

Factors affecting school attendance in Buikwe district, Uganda

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ABSTRACT

Understanding the factors affecting school attendance is crucial for developing effective educational policies and interventions, particularly in regions with high absenteeism rates. This article focuses on explaining the factors affecting regular school attendance in the Buikwe district in Uganda. The primary data for this research were collected based on a questionnaire survey in three primary schools in the district. The sample included 480 participants, covering the period from February to September 2018. Using the Poisson regression technique, the analysis focused on factors affecting the pupils' number of absences per month ($M = 1.54$ days of absences, $SD = 2.45$ days). The results suggest that there are at least three factors with strong effects on the number of absences. First, it is clearly shown that children from female-led families have significantly lower absences. Second, children from incomplete families with one or both parents missing have significantly higher absences. And third, children receiving support through various sponsorship programs attend school more often. The results also confirm the trade-off between school attendance and paid child labor as well as the fact that education of parents (mothers) plays a role in school absenteeism of children.

KEYWORDS

school attendance; education; regression analysis; Buikwe; Uganda

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1. Introduction

Despite the key role of education as a prerequisite for development, 59 million children are not enrolled in schools – more than a half from Sub-Saharan Africa (UNESCO 2020). However, enrolment alone does not guarantee effective participation in education. Many children who are formally enrolled experience substantial absenteeism, which limits learning outcomes and the accumulation of human capital. In developing regions in particular, understanding the determinants of school attendance is crucial, as absenteeism may signal structural barriers such as economic constraints, household vulnerability, or limited access to school infrastructure. Identifying these factors is therefore essential for designing targeted interventions aimed at improving regular school participation and reducing the risk of dropout.

School absenteeism is shaped by a range of inter-related factors. Documented determinants include chronic illnesses and mental health conditions (Cook et al. 2017; Allen et al. 2018), characteristics of the school environment (Van Eck et al. 2017; Lenhoff and Pogodzinski 2018), and family-related factors such as inconsistent parenting or limited parental involvement (Sugrue et al. 2016). Economic disadvantage also represents a significant barrier to regular attendance, while limited peer engagement and certain individual characteristics may further exacerbate absenteeism (Allen et al. 2018; Gottfried and Kirksey 2017; Psyridou et al. 2024).

Persistent absenteeism is associated with lower academic performance and weaker long-term educational trajectories (Gottfried and Kirksey 2017; Gottfried 2019), as well as poorer social functioning (Gottfried 2014). Although various interventions have been developed and, in some cases, rigorously evaluated (Cook et al. 2017; Wang et al. 2017), most empirical evidence on the determinants and consequences of absenteeism originates from developed-country contexts.

This paper analyses the determinants of school absenteeism in the Buikwe District, Uganda. Using primary micro-level data, where the focus is on pupils of several local primary schools, it examines the association between living standards (captured through an asset index), socio-demographic characteristics, family background, and children's absenteeism, measured as the number of recorded absences. Additional factors, including distance to school, are also considered.

The main research question guiding this study is: which household-, socio-demographic, and contextual factors are associated with variation in school absenteeism in rural Uganda?

By focusing on absenteeism in rural Uganda, the study contributes empirical evidence from an under-researched setting, where most existing findings are derived from high-income countries. Rather

than assuming universal determinants, it assesses whether commonly identified factors – such as economic disadvantage or family characteristics – also explain attendance patterns in this specific socio-economic context. The results therefore provide context-specific evidence relevant for understanding barriers to regular school participation.

The rest of the paper is organized as follows. The next section reviews the literature on determinants of school attendance. Section three presents the data and methodology. Section four reports the results, followed by a discussion. The final section concludes.

2. Literature review

The government of Uganda considers education as an essential human right and one of the basic tools to reduce poverty. It is guaranteed in the Constitution of the Republic of Uganda, more specifically in Articles 30 and 34. Uganda's formal educational system has been modified many times since independence. The Universal Primary Education (UPE) program, launched in 1997, represents Uganda's key policy initiative to provide free primary education and improve equitable access. It aims to reduce disparities and promote gender parity as part of broader poverty reduction and human development efforts (Bategeka and Okurut 2006; Harmáček et al. 2017).

The UPE program has also been implemented in Buikwe District, where the education system faces several challenges. The district has 647 schools (408 primary schools) (Buikwe.go.ug 2022), and about 84% of children aged 6–12 attend primary school (Uganda Bureau of Statistics 2017). Nevertheless, problems such as poor school performance, limited facilities, long travel distances to schools, and high dropout rates persist (Buikwe District Local Government 2015).

School attendance in Sub-Saharan Africa remains among the lowest globally. While over 99% of children are enrolled, only about 70% attend school regularly, highlighting the gap between enrollment and actual attendance (Roby et al. 2016; World Bank 2021). It is confirmed that school absenteeism is the main predisposition of dropout from school, and it is an important factor influencing the performance of pupils.

Socio-economic status strongly affects school attendance, with children from wealthier families attending school more regularly than those from poorer households (Roby et al. 2016; Saasa 2018; Zhang 2003). In many developing countries, education expenses remain a substantial burden for poor families, limiting children's access to schooling (UNICEF 2016).

In particular, extreme poverty may lead households to prioritize children's work over schooling to contribute to the family income (Cardoso and Verner 2006). In Uganda, poverty was found to be the main

obstacle to regular school attendance, even though primary education is free and mandatory (Namukwaya and Kibirige 2014). However, it's worth noting that some older research suggests that children from wealthier families might also miss school frequently, possibly due to different priorities placed on education (Devadoss and Foltz 1995).

Closely related to household poverty is children's nutrition, which may also affect school attendance. Many Ugandans do not consume enough calories daily, and a significant portion of school children go hungry during the school day (WFP 2021). Poor nutrition can lead to health problems, stunted growth, and hindered mental development, all of which can impact a child's ability to attend and perform well in school (De Muro and Burchi 2007; WFP 2006).

Household size may impact children's schooling as well. Research from Uganda by Nannyonjo (2007) suggests that smaller families tend to have children with higher test scores and better school attendance compared to larger families. This could be because in larger families, children may face more distractions from household responsibilities and receive less support from parents for their education. Additionally, larger families may require elder daughters to stay home for household chores or childcare, affecting their school attendance (Jayachandran 2002).

