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Incident pregnancy and mental health among adolescent girls and young women in rural KwaZulu-Natal, South Africa: an observational cohort study

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ABSTRACT

Pregnancy can place adolescent girls and young women (AGYW) at risk of poor mental health. However, evidence linking youth pregnancy to mental health in resource-limited settings is limited, especially where HIV incidence is high. We analysed a population-representative cohort of AGYW aged 13–25 in rural KwaZulu-Natal to assess how adolescent pregnancy predicts subsequent mental health. Among 1851 respondents, incident pregnancy (self-reported past-12-month) rose from 0.7% at age 14% to 22.1% by 18. Probable common mental disorder (CMD; 14-item Shona Symptom Questionnaire) prevalence was 19.1%. In adjusted Poisson regression recent pregnancy was associated with slightly higher probable CMD (adjusted prevalence ratio [aPR] 1.19, 95%CI 0.96–1.49), and stronger association among 13–15 year-olds (aPR 3.25, 95%CI 1.50–7.03), but not with HIV serostatus. These findings suggest a possible incremental mental health impact of being pregnant earlier than peers, pointing to the need for age-appropriate mental health interventions for AGYW in resource-limited settings.

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Introduction

Adolescent girls and young women (AGYW) in sub-Saharan Africa (SSA) have the highest rate of early childbearing globally (United Nations Department of Economic and Social Affairs, 2022). Around 35% of SSA pregnancies among 15–19-year olds are estimated to be unplanned, unwanted or untimed (Bankole & Malarcher, 2010). In rural South Africa, almost one in five pregnant women is under 20 years of age (le Roux et al., 2019). Adolescent pregnancy presents quantitatively and qualitatively different challenges compared to pregnancy during adulthood, with physical, social, emotional, and financial difficulties of pregnancy and childrearing in adolescence predisposing adolescent mothers to worse maternal outcomes in the short and longer term (Coyne & D'Onofrio, 2012; le Roux et al.,

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2019; National Research Council, 1993; Siegel & Brandon, 2014), burdensome mental health challenges (Roberts, Smith, Cluver, Toska, Zhou, et al., 2021) and specific challenges to their infants.

Many people face mental health disorders in their lives. One-eighth (12.3%) of all individuals globally are estimated to have had experienced a DSM-IV defined mental health condition in 2019 (GBD Mental Disorders Collaborators, 2022). Evidence from South Africa suggests potentially even higher rates, with an estimated 16.5% of adults having had a past-year mental health or substance use disorder 2003–4 (Herman et al., 2009). Past-year prevalence among adolescents globally is higher than the general adult population, perhaps 25–31% (Silva et al., 2020). Again, South Africa has similar or higher levels of common mental disorders (CMD), with many as 33% of 20-year-olds screening positive in one rural setting in 2017 (Mthiyane et al., 2021).

Adverse mental health, notably depression and anxiety, is an important aspect of adolescent pregnancy (Lockwood Estrin et al., 2019; Osok et al., 2018; Siegel & Brandon, 2014; Toska et al., 2020). While there are several other age-specific risk factors for CMDs in SSA AGYW, unintended pregnancy appears to act independent of them (Hymas & Girard, 2019; Kuringe et al., 2019; Roberts, Smith, Cluver, Toska, & Sherr, 2021). Psychological distress and CMD prevalence can also continue postnatally for adolescents (Field et al., 2020; Lockwood Estrin et al., 2019; van Heyningen et al., 2017), increasing the risk of adverse mental health in their children (Field et al., 2020) and with potential ramifications for development (Falster et al., 2018). A recent systematic review on mental health and adolescent pregnancy in SSA highlighted a substantial gap in understanding and called for focused research (Roberts, Smith, Cluver, Toska, & Sherr, 2021).

