rate compared to studies conducted before the 2007 national policy on pregnant learners was implemented in South Africa (Grant and Hallman, 2008; Marteleto et al., 2008). These results may substantiate an increasing acceptance in the Eastern Cape to allow pregnant learners to remain in school, possibly as a result of the learner-policy and subsequent calls for schools to show flexibility towards enrolling pregnant adolescents (Panday et al., 2009). Laws and policies that support pregnant girls' school attendance are a necessary step to ensure their continued education. A recent analysis of Demographic and Health Survey data from nine African countries (Zambia, Gabon, Malawi, Mozambique, Nigeria, Senegal, Lesotho, Zimbabwe, and Rwanda) showed that law and policy changes which allow girls to remain in school during the pregnancy increases pregnant girls' school attendance two years after the bans were lifted (Evans and Mendez Acosta, 2020). Despite the inconsistent implication of policies aiming to support

pregnant girls or lack of support from schools, the girls in our sample may have been able to resist discriminatory school regulations. Recent studies indicate that girls' knowledge of continuation policies may make it less likely that they are forced out of school during pregnancy or having to leave due to harassment or teasing (Zuilkowski et al., 2019). These findings align with results from South Africa showing that some pregnant girls are able to exert their right to education by insisting on remaining in school despite being asked to leave (Ngabaza and Shefer, 2013). It is also possible that the adolescent girls have been able to remain in school through deploying various strategies captured in other studies, such as avoiding teachers who would dismiss them from school (Ngabaza and Shefer, 2013) or concealing their pregnancies under wide clothing (Matlala, 2020; Salvi, 2019). Setting aside the reasons for uninterrupted enrolment, the high number of school-going pregnant girls underscores the urgency for updated education and health policies which fully equip schools to manage pregnant learners but also ensure that pregnant girls remain free of discrimination from teachers and fellow students (Runhare et al., 2014; Panday et al., 2009).

For the quarter of pregnant girls who are vulnerable to discontinue school during pregnancy, access to specific support that counteracts the risks for premature dropout may be crucial. Since our analyses also indicated that some girls withdraw from school as early as the first trimester, there is an additional need for timely interventions that reach adolescents early on during pregnancy. With 91% of mothers enrolled in school at the onset of their pregnancy, school-based services that identify pregnant adolescents at risk for dropout may offer feasible opportunities for these interventions. For instance, our findings corroborate previous evidence from South Africa suggesting that girls who struggled in school prior to their pregnancy are more likely to experience a pregnancy-related dropout and less likely to return to school after birth (Grant and Hallman, 2008). Similarly, girls' with higher aspirations to attend college before the pregnancy have shown to be less likely to be forced out of school during pregnancy in a Zambian sample (Zuilkowski et al., 2019). Existing school-based services in South Africa – such as the work of Learning Support Agents – may be best placed to access information about girls' educational history and identify poorly-performing girls who would benefit from targeted support to facilitate school enrolment. Previous qualitative studies indicate that some girls decide to drop out of school before the pregnancy shows in order to avoid unwanted attention and teasing from fellow learners (Ngabaza and Shefer, 2013). These findings may partly explain why the majority of discontinuing girls in our sample had left school by the third month. In these cases, the cross-sectorial work outlined in the integrated school health policy (South African Department of Health, 2012) which includes for schools to facilitate access to social services might become especially important (South African Department of Basic Education, 2018). Echoing previous calls, we advocate for improved educational policies and health service support which reassure principals that they can manage to enroll girls late into their pregnancy (Ramalepa et al., 2020; Runhare et al., 2014; Zweigenthal et al., 2020).

Moreover, given that approximately 5% of adolescent girls had dropped out of school prematurely even at the onset of their pregnancy, community-based outreach remains essential to reach those who are potentially most vulnerable. It is also noteworthy that not all girls will have chosen to discontinue school themselves. The decision to send pregnant girls home could have been made by the schools which continue to dismiss girls over concerns about babies being delivered on school grounds (Du Preez et al., 2019; Zweigenthal et al., 2020).

Countries across Sub-Saharan continue to change laws and lift bans that prevent pregnant girls from attending school. Sierra Leone lifted the ban in 2020 after the Economic Community of West African States Court of Justice ruled it a violation of the rights of pregnant girls to education which violates, among others, the Convention on the Rights of the Child and the Convention Against Discrimination in Education. Tanzania, where pregnant girls were banned from school for the past 40 years, recently announced revoking a ban for pregnant girls in schools (Thomson

Table 3
Hierarchical logistic regression showing odds ratios for adolescent mothers' school withdrawal during pregnancy (n = 915).