Women-led households tend to prioritize children's education more, leading to better school attendance (Ahiakpor and Swaray 2015; Ainsworth et al. 2002; Lloyd and Blanc 1996).

The death of parents, which is more common in poor contexts, can significantly impact a child's schooling. Orphans may face poorer school performance and attendance due to various reasons, including financial constraints and caregiving responsibilities (Yamano and Jayne 2005). Orphans often live with grandparents, who may prioritize household work over the child's education, leading to lower school attendance (Roby et al. 2014). Studies also suggest in this context that the presence of mothers is crucial for children's schooling, with children without their mother being more vulnerable (Tansel 1997; Ainsworth et al. 2002).

Support interventions, such as direct school support or sponsorship, can improve school attendance of orphaned pupils of various age categories (Cho et al. 2017). These interventions help mitigate barriers like school fees and lack of supplies, ensuring orphans have better access to education. Parents' education plays a crucial role in determining whether children attend primary school. Studies by Namukwaya and Kibirige (2014) and Pal (2004) suggest that parental education significantly influences children's enrollment and attendance. The research shows that higher levels of parental education are associated with more children attending school. Ahiakpor and Swaray (2015) found a positive connection between parental education and school attendance, particularly for

girls. Saasa (2018) discovered in the Zambian setting that children (aged 6–14) living with a head of household who had attained primary education were more likely to attend school, with even higher attendance rates if the head of household had secondary or university education. Mothers' education seems to have a stronger impact than fathers' education (Ainsworth et al. 2002).

Household responsibilities and access to resources greatly affect school attendance. Families facing food insecurity may prioritize children working to support the household, hindering school attendance (De Muro and Burchi 2007). In Uganda, children's involvement in domestic work is a significant barrier to school enrollment and retention (Namukwaya and Kibirige 2014).

Child labor is another barrier to school attendance, particularly in sub-Saharan Africa, where a high number of children are engaged in work, preventing them from attending school (Cardoso and Verner 2006; Oryioe and Alwang 2018). As shown by Maligalig et al. (2010) for children aged 6–17, boys are more likely to choose work over school, while girls tend to focus on household chores and caregiving. Factors such as income, parental education, and government support influence the reduction of child labor and increase school attendance (Valero-Gil and Valero 2022).

The gender of children also plays a significant role in school attendance. In many developing countries girls face more obstacles to education than boys. However, education can empower girls and positively impact their families (Karabo and Natal 2013; Alika and Egbochuko 2009). Yet, cultural taboos and early marriages still affect girls' schooling, as found by Bhattacharai et al. (2020) for girls of grades 8–10.

Health status of children significantly influences their school attendance and performance. In Uganda, youth living with HIV/AIDS often experience challenges like missing school, lower performance, and dropping out due to the stigma related to HIV/AIDS. Furthermore, various health conditions like epilepsy, parasitic infections, and malnutrition can also negatively affect school attendance and performance (Hassen and Beyene 2020; Jejaw et al. 2015). Additionally, Donnelly (2017) explored the relationship between physical fitness and school performance, and Barnes et al. (2020) highlighted how children and young people with inflammatory bowel disease attend school less than their healthy peers.

In terms of the distance to school, Nannyonjo (2007) found in the Ugandan context that (grade 6) pupils living near schools perform better than those living farther away. Children who live far from school are more likely to be late, spend more time walking to and from school, feel more tired, and have difficulty concentrating in class.

Low quality of school infrastructure, including suitable furniture, and the availability of educational resources like books, maps and charts (Burke and

Beegle 2004), or digital textbooks (Hermita et al. 2023) and equipment (Ma 2021) also negatively impact school attendance and educational performance of children.

Recently, several studies focused on the complex multidimensional factors of school attendance and performance. For example, Schreurs and Rundgren (2021) emphasized the significance of parents-related factors (such as their social, cultural, and economic backgrounds) in understanding children's elementary school attendance dynamics. Pezzulo et al. (2022) explored factors related to secondary school attendance in Tanzania and found associations between the attendance and age, parental education levels, household wealth, and the total number of children in a household.

3. Data and methods

3.1 Study area

Buikwe District is located in the Central Region of Uganda, east of Kampala, and is characterized by predominantly rural settlement patterns with several

small urban centers. The local economy relies largely on smallholder agriculture and informal economic activities, reflecting relatively modest socio-economic conditions typical of many districts in rural Uganda. Dispersed settlements and uneven accessibility of educational infrastructure may result in longer travel distances to schools, which can represent an important constraint affecting pupils' regular school attendance.

3.2 Research design

The paper investigates factors affecting school attendance in the Buikwe District, Uganda. Using primary micro-level data of pupils of several local schools, the effects of various social, demographic and other attributes on pupils' absenteeism were examined. Given the nature of the dependent variable and the structure of the data, the random-effects Poisson model was employed in the analysis.

3.3 Sample

Three primary schools were purposively selected based on prior field engagement of one of the