Much of the existing literature on the mental health impacts of adolescent pregnancy is based on settings where pregnancy in adolescence and even early adulthood is uncommon. However, South Africa has a bimodal fertility pattern where almost half of women have premarital births, with incidence peaking around age 20, followed by subsequent marital birth peaking 10 or more years later (Garenne et al., 2001; Sennott et al., 2016). This pattern reflects both social norms about fertility patterns, and a wide range of sexual and non-sexual predictors of early pregnancy – including limited education and employment opportunities, inadequate sexual health education, high rates of substance use and coercive sexual relationships, particularly relating to older men (Araújo Pedrosa et al., 2011; McHunu et al., 2012; Yakubu & Salisu, 2018). Additionally, HIV seropositivity remains high in South Africa, including during adolescence (Akullian et al., 2021). Living with HIV is associated both with pregnancy, due to the common factor of unprotected sexual intercourse, and poor mental health (Boyes et al., 2019); however, it is unclear how pregnancy and mental health are correlated in the context of living with HIV (Roberts, Smith, Cluver, Toska, Zhou, et al., 2021).

This study therefore seeks to assess how adolescent pregnancy predicts subsequent mental health in a cohort of vulnerable young women residing in a rural South African setting where both adolescent pregnancy and poor mental health are common, and several key predictors of both are prevalent. We hypothesize that pregnancy will be associated with worse mental health. It will also assess how the age of pregnancy within adolescence and prior HIV serostatus modifies any association seen. We hypothesize that younger age at pregnancy will be associated with a stronger negative association between pregnancy and mental health.

Methods

Study setting and procedures

We conducted a secondary analysis of data collected from the Africa Health Research Institute (AHRI) Population Intervention Platform Study Area (PIPSA) in the uMkhanyakude district of KwaZulu-Natal (Gareta et al., 2021). PIPSA covers ~440 km^2 with approximately 100,000 members of 12,000 households; it is largely rural with one town. Data were collected as part of the impact evaluation of an implementation of the PEPFAR-funded Determined, Resilient, Empowered, AIDS-free, Mentored and Safe (DREAMS) initiative – a package of evidence-based combination HIV prevention interventions –

in this area (Birdthistle et al., 2018). As part of the evaluation process, a sample of 3,013 AGYW aged 13–22 was randomly drawn from age-eligible PIPSA residents in 2017. Sampled individuals were visited at their homes and asked to participate in the study.

Consenting participants were enrolled into a study cohort and completed a structured quantitative questionnaire each year between 2017 and 2019, conducted in the local isiZulu language. Survey rounds ran from May 2017 to February 2018 (Round 1), April to July 2018 (Round 2) and June to September 2019 (Round 3). Participants were asked questions on a wide range of topics, including socio-economic indicators, reproductive and sexual health, gender-based violence and mental wellbeing. Sexual behaviour questions were self-completed by participants on a tablet computer with interviewer support as needed. Additionally, dried blood spots were collected at each survey round and tested for HIV and Herpes Simplex Virus 2 serostatus.

Measures

The outcome in this study was probable CMD, assessed using the locally validated 14-item Shona Symptom Questionnaire (SSQ-14) (Haney et al., 2014; Mthiyane et al., 2021; Patel et al., 1997). The SSQ-14 contains items asking participants if they have experienced a range of symptoms in the past 7 days, from which a continuous sum score can be generated (range 0–14). We used a validated cut-off score ≥9 to identify those with probable CMD.

Our primary exposure measure was incident pregnancy, which we defined as reporting having been pregnant at some point within the last 12 months (including at the interview date) at the end of each observation period, i.e. they were pregnant in the year prior to reporting on their mental health.

We considered several variables as potential confounders based on existing literature regarding adolescent pregnancy and CMD. These included socio-demographic variables for age and urbanicity (rural, urban/peri-urban); we did not include partner status since only five individuals reported being married or cohabiting. We also considered socio-economic factors: employment status (any, none); other sources of income (any, none); current school attendance (no, yes); and missed school days in the past year (any, none). Finally, we included household food insecurity, defined as having to reduce food portions or skipping meals due to insufficient money in the past 12 months.

We additionally considered some potential mediators of pregnancy and CMD. These included social support availability (having a female friend to confide in) and lifetime experience of violence based on a 15-item checklist of physical, psychological and sexual violence perpetrated by men (any, none). We also considered self-reported HIV status (negative, positive, never tested or no response given) and HIV serostatus based on dried blood spot samples (negative, positive, no test performed).

