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A predictive analysis of risk factors contributing to low examination registration rate by secondary schools' learners in Zimbabwe's rural areas

Taruvinga Muzingili[a], Willard Muntanga[b], Laison Mwiinde[c], Quegas Mutale[c] and Weston Chidyausiku[d]

[a]Department of Social Work, Midlands State University, Gweru, Zimbabwe; [b]Department of Social Sciences and Humanities, Lupane State University, Gweru, Zimbabwe; [c]Department of Social Science, Lupane State University, Gweru, Zimbabwe; [d]Department of Social Work, Eswatini Medical Christian University, Mbabane, Eswatini

ABSTRACT

The study investigates the risk factors that contribute to low examination registration among secondary school learners in Zimbabwe's rural areas. Data was collected from 525 secondary school learners who had failed to register for their ordinary and advanced level examinations from 2019 to 2023. Regression modeling was used to assess the impact of four major categories of independent variables that included family characteristics, learner characteristics, access-based factors, and school-level factors. Using regression analysis, findings revealed that failure to register for the examination was mostly influenced by family characteristics, with an estimated variation in examination registration of around 35.4%, followed by learners' characteristics with a variation of 24.7%, school-based factors with 16.0%, and access factors at 13.3%. Analysis of sub-factors revealed that the low examination rate in rural areas was mostly explained by factors associated with affordability that were exacerbated by vulnerability associated with the learner's characteristics. The study recommended a holistic approach to improving examination registration around the harmonization of current social protection schemes, community empowerment, and learner's specific educational needs assessments and interventions.

IMPACT STATEMENT

- The study looked at why some learners in rural areas don't register for important exams.
- It wanted to find out what factors affect a learners' decision to register for exams.
- Low family income is a major reason why learners don't register for exams.
- Learners who are orphans, have disabilities, or are female are also less likely to register.
- The distance to school and lack of school resources also affects exam registration.
- Financial support from outside the family can help increase exam registration.
- The study suggests that providing financial support, improving school infrastructure, and helping vulnerable learners can increase exam registration rates.
- This can help more learners in rural areas access education and improve their future opportunities.

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Introduction

Since achieving political independence from British colonial rule in 1980, Zimbabwe has ratified several international and regional educational protocols and treaties to support universal and quality education. These include the United Nations Convention on the Rights of the Child (CRC), which Zimbabwe ratified in 1990. Article 28b focuses on every child's right to education and emphasizes the importance of

CONTACT Taruvinga Muzingili tmuzingili@gmail.com Department of Social Work, Midlands State University, Gweru, Zimbabwe

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ensuring access to free, quality secondary education. Zimbabwe is also a signatory to the African Charter on the Rights and Welfare of the Child, with Article 11 highlighting the right to education as a fundamental right for every child. Zimbabwe has also committed to the SDGs, including Goal 4, which focuses on ensuring inclusive and equitable education for all. Section 27 of the Zimbabwe Constitution (Amendment of 2023) calls for the government to provide free and compulsory basic education. However, the budget process mostly underfunds the education sector, resulting in gross inequalities in the distribution of educational resources in Zimbabwe, particularly between rural and urban areas (Chimbunde, 2023; Manda & Chirume, 2023). The 2023 budget allocated 14% of the total expenditure to the education sector, slightly increasing from the 13.4% in 2022. This is all below the Dakar Framework for Action, which recommends a 20% threshold on budgets for the education sector. Examination fees have also exceeded the majority's reach for ordinary and advanced-level examinations in rural communities (Mabhoyi, 2017). The failure of 30,000 pupils to register for the Zimbabwe Schools Examination Council (ZIMSEC) for the year 2021 (Moyo, 2024) provides evidence of this. This shows that the current educational support is insufficient to cater to all learners in need, examination fees included.

The phenomenon of learners in rural secondary schools failing to register for their final examinations can have significant implications for their academic and professional futures (Muzingili et al., 2024). Registration and subsequent examination attendance are unique aspects of education that somewhat reflect a situation where the learner has not dropped out of school but encounters some challenges at the final stage of learning (Banaag et al., 2024). However, academic studies often neglect the risk factors of low examination registration.

