Correlates of school dropout and absenteeism among adolescent girls from marginalized community in north Karnataka, south India

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ABSTRACT

Secondary education among lower caste adolescent girls living in rural Karnataka, South India, is characterized by high rates of school drop-out and absenteeism. A cross-sectional baseline survey (N=2275) was conducted in 2014 as part of a cluster-randomized control trial among adolescent girls (13-14 year) and their families from marginalized communities in two districts of north Karnataka. Bivariate and multivariate logistic regression models were used. Overall, 8.7% girls reported secondary school dropout and 8.1% reported frequent absenteeism (past month). In adjusted analyses, economic factors (household poverty; girls' work-related migration), social norms and practices (child marriage; value of girls' education), and school-related factors (poor learning environment and bullying/harassment at school) were associated with an increased odds of school dropout and absenteeism. Interventions aiming to increase secondary school retention among marginalized girls may require a multi-level approach, with synergistic components that address social, structural and economic determinants of school absenteeism and dropout.

1. Introduction

School dropout is prevalent in many low and middle-income countries (LMIC) and disproportionately affects girls (UNESCO & United Nations Girls Education Initiative, 2015). It determines subsequent life trajectories both for the girls

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themselves and for the next generation. Little or no schooling is associated with extreme poverty and hunger (United Nations Educational Scientific and Cultural Organisation, 2014); gender inequality (United Nations Educational Scientific and Cultural Organisation, 2011; Warner, Malhotra, & McGonagle, 2012); increased child mortality (Ghosh, 2012; Mehra & Agrawal, 2004; Prakash, Singh, Pathak, & Parasuraman, 2011); poor maternal health (Arthur, Bangha, & Sankoh, 2013); increased teenage pregnancy rates (Baird, Garfein, McIntosh, & Ozler, 2012; Duflo, Dupas, & Kremer, 2012); early sexual debut; child marriage (Hallfors et al., 2011; Raj, 2010); increased fertility levels (Arthur et al., 2013) and increased HIV infection (Baird et al., 2012; Pettifor et al., 2008). Secondary school dropout is also associated with higher levels of intimate partner violence (Ackerson, Kawachi, Barbeau, & Subramanian, 2008; Hindin, Kishor, & Ansara, 2008). Conversely, educational attainment between late childhood and the mid-20s is a strong and independent predictor of cognitive capacity in midlife (Patton et al., 2016). The Millennium development goals, Education for All movements, and the Sustainable Development Goals have all highlighted the importance of girls' education, with substantial progress made in recent years towards increasing primary school enrolment, attendance, and completion in LMIC. However, high rates of attrition persist during secondary level education (13–16 years), particularly for girls, where gendered social and schooling experiences can combine with economic, marital and childbearing roles, to discourage adolescent girls' participation (Patton et al., 2016). To design interventions that address these concerns, it is important to understand the particularities of specific cultural contexts and to acknowledge the inter-section of gender with other forms of disadvantage.

India has an estimated 11.9 million primary and lower secondary school-age (6–13 years) children out of school, with the highest proportion of these children being girls (UNICEF & UNESCO, 2014a, 2014b). Despite the government's commitment to universal secondary education, few boys (42%) and even fewer girls (32%) complete secondary school (aged 16 years) (International Institute for Population Sciences (IIPS) & Macro International, 2007). Gender inequality and the marginali-zation of women cuts across caste, class and geographic boundaries (Shah, 2011). School dropout tends to be highest among adolescent girls from low-income families, living in rural areas, with lower caste (scheduled caste/scheduled tribe) families facing particular barriers to accessing government schemes designed to alleviate poverty and promote girl school attendance (UNICEF & UNESCO, 2014a).

The districts of north Karnataka in south India are poor, rural regions where approximately 50% of the population live below the poverty line (International Institute for Population Sciences, 2010). The main form of employment is agriculture and manual labor, and families frequently migrate to the neighboring state of Maharashtra for seasonal work. Scheduled caste/scheduled tribe (SC/ST) are legal caste categories in India and refer to indigenous populations from the most disad-vantaged strata of Indian society.[1] In Karnataka, SC/ST people comprise 24% of the total population (Office of the Registrar General & Census Commissioner, 2011). SC/ST girls from north Karnataka have the lowest enrolment in secondary school in the state, with 60% of SC/ST girls enrolled, compared with 67% of girls from higher castes and with 71% of boys (irrespective of caste) from this region. This falls well below the state average of 77% enrolment at secondary school level, highlighting gender, caste and regional disparities in educational uptake. Among those who do enrol in secondary school, SC/ST girls from north Karnataka have the highest likelihood of dropping out in the State (11% vs. 5.8% for all children in the state, class 8 (13/14 years) to class 9 (14/15 years)) (Prakash, Bhattacharjee, Thalinja, & Isac, 2016). Preliminary qualitative research with parents, teachers, and girls from north Karnataka suggest that multiple barriers to secondary school education exist, conceptualized as operating at the macro/societal, school, interpersonal and individual level (Bhagavatheeswaran et al., 2016). These include societal norms (relating to child marriage, sexual purity and the low value placed on girl education), school level barriers (such as infrastructure, costs related to attending school, teacher discrimination of lower caste girls) and issues related to poverty (girls being needed to help at home or for income generation; family economic migration leading to disrupted schooling). However, large-scale surveys with adolescents examining this issue are lacking. A recent systematic review of education interventions on school attendance and learning suggested interventions that address multiple constraints may be necessary to achieve larger overall effects across multiple outcomes (Snilstveit et al., 2016), but it remains unclear which barriers to education programmers and policy makers should be prioritising to improve secondary school retention and completion among lower caste adolescent girls in rural India.

In 2014, we conducted a large cross-sectional survey with 2275 lower caste adolescent girls (aged 13–14 years) and their parents or carers, living in 80 village clusters and their catchment areas in two rural districts (Bijapur and Bagalkot) in north Karnataka. This survey data was collected as part of the baseline evaluation of the *Samata* intervention that aims to delay age at marriage and entry into sex work, by supporting entry into and retention of lower caste adolescent girls in secondary education (Beattie et al., 2015). The *Samata* project comprises a comprehensive, multi-level intervention that works with key stakeholders (girls, families, boys, villages, schools, policy makers) to change social norms regarding gender, child marriage and girls' education, as well as to link lower caste families to government schemes that provide scholarships, bicycles and other incentives to support retention in school. In this paper, we examine the individual, family, and school-level correlates of secondary level school dropout and absenteeism among lower caste adolescent girls in this context.