Observations missing values for potential confounders and mediators (0.9% of all observations) were assigned to the most common category (employed $n = 7$, other income $n = 5$, trusted female friend $n = 14$, skipped meals $n = 5$).

Statistical analyses

We created two observation periods per participant (2017 to 2018; 2018 to 2019), excluding those seen in 2017 and 2019 but not 2018. For each period, we first described characteristics at the beginning of the observation-period using means, standard deviations (SD), frequencies and percentages. We then used Student-t and χ^2 tests to compare characteristics by pregnancy status. We next conducted regression analysis using two-level hierarchical Poisson models (time periods nested within participants) with robust standard errors to provide prevalence ratio (PR) measures – a common approach when a binary outcome is not rare (Barros & Hirakata, 2003). First, we ran a bivariate analysis of pregnancy status at the start and CMD score at the end of each observation period. We then ran multivariable regression models including first confounders and then potential mediators. All regression models were adjusted for age (in four categories: 13–15, 16–18, 19–22, 23–25 years) and for start-of-period CMD score. Finally, we considered whether the effect of pregnancy

on CMD was moderated by start-of-period age or HIV serostatus using interaction terms. All analyses were conducted using Stata v.15.1 (StataCorp LP, College Station, Texas, U.S.A.).

Ethical approval

The DREAMS Partnership impact evaluation protocol was approved by the University of KwaZulu-Natal Biomedical Research Ethics Committee (BFC339/19), the London School of Hygiene & Tropical Medicine Research Ethics Committee (REF11835) and the AHRI Somkhele Community Advisory Board. Further ethical approval was obtained from University College London (18321/001) for secondary data analyses. Written parental consent and participant assent were provided for participants below 18 years of age and participants aged 18 years or older provided a written consent.

Results

Of 3,013 AGYW sampled, 2,527 were eligible to participate, 2,184 (86.4%) consented at baseline and 2,016 were seen at least once subsequently. After dropping 164 not interviewed at midline, we analysed 1,851 unique individuals (84.7% of consenters), comprising 3,398 episodes and 2,792.3 person-years of observation (Table 1). Mean age at baseline was 17.0 years; two-thirds (1237, 66.8%) were aged under 19 and one-third (614) aged 19–22. Most participants lived in rural settings, and almost none were married or cohabiting. Most were in education (75.3%), but unemployment was very high: only 2.5% reported being in any employment, 10% of those not in education. The majority of respondents (59.0%) reported knowing their HIV status, but far fewer reported that they knew that they were living with HIV (1.8%) than were actually seropositive (10.3%). Household food insecurity was common (30.6%), lifetime gender-based violence was ubiquitous (95.2%) and 21.1% of AGYW screened positive for CMD. By the second observation-period, the sample was older, less likely to have income, more likely to report knowing that they were living with HIV and had improved outcomes for social support, food security, violence experience and CMD.

At baseline, 418 individuals (22.7%) reported ever having been pregnant. The prevalence of incident pregnancy (any pregnancy within the past 12 months at period-end) was not

Table 1. Descriptive characteristics of participants by observation-period.

	2017–18		2018–19		Test statistic	p-value
N	1,851		1,547			
Age†	17.0	(2.7)	17.3	(2.7)	3.17	0.002
Rural vs urban/peri-urban location	1377	(74.4%)	1147	(74.1%)	0.03	0.869
Currently employed	43	(2.3%)	20	(1.3%)	4.92	0.027
Any other source of income	114	(6.2%)	42	(2.7%)	22.82	<0.001
Currently in school	1453	(78.5%)	1180	(76.3%)	2.38	0.123
Any school days missed in past year	638	(34.5%)	459	(29.7%)	8.71	0.003
Skipped meals in past 12 months	567	(30.6%)	269	(17.4%)	79.68	<0.001
Has ≥ one trusted female friend	1427	(77.1%)	1255	(81.1%)	8.23	0.004
Ever experienced violence from men	1762	(95.2%)	1445	(93.4%)	5.06	0.024
SSQ-14 screen positive	391	(21.1%)	257	(16.6%)	11.11	<0.001
Reported known HIV status					26.33	<0.001
Negative at last test	1059	(57.2%)	1008	(65.2%)		
Positive ever	33	(1.8%)	36	(2.3%)		
Never tested or no answer	759	(41.0%)	503	(32.5%)		
Specimen HIV serostatus					2.13	0.345
Negative	1577	(85.2%)	1292	(83.5%)		
Positive	191	(10.3%)	172	(11.1%)		
No test performed	83	(4.5%)	83	(5.4%)		

Values are N (%), and χ^2_{k-1} tests for categorical data, mean (standard deviation) and t-tests for continuous data (indicated †). Tests are for difference across observation periods. SSQ-14: 14 item Shona Symptom Questionnaire.