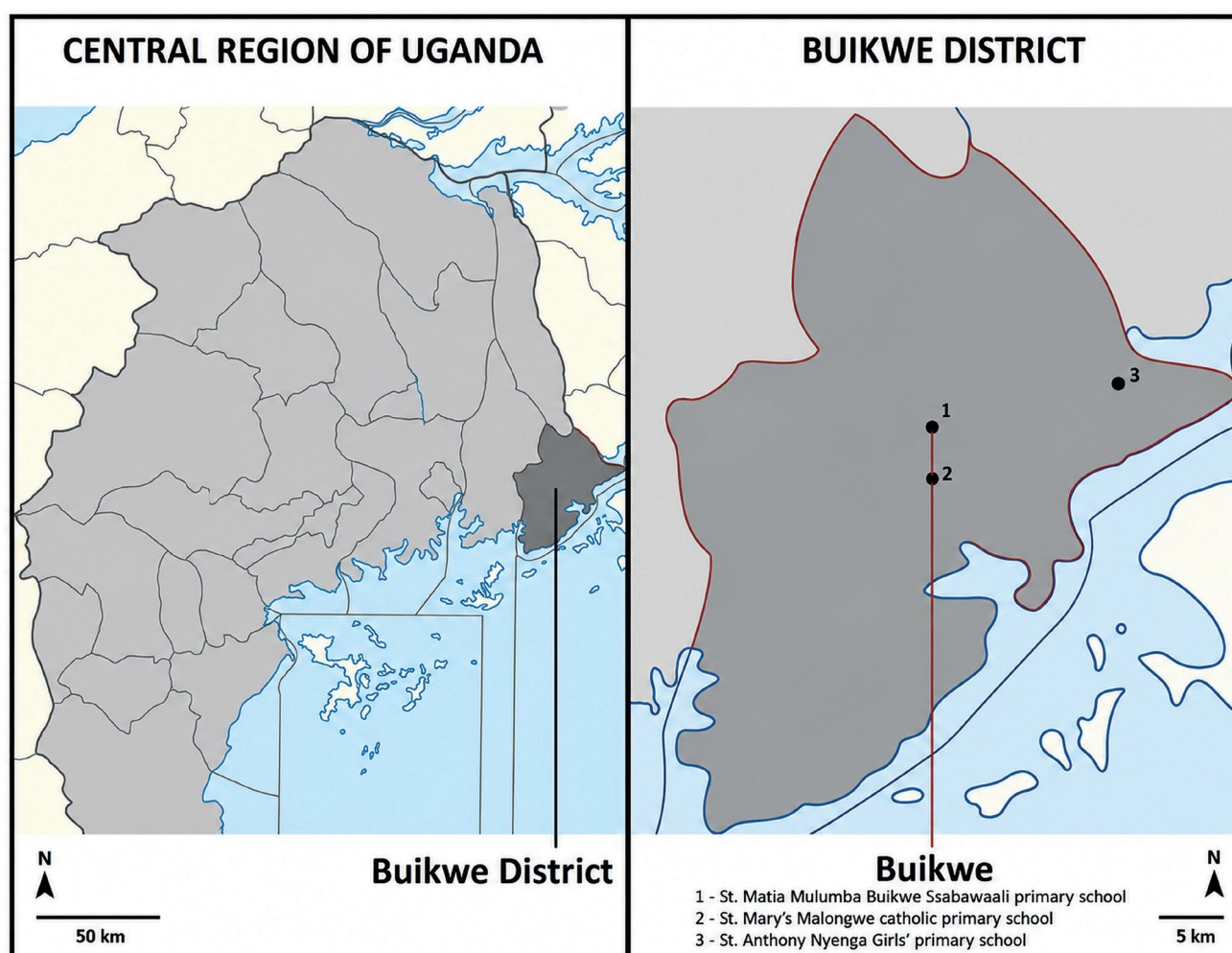


Fig. 1 Location of the survey area.

authors, which ensured established trust, familiarity with the institutional setting, and smooth administrative coordination necessary for conducting research with school-aged children: St. Matia Mulumba Buikwe Sabawaali Primary School, St. Mary's Malongwe Catholic Primary School, and St. Anthony Nyenga Girls Primary School.

Although the three schools were selected purposively and do not constitute a probability sample of schools in the region, the use of the regression analysis approach is appropriate for modelling within-sample variation. The inferential interpretation of the model is therefore restricted to the observed sample and does not assume random selection of schools from a broader population.

Within selected schools, all pupils enrolled in the fifth, sixth, and seventh grades (i.e., the final three grades) were considered eligible for participation. These grades were selected due to the assumed sufficient level of English proficiency required to understand the questionnaire, which was administered in English.

The study thus followed a census-based approach rather than a sampling procedure, aiming to include all pupils present on the day of data collection. The total number of pupils enrolled in the selected grades across the three schools during the second trimester of 2018 was 542 (221 in Grade 5, 194 in Grade 6, and 127 in Grade 7), based on official school registers.

On the day of the survey (including a follow-up data collection), 494 pupils were present (191 in Grade 5, 185 in Grade 6, and 118 in Grade 7), representing approximately 91% of all enrolled pupils. All present pupils completed the questionnaire (i.e., a 100% response rate among those present). During data cleaning, 14 questionnaires were excluded due to missing identifiers or empty responses. Therefore, the total number of observations included in the analysis is 480.

The school administration informed each parent about the survey, including its purpose and content. Considering that some parents were not literate and signing formal documents was a sensitive issue within the community, we decided, after consulting with the principals, not to request written consent. Nevertheless, every parent had the option to decline their child's participation. The research was conducted in full compliance with the Palacký University's ethical code of conduct and ethical standards for field research at the DEPARTMENT of Development and Environmental Studies, ensuring adherence to ethical standards, including respect for participants, informed consent, and the confidentiality of collected data.

No pupil was required to fill out the questionnaire, and they could have left the classroom at any time. They could have also skipped any question in the questionnaire if they wished to do so. This was stressed repeatedly during the data collection. After

the data collection, the questionnaires were strictly anonymized.

3.4 Procedure

The underlying questionnaire was designed to examine various factors of school attendance of pupils in the selected primary schools in the Buikwe district, Uganda, and it consisted of eight parts:

1. Transport to school – how children commute to school.
2. Housework – what activities are children required to do at home (in terms of house chores, etc.).
3. Family – children's family situation, number of household members, whether the biological parents are alive, whether they are literate, and what is their highest educational attainment.
4. Housing – the type of housing and assets.
5. Food – children's eating habits.
6. Aid programs – whether children are supported through any assistance/aid program.
7. School – who sends the children to school every morning?
8. Personal information about children – gender, age, class, school, residence, etc.

The questionnaires were filled out collectively in classrooms, directly under supervision of one of the authors of the paper; all questions were read aloud slowly, so that the pupils were able to answer the same questions at the same time. The permissions to conduct the survey were requested from the school principals, and they were also urged to consult their decisions with the teaching staff.

Data for the dependent variable (number of pupils' daily absences per month) were collected from the schools' registers (used for daily registration of pupils).

3.5 Variables/Instruments

Our dependent variable indicates the number of days a pupil was absent in each calendar month, observed repeatedly for pupils in the three primary schools from February 2018 to September 2018. The resulting dataset comprises 3,522 pupil-by-month observations; monthly absences of individual pupils range from 0 to 20 days ($M = 1.54$ days, $SD = 2.45$ days).