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[1] Some members of this group prefer the term *'Dalit'* which connotes people who are 'broken, crushed and torn apart' ((Kumar, 2007)) and which is part of a wider political vision. However, to keep with the project terminology, we use the term 'SC/ST' in this article.

2. Method

2.1. Study design and participants

Two waves of data collection were conducted with two cohorts of adolescent girls (aged 13–14) and their families from two districts (Bijapur and Bagalkot) in north Karnataka, as part of the baseline evaluation of the *Samata* intervention (Beattie et al., 2015). A cluster randomized control trial (RCT) design is being implemented at the cluster level, with intervention components delivered in the schools and the communities where girls reside and study. The details of the sample size calculations and the randomisation have been described elsewhere (Beattie et al., 2015). In brief, 80 village clusters (comprising a main village and small feeder villages) were randomly selected from a sampling frame of 121 village clusters, and randomly assigned to either intervention (40 village clusters) or waitlist controls (40 village clusters). All SC/ST 13–14 years old girls residing in these 80 village clusters and enrolled in 7th standard (last year of primary school) were selected to participate in the study in two cohort waves. All eligible girls who consented to participate, along with their parents or household members, were interviewed between February–April 2014 (cohort 1) and September–November 2014 (cohort 2). The intervention implementation of the three-year programme began in August 2014, one month before the survey of cohort 2 began; as such the impact of the intervention on this cohort is expected to be minimal.

2.2. Behavioral and socio-demographic questionnaires

Two structured behavioral questionnaires, one with adolescent girls and one with their parent/carer, were used for this study. The girls' questionnaire included two parts. The first part comprised a face-to-face interview (FTFI) and included questions on socio-demographic details of the household, girls' schooling, participation in public campaigns on girls education/child marriage, and their perception of their own and their parents attitudes towards girl education and marriage, parental support towards their studies, accessibility to their secondary school, and their secondary school environment. The second part of the questionnaire was short and contained sensitive questions including on menstruation and teasing (eve-teasing, i.e., making unwanted sexual remarks or advances by boys and men to adolescent girls in a public place or sexual harassment in public spaces). To limit potential distress and reduce reporting bias, these questions were administered at the end of the FTFI, using an anonymous pen and paper questionnaire.

The questionnaire administered to the girl's parent or carer included a series of questions on their perception of: the value of girls' secondary education; the ideal age at marriage for a girl; difficulties for girls in completing secondary school; their support towards their daughters completing secondary education; and if they had accessed government schemes which are designed to support girl's attendance at secondary school. All interviews were conducted in *Kannada* (the local language) by trained researchers. Interviews with girls were conducted in private by a female interviewer.

2.3. Ethical considerations

Ethics approvals for the *Samata* cluster RCT were obtained by the Ethical Review Boards of St. John's Medical College (Bangalore, India), the London School of Hygiene and Tropical Medicine (London, UK) and the University of Manitoba (Winnipeg, Canada). Interviews were conducted in a sensitive and non-judgmental manner in a private space. Since a large proportion of the study participants were minors, appropriate procedures were followed to obtain informed consent both from girls and either from their parents or legal guardian (if unmarried) or from their spouse or parents-in-law (if married). Independent consent was obtained from parents/guardians participating in the family level survey. Written consent was obtained from adolescent girls; parental/guardian consent was either written or witnessed verbal as many adults in this region are non-literate and not able to sign documents. All data was anonymised by using unique participant identifiers and participant's names were not recorded in the datasets. The study datasets were stored in password protected files on secure servers and on password protected laptops of the researchers. Access to the data was available only to researchers working on the *Samata* data analyses.

2.4. Outcomes and predictors

The primary outcome measures were school dropout and absenteeism. School dropout was defined as a binary variable (yes/no), using the following question: *"Are you currently attending school."* Recent school absenteeism was measured for cohort 2 only. All girls who were attending school at the time of the survey were asked the following question: *"Thinking about the last month you went to school, how many days in that month would you say that you did not attend classes?"* Girls who reported being absent from school for 4 or more days in the past 30 days were defined as 'frequently absent.'