Aim of the study

The aim of this study is to assess the risk factors associated with secondary school learners' low examination registration in Zimbabwe's rural areas. Thus, the primary research question was, 'What are the risk factors contributing to the low examination registration rate among secondary school learners in Zimbabwe's rural areas?'

Significance of the study

The significance of this study extends beyond identifying risk factors affecting low examination registration rates among rural learners in Zimbabwe. By providing evidence-based insights, the findings can inform policy reforms and targeted interventions to improve registration rates, thus fulfilling SDG 4 (Quality Education) and SDG 10 (Reducing Inequality). Enhancing access to education in rural areas promotes equal opportunities, reduces long-term socio-economic inequalities, and empowers marginalized communities. Importantly, the study's recommendations play a crucial role in shaping educational programming and resource allocation, ensuring inclusive and equitable learning environments for all.

Factors affecting learners' education success and achievement

Family socio-economic characteristics may be relevant to the issue of educational success across the globe. The income level of the learner's family may be a significant predictor of educational success (Moyo, 2022; Muzingili & Muchinako, 2016; Roby, 2021). Families with lower incomes may struggle to afford the costs of registering for examinations, such as exam fees, study materials, and transportation to the exam venue. Studies show that the occupation of the learner's parents or guardians may also be a factor (McAnally et al., 2024; Mwiinde & Muzingili, 2020; Plasman et al., 2021; Wilson Fadiji & Reddy, 2021). For example, families, where the parents or guardians are farmers, manual laborers, or low-paying jobs, may need more financial resources to support their learner's education, leading to a higher likelihood of low examination registration. The education level of the learner's parents or guardians has been a significant predictor of the learner's ability to complete school (Roby et al., 2016). Families whose parents or guardians have lower education levels may have a limited understanding of the importance of education and may not prioritize their learner's examination pursuits. The size of the learner's family may also be a factor. This shows that families with many learners may struggle to provide adequate

financial and emotional support to each child, leading to a higher likelihood of low examination registration (Gao et al., 2024; Kazeem et al., 2010).

The evidence further shows that families with limited access to resources are associated with their learner's poor school attendance (Moyo, 2022; Muzingili & Muchinako, 2016; Mwiinde & Muzingili, 2020; Plasman et al., 2021; Wilson Fadiji & Reddy, 2021). Families with limited access to resources, such as computers, the Internet, and educational materials, may find supporting their learner's education more challenging, thereby increasing the likelihood of poor examination performance. The level of parental involvement in the learner's education may also be a factor (Banaag et al., 2024). Banaag et al. (2024) show that families where parents or guardians are not actively involved in their learner's education may have a higher likelihood of low educational success. Literature shows that families may have different attitudes toward education, leading to a higher likelihood of school completion (Banaag et al., 2024; Garcia et al., 2023; Muzingili & Taruvinga, 2024). The location of the learner's residence may also be a factor (Adeleke & Alabede, 2022; Muzingili et al., 2017; Okunlola & Hendricks, 2022). Families living in rural areas may need more access to educational resources, increasing the likelihood of low examination registration.

The challenges rural schools face in Zimbabwe are directly linked to the low examination registration rates among secondary school learners, as these factors hinder their ability to complete their education. Limited access to educational resources, such as textbooks and qualified teachers, directly impacts learners' preparedness for examinations, contributing to low registration rates (Muzingili & Muchinako, 2016; Mwiinde & Muzingili, 2020). Poor infrastructure, including inadequate classrooms and poor sanitation, creates an environment unconducive to learning, discouraging learners from continuing their education and registering for exams (Muntanga & Kapoka, 2021; Mutale, 2015; Muzingili et al., 2024). High teacher turnover and insufficient subject-specific expertise further disrupt academic continuity, making it difficult for learners to build the confidence needed to register for examinations (Gomba et al., 2015; Nkoma & Shoshore, 2023). Additionally, the lack of guidance and counseling services in rural schools means learners receive minimal support in navigating academic challenges and planning for their future careers, which can demotivate them from registering for exams (Muzingili & Muchinako, 2016). Limited access to technology and study materials restricts learners' ability to engage in digital learning or research, reducing their preparedness and willingness to register for examinations (Moyo, 2022; Reniko et al., 2019). These barriers are exacerbated for learners with disabilities, who face additional challenges due to the lack of specialized support, resulting in even lower registration rates within this group (Pickl et al., 2016; Shaukat, 2023). Thus, addressing these challenges is crucial for improving examination registration rates in Zimbabwe's rural areas.