In the presented analyses, in total 14 independent variables are used that can be grouped into four categories. The first category reflects basic characteristics of the pupil – *Age* (in years), and *Gender* – and it also includes the *Distance* between home residence and school. The underlying survey shows that at the three selected primary schools, there are 55 percent of girls and 45 percent of boys. The range of age at the fifth, sixth, and seventh grades is from nine years to 18 years. As for the *Distance* variable, it is converted into a dummy that equals 1 if the distance is higher

than the median distance (i.e., higher than 1.5 km). Distances from the schools range from 0.25 to 7 km, and more than 88.5 per cent of pupils walk to school. In accordance with previous findings (Nannyonjo 2007), the relationship between distance and absences is expected to be positive (higher distance is associated with higher absences).

The second group of variables captures the characteristics of the households in which a pupil lives. These variables are selected in line with previous research and studies (e.g., Ainsworth et al. 2002; Ahiakpor and Swaray 2015; Saasa 2018). The size of households is measured by the *Number of household members* while the variable *Younger siblings* captures the number of younger siblings of a pupil in that household. The *Orphan* variable shows whether a child is missing one or both parents. In the sample, 22.13 per cent of pupils lost at least one biological parent. Focusing on the education of parents, *Mothers with higher education* is a dummy variable that indicates whether the mother of a child has higher than primary education. In the data, 53.09 per cent of mothers have achieved education levels higher than primary. In line with the literature, the household size is expected to be positively related to absenteeism (Jayachandran 2002; Nannyonjo 2007), and the same is expected about orphanage (Yamano and Jayne 2005; Roby et al. 2014), while negative effects are anticipated about education of parents on absenteeism (better education of parents leads to lower absences, as in Ainsworth et al. 2002).

The *Asset index* is also classified into the second group of factors since it approximates the living standard of households. It consists of sub-indices that can be divided into two categories: house quality, and items ownership. While the former considers basic qualities of houses such as materials of walls, roof, access to the electricity, number of rooms etc., the latter accounts for ownership of various items (car, stove, bed, armchairs, freezer, phone, etc.) in households. The multiple correspondence analysis is used to determine the weights of sub-indicators. To make results more intuitive, the results are rescaled linearly in a manner that assigns zero points to households with the worst set of assets (i.e., they do not own any item on the list and characteristics of their house are always inferior) and 100 points to households with the best set of assets (i.e., households that own all items on the list and characteristics of their house are always superior), as in Němečková et al. (2020).¹ It is

hypothesized that better living standards are associated with lower absences (similarly to, e.g., Roby et al. 2016; Saasa 2018; or Namukwaya and Kibirige 2014), although the opposite was found in the literature as well (Devadoss and Foltz 1996).

The third category of variables captures household decision-making in domains directly related to the child and schooling. Both variables were constructed from three questionnaire items: major household purchases, school choice/enrolment, and the child's everyday school attendance. In each domain, women received one point if at least one woman was involved in the decision, and men received one point if at least one man was involved; joint decision-making therefore gave one point to both. *Female-led household* indicates that women obtained a majority of points across these domains, while *Household head parent* indicates that the pupil's parent was among the person(s) with the highest number of decision-making points. These variables should be read as operational indicators of decision-making authority in the measured child- and schooling-related domains, not as formal measures of household headship or leadership in unmeasured areas of household life. In the sample, 82.95% of pupils lived in such households, and 49.46% lived in households classified as female-led. Following evidence on the role of mothers and women in children's schooling, lower absenteeism is expected among children from female-led households as defined here (Ainsworth et al. 2002).

The last group of variables reflects the social and economic conditions of pupils – how many different kinds of housework (e.g., fetching water, cooking, washing clothes, etc.) they need to carry out before going to school (*Work before school*), whether pupils do any paid work (*Employment*), whether they are supported or sponsored through any assistance program (*Sponsorship*), and whether they felt strong hunger or food shortage at least once a week (*Hunger*). For example, in the sample, over 55 percent of pupils do some paid work, and more than 18 percent are supported by some aid program.

In accordance with existing studies, it is hypothesized that house chores as well as paid work are associated with higher absenteeism (Namukwaya and Kibirige 2014; Teshome 2002; Cooper-Vince et al. 2017; Cardoso and Verner 2006). In contrast, less absences should be associated with better access to food and with the existence of support through aid programs (De Muro and Burchi 2007; Ainsworth et al. 2002).

The variables *Gender*, *Distance*, *Orphan*, *Mother with higher education*, *Female led household*, *Household head parent*, *Employment*, *Sponsorship*, and *Hunger* are dummy variables. Data for all independent variables were obtained from the questionnaire survey carried out at the three selected primary schools in the Buikwe district. The variables used in our analysis are summarized in Tab. 1.

1 After constructing the index, a sensitivity analysis is performed: specifically, an alternative asset index with equal weights of all indicators is calculated. A very high correlation between the original and alternative index (Pearson correlation coefficient is roughly 0.96) shows that the (normative) decision to create weights by MCA does not substantially change the picture of households' living standards presented by the asset index.

Tab. 1 Description of variables.

Variable name	Definition	Expected relationships to absenteeism
Dependent variable		
Number of absences	Number of absences per pupil per month (in days).	
Independent variables		
Group 1: Basic characteristics of pupils		
Age	Age in years.	unclear
Gender	Dummy variable that takes the value of 1 if the child is male, and 0 if the child is female.	unclear
Distance	Dummy variable that takes the value of 1 if the distance to school is higher than the median distance (1.5 km). It is equal to 0 otherwise.	positive
Group 2: Household characteristics		
Number of household members	Number of people within a household.	positive
Younger siblings	Number of younger siblings.	positive
Orphan	Dummy variable that takes the value of 1 if at least one parent is missing. It is equal to 0 otherwise.	positive
Mothers with higher education	Dummy variable that takes the value of 1 if the mother has higher than primary education. It is equal to 0 otherwise.	negative
Asset index	An index ranging from 0 to 100 measuring housing quality, and assets ownership (in a household).	negative
Group 3: Characteristics of the household head		
Female led household	Dummy variable coded as 1 if women had the majority decision-making role in three child- and schooling-related domains.	negative
Household head parent	Dummy variable coded as 1 if the pupil's parent was among the main decision-makers in the same three domains.	negative
Group 4: Social and economic conditions of pupils		
Work before school	The number of various types of housework the pupil needs to carry out before going to school	positive
Employment	Dummy variable that takes the value of 1 if the pupil does any paid work. It is equal to 0 otherwise.	positive
Sponsorship	Dummy variable that takes the value of 1 if the pupil is supported or sponsored through any assistance programs. It is equal to 0 otherwise.	negative
Hunger	Dummy variable that equals to 1 if the pupil felt strong hunger or food shortage at least once a week. It is equal to 0 otherwise.	positive

Source: Authors. Note: Positive expected relationship means that such a factor would increase the number of absences. Negative expected relationship means that the factor would reduce the number of absences.