Potential covariates included in the analyses were derived from the conceptual framework (Fig. 1) and were categorized at three different levels: individual, family, and village/school. Individual level predictors included age of the adolescent girl, caste, marital status (never married vs. engaged/married but *gauna* not performed i.e., marital sexual debut has not happened/married), experience of first menstrual period and experience of teasing and sexual harassment in the 12 months before the survey. We also asked questions about girls' social beliefs on marriage, employment and completion of secondary education as follows. Marrying a girl before 18 is important (yes/no); having steady employment in adulthood is important
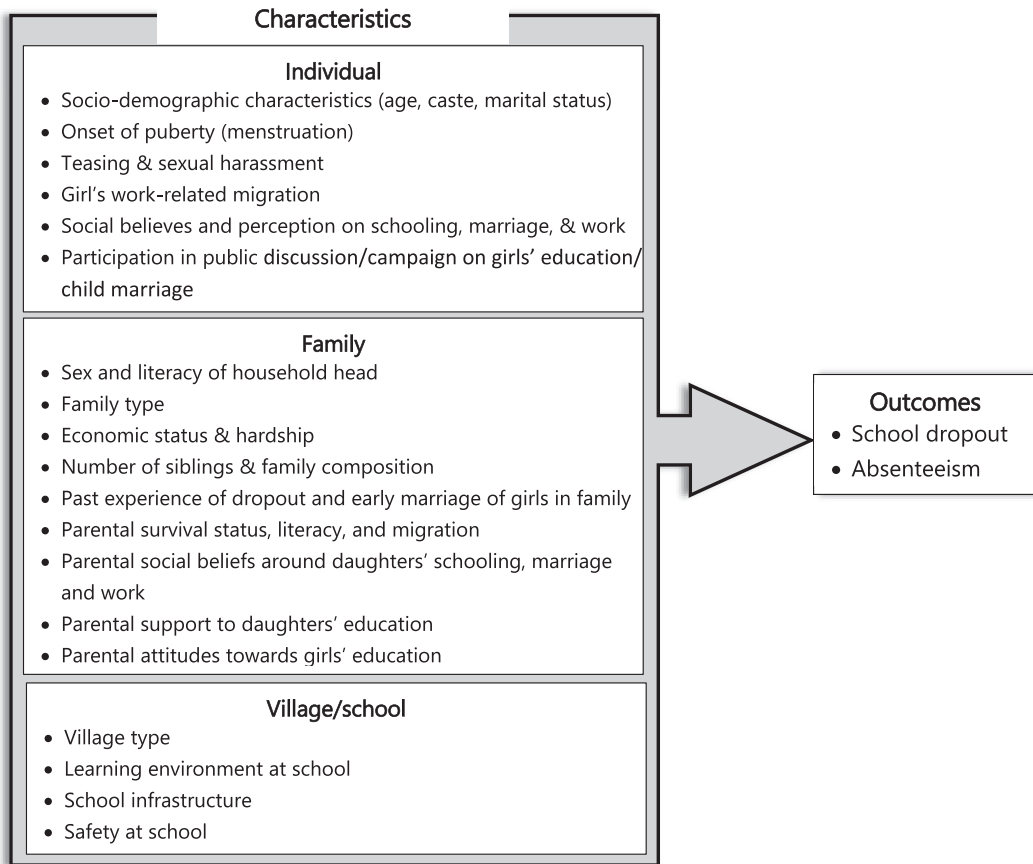
Fig. 1. Conceptual framework depicting correlates of school dropout and absenteeism.

(yes/no); and completing secondary education for girls in the village is very difficult (yes/no). We asked about her participation in public discussions or campaigns supporting girls education or preventing child marriage (yes/no); and if she had migrated outside the village for the purpose of work (alone or with family members) in the 12 months period preceding the survey (yes/no) (cohort 2 only).

Family level characteristics (derived from adolescent girls' responses except where stated) included information on characteristics of the household head, family composition (parents and siblings only vs. extended or spouse's family), family debt and sibling characteristics. We asked 13 household asset questions used in the national level demographic health surveys in India and used principle component analysis (PCA) to compute household wealth quintiles (International Institute for Population Sciences (IIPS) & Macro International, 2007). Parent characteristics included parents' survival status, literacy, and migration in last 12 months (cohort 2 only). Parental beliefs on girl education and marriage (as percieved by the girl) were measured as follows. We asked the girl how important was it for her parents that she (i) transition to and complete secondary school; (ii) has steady employment in adulthood; and (iii) is married before the age of 18 years (very important/somewhat important vs. not important). The response categories very/somewhat important were recoded as 'yes' while not important as 'no'.

Parent support for education (as perceived by the girl) in the past 12 months was measured using the following binary (yes/no) questions: In the past 12 months, did your parents discuss school matters with you; spend time with you on your studies; and visit your school.

Additionally, 'non-supportive attitudes of family members towards girls' education' scale was created using PCA using answers from parents/carers to four questions: it is unnecessary to educate girls because they will eventually marry and leave home; girl's education is a financial burden for the family; girls will be more rebellious if they go to secondary school; and it is more essential for girls to help with household chores than continue their education. Answers were on a likert scale (disagree (1)/somewhat agree (2)/agree (3)). Parents/carers were defined as highly non-supportive if they answered 'agree' to all four questions (giving a score of 12). Scores of 10—11 were defined as a medium level of non-support, and scores from 1 to 9 were grouped in the low category.

The only village characteristic was village type (feeder vs. main). School-level characteristics were defined using girl's answers to a series of questions with a binary answer (yes/no). A school learning environment was defined as poor if a girl responded "yes" to any of the following four variables: non-availability of textbooks, poor teaching quality, irregular attendance of teachers or teacher drunk while at school. The quality of school infrastructure was defined as poor if a girl reported "yes" to any of the following three variables: classrooms are crowded, classrooms are dirty, no separate toilets for girls. A school was defined as having a harassing or bullying school environment if a girl answered "yes" to any of the following five questions about their school: girls treated poorly compared to boys, sexual harassment of girls by other students, sexual harassment of girls by teachers or other staff, harsh physical punishment by teachers, or bullying by other students.

2.5. Statistical analyses

Data were double entered using the Census and Survey Processing System (CSPro; https://www.census.gov/population/internatioan/software/cspro). The individual and family datasets were merged to form a single database. All statistical analyses were performed in STATA (version 14.0; StataCorp, College Station, TX). Odds ratios (ORs) were used as the measure of association in univariate analysis and multivariate analyses. The Wald $\chi2$ test and the likelihood ratio chi-square test were the statistical tests used in univariate and multivariate models, respectively.

Given that the information on absenteeism was only available for cohort two girls, we first performed descriptive analyses both of the overall cohort, and of cohort 2 girls. To measure the association between predictors and the two outcomes, the analysis was conducted in two stages: first, univariate unadjusted models explored the associations between each of the predictors with the outcomes. Next, multivariate-adjusted models were built adopting the conceptual framework approach presented in Fig. 1, wherein all the predictors were classified into three major groups (individual, family, and village/school). Multivariate models were adjusted *a priori* for cohort wave and district. Variables associated with the outcomes in univariate analysis to a significance level of p < 0.20 were then included in the three separate multivariable models (one model for each group/level) (Vittinghoff, Glidden, Shiboski, & McCulloch, 2005). Results presented for univariate and multivariate analyses are shown as significant at the level of p ≤ 0.05.