Learner-based characteristics are critical in understanding the low examination registration rates among secondary school learners in Zimbabwe's rural areas. Learners who struggle academically often face a lack of confidence and discouragement, which negatively impacts their willingness to register for examinations. These learners may feel inadequately prepared or fear failure, contributing to their decision to avoid exams (Alivernini & Lucidi, 2011; Ansong et al., 2019; Ugwuanyi et al., 2020). Conversely, learners with strong academic motivation and a desire for success are more likely to register for and attend examinations as they recognize the value of demonstrating their knowledge and skills (McGeown et al., 2014). Gender inequalities also contribute to low registration rates in rural Zimbabwe. Societal expectations may limit girls' participation in education, as they are often expected to prioritize domestic responsibilities over schooling (Banaag et al., 2024; Guill et al., 2020; Moyo, 2024; Muzingili et al., 2018). Furthermore, gender-based discrimination in schools, where teachers may have lower expectations for girls, can impact girls' confidence and motivation to register for exams (Jayachandran, 2015). Learners with disabilities face additional barriers, such as inadequate infrastructure and support systems, which limit their ability to participate fully in education and register for exams (Alsolami, 2024; Muzingili & Taruvinga, 2024). Discrimination and stigma associated with disabilities can further diminish these learners' self-esteem and motivation, reducing their likelihood of registering for examinations (Alsolami, 2024). Addressing these learner-based characteristics is essential to improving examination registration rates in rural areas. Self-efficacy, or a learner's belief in their ability to succeed, also plays a significant role in examination registration. Learners with high self-efficacy are more confident in their academic abilities and thus more likely to take up the challenge of exams

(Daza-Pérez et al., 2024; Mubarak et al., 2024; Yesuf et al., 2022). Additionally, learners with clear career aspirations tend to prioritize examinations because they understand the potential career benefits of academic success (Cairns & Dickson, 2021). The influence of peers on examination registration is another important factor. Learners whom academically motivated peers surround often feel encouraged and supported, increasing their likelihood of registering for exams (Cairns & Dickson, 2021).

The cost of education can be a significant barrier to examination registration for many individuals, particularly those from low-income backgrounds. Tuition fees, textbook costs, and other expenses can make it difficult for learners to access education. Financial support from the government and donors is crucial in enabling learners in rural areas to register for examinations (Chimbunde, 2023; Manda & Chirume, 2023). This support can include fee waivers, scholarships, grants, and subsidies for examination-related expenses. By alleviating the financial burden, learners are more likely to register for examinations and pursue their education goals. Studies show that learners living in rural or remote areas may not have access to educational institutions, making it difficult for them to pursue their academic goals (Adeleke & Alabede, 2022; Muzingili et al., 2017; Okunlola & Hendricks, 2022). Social and cultural norms can also impact access to education (Moyo, 2024; Muzingili et al., 2024; Robb, 2021). For instance, certain societies may discourage girls from pursuing education or exclude certain groups from educational opportunities based on their social or cultural background. Conflict and war can disrupt the education system, making it difficult for learners to access examination resources and institutions (Silwal, 2016). Political instability can also affect learners' access to education (Silwal, 2016), and civil conflicts can lead to school closures due to the fear of abduction. Studies further show that learners who speak a minority language may face challenges in accessing education if educational resources are not available in their language (Trieu & Jayakody, 2019; Watkins et al., 2012). Weather conditions, such as heavy rainfall, extreme temperatures, or natural disasters, can significantly impact learners' ability to attend examinations (Rush, 2018; Takasaki, 2017). These challenges often worsen in rural areas, where infrastructure and transportation systems may be less developed (Onigbinde, 2018). For instance, flooded roads or damaged bridges can impede learners' access to examination centers, leading to lower attendance rates.