3.6 Statistical analysis

The dependent variable captures the number of days absent per pupil per month in three primary schools, observed from February 2018 to September 2018. While this outcome varies over time (month by month), all independent variables are treated as time-invariant because they were measured only once in the survey. Accordingly, we assume that these characteristics remain constant over the observation window, although for some variables this assumption may be restrictive, as they could plausibly change even within several months.

The repeated monthly observations for each pupil motivate a panel-data modelling strategy. Given that the dependent variable is a count (monthly absence days), we employ Poisson regression as the standard approach for modelling count outcomes. Prior to estimation, we assess whether unobserved individual heterogeneity is present, indicating that

a panel estimator is preferable to a pooled specification. The diagnostic results support a panel approach and, specifically, the use of a random-effects Poisson regression with heteroskedasticity-robust inference. A fixed-effects Poisson model is not suitable here because the explanatory variables are time-invariant and would therefore be absorbed by pupil fixed effects, preventing estimation of their coefficients.

In the random-effects Poisson model, the covariates are linked to the expected number of absence days per pupil-month. We include a pupil-specific random intercept to capture persistent unobserved differences between pupils (such as underlying health or household constraints), and to account for within-pupil dependence of observations across months. To absorb common seasonal patterns and systematic differences across schools, all specifications include month fixed effects and school fixed effects. We report pupil-clustered robust standard errors to allow for

Tab. 2 Absence structure by months and schools.

Month	Obs	Mean	St. Dev	Min	Max	Skewness	Zero abs.
February	367	2.58	3.72	0	17	2.00	40.0%
March	443	1.26	2.42	0	20	4.20	54.6%
April	442	0.63	1.68	0	19	5.43	73.1%
May	416	1.45	1.67	0	7	0.89	43.0%
June	414	1.42	2.28	0	16	2.94	47.3%
July	414	1.68	2.54	0	16	2.48	43.7%
August	336	1.56	2.44	0	14	2.42	49.1%
September	417	2.01	2.08	0	9	0.74	34.1%
School	Obs	Mean	St.Dev	Min	Max	Skewness	Zero abs.
Malongwe	971	1.51	2.33	0	17	2.76	46.9%
Nyenga	1060	1.27	2.37	0	20	3.27	57.6%
Ssabawaali	1218	1.81	2.59	0	19	2.55	41.8%

Source: Authors' calculations based on the survey data. Note: The last column reports the percentage of pupil-month observations with zero absences (no days absent), by month and by school.

within-pupil correlation across months and remaining distributional misspecification.

This approach rests on several standard assumptions. The model specifies the conditional mean of absences as a log-linear function of observed covariates, while the random intercept captures unobserved, time-invariant pupil characteristics. A key identifying assumption is that the unobserved pupil-specific propensity for absence is not systematically correlated with the included covariates. To reduce the scope for confounding, we include a broad set of controls as well as month and school fixed effects. In addition, because count data may exhibit overdispersion relative to the Poisson distribution, we rely on pupil-clustered robust standard errors and assess robustness to alternative variance assumptions. We estimated two alternative specifications, namely random-effects negative binomial regression and mixed-effects negative binomial model with a pupil-level random intercept. Both clearly supported the main random-effects Poisson model findings.

In terms of our estimation strategy, we perform four regression models in total, mostly with the same explanatory variables to test their statistical significance and the direction of their effects on the dependent variable. However, two variables – the *Asset Index* and *Mothers with higher education* – are excluded from some of the models because their inclusion significantly lowers the number of observations that enter the estimations (Appendix 1 and Appendix 2).

4. Results

In this section, we first present descriptive statistics for the dependent variable, showing how pupil absences vary across months and schools. We then summarize the independent variables included in the

regression models. Finally, we report and describe the results of the regression analysis.

Tab. 2 summarizes the distribution of pupil absences (days absent per pupil per month) across the study period and by school. Absences vary markedly by month: the highest average is observed in February, after which mean absences drop sharply in March and reach their lowest level in April. From May onward, monthly means generally hover between about 1.4 and 1.7 days, with a moderate uptick again in September. Across all months, the minimum number of absences is zero, whereas the upper tail reflects occasional extreme absence spells, reaching 20 days in March and 19 days in April, which results in highly right-skewed distributions. Consistent with this pattern, the share of pupils with zero absence days in a given month varies markedly over time, ranging from 73.1% in April to 34.1% in September.

The lower panel of the table shows differences in absence levels across the three schools. Ssabawaali records the highest mean monthly absence, followed by Malongwe and Nyenga. While average differences are not large in absolute terms, the standard deviations are substantial relative to the means in all schools, pointing to considerable heterogeneity among pupils and months, with most observations at low absence levels but a small number of high-absence cases driving the upper tail (as also reflected in the values of skewness and percentages of zero absences).

Tab. 3 presents descriptive statistics for the explanatory variables included in the regression models. Sample sizes differ across variables due to item-level missingness in the survey. The covariates comprise both continuous measures and binary indicators, for which the reported means can be interpreted as sample proportions. The continuous variables exhibit considerable dispersion, most notably the asset index and household composition, indicating meaningful heterogeneity in socio-economic conditions within the study sample.

Tab. 3 Descriptive statistics of explanatory variables used in the regression.

Variable	Obs	Mean	St. Dev	Min	Max
Age	463	12.89	1.60	9	18
Gender (dummy)	480	0.45	0.50	0	1
Distance (dummy)	425	0.50	0.50	0	1
Number of household members	471	6.86	2.46	0	18
Female led household (dummy)	461	0.49	0.50	0	1
Household head parent (dummy)	475	0.83	0.38	0	1
Orphan (dummy)	461	0.22	0.42	0	1
Younger siblings	471	2.57	1.79	0	13
Mothers with higher education (dummy)	356	0.53	0.50	0	1
Employment (dummy)	467	0.55	0.50	0	1
Work before school	450	2.07	1.57	0	8
Sponsorship (dummy)	408	0.18	0.39	0	1
Hunger (dummy)	436	0.73	0.44	0	1
Asset index	361	34.87	17.05	0	100

Source: Authors' calculations based on the survey data. Note: All explanatory variables were measured only once in the survey. In the regressions, these values are assigned to each pupil's monthly observations and are therefore treated as time-invariant.