3. Results

3.1. Study population

Overall 2457 SC/ST girls enrolled in class seven (last year of primary school) were enumerated in 80 village clusters and targeted for the survey. Of these, 2275 girls (1084 in cohort 1 and 1191 in cohort 2; response rate 92.6%) and 2257 parents/guardians (1069 in cohort 1 and 1188 in cohort 2; response rate 91.9%) participated and completed the interview. Overall, about 5% of girls and 7% of parents/carers did not consent for interview. Table 1 shows the profile of adolescent girl participants who completed an interview. The median age of girls was 13 years (range 11–18 years), two-thirds belonged to the scheduled caste, and 6% were engaged or married but *gauna* not performed (marital sexual debut has not happened) or married (and *gauna* performed). More than 60% of girls had started menstruating, 8% reported being teased or sexually harassed in the 12 months period preceding the survey, 30% had ever participated in a public discussion or a campaign on girls education or marriage, and around 8% of girls (cohort 2) had travelled within or outside of the district in the 12 months' preceding the survey, either alone or with family, for work. When we examined girls' social beliefs around education and marriage, approximately 20% of girls percieved that marrying before age 18 is important, 90% believed that steady employment in adulthood is important, and around 17% perceived that it is very difficult for girls in their village to complete secondary school education.

Around 20% of girls belonged to a female headed family, 60% of family household heads were not literate, and nearly 40% of girls lived in households that included extended family members (grandparents, aunts, uncles etc.). More than 80% of girls had both parents alive, 2% had a mother who had died, 12% had a father who had died and the remainder (6%) had both parents who had died. 10% of girls had a literate father and mother. On average, girls had 3 siblings. While 69% had an older sister, 8% of girls had a sister aged below 16 years who had already dropped out of school and 6% had a sister below age 18 years who was married. 27% of girls were from families where parents or carers expressed high levels of non-supportive attitudes towards girls' education. As reported by girls, 90% of their parents had high aspirations about their daughters' transition to and completion of secondary school and steady employment beyond schooling, and 67% of their parents believed that marrying their daughter before age 18 is very important.

Approximately 70% of girls were from the main village with the remainder from smaller 'feeder' villages. 12% of girls reported their secondary school had poor infrastructure, 8% reported a poor school learning environment and 8% reported a lack of safety (harassing/bullying environment) at their school. The profile of cohort 2 girls compared with the combined group was generally similar (Table 1).

Table 1
Profile of adolescent girls participated in baseline survey.

Characteristics	Overall		Cohort-2 girls	
	%	n	%	n
Overall	**100.0**	**2275**	**100.0**	**1191**
Individual characteristics				
Median age of adolescent girls (in years)	13.0	2275	13.0	1191
% belonging to scheduled caste	78.6	1788	77.3	921
% engaged/married but *gauna* not performed[a]/married	6.2	141	4.2	50
% started menstruating	67.3	1523	61.5	728
% teased or sexually harassed in last 12 months	8.8	199	8.0	95
% ever participated in public discussion/campaign on girls' education/child marriage	30.2	683	19.4	231
% migrated for work (within or outside district) in 12 last months	–	–	8.4	100
% perceives marrying before age 18 is important	21.1	481	16.3	194
% perceives that having a steady employment in adulthood is important	89.5	2036	90.8	1082
% perceives completing secondary education for girls in the village is very difficult	17.2	383	13.7	158
Family level characteristics				
% belonging to female-headed household	21.3	484	23.2	276
% belonging to family with non-literate household head	62.7	1415	63.3	753
% belonging to non-nuclear family	40.7	925	40.7	484
% belonging to different wealth quintiles:				
Poorest	20.0	455	16.8	200
Poor	20.0	455	19.4	231
Moderate	20.0	455	19.8	236
Rich	20.0	455	22.1	263
Richest	20.0	455	21.9	261
% belonging to family currently under debt	44.7	982	43.8	514
% belonging to families by levels of non-supportive attitude for girls education:				
Low	51.1	1163	46.5	554
Medium	21.9	499	26.7	318
High	27.0	613	26.8	319
Mean number of siblings (in numbers)	3.0	2275	3.0	1191
% has an older sister	69.0	1569	68.7	818
% has a sibling below age 6	23.7	539	25.2	300
% has a sister <16 years who has dropped out	8.7	198	7.1	85
% has a sister <18 years who is married	6.2	140	4.5	54
% having both the parents surviving	83.3	1896	84.0	1001
% having both the parents literate	10.3	234	10.4	124
% whose parents migrated for work (within or outside district) in past 12 months	–	–	16.7	198
% whose parents perceived that:				
Her daughter should complete secondary education	92.6	2106	92.7	1104
Her daughters' transition to secondary school is important	94.2	2144	94.7	1128
Marrying her daughter before age 18 is important	33.3	757	30.1	358
Getting steady employment of her daughter in adulthood is important	86.6	1971	88.4	1053
% parents discuss school related matters with their daughters	49.1	1096	56.1	665
% parents spend time with girls on her studies	40.3	900	43.4	515
% parents visit to daughter's school in past 12 months:				
Never	28.8	642	30.0	356
1—2 times	31.5	704	32.8	389
3 or more times	39.7	887	37.2	441
Village/school level characteristics				
% belonging to the main village	70.7	1608	70.4	838
% reported poor learning environment in school	7.8	177	4.9	58
% reported poor school infrastructure	12.4	281	9.7	116
% reported harassing/bullying environment in school	8.1	184	4.7	56
Survey districts				
Bagalkot	55.3	1259	57.2	681
Bijapur	44.7	1016	42.8	510
Survey cohorts				
Cohort 1	47.6	1084	–	–
Cohort 2	52.4	1191	100.0	1191

[a] Married but marital sexual debut has not happened by the time of survey.

4. Correlates of school dropout

4.1. Individual level

Of the 2275 girls who participated in the survey, 8.7% had dropped out of school (Table 2). School dropout levels were 9.6% and 8.0% among cohort 1 and cohort 2 girls, and 8.1% and 9.5% in Bagalkot and Bijapur districts, respectively. In both univariate

Table 2
Association between individual, family, and village/school level predictors and school dropout among adolescent girls.