The status of skewed education system in Zimbabwe

The reduction in financial resources allocated to the education sector due to austerity measures, which include cutting government spending on social services, has led to a decline in the quality of education provided in schools (Gomba et al., 2015; Moyo, 2022; Moyo et al., 2020). Learner from higher socioeconomic backgrounds have obtained an education and access superior learning environments, frequently resorting to alternative learning methods, leading to more promising future opportunities. In contrast, learner from lower-income and rural areas face greater challenges in accessing quality education and favorable learning conditions. Rural and low-income schools suffer from inadequate instructional infrastructure. Certain rural schools lack enough classroom facilities to provide refuge for learners during their studies (Mutale, 2015; Muzingili et al., 2018). This demonstrates the disparity in educational resources and facilities between rural and urban locations in Zimbabwe. The distribution of a quality education system is disproportionately biased towards urban schools, resulting in a disparity between rural and urban areas (Roby, 2021; Tokotore, 2017). This discrepancy hurts their future access to better opportunities. Although the government possesses precise knowledge of the necessary actions, it persistently disregards the underprivileged and vulnerable citizens who depend on public education.

Zimbabwe's state-funded initiative, the Basic Education Assistance Module (BEAM), aims to provide financial support to underprivileged learner, especially those struggling with poverty, disabilities, orphans, and girls, to improve their access to basic education. Introduced in 2011, BEAM has significantly improved educational opportunities for disadvantaged learner in Zimbabwe (Kanengoni, 2021). The program offers monetary assistance to families, allowing them to meet the expenses associated with tuition fees, textbooks, and other educational supplies. This assistance has facilitated the enrollment of several learner in school, including covering the costs of exam registration for those who would otherwise lack the financial means to do so. The government's education budget is inadequate and shows a lack of sincerity in addressing educational disparities. Social educational spending programs receive insufficient resources to fulfill their mandate (Kanengoni, 2021). The 2023 national budget allocates ZWL 23 billion

(US$35 million) to the Basic Education Assistance Module (BEAM). As of June, the mid-term national budget review revealed a 6.9% overspend in BEAM, with no observed development or change (Marishane & Mutigwa, 2023). This is because the allotment of funds for BEAM (Basic Education Assistance Module) was insufficient to meet the needs of all individuals requiring financial assistance for school expenses. The cost of education in Zimbabwe has increased significantly because the salaries of many civil servants are below the poverty line. Boarding schools often require a minimum payment of USD300 or equivalent in local currency, whereas secondary day schools in urban areas charge around USD50 per term (Ringson, 2020).

Despite achieving certain results, BEAM's reach is limited, with only a small fraction of disadvantaged learner receiving assistance. The program's financing is inadequate to encompass all eligible learner, resulting in a lack of access to the necessary support for many (Marishane & Mutigwa, 2023). The program faces widespread criticism for its inefficiency and susceptibility to corruption, leading to the ineffective allocation of resources. Additionally, there are instances of cash misappropriation or re-direction, along with delays in distributing funds to the intended recipients. Furthermore, there is a heavy reliance on government financing (Magudu, 2020). The COVID pandemic has resulted in a decline in education for almost 4.5 million learner by early 2021, exacerbating the situation. Subsequently, there has been a lack of substantial actions or initiatives taken to effectively tackle the educational disparities caused by COVID-19 (Nera & Nyikadzino, 2023). Furthermore, around 60% of girls and women in rural areas face period poverty, resulting in a lack of access to menstruation supplies and education (Marishane & Mutigwa, 2023). Furthermore, poverty-stricken girls reportedly miss 20% of their school days, which prompts them to seek refuge in child marriage. The prevalence of child marriage among adolescent girls aged 15–18 remains significant, with a rate of 21.2% (Kanengoni, 2021). Studies show that poverty and societal customs primarily influence this issue (Muntanga & Kapoka, 2021; Muzingili et al., 2024).