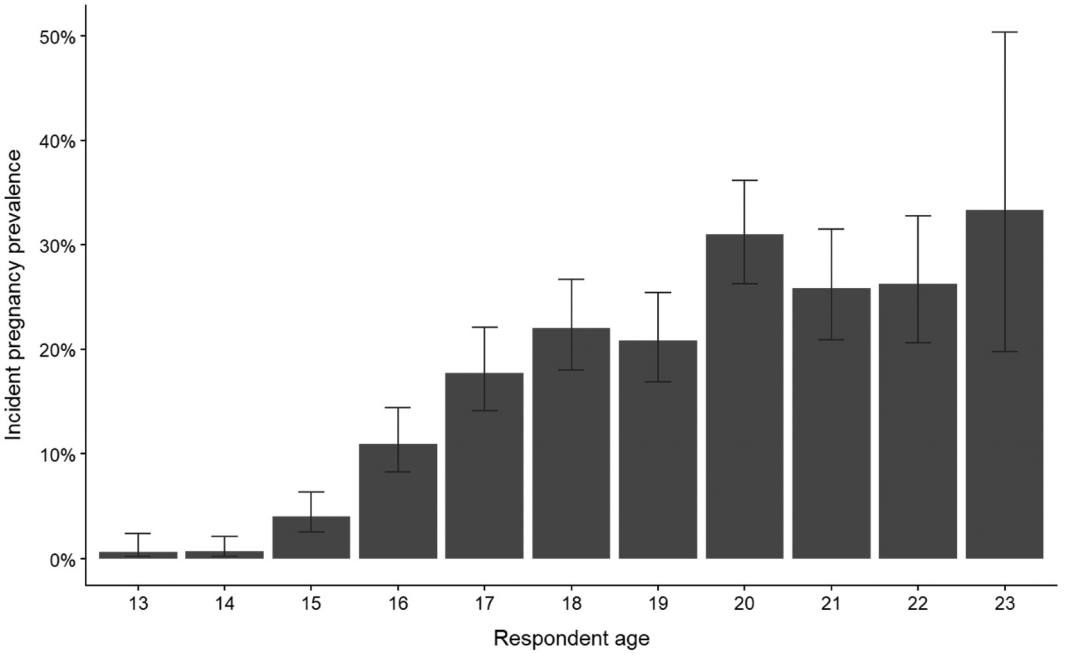

Figure 1. Incidence of pregnancy by age. Incident pregnancy defined as pregnant at any time within the 12 months prior to interview.

significantly different across observation periods: 14.3% vs 15.9% ($\chi^2_1 = 1.77$, $p = 0.183$). Pregnancy incidence rose rapidly with age, to a peak of 26.5% at ages 21–23 (Figure 1). In bivariate comparisons, recent pregnancy was significantly associated with older age, other income sources, not being in education, fewer missed school days (given they were in school), more HIV seropositivity and greater HIV serostatus knowledge, less peer social support, greater household food insecurity and more probable CMD (Supplementary Table S1).

Recent pregnancy was associated with 26% higher incidence of CMD (adjusted PR [aPR]: 1.26; 95% confidence interval [CI]: 1.01–1.57), an association slightly attenuated once potential confounders were accounted for (aPR: 1.19, 95%CI: 0.96–1.49; Table 2, columns 1 and 2). There was little evidence that this association was mediated through the variables highlighted in the literature (Table 2, column 3). When respondent age was considered as a potential effect-modifier of the pregnancy–CMD relationship (Table 3, column 1), there was some evidence that CMD was more strongly associated with recent pregnancy among the youngest respondents, those aged 13–15 (aPR 3.25, 95%CI 1.50–7.03). There was no evidence of significant effect-modification by HIV serostatus (Table 3, column 2).