Characteristics	School dropout		Unadjusted OR (95% CI)	Adjusted OR[a] (95% CI)
	%	n		
Overall	**8.7**	**2275**	-	-
Individual characteristics				
Age of the adolescent girl (Ref- below 13 years)	8.7	2170	0.81 (0.43–1.54)	
Scheduled caste (Ref- Scheduled Tribe)	9.1	1788	1.21 (0.84–1.76)	
Engaged/*gauna* not performed/married (Ref-Never married)	31.2	141	5.79 (3.91–8.56)***	3.69 (2.12–6.40)***
Started menstruating (Ref-No)	9.9	1523	1.66 (1.18–2.34)**	1.26 (0.82–1.93)
Teased or sexually harassed in last 12 months (Ref-No)	9.0	199	1.04 (0.63–1.73)	
Participated in public discussion/campaign on girls education/child marriage (Ref-No)	6.3	683	0.66 (0.47–0.94)*	0.92 (0.59–1.43)
Perceives marrying before age 18 is important (Ref-No)	11.4	481	1.48 (1.07–2.05)*	1.83 (1.18–2.83)**
Perceives that having a steady employment in adulthood is important (Ref-No)	3.5	2036	0.03 (0.02–0.05)***	0.04 (0.02–0.05)***
Perceives completing secondary education in the village is very difficult (Ref-No)	12.3	383	1.79 (1.26–2.55)**	1.83 (1.18–2.84)**
Family level characteristics				
Female-headed household (Ref-No)	8.7	484	0.99 (0.69–1.41)	
Family with non-literate household head (Ref-No)	10.0	1415	1.66 (1.20–2.31)**	1.44 (1.03–2.02)*
Non-nuclear family (Ref-No)	7.4	925	0.74 (0.54–1.00)	
Wealth quintile (Ref-Poorest)	13.6	455		
Poor	9.2	455	0.64 (0.43–0.98)*	0.66 (0.43–1.00)
Moderate	8.4	455	0.58 (0.38–0.89)*	0.57 (0.37–0.89)*
Rich	7.5	455	0.51 (0.33–0.80)**	0.57 (0.36–0.89)*
Richest	5.1	455	0.34 (0.21–0.56)***	0.43 (0.26–0.71)**
Belong to family currently under debt (Ref-No)	8.2	982	0.93 (0.69–1.26)	
Levels of non-supportive attitude for girls education (Ref-Low)	6.3	1163		
Medium	8.4	499	1.37 (0.92–2.04)	1.39 (0.93–2.09)
High	13.7	613	2.37 (1.70–3.30)***	2.21 (1.57–3.10)***
3 or more siblings (Ref-Less than 3 siblings)	9.4	1367	1.25 (0.92–1.69)	
AG has an older sister (Ref-No)	9.4	1569	1.34 (0.96–1.86)	
AG has a sibling below age 6 (Ref-No)	10.8	539	1.36 (0.99–1.88)	
AG has a sister <16 years who has dropped out (Ref-No)	15.2	198	2.02 (1.33–3.07)**	1.63 (1.05–2.53)*
AG has a sister <18 years who is married (Ref-No)	15.0	140	1.94 (1.19–3.16)**	1.62 (0.98–2.70)
AG has both the parents surviving (Ref-No)	8.7	1896	0.97 (0.66–1.42)	
AG has both the parents literate (Ref-No)	4.7	234	0.49 (0.26–0.91)*	1.42 (0.66–3.06)
AG whose parents perceived that:				
Her daughter should complete secondary education (Ref-No)	4.1	2106	0.02 (0.01–0.03)***	0.20 (0.09–0.44)***
Her daughters' transition to secondary school is important (Ref-No)	4.5	2144	0.01 (0.01–0.02)***	0.18 (0.08–0.43)***
Marrying her daughter before age 18 is important (Ref-No)	10.7	757	1.42 (1.06–1.91)*	1.37 (0.90–2.08)
Getting steady employment for daughter in adulthood is important (Ref-No)	4.0	1971	0.06 (0.05–0.09)***	0.29 (0.18–0.47)***
Parents discuss school related matters with their daughters (Ref-No)	2.2	1096	0.13 (0.08–0.20)***	0.35 (0.18–0.67)**
Parents spend time with girls on her studies (Ref-No)	1.8	900	0.12 (0.07–0.20)***	0.49 (0.23–1.05)
Parents visit daughter's school in past 12 months (Ref-No)	19.5	642		
1–2 times	3.7	704	0.16 (0.10–0.25)***	0.27 (0.16–0.46)***
3 or more times	4.8	887	0.21 (0.15–0.30)***	0.42 (0.26–0.69)***
Village/school level characteristics				
Belonging to main village (Ref-Feeder village)	9.4	1608	1.34 (0.95–1.87)	1.34 (0.95–1.89)
Poor learning environment in school (Ref-No)	16.4	177	2.22 (1.45–3.41)***	1.93 (1.09–3.42)*
Poor school infrastructure (Ref-No)	12.5	281	1.59 (1.08–2.34)*	1.00 (0.59–1.67)
Harassing/bullying environment in school (Ref-No)	15.2	184	2.02 (1.31–3.10)**	1.70 (1.07–2.69)*
Survey districts (Ref-Bagalkot)	8.1	1259		
Bijapur	9.5	1016	1.20 (0.89–1.60)	
Survey cohorts (Ref- Cohort 1)	9.6	1084		
Cohort 2	8.0	1191	0.82 (0.61–1.09)	

*p = 0.05; **p < 0.01; ***p < 0.001.
  [a] Models are adjusted for survey cohorts, districts, and the other variables within the each level presented in the table.

and adjusted analyses, school dropout among girls was significantly associated with being engaged or married (AOR 3.69, CI: 2.12–6.40). It was also associated with the perception that marrying before age 18 is important (AOR 1.83, CI: 1.18–2.83), and it is very difficult for girls in their village to complete secondary education (AOR 1.83, CI: 1.18–2.84). In contrast, girls who perceived that steady employment during adulthood is important were significantly less likely to have dropped out of school (AOR 0.04, CI: 0.02–0.05) compared with those who did not.