BEAM is the main government educational support program for primary and secondary schools; however, additional programs such as Second Chance exist. The initiative encourages teenage mothers to complete their studies for personal and professional advancement (Chiyota & Marishane, 2021). A supportive environment allows young women to pursue academic ambitions while caring for their learner. The program provides daycare, allowing young mothers to study without worrying about their learner. However, the program is inaccessible to all pregnant or mothering teens, faces resistance from stigmatizing communities, and lacks a sustainable financial source (Chiyota & Marishane, 2021; Muzingili et al., 2024). The program may prioritize schooling and childcare above young mothers' healthcare, nutrition, and social support. This can lead to fragmented solutions for young mothers. Since the 1980s, Zimbabwe has introduced the School Feeding Scheme (SFS) to feed impoverished rural learner. The SFS provides food, enabling youngsters to attend school regularly and concentrate on their schoolwork. This has increased enrollment and retention, especially among girls (Ndiweni, 2019). However, the SFS only covers a minority of Zimbabwe's underprivileged learner, leaving many without access to food or education. Beyond providing food, schools, and exam registration, the SFS pays little attention to sustainability and learner's education (Mpofu, 2011). The Bicycle for Educational Empowerment Programme (BEEP) has helped poor rural Zimbabwean learner attend school by donating bicycles. BEEP has focused on rural learner's transportation issues, which prevent them from attending school on time. This has reduced absenteeism and tardiness, which are common problems for rural learners due to poor transportation. Muzingili and Taruvinga (2024) found that BEEP-provided bicycles reduce absenteeism and tardiness in youngsters. Program benefits include reducing sexual harassment and abuse while walking long distances to school and challenging detrimental cultural ideas and behaviors that deter learner, especially females, from attending school. Bicycles have enhanced education access, but BEEP's solution does not address education quality (examination registration) or disability mainstreaming (Muzingili and Taruvinga (2024).

While organizations like CAMFED play a vital role in promoting girls' education in Zimbabwe's rural areas, their efforts alone are insufficient to address the broader issue of low examination registration rates. CAMFED's focus on providing scholarships, mentorship, and leadership development is crucial for empowering girls. However, the organization's limited reach means that many disadvantaged girls in rural areas remain without the necessary support to stay in school and register for exams (Rose et al., 2022). Furthermore, CAMFED's reliance on donations presents sustainability issues, as its financial model

may not consistently meet the growing needs of these vulnerable populations (Hlungwani, 2021). This gap in support leaves many girls—especially those from economically disadvantaged backgrounds—without the resources needed to continue their education, let alone register for critical examinations. Rural learners' broader social and economic challenges, such as poverty, gender inequality, and lack of infrastructure, remain largely unaddressed by these initiatives. Consequently, while CAMFED's efforts are commendable, a more comprehensive approach is needed to ensure that all learners, regardless of gender or socioeconomic status, can register for exams and complete their education. This study aims to identify those risk factors to better inform policy and intervention strategies to improve examination registration rates.