Discussion

In our analysis of a cohort of 13–25-year-old adolescent girls and young women in a resource-poor area of rural South Africa, we found that past-12-month pregnancy was common from age 16 onwards, rising from 1% among 13–15-year olds to 13% among 16–18-year olds and over 20% for all ages 18 and above. Incident pregnancy was associated with an approximately 20% proportional increase in prevalence of CMD compared to non-pregnant peers, against a background CMD prevalence of 15–20% across ages 16–25. However, pregnant girls aged 13–15 had over three times the risk of CMD compared to their non-pregnant age-peers. These associations come after

Table 2. Association of incident pregnancy with risk of common mental disorders in AGYW.

	Bivariate (age-adjusted)		Multivariable (+ confounders)		Multivariable (+ mediators)	
	PR	95% CI	PR	95% CI	PR	95% CI
Pregnant in past 12 months	1.26	[1.01, 1.57]	1.19	[0.96, 1.49]	1.17	[0.94, 1.47]
Age group (vs 13–15)						
16–18	1.62	[1.27, 2.08]	1.39	[1.07, 1.79]	1.28	[0.98, 1.67]
19–22	2.36	[1.87, 2.98]	1.63	[1.24, 2.15]	1.45	[1.07, 1.95]
23–25	2.04	[0.90, 4.65]	1.64	[0.69, 3.91]	1.42	[0.59, 3.41]
Common mental disorder at start of period	2.92	[2.44, 3.49]	2.66	[2.21, 3.20]	2.59	[2.15, 3.12]
Observation period 2018–19 vs 2017–18	0.69	[0.57, 0.82]	0.76	[0.63, 0.92]	0.74	[0.62, 0.90]
Rural vs urban/peri-urban location	0.74	[0.61, 0.89]	0.91	[0.83, 1.00]	0.92	[0.83, 1.01]
Currently employed	0.89	[0.47, 1.67]	0.85	[0.45, 1.61]	0.87	[0.46, 1.65]
Any other income source	1.25	[0.88, 1.80]	1.04	[0.72, 1.50]	1.02	[0.71, 1.47]
Currently in school	0.89	[0.71, 1.11]	0.87	[0.67, 1.13]	0.91	[0.70, 1.18]
Any school days missed in past year	1.11	[0.92, 1.35]	1.09	[0.88, 1.35]	1.07	[0.87, 1.33]
Skipped meals in past 12 months	1.65	[1.37, 1.98]	1.31	[1.08, 1.58]	1.28	[1.06, 1.55]
Has ≥ one trusted female friend	0.93	[0.76, 1.14]			1.02	[0.83, 1.25]
Ever experienced violence by men	1.08	[0.74, 1.60]			1.04	[0.71, 1.54]
Reported known HIV status (vs negative)[†]						
Positive ever	1.65	[1.05, 2.59]			1.17	[0.72, 1.90]
Never tested or no answer	0.76	[0.61, 0.96]			0.80	[0.63, 1.01]
Specimen HIV serostatus (vs negative)						
Positive	1.48	[1.17, 1.87]			1.22	[0.94, 1.57]
No test performed	0.65	[0.39, 1.07]			0.72	[0.43, 1.19]

Models are mixed effects Poisson models with random intercept for 3398 observation periods covering 1851 individuals.
[†] Bivariate model for reported HIV status does not have a random effect for individual due to non-convergence of the mixed model. PR: prevalence ratio: CI: confidence interval.

adjusting for start-of-period CMD and thus do not reflect higher rates of pre-existing mental health among those who became pregnant.