4.2. Family level

At the family level, in univariate and multivariate analyses, wealth quintile was strongly associated with school dropout, with a striking increase in the odds of school dropout with each incremental reduction in family whealth quintile (Table 2). Additionally, the presence of a non-literate household head (AOR 1.44, CI: 1.03–2.02) and having a sister below age 16 years

who had dropped out of school (AOR 1.63, CI: 1.05—2.53) were also associated with increased odds of school dropout. While non-supportive attitudes of family members around girls' education (as reported by parents/carers) was associated with a significantly increased likelihood of school dropout (AOR 2.21, CI: 1.57—3.10), supportive parental beliefs on girl education and employment (as reported by girls), and parental support on school related matters (as reported by girls) were significantly associated with school retention (Table 2).

4.3. Village/school level

At the village/school level, in both univariate and multivariate analyses, a poor school learning environment and a harassing/bullying environment at school were significantly associated with increased odds of school dropout (AOR 1.93, CI: 1.09—3.42 & AOR 1.70, CI: 1.07—2.69, respectively) (Table 2).

4.4. Correlates of frequent absenteeism

When we examined frequent absenteeism (among cohort 2 girls who were attending school at the time of survey), 8.1% reported being frequently absent (four or more days) in the past month. Many of the covariates associated with school dropout were also associated with frequent absenteeism (Table 3). Thus, at the *individual level*, experience of menstruation (AOR 1.84, CI: 1.11—2.05), the perception that steady employment in adulthood is important (AOR 0.37, CI: 0.17—0.82), and that it is very difficult for girls in their village to complete secondary education (AOR 1.86, CI: 1.04—3.33) were associated with recent, frequent absenteeism. Additionally, migration in the past 12 months for work was also associated with an increased odds of recent, frequent absenteeism (AOR 3.94, CI: 2.17—7.15).

Similar to school dropout, at the *family level*, wealth quintile was found to be strongly associated with absenteeism, with a striking decline in the odds of recent frequent absenteeism with each incremental increase in family whealth (Table 3). Moreover, girls with a married sister age <18 years were more likely to report recent frequent absenteeism (AOR 2.08, CI: 0.93—4.64). At the *village/school level*, similar to school dropout, a bullying/harassing school environment was strongly associated with recent, frequent absenteeism (AOR 3.39, CI: 1.62—7.08).

5. Discussion

In this study with 2275 lower caste adolescent girls (aged 13—14 years) in rural north Karnataka, we found that school dropout was associated with economic factors (household poverty), social beliefs and practices (girl child marriage; value of girl education), and school-related factors (poor quality of learning at school; bullying/harassing school environment). Not only that, when we examined school absenteeism with a subset of participants, we found similar results; being absent for 4 or more days in the previous month was also associated with economic factors (recent girl migration for work), social beliefs and practices (girl child marriage; value of girl education), and school-related factors (bullying and harassment at school). Given that previous research has emphasized school dropout as "a process of events, situations, and contexts, rather than the result of a single event" (Hunt, 2008), the similarity between the predictors of school dropout and absenteeism is not surprising.

Household economic factors, including household wealth, was a key predictor of school dropout in this study, with a stepwise increase in the likelihood of school dropout with each decreasing wealth quintile. In addition, girls living in households with young siblings (<6 years old) were also more likely to have dropped out of school. Similarly, girls from the poorest households were also most likely to report frequent absenteeism, and we also found a strong association between recent adolescent girl migration for work and school absenteeism in the last 30 days. Agricultural work is often seasonal with clashes with school timetables, leading to seasonal withdrawals from school. While these withdrawals are 'temporary,' research from elsewhere suggests they may lead to more permanent removal from school (Boyle, Brock, Mace, & Sibbons, 2002). Indeed, absenteeism and (related) low achievement, have been described as key precursors to school dropout (Hunt, 2008; Yi et al., 2012). Poverty is cited in the scholarly literature as an important factor associated with educational uptake and retention across multiple settings in low and middle-income countries, at both primary and secondary levels (Adato, Devereux, & Sabates-Wheeler, 2016; Hu, 2012; Hunt, 2008; Roby, Erickson, & Nagaishi, 2016; Yi et al., 2012). Similar to our study, this can be particularly true for children (especially girls) living in poor rural communities (Hu, 2012; Patton et al., 2016; Roby et al., 2016; Warrington & Kiragu, 2012). Results from our longitudinal qualitative interviews with 31 girls, suggest that among those girls who are about to drop out of school, household poverty is more extreme, and household dynamics are different too, with less harmonious families, a lack of parental communication, and increased demands on girls to give their time at home (performing domestic and caring duties), negatively affecting the time they have to study and to attend school (Ramanaik et al., 2017). School associated direct and indirect costs may link with gendered patterns of access, with some households less willing to pay costs for girls' education compared with boys (Brown & Park, 2002). Although schooling in our setting should not incur direct costs as the Indian government provides free, government funded schools, educating children, especially girls, can have substantial indirect costs (such as loss of child labor within and outside the household, school uniform and transport costs). Similar to households in our study setting, evidence from elsewhere suggests impoverished families with no access to credit or savings schemes can be particularly vulnerable to economic shocks (such as droughts, loss of daily wage) which can also impact on parents' ability to afford indirect costs (Hunt, 2008; Warrington & Kiragu, 2012). Alleviating poverty through cash transfer schemes may improve girl education retention in some settings (Snilstveit et al.,

Table 3

Association between individual, family, and village/school level predictors and frequent absenteeism among adolescent girls.