Parameter	Model 1 OR [95% CI]	Model 2 OR [95% CI]	Model 3 OR [95% CI]	Model 4 OR [95% CI]	Model 5 OR [95% CI]
Socio-demographic characteristics					
Necessities afforded in household	0.89 [0.84, 0.96]**	0.91 [0.85, 0.97]**	0.91 [0.85, 0.98]**	0.91 [0.85, 0.97]**	0.92 [0.86, 0.98]*
Lives with caregiver	0.53 [0.31, 0.91]*	0.59 [0.34, 1.03]	0.59 [0.34, 1.03]	0.58 [0.33, 1.01]	0.62 [0.35, 1.09]
Residency (rural/urban)	1.06 [0.76, 1.48]	1.03 [0.73, 1.45]	1.00 [0.71, 1.41]	0.97 [0.69, 1.38]	0.98 [0.69, 1.39]
Age at pregnancy onset	1.16 [1.10, 1.28]**	1.01 [0.91, 1.13]	1.02 [0.91, 1.14]	1.03 [0.92, 1.14]	1.00 [0.90, 1.12]
School delay at the time of pregnancy					
Grade delay at pregnancy onset		3.18 [2.21, 4.56]***	3.13 [2.18, 4.51]***	3.08 [2.14, 4.44]***	3.26 [2.25, 4.72]***
Pregnancy intention					
Unplanned and unwanted pregnancy			3.99 [1.19, 13.31]*	3.92 [1.17, 13.09]*	3.93 [1.17, 13.23]*
Intentions to terminate the pregnancy			1.46 [0.86, 2.47]	1.48 [0.87, 2.51]	1.47 [0.87, 2.51]
Medical problems					
Any medical problems during pregnancy				1.41 [0.93, 2.16]	1.44 [0.94, 2.00]
Pregnancy support					
Boyfriend supportive reaction					0.88 [0.53, 1.46]
Lack of information from caregiver					1.59 [1.15, 2.21]**
Lack of information from school					1.56 [0.43, 5.67]
	$X^2 = 24.42$ Prob > $\chi^2 < .001$ Pseudo $R^2 = .02$ Count $R^2 = 0.74$	$X^2 = 67.11$ Prob > $\chi^2 < .001$ Pseudo $R^2 = .06$ Count $R^2 = 0.75$	$X^2 = 76.45$ Prob > $\chi^2 < .001$ Pseudo $R^2 = .07$ Count $R^2 = 0.74$	$X^2 = 78.95$ Prob > $\chi^2 < .001$ Pseudo $R^2 = 0.08$ Count $R^2 = 0.75$	$X^2 = 87.87$ Prob > $\chi^2 < .001$ Pseudo $R^2 = 0.08$ Count $R^2 = 0.75$

Note
* p < .05
** p < .01
*** p < .001.

Table 4
Hazard ratios for the effect of pregnancy on incident school discontinuation among school-aged girls in the Eastern Cape, enrolled in the study between 2017-2019 (n = 896).

Variable	HR	SE	z	p	95% CI
Necessities afforded in household	.93	0.03	-2.45	.014	[0.88, 0.99]
Grade delay at pregnancy onset	2.72	0.47	5.81	< .001	[1.94, 3.81]
Unplanned and unwanted pregnancy	3.16	1.84	1.97	.049	[1.00, 9.89]
Lack of information from caregiver	1.45	0.20	2.62	.009	[1.09, 1.91]

Note. CI = confidence intervals; HR = Hazard ratio

Reuters., 2017). Even though it is still largely unclear how to ensure that policies for pregnant girls succeed and which additional programs help childbearing adolescents in South Africa to do well academically (Psaki et al., 2021), our results offer several suggestions for potential points of intervention. First, school discontinuation was associated with an unplanned and unwanted pregnancy and higher household poverty, suggesting that support programs that address these stressors could improve withdrawal rates. However, given that our findings showed only a weak association between household poverty and leaving school, it is likely that cash transfer programs may be necessary but not sufficient to address school leaving. Further explorations on how unintended pregnancies affect schooling may be one way to identify additional interventions that mitigate risk pathways towards school withdrawal. Future studies should also clarify which other forms of support benefit adolescent mothers and

assess the extent to which it necessary to combine these with cash transfers that address economic stressors.