Tab. 4 shows the results of the four regression models that are estimated using the random-effects Poisson method with heteroskedasticity-robust standard errors clustered on pupils. The first model (1) excludes both variables that limit the number of observations (*Mothers with higher education*, and *Asset index*) entering the regression. Therefore, this model works with the highest number of observations (2,267).

The second model (2) includes the *Asset index* while excluding the variable indicating higher education of mothers, resulting in 1,911 observations. Conversely, the third model (3) includes *Mothers with higher education* while excluding the *Asset index*, meaning that 1,665 observations enter the regression. And finally, the fourth model (4) includes both of these variables which limits the number of observations to 1,427.

Tab. 4 Regression model and results.

Dependent variable: Number of absences	Regression models			
Independent variables	(1)	(2)	(3)	(4)
Age	-0.079*** (0.030)	-0.069** (0.033)	-0.092*** (0.035)	-0.082* (0.037)
Gender (dummy)	0.238** (0.094)	0.325*** (0.102)	0.285*** (0.107)	0.362*** (0.112)
Distance (dummy)	0.081 (0.100)	0.150# (0.099)	0.115 (0.111)	0.170# (0.113)
Number of household members	-0.017 (0.026)	-0.023 (0.027)	-0.021 (0.027)	-0.027 (0.026)
Female led household (dummy)	-0.277*** (0.094)	-0.207** (0.101)	-0.410*** (0.109)	-0.356*** (0.117)
Household head parent (dummy)	0.056 (0.141)	0.104 (0.140)	0.089 (0.160)	0.214 (0.158)
Orphan (dummy)	0.376*** (0.127)	0.462*** (0.127)	0.556*** (0.152)	0.569*** (0.154)
Younger siblings	0.022 (0.033)	0.055* (0.033)	0.021 (0.037)	0.051# (0.035)
Mothers with higher education (dummy)			-0.188* (0.105)	-0.204* (0.111)
Employment (dummy)	0.178* (0.096)	0.195* (0.103)	0.184# (0.116)	0.212* (0.122)
Work before school	-0.051 (0.038)	-0.053 (0.039)	-0.092** (0.039)	-0.104*** (0.039)
Sponsorship (dummy)	-0.199# (0.139)	-0.234* (0.136)	-0.336** (0.150)	-0.312* (0.169)
Hunger (dummy)	0.010 (0.107)	-0.026 (0.111)	-0.021 (0.118)	-0.053 (0.121)
Asset index		0.005* (0.003)		0.007** (0.003)
Dummy variables for schools	Yes	yes	yes	yes
Dummy variables for months	Yes	yes	yes	yes
_const	1.658*** (0.428)	1.081** (0.485)	2.015*** (0.506)	1.315** (0.550)
Number of observations	2,267	1,911	1,665	1,427
Number of groups	321	270	242	207
Wald chi2	296.63***	261.49***	307.14***	276.48***

Source: Author's calculations. *** Significant at the 1% significance level. ** Significant at the 5% significance level. * Significant at the 10% significance level. # Significant at the 15% significance level. Robust standard errors are in parentheses.

Additionally, each model also contains two sets of dummy variables to control for the possible differences among the three schools, as well as to account for the possible effects of various months on school absences.

Generally, it can be concluded from Tab. 4 that the coefficients do not change much across the models, pointing to the same direction of effects in all significant cases. However, the statistical significance varies a bit among models which could also be influenced, to some extent, by the different number of observations entering the models.

The results in Tab. 4 show that *Age*, *Female led household*, *Mothers with high education*, *Work before school*, and *Sponsorship* have statistically significant and negative associations with absences at schools in the Buikwe district. This means that:

- older children have lower absences;
- children from female-led households have significantly lower absences;
- children of mothers with higher education (i.e., with higher than primary education) have lower absences, although this variable is significant only marginally;
- children who receive a sponsorship support have lower absences;
- children who must work more in the household in the morning (before school) have lower absences (although this may sound surprising it could mean that they have a better attitude to fulfilling their duties). It needs to be noted, however, that this variable is significant only in the models with lower number of observations.

Furthermore, the results presented in Tab. 4 also indicate that *Sex*, *Orphan*, *Asset index* and marginally *Distance*, *Employment*, and *Younger siblings* have statistically significant and positive associations with school absences, meaning that:

- boys have higher absences than girls;
- children from incomplete families (that lost one parent or both parents) have significantly higher absences;
- children that live farther away from schools have higher absences;
- children that have a paid employment miss classes more often;
- children who have (more) younger siblings in the household have higher absences (because they must look after them more often)
- children who come from households with more assets have higher absences. While this may seem as a surprising result, it may be that children from more wealthy households feel less motivated and pressured to attend school that frequently.

Variables *Number of households members*, *Household head parent*, and *Hunger* do not have statistically significant associations with absences from school even at the 15% level, as shown in Tab. 4.

The results suggest that there are at least three decisive factors of school absences in the Buikwe district. The first one is gender-related: girls have lower absences than boys, and children from households where women predominate in child- and schooling-related decision-making also have significantly lower absences. The second factor is the completeness of the pupils' families: children with both parents have significantly lower absences than children with at least one parent missing. And thirdly, sponsorship support of children seems to increase attendance in school, too. Apart from these three, there are other factors that seem to play a role in lowering absences of pupils, such as for example the education of mothers. The results also show that there are differences in absences among different schools and over different months under review.

5. Discussion

The main aim of this research is to examine factors associated with elementary school absenteeism in the Buikwe district, Uganda. The results indicate several factors significantly associated with absenteeism across all models: gender and age of the pupil, family environment, and sponsorship support. These findings should be interpreted as context-specific evidence from a predominantly rural Ugandan district, where school attendance is shaped by the interaction of household vulnerability, children's work responsibilities, access to support, and local livelihood conditions. The descriptive statistics also reveal substantial month-to-month variation in absences, suggesting that attendance in Buikwe is shaped not only by household characteristics but also by time-specific contextual conditions, such as the school calendar, household resource constraints, weather conditions, and seasonal labour needs.