Characteristics	Frequent absenteeism		Unadjusted OR (95% CI)	Adjusted OR[b] (95% CI)
	%	n		
Overall	**8.1**	**1092**	-	-
Individual characteristics				
Age of the adolescent girl (Ref- below 13 years)	7.7	1011	0.59 (0.29–1.20)	
Scheduled caste (Ref- Scheduled Tribe)	7.3	844	0.68 (0.42–1.10)	
Engaged/*gauna* not performed/married (Ref-Never married)	11.1	36	1.45 (0.50–4.19)	
Started menstruating (Ref-No)	9.9	657	1.93 (1.18–3.15)[**]	1.84 (1.11–3.05)[*]
Teased or sexually harassed in last 12 months (Ref-No)	11.5	87	1.54 (0.77–3.10)	
Participated in public discussion/campaign on girls education/child marriage (Ref-No)	7.9	214	0.98 (0.56–1.70)	
Migrated for work in last 12 months[a] (Ref-No)	23.4	77	4.12 (2.30–7.36)[***]	3.94 (2.17–7.15)[***]
Perceives marrying before age 18 is important (Ref-No)	10.5	171	1.43 (0.83–2.47)	
Perceives that steady employment is important in adulthood (Ref-No)	7.6	1046	0.34 (0.16–0.72)[**]	0.37 (0.17–0.82)[*]
Perceives completing secondary education in the village is very difficult (Ref-No)	12.7	134	1.79 (1.02–3.15)[*]	1.86 (1.04–3.33)[*]
Family level characteristics				
Female-headed household (Ref-No)	8.4	251	1.05 (0.63–1.76)	
Family with non-literate household head (Ref-No)	8.8	679	1.33 (0.83–2.12)	
Non-nuclear family (Ref-No)	7.4	444	0.86 (0.55–1.35)	
Wealth quintile (Ref-Poorest)	11.4	175		
Poor	10.0	211	0.86 (0.45–1.64)	0.87 (0.45–1.68)
Moderate	4.6	219	0.37 (0.17–0.81)[*]	0.39 (0.18–0.86)[*]
Rich	9.5	243	0.81 (0.43–1.53)	0.85 (0.45–1.61)
Richest	5.7	244	0.47 (0.23–0.96)[*]	0.50 (0.24–1.02)[*]
Belong to family currently under debt (Ref-No)	8.2	473	1.06 (0.68–1.65)	
Levels of non-supportive attitude for girls education (Ref-Low)	7.2	516		
Medium	7.7	298	1.08 (0.63–1.86)	
High	10.1	278	1.45 (0.87–2.42)	
3 or more siblings (Ref-Less than 3 siblings)	7.0	625	0.73 (0.47–1.13)	
AG has an older sister (Ref-No)	8.1	745	1.00 (0.63–1.59)	
AG has a sibling below age 6 (Ref-No)	5.2	268	0.56 (0.31–1.01)	
AG has a sister <16 years who has dropped out (Ref-No)	10.0	70	1.29 (0.57–2.91)	
AG has a sister <18 years who is married (Ref-No)	16.3	49	2.35 (1.06–5.18)[*]	2.08 (0.93–4.64)[*]
AG has both the parents surviving (Ref-No)	7.9	919	0.91 (0.51–1.62)	
AG has both the parents literate (Ref-No)	5.1	117	0.59 (0.25–1.38)	
AG whose parents migrated for work in past 12 months[a] (Ref-No)	7.7	181	0.94 (0.52–1.71)	
AG whose parents perceived that:				
Her daughter should complete secondary education (Ref-No)	7.6	1065	0.24 (0.10–0.57)[**]	0.51 (0.15–1.72)
Her daughters' transition to secondary school is important (Ref-No)	7.8	1083	0.11 (0.03–0.40)[**]	0.26 (0.05–1.43)
Marrying her daughter before age 18 is important (Ref-No)	11.3	319	1.76 (1.13–2.76)[*]	1.77 (1.11–2.80)[*]
Getting steady employment of her daughter in adulthood is important (Ref-No)	7.4	1011	0.42 (0.22–0.79)[**]	0.56 (0.27–1.16)
Parents discussed school-related matters with their daughters (Ref-No)	7.1	647	0.73 (0.47–1.12)	
Parents spend time with girls on her studies (Ref-No)	6.7	504	0.71 (0.45–1.11)	
Parents visited daughter's school in past 12 months (Ref-No)	10.7	299		
1–2 times	7.3	372	0.65 (0.38–1.12)	
3 or more times	7.0	416	0.63 (0.37–1.06)	
Village/school level characteristics				
Belonging to main village (Ref-Feeder village)	7.5	769	0.80 (0.50–1.26)	
Poor learning environment in school (Ref-No)	8.9	45	1.12 (0.39–3.20)	
Poor school infrastructure (Ref-No)	9.1	99	1.16 (0.56–2.38)	
Harassing/bullying environment in school (Ref-No)	21.3	47	3.35 (1.61–6.99)[**]	3.39 (1.62–7.08)[**]
Survey districts (Ref-Bagalkot)	8.4	619		
Bijapur	7.6	473	0.90 (0.58–1.40)	

[*]p = 0.05; [**]p < 0.01; [***]p < 0.001.
[a] Migration within or outside the district.
[b] Models are adjusted for survey districts and the other variables within the each level presented in the table.

2016). In India, the government provides various schemes to support education retention of girls from lower caste families, although it is unclear if families can access them. Additional research is needed to understand the impact and uptake of such provision.

Social beliefs and practices around girl child marriage and the value of girl education and employment were also key predictors of adolescent girl absenteeism and school dropout in this context. Thus, girls who were engaged or married and girls who believed that marrying before age 18 years is important were more likely to have dropped out of school. Child pregnancy and/or marriage have been linked to girl school dropout across several LMIC, with girls who become engaged/ married or pregnant at particularly high risk of dropout (Hunt, 2008; Patton et al., 2016; Warrington & Kiragu, 2012).

Although illegal, child marriage, particularly among girls, is commonly practiced in north Karnataka, especially among families from the lower castes. The practice involves several steps including engagement, marriage, the 'first night ceremony' where the marriage is usually consumated, and movement of the girl's residence from her natal home to her husband's home. Results from our qualitative interviews suggest that once girls become engaged, this can prompt her withdrawal from education for multiple reasons. Her family may be unwilling to continue to incur the indirect costs of her schooling as she will soon no longer be considered their responsibility. Her husband's family may be keen for her to discontinue her education, so she does not become too empowered or 'uppity', and both families may be keen for her to remain at home until she is married to ensure her 'honour' linked to her 'sexual purity' can not be compromised or questioned (Ramanaik et al., 2017).