The pregnant AGYW in this cohort represent particularly vulnerable individuals within an already-vulnerable population. While not statistically significant after adjusting for all potential confounders, our finding that pregnant AGYW were at moderately increased risk of CMD compared to non-pregnant peers remains concerning. A small increase in mental health burden associated with pregnancy is in line with evidence from elsewhere showing that while depression was more common in adolescent than older mothers, it was not notably higher than among non-pregnant peer AGYW (Siegel & Brandon, 2014). This limited increase in CMD risk may reflect the high background level of stressors present in these AGYW's lives. These include financial poverty, high levels of community and interpersonal violence, and the boredom of 'waithood' – a period of a decade or more between formal education ending and meaningful employment beginning (Bernays et al., 2020), and living with HIV (Rochat et al., 2011). Pregnancy may therefore not be a particularly pertinent stressor for CMD in this setting, especially when it is so normative to be pregnant between 18 and 25 years of age.

Nevertheless, our most concerning finding was the large increase in CMD among girls aged under 16, relative to their non-pregnant age-peers. Such an increased risk among those in the lower tail of the age distribution within a setting is consistent with past work showing 16–24-year olds having greater odds of CMD during pregnancy than older women in the UK (Lockwood Estrin et al., 2019). However, given the smaller number of pregnancies at young ages in this cohort (22 among those aged under 16), future research with larger cohorts of younger adolescents is needed to confirm or refute this finding. This effect-modification of the association between pregnancy and CMD highlights that the needs of younger adolescents may differ from those of older AGYW, and may require targeted interventions. There is scant literature on the particular needs of younger adolescents – with many studies combining cohorts up to young adulthood and thus blurring the particular needs of this subgroup

Table 3. Potential effect-modification of association of incident pregnancy with risk of common mental disorders in AGYW.

	Age as modifier			HIV serostatus as modifier		
	PR	95% CI	Modification test	PR	95% CI	Modification test
Age group (vs 13–15)						
16–18				1.38	[1.07, 1.78]	
19–22				1.59	[1.20, 2.10]	
23–25				1.53	[0.64, 3.66]	
Common mental disorder at start of period	2.66	[2.21, 3.20]		2.59	[2.15, 3.12]	
Observation period 2018–19 vs 2017–18	0.76	[0.63, 0.91]		0.76	[0.63, 0.91]	
Rural vs urban/peri-urban location	0.92	[0.83, 1.01]		0.92	[0.83, 1.01]	
Currently employed	0.85	[0.44, 1.62]		0.85	[0.45, 1.62]	
Any other income source	1.04	[0.72, 1.50]		1.04	[0.72, 1.50]	
Currently in school	0.86	[0.66, 1.11]		0.88	[0.68, 1.14]	
Any school days missed in past year	1.10	[0.89, 1.37]		1.09	[0.88, 1.35]	
Skipped meals in past 12 months	1.32	[1.09, 1.59]		1.30	[1.07, 1.57]	
13–15 not recently pregnant	1.00					
13–15 recently pregnant	3.25	[1.50, 7.03]	9.0 ($p = 0.003$)			
16–18 not recently pregnant	1.52	[1.17, 1.99]				
16–18 recently pregnant	1.42	[0.92, 2.17]	0.12 ($p = 0.73$)			
19–22 not recently pregnant	1.67	[1.25, 2.23]				
19–22 recently pregnant	2.06	[1.45, 2.93]	2.18 ($p = 0.14$)			
23–25 not recently pregnant	1.66	[0.59, 4.68]				
23–25 recently pregnant	2.13	[0.50, 9.10]	0.08 ($p = 0.77$)			
Seronegative not recently pregnant				1.00		
Seronegative recently pregnant				1.14	[0.88, 1.48]	1.05 ($p = 0.31$)
Seropositive not recently pregnant				1.25	[0.95, 1.65]	
Seropositive recently pregnant				1.52	[0.99, 2.33]	0.66 ($p = 0.42$)
Unknown serostatus not recently pregnant				0.57	[0.30, 1.07]	
Unknown serostatus recently pregnant				1.45	[0.64, 3.26]	3.24 ($p = 0.07$)

Models are mixed effects Poisson models with random intercept for 3398 observation periods covering 1851 individuals. Modification tests are χ^2_1 statistics and p-values comparing across groups with same age/HIV serostatus within age categories. PR: prevalence ratio: CI: confidence interval.

(Toska et al., 2020). The importance of socioeconomic disadvantage (Penman-Aguilar et al., 2013), violence (Young et al., 2011) and education (Mosha et al., 2022) need to be considered in age-appropriate ways.