The gender of the pupil is a frequently recognized factor that affects school attendance, often in a combination with other variables. The results suggest that girls exhibit lower absenteeism from elementary schools than boys. The presented finding, however, contradicts some other research such as Teshome (2002) or Ahiakpor and Swaray (2015) who indicated the opposite. In their case, girls are more involved in domestic work which leads to lower school attendance and performance. On the other hand, the results are more in line with Maligalig et al. (2010) who found that boys have more absences due to their involvement in paid work.

The results suggest that children from incomplete families (in which one or both parents are missing) have higher absenteeism than children from complete families. This finding is in accordance with Yamano and Jayne (2005) and Ainsworth et al. (2002) who show that orphanage has a detrimental effect on the households' incomes, which in turn leads to a lower

ability of households to pay school fees. Moreover, in poor households without one or two parents, children's time may be re-allocated from school to caregiving or work to compensate for the lost labour. Furthermore, if an orphan stays with its grandparents or other relatives (aunts, uncles), it is believed that their school attendance is also lower because of their higher involvement in household work due to discrimination (Roby et al. 2013; Roby et al. 2014).

In accordance with literature emphasizing the role of mothers and women in children's schooling (Ahiakpor and Swaray 2015; Ainsworth et al. 2002; Lloyd and Blanc 1996), we found that pupils from households classified as female-led have significantly fewer absences. As noted above, this variable refers to women's predominance in child- and schooling-related decision-making rather than to formal household headship. In the Buikwe context, this may indicate that women's stronger role in decisions about schooling and daily attendance is associated with closer monitoring of children's school participation. The findings also confirm to some extent that higher education of mothers is associated with lower absenteeism, as stated by previous research (Namukwaya and Kibirige 2014; Pal 2004; Ahiakpor and Swaray 2015; Saasa 2018; Ainsworth et al. 2002).

As shown by Ainsworth et al. (2002), children supported through aid programs attend school more, which is especially true for orphans (Cho et al. 2017). Our results are consistent with this finding, indicating that pupils receiving some sort of a sponsorship support have lower absenteeism. It needs to be emphasized however, that some of these programs may be conditional on regular school attendance. In other words, pupils are sent to school regularly (more often) so that their household stays eligible for the support.

On the other hand, only a weak effect was found for the *Younger siblings* variable – it holds merely marginally that a higher number of younger siblings increases the absences of pupils, as the literature would suggest. For example, Jayachandran (2002) found that especially in larger families, elder daughters may be required to stay at home more often (and be absent from school) to carry out household chores or care about their younger siblings. Similarly, according to Teshome (2002), girls' involvement in household chores and care for siblings can lead to poorer school performance.

We also show that if a child does household chores before school, the number of absences decreases. This result does not confirm the findings of the majority of previous research. For example, Namukwaya and Kibirige (2014) as well as De Muro and Burchi (2007) found that engagement in household work is one of the key reasons why children cannot attend school regularly. As hypothesized in this context, such children might be more active with better attitudes to work and duties and therefore miss classes less (which was also informally validated by some of

the school principals). On the contrary, the trade-off between paid work and school attendance is confirmed: paid jobs of children tend to increase their absenteeism. This is in line with Cardoso and Verner (2006) who stated that child labour and regular school attendance were exclusive activities.

The relationship between the *Asset index* variable and school absenteeism is unexpectedly positive – children from families that are better off in terms of their asset ownership tend to have higher absences from school. Usually, this factor (as a proxy for better socioeconomic status or lower poverty) lowers the number of absences. According to Cardoso and Verner (2006), UNICEF (2016), and Namukwaya and Kibirige (2014), poverty was the most important barrier to attending school at all educational levels. However, Devadoss and Foltz (1996) found that financial support from parents may lead to a higher absenteeism since children from wealthier families may have a tendency to put less emphasis on education. For these reasons, such pupils may have more absences and worse grades compared to pupils from poorer families.

Our results do not provide enough evidence for the positive relationship between school absenteeism and household size. Such an association was identified in some previous papers, most importantly by Nannyonjo (2007), who suggests in a study from Uganda that children from smaller families tend to have better school attendance and test scores than children from larger families. A possible explanation is that individual children in larger families may receive less support for their education. The findings also provide only weak support for the association identified by Nannyonjo (2007) between longer distance to school and higher absenteeism.

Overall, the results suggest that absenteeism in Buikwe is not only a matter of individual or household characteristics, but also reflects the local context in which schooling takes place. In a rural setting where households often combine schooling with informal work, domestic responsibilities, and seasonal livelihood demands, factors such as child labour, sponsorship support, household decision-making, and distance to school may operate differently than in urban or high-income contexts. The findings should therefore not be read as universal determinants of absenteeism, but as evidence of how broader mechanisms identified in the literature materialize in a specific rural Ugandan setting.

6. Conclusion

The decision whether to attend school on a daily basis is influenced by a range of social, economic, personal, and institutional factors. This paper examined how selected factors relate to school absenteeism of pupils from three primary schools in the Buikwe district in south-eastern Uganda.

The results point to several factors that are significantly associated with pupils' absenteeism. In particular, family characteristics appear to play an important role. Pupils from households classified as female-led in terms of child- and schooling-related decision-making tend to have fewer absences, and children living with both parents show lower absenteeism compared to those from incomplete families. In addition, pupils receiving support through sponsorship programs are absent from school less frequently.

Other associations are also observed. Paid child labour is linked with higher absenteeism, suggesting a clear trade-off between work and school attendance. The educational level of mothers is another relevant factor, as pupils whose mothers have higher than primary education tend to miss school less often. Gender differences are also visible, with girls showing fewer absences than boys.

Some findings are less intuitive. Pupils who carry out household duties before school tend to have fewer absences. One possible explanation is that children who regularly perform household responsibilities may develop daily routines that also support regular school attendance. Another unexpected result concerns the assets ownership: pupils from relatively better-off households show slightly higher absenteeism. One possible interpretation is that children from wealthier households may place less emphasis on regular attendance, although this result should be interpreted with caution.