Second, caregivers' provision of information appeared to buffer against school withdrawal. Providing information on the pregnancy could be seen as a form of social support (Assini-Meytin et al., 2018; Calasanti and Slevin, 2001) and concern for the adolescent's future advancements, which would be worsened by leaving school (Assini-Meytin et al., 2018; Bhana and Nkani, 2016; Salvi, 2019). Previous studies have shown that receiving financial or practical support lessens the chance of dropout (Ngabaza and Shefer, 2013) whereas lack of support might lead to girls' dropping out of school (Bhana and Nkani, 2016; Chigona and Chetty, 2008; Nkwemu et al., 2019). Alongside the development of services and programs that facilitate conversations about the pregnancy between caregivers and adolescents, it may also be important to ensure that girls are able to access childbearing-information outside the family. However, future studies should further investigate the type of information most beneficial to adolescent girls and determine which other parenting practices support pregnant girls' schooling. Further studies should also explore the range of protective factors that counteract school discontinuation during pregnancy in the South African context and investigate the breadth of feasible interventions that could interrupt these risk pathways. For instance, one pilot-intervention in KwaZulu Natal showed small positive effects on school re-enrolment nine months after birth (Shazi et al., 2018). The intervention trained "mentor mothers" (i.e., young women who had given birth whilst in school and subsequently completed high school) to support adolescent mothers after birth. In liaison with social and school-based services, it may be worth exploring how the format of mentor mothers could be used with pregnant girls.

The present study has several limitations. First, the cross-sectional nature of the data precludes establishing a clear temporal sequence or

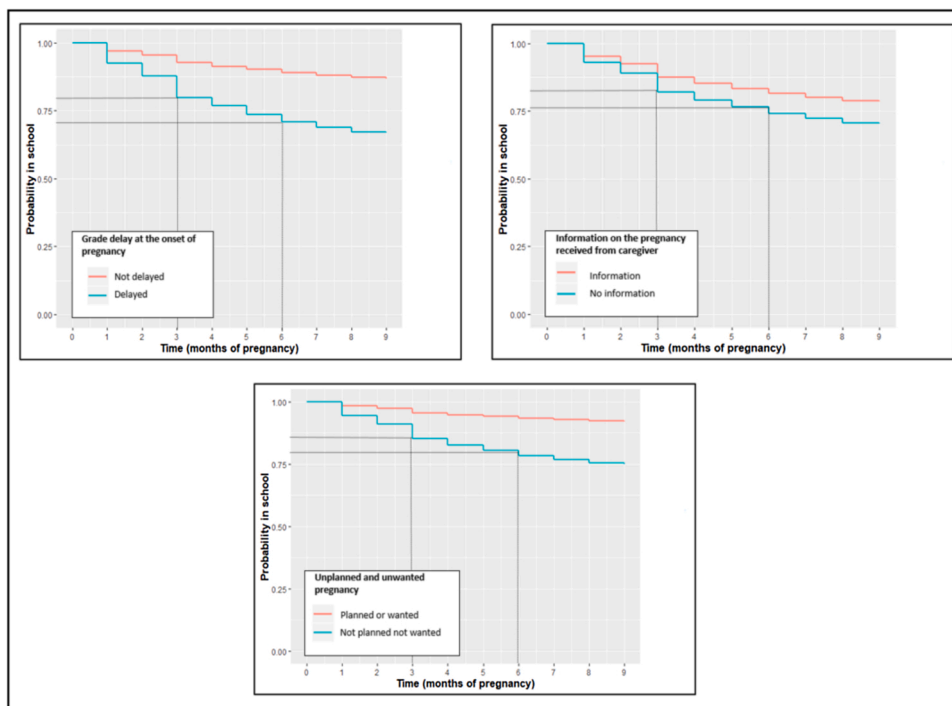


Fig. 1. Adjusted survival curves for Cox proportional hazards models comparing groups of mothers a) Grade delayed versus not grade delayed at the time of pregnancy (top left) b) Planned or wanted to get pregnancy versus not planned and not wanted to get pregnant (bottom central) c) Received pregnancy-related information from the caregiver versus no receipt of pregnancy-related information from caregiver (top right).

causal relationship. To mitigate this, the questionnaire was designed to establish some temporality through items requiring recall of past events (Shahar and Shahar, 2013). However, some sociodemographic variables (i.e., place of residency, access to necessities, living with a caregiver, grant access) were assessed with reference to the time of the interview. Whilst it is possible that these variables have changed over time, an examination of the data prior to conducting the analyses suggests that resulting bias are minimal. Specifically, for the majority of mothers in the sample (85%) less than three years had passed since their pregnancy and 50% of mothers had given birth to their child within the previous 12 months, reducing the likelihood that substantial changes occurred in this short period of time. Despite the relatively short time span between the pregnancy and the time of the interview, it is still possible that girls' access to necessities and their living situation could have changed since the birth of the child. However, 93% of mothers reported living with a caregiver at the time of the interview and, given the young age of the participants, it appears unlikely that these girls had not also lived with their caregiver during the pregnancy, especially since the presented analyses focused on school-going girls. At the same time, young mothers frequently report that a birth worsened their poverty levels (Bhana and Nkani, 2016), which would strengthen (not weaken) the association between school withdrawal and the ability to afford fewer necessities that was identified in our analyses.