Pregnant AGYW were also more vulnerable than their age-peers in several other ways. These young women were substantially more likely to have faced food insecurity, highlighting that even when youth pregnancy is common, those with fewer resources are more likely to have children earlier in life (Maness & Buhi, 2016). Pregnant AGYW were also both more likely to report knowing that they were living with HIV than their non-pregnant peers – reflecting effective antenatal HIV testing in this context and that HIV testing is frequently perceived as being non-negotiable (Groves et al., 2010) – and almost 50% more likely to actually be living with HIV based on sero-testing, reflecting their recent unprotected sexual activity. Finally, pregnant AGYWs were also more than three times more likely to have reported CMD at the beginning of the observation period. While our analysis does not account for all potential confounders of a reverse relationship between CMD and pregnancy, and is not the focus of this paper, such a strong bivariate association suggests the importance of addressing mental health needs prior to pregnancy (Duby et al., 2020; Witt et al., 2010).

In addition to past childhood adversities, teenage mothers face the challenge of parenting in the context of chronic stress, cumulative disadvantage, and limited social support (SmithBattle & Freed, 2016). South African teenage mothers tend to have fewer structural resources, less education and lack financial independence compared to older mothers (le Roux et al., 2019). These young mothers must negotiate their own adolescent development and adapting to parenting responsibilities in parallel, placing additional strain on their mental wellbeing. South

African AGYWs have a higher prevalence, but greater under-diagnosis and under-treatment than their male peers (Barhafumwa et al., 2016). Finally, adolescents perceive considerable stigma relating both to teenage pregnancy and to mental illness, reducing uptake of any available mental health services (Field et al., 2020).

When considering potential mediating pathways, we found that CMD was not associated with having experienced male violence or having peer support in this cohort, in contrast to elsewhere (Grose et al., 2021), including evidence that South African mothers and mothers-to-be experience poorer physical and emotional adverse outcomes, often due to exacerbating interpersonal and contextual stressors (le Roux et al., 2019; Watt et al., 2014). There was thus no evidence that these factors mediated the relationship between pregnancy and CMD. This lack of association may reflect the already high background levels of gender-based violence and limited social support (Gourlay et al., 2022; Hill et al., 2015; Hlongwa et al., 2020; Zuma et al., 2020).

Limitations

While our analysis uses a large and population-representative cohort of AGYW living in rural South Africa, our results might be biased if study attrition was differential, e.g. higher rates of drop-out among pregnant vs non-pregnant AGYW having CMD. Additionally, the self-reported nature, particularly of the CMD data, means that it might have been subject to social desirability bias, again potentially differential by pregnancy or HIV status, or misclassification bias which would tend to bias associations towards the null. While the SSQ-14 was created for, and has been validated in, southern Africa it has not specifically been validated for adolescents aged under 18. Finally, all participants were responding during the rollout of a comprehensive package of HIV interventions, several of which would have been expected to affect pregnancy incidence and some of which might have impacted AGYW mental health. Replicating this work in other rural SSA sites would therefore be an important validation step. Such replication would also assuage concerns about generalizability given the specificity of the research site.

Conclusion

In this analysis of a cohort of adolescent girls and young women in rural South Africa, where life stressors and pregnancy for this group are extremely common, we note three key findings. First, there was little evidence for an increased risk of common mental health disorders among pregnant participants compared to non-pregnant ones in general. This finding highlights the importance of considering background stressor levels, such that in high-stress environments youth pregnancy may only be one issue among many. Second, despite the overall result, the very youngest pregnant cohort members – those aged under 16 – had a substantially increased risk of poor mental health compared to their non-pregnant age-peers. This finding highlights the importance of considering the importance of normative ages for first pregnancy, and that poor mental health due to pregnancy may be in part the result of being pregnant at an earlier age than peers in a setting. Finally, poor mental health was extremely common in pregnant AGYW even prior to pregnancy, suggesting that many pregnant youth needed mental health support prior to becoming pregnant. All these findings point to the need to invest in age-appropriate interventions to support the mental health of girls and young women as they approach and live through pregnancy, for their own wellbeing and that of their children.

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