Several directions for further research emerge from this analysis. Future studies could examine additional contextual factors that may influence school attendance in rural Uganda, including cultural norms, teacher absenteeism, or school infrastructure. Longitudinal data could also provide a clearer picture of how family circumstances, sponsorship programs, and child labour affect attendance over time. Qualitative approaches, such as interviews with pupils and their families, could complement the quantitative results and offer deeper insight into the motivations and constraints affecting school participation.

The findings may also have practical relevance for educational policy and practice, although they should be interpreted as indicative rather than prescriptive. Programs supporting vulnerable households, initiatives encouraging parental involvement in education, or the continued expansion of sponsorship schemes may contribute to improving school attendance. At the same time, measures addressing child labour and raising awareness about the value of education within local communities may also play a role.

Finally, several limitations of this study should be acknowledged. The analysis is based on data from three purposively selected schools in the Buikwe district, which in fact limits the possibility to generalize the findings outside the sample. Additionally, although the survey instrument was piloted in the local context, it was not formally externally validated. Moreover,

school registers, while useful, may contain inaccuracies that could influence some of the reported results.

Despite these limitations, the study provides empirical evidence on factors associated with school absenteeism in a specific rural Sub-Saharan African setting. The findings contribute to a better understanding of barriers to regular school attendance and may help inform future research as well as discussions on improving educational participation in similar contexts.

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Appendix 1 Mixed-effects negative binomial regression.

Dependent variable: Number of absences	Regression models							
Independent variables	(1)		(2)		(3)		(4)	
Age	−0.083**	(0.036)	−0.071*	(0.039)	−0.098**	(0.04)	−0.08*	(0.043)
Gender (dummy)	0.228**	(0.108)	0.323***	(0.116)	0.255**	(0.121)	0.335***	(0.126)
Distance (dummy)	0.189#	(0.117)	0.226*	(0.119)	0.187#	(0.128)	0.227*	(0.13)
Number of household members	−0.017	(0.028)	−0.02	(0.03)	−0.016	(0.029)	−0.018	(0.029)
Female led household (dummy)	−0.248**	(0.106)	−0.173#	(0.112)	−0.391***	(0.115)	−0.329***	(0.122)
Household head parent (dummy)	0.183	(0.155)	0.178	(0.153)	0.164	(0.167)	0.248#	(0.167)
Orphan (dummy)	0.404***	(0.144)	0.479***	(0.146)	0.592***	(0.162)	0.582***	(0.164)
Younger siblings	0.023	(0.038)	0.055	(0.039)	0.019	(0.042)	0.046	(0.041)
Mothers with higher education (dummy)					−0.192*	(0.115)	−0.213*	(0.122)
Employment (dummy)	0.183*	(0.109)	0.183#	(0.119)	0.22*	(0.126)	0.229*	(0.135)
Work before school	−0.05	(0.044)	−0.05	(0.045)	−0.101**	(0.044)	−0.114**	(0.044)
Sponsorship (dummy)	−0.251#	(0.154)	−0.258#	(0.16)	−0.393**	(0.17)	−0.356*	(0.187)
Hunger (dummy)	0.017	(0.123)	0.002	(0.131)	−0.008	(0.136)	−0.014	(0.142)
Asset index			0.004	(0.003)			0.008**	(0.003)
Dummy variables for schools	Yes		yes		yes		yes	
Dummy variables for months	Yes		yes		yes		yes	
_const	1.293***	(0.501)	0.78	(0.568)	1.773***	(0.571)	0.987	(0.631)
Number of observations	2,267		1,911		1,665		1,427	
Number of groups	321		270		242		207	
Wald chi2	198.79***		174.96***		205.15***		178.36***	

Source: Author's calculations. *** Significant at the 1% significance level. ** Significant at the 5% significance level. * Significant at the 10% significance level. # Significant at the 15% significance level. Robust standard errors clustered on pupils are in parentheses.

Appendix 2 Random-effects negative binomial regression.

Dependent variable: Number of absences	Regression models							
Independent variables	(1)		(2)		(3)		(4)	
Age	−0.075***	(0.029)	−0.043	(0.032)	−0.07**	(0.033)	−0.04	(0.035)
Gender (dummy)	0.276***	(0.083)	0.309***	(0.09)	0.281***	(0.094)	0.325***	(0.098)
Distance (dummy)	0.116	(0.088)	0.099	(0.095)	0.085	(0.1)	0.073	(0.105)
Number of household members	−0.011	(0.023)	−0.003	(0.024)	−0.014	(0.025)	−0.007	(0.026)
Female led household (dummy)	−0.237***	(0.088)	−0.186*	(0.095)	−0.35***	(0.098)	−0.306***	(0.105)
Household head parent (dummy)	0.208*	(0.114)	0.158	(0.118)	0.143	(0.128)	0.146	(0.13)
Orphan (dummy)	0.0271***	(0.104)	0.296***	(0.109)	0.373***	(0.116)	0.354***	(0.122)
Younger siblings	0.019	(0.032)	0.026	(0.035)	0.016	(0.035)	0.028	(0.037)
Mothers with higher education (dummy)					−0.254***	(0.092)	−0.229**	(0.1)
Employment (dummy)	0.243***	(0.085)	0.227**	(0.092)	0.266***	(0.099)	0.257**	(0.106)
Work before school	−0.042	(0.031)	−0.045	(0.032)	−0.072**	(0.033)	−0.088***	(0.034)
Sponsorship (dummy)	−0.215*	(0.113)	−0.262**	(0.123)	−0.318**	(0.133)	−0.329**	(0.142)
Hunger (dummy)	0.138#	(0.093)	0.163#	(0.101)	0.045	(0.105)	0.09	(0.112)
Asset index			0.001	(0.003)			0.005*	(0.003)
Dummy variables for schools	Yes		yes		yes		yes	
Dummy variables for months	Yes		yes		yes		yes	
_const	0.618#	(0.417)	0.054	(0.486)	0.999**	(0.484)	0.245	(0.543)
Number of observations	2,267		1,911		1,665		1,427	
Number of groups	321		270		242		207	
Wald chi2	196.11***		162.65***		170.88***		143.88***	

Source: Author's calculations. *** Significant at the 1% significance level. ** Significant at the 5% significance level. * Significant at the 10% significance level. # Significant at the 15% significance level. Standard errors are in parentheses.