Supporting girls to continue their secondary education can have profound benefits for themselves and their offspring including better mental and sexual health, reductions in all-cause and injury mortality, reductions in maternal mortality and reductions in adolescent birth rates (Patton et al., 2016). In our study, we found that almost half of the girls' parents or carers had medium or high levels of non-supportive attitudes towards girls education. Moreover, girls from such families, and girls with a sister who had dropped out of school before age 16 years, were most likely to have dropped out of school. Studies from elsewhere suggest that families frequently *do* appreciate the value of education for girls, even if they have not been schooled themselves. However, other factors, such as economic shocks and the need for child labor within or outside the household, can often override the value placed on education (Hunt, 2008). Interestingly, in our study, individual and parental beliefs which endorsed the value of girl education and future employment, and having a literate household head, were predictors of girl school attendance and retention. Parental education, particularly maternal education, has also been shown to be protective for girl high-school attendance in rural China (Hu, 2012; Yi et al., 2015). Qualitative research from rural Kenya describes how some girls, despite multiple mitigating factors, still manage to complete their studies through their own tenacity, and family or teacher support (Warrington & Kiragu, 2012). Further qualitative research is needed in the Indian context to explore the reasons why and how some girls manage to overcome multiple barriers and continue their education.

In our study, a poor school learning environment (as perceived by the respondent) and harassment and bullying at school were important school-related factors associated with school dropout. Menarche as well as harassment and bullying at school were also strongly related to recent absenteeism. A recent systematic review and meta-analysis of 138 studies from India, found 24% of girls miss school during menstruation (van Eijk et al., 2016). Further research is needed to understand how menarche relates to absenteeism in this setting but many schools do not have useable, or gender specific, toilets. The construction of sex-specific school toilets has increased school attendance, particularly among girls in Kenya and India (Adukia, 2017; Greene et al., 2012). Research from elsewhere in India suggests teachers can frequently be absent from school (Chaudhury, Hammer, Kremer, Muralidharan, & Rogers, 2006), use corporal punishment to apprehend failing students and have limited sympathies for children unable to complete their homework (due to household chores, etc.). Evidence from other LMIC suggests perceptions of a poor learning environment may also be linked to fears around harassment, violence, and corporal punishment by teachers, pupils, parents and men in the community (Hunt, 2008; Warrington & Kiragu, 2012). It is unclear from our quantitative research if harassment and bullying are due to casteism, gender, low attainment, girls pubertal age or something else (Boyle, , Brock, , Mace, , & Sibbons, 2002; Chaudhury et al., 2006; The PROBE Team, 1999). Creating a school environment that feels safe for lower caste adolescent girls, for example introducing and enacting anti-bullying, discrimination and harassment policies, providing useable, gender-segregated toilets, and supporting students who are falling behind with their studies, will be important to improve retention. The *Samata* intervention aims to address some of these concerns by supporting girls who are falling behind through the provision of additional tutorials, tracking girls and following up with those who are absent, and providing gender training to teaching staff in the intervention schools. Endline analyses will enable us to explore if these intervention components have improved girls perceptions of their schools and if school dropout is randomly distributed or clustering at the school level.

6. Limitations

This study has several limitations. The cross-sectional study design does not allow us to establish temporality or causality. Thus it is not possible for us to explore how factors are related to one another (for example, menarche, marriage and school dropout). Additionally, we could not explore associations between absenteeism and school dropout because the questions on absenteeism were asked only to those girls who were attending school at the time of the survey. As this study comprised baseline analyses of cohort data, we will be able to examine these in more detail at endline. The cross-sectional design also did not allow to conduct multi-level modeling. The exploratory nature of these analyses means that some of the findings presented here could have been due to chance, although the large sample size and the ongoing qualitative studies which helped inform these analyses help to reduce the likelihood of spurious findings. Social desirability bias, especially in response to sensitive questions, may have led to under-reporting of factors such as marriage and eve-teasing experience. To help overcome this and enable triangulation of findings, at end-line these questions will be repeated in the short, self-completed section at the end of the questionnaire. A key study strength was the sampling design and the scale of the survey, which interviewed >90% of all lower caste adolescent girls enrolled in seventh standard, living in 80 randomly selected village clusters in two districts in north Karnataka. To our knowledge, a study of this magnitude with this population has not been conducted in India, especially in Karnataka, before.

7. Programmatic implications

Despite these limitations, the findings of this study fill important knowledge gaps on which barriers to education, programmers and policy makers should be prioritising to improve secondary school retention and completion among lower caste adolescent girls in rural areas in India. As poverty was a strong predictor of school dropout and absenteeism, interventions should pro-actively identify the most economically deprived households and support those families to find economic solutions to enable continuation of their daughter's education. This could include enabling access to government initiatives and schemes which aim to increase girls' access to secondary education through financial incentives. Interventions also need to address harmful social practices around girl child marriage, withdrawal of girls from secondary education, and 'eve-teasing', which is a frequent matter of concern for parents, leading to restrictions to girl's mobility and withdrawal from school. Community-level campaigns, for example using street theatre, which raise issues such as girl child marriage, the value of girls' education, and eve-teasing in the community can provide a platform for discussion as well as creating spaces for open discussions between parents and their children to develop communication and trust between them. Such a forum may also provide a safe space where girls can explore their future aspiration and career goals and discuss important issues around gender norms that restricts girls mobility within and outside the village. The findings of this study also highlight the importance of school-level initiatives which provide a quality learning environment for girls and minimise bullying and harassment. This could include involving boys and working with teachers and school authorities to build a gender-egalitarian environment which ensures a girls safety in school, providing extra tutorial classes to struggling students and giving an equal focus to the quality of girls education as to boys. Since frequent and long-term absenteeism may also lead to dropout, teachers will need to give additional focus to frequently absent and non performing girls, and provide tutorial classes in a sensitive and non-judgemental manner. The study findings support the rationale behind the *Samata* intervention program, which aims to address the individual, family and village/school level barriers that influence both absenteeism and school dropout among lower caste adolescent girls in this setting.

8. Conclusions

Taken together, these findings call for the effective implementation of multi-level interventions, involving individuals, families, villages and schools to synergistically address the social, economic and structural determinants of girl school dropout. Improving secondary school education entry and completion of girls, especially from rural and marginalized populations, will have health and economic benefits both for them and for the next generation.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.adolescence.2017.09.007.

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