Second, variables on pregnancy experiences were assessed retrospectively and may be subject to recall bias, although for 65% of mothers less than a year had passed since birth, which could reduce this risk (Stull et al., 2009). Third, school enrolment should not be confused with attendance (Ardington et al., 2015), which could have been impaired even without official school withdrawal. South Africa places a high value on education and learners often display high educational aspirations as indicated by 99% of learners intend to completed matric (National Income Dynamics Study, 2008). These future ideation may have caused socially desirable responding, including over-reporting of continued schooling. Fourth, the present study does not speak to girls' longer-term or final school outcomes. For example, it is possible that

girls who withdrew from school during the pregnancy returned subsequently or that girls who continued with school throughout pregnancy discontinue their education once the child is born. These differences are meaningful and future studies should build on the present findings and further investigate the unique set of covariates that differentiates these groups of adolescent mothers. Fifth, the study would have benefitted from exploring additional variables that might affect school withdrawal, including the point in time when mothers found out about the pregnancy, parental education, and girls' motivation, intent, and ability to complete school (e.g., Ngabaza and Shefer, 2013). Specifically, peer reaction to the pregnancy and girls' exposure to harassment and teasing in school have been shown in several studies which investigated pregnant girls' experiences (Atuyambe et al., 2005; Brown, 2012; Runhare and Vandeyar, 2011; Wanjiku, 2015; Willian, 2013) and, in some cases, girls report discontinue school even before the pregnancy is visible to avoid judgement from fellow pupils (Ngabaza and Shefer, 2013). Furthermore, utilizing triangulation techniques may enable future studies to assess schools' implementation of South Africa's national learner policy and its impact on girls' enrolment. Sixth, our results concerning mothers' pregnancy intentions on schooling should be treated with caution because the low frequency of mothers who planned or wanted the pregnancy affected the statistical tests and caused large confidence intervals (Table 3). Seventh, this research excluded participants who had already dropped out of school at the onset of their pregnancy and may, therefore, exclude particularly vulnerable participants. Lastly, the generalizability of our findings beyond the Eastern Cape requires additional research with samples from other South African provinces.

6. Conclusion

During the current COVID-19 crisis, an additional seven million unintended pregnancies are expected across the globe (UNFPA, 2020). In this time, adolescent girls are likely to be disproportionately affected by many risk factors for an early pregnancy, including school closures

(Giannini, 2020), heightened poverty (UN, 2020), restricted access to sexual and reproductive healthcare (Cousins, 2020), and an increase in child marriages (Grant, 2020; Jones et al., 2020). Now, more than ever, there is an urgent need for updated continuation-policies which leave no leeway for misinterpretations that unnecessarily exclude girls from schools too early into their pregnancies. Instead, aligned educational and health policies should provide the structures that enable schools to confidently support girls to continue schooling throughout their pregnancies and outline the steps and procedures to ensure that pregnant girls are protected from discrimination.

The present results suggest that it may be feasible to extend school-based services (social workers, school-based nurses, or learner support agents) to screen for the characteristics that render pregnant girls vulnerable to school withdrawal and provide further targeted support to at-risk learners. Our findings also indicate that individual or combination of interventions that address mothers' stressors and are sensitive towards their needs could improve their schooling without specifically targeting school enrolment. Since school withdrawal occurred from the first trimester for some girls, the present study also raises the question on how at-risk girls can be optimally identified and supported early on during pregnancy. Further research on the factors determining the variability in adolescent mothers' school outcomes and assessments of the programs that address these risk factors are crucial to address girls' educational disadvantage, during pregnancy and beyond.

Author statement

Author statement: LC has conceptualised the overall study. LC and JJ were involved in study design and data collection. JJ, LC, and FM contributed to data management and analyses. JJ prepared the manuscript and all authors have reviewed and approved this manuscript.

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Declaration of Competing Interest

None

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