Materials and methods

Study site

We conducted the study in Binga Rural District in Matabeleland North Province, Zimbabwe. Several factors influenced this district's deliberate selection. The district consists of twenty-one wards, divided into two parliamentary constituencies: Binga North Constituency with twelve wards and South Binga Constituency with nine Wards. The district of Binga is the largest settlement. It is located on Lake Kariba's south-eastern shore. The district shares borders with Hwange in the south, Gokwe South in the northeast, Lupane District in the southeast, and Zambia to the north. The construction of the Kariba dam in the late 1950s flooded the BaTonga people's homeland, leading to the construction of most of the district. Binga District is a rural area that is significantly underdeveloped, with only gravel roads that are not car-friendly, especially during the rainy season (Matanzima, 2024; Matanzima & Marowa, 2022; Matsa et al., 2024). It is also one of the most sparsely populated districts in the country. The Binga District is located in Zimbabwe. Drought and poor soil are typical in this area, making agriculture difficult and forcing the communities to rely on the fishing business for their livelihood (Matanzima, 2024; Mutale & Muzingili, 2022). Commercial cultivation of kapenta, bream, tilapia, and tiger fish are also part of the district's livelihood strategies (Matanzima & Marowa, 2022; Matsa et al., 2024).

The lack of infrastructure in most rural schools in Binga is a challenge that affects learner's learning (Chipfakacha, 2020; Mutale, 2015; Muzingili & Muchinako, 2016; Nyamanhare et al., 2022). There are few classroom blocks, few toilets, a lack of fencing, and a lack of furniture. Such an unpalatable and child-unfriendly school environment creates concerns about how learners can properly learn (Mwiinde & Muzingili, 2020). In some parts of the district, on windy and rainy days, learning outside the classrooms can disrupt school learning (Muntanga & Kapoka, 2021). Stray animals impede learner's learning. Untrained and less trained staff concentrate in most primary schools around Binga in Zimbabwe (Muzingili et al., 2018, 2019). This compromises the quality of education learners in rural Binga schools receive. Rural schools in Binga rural district occasionally appoint teachers with non-teaching professional qualifications (Chipfakacha, 2020). This compromises the Binga education system and, in the long run, affects learner's futures and community development in general. These districts have data on high school learners who have discontinued their studies (Muzingili & Muchinako, 2016; Nyamanhare et al., 2022). While there is no statistical data on school dropout prevalence, several studies (Muzingili & Muchinako, 2016; Mwiinde & Muzingili, 2020; Nyamanhare et al., 2022) have shown the difficulties associated with girls dropping out of school in Binga. Therefore, we selected Binga as an appropriate location to study the challenges associated with second-chance schooling.

Sampling procedure

The study's primary target population was learners who had failed to register for their ordinary and advanced-level examinations each year. In this context, the inclusion criteria focused on learners successfully reaching the examination registration stage. This includes reaching at least the second term of the three annual terms in Zimbabwe's primary and secondary examination year calendar. According to the Zimbabwe Examination Council (ZIMSEC), registration for the June and November examinations is often (but not always) done between April and June every year. Therefore, we incorporate learners who

attended school but failed to register for the examinations within the deadlines. Therefore, the study excluded those who had left school before registering for the examinations.

Based on the aforementioned criteria, we collaborated with the Binga District Education Office to engage 23 secondary schools, of which 8 had advanced levels, and the remaining 15 had only ordinary levels. This decision was based on recommendations from the Ministry of Primary and Secondary Education, which identified these schools as having the lowest examination registrations in the district. The researchers were interested in the study for the five years starting in 2019 and ending in 2023. Accordingly, there was no predetermined sample size. Therefore, we adopted a census approach, including all learners failing to register for the annual examination. In quantitative research, census sampling is defined by its ability to eliminate sampling error (Verlaan & Langton, 2024). Moreover, the census sampling approach provides researchers with a complete dataset, enabling them to conduct more robust and accurate data analysis. Additionally, census sampling allows for precise estimation and inference, enabling the drawing of conclusions and making predictions with high confidence (Stapor & Stapor, 2020). This is particularly valuable when conducting research that requires precise statistical analysis, as in the current study, which focused on assessing risk factors contributing to low examination registration.

Explanatory and response variables

A range of factors, including individual, family, and school-level, can influence the complex issue of low examination registration. We categorized some identified risk factors into four major themes in Zimbabwe's rural areas, guided by previously reviewed literature. We treated these factors as independent (explanatory variables) influencing the examination registration rate (dependent or response variables). Family characteristics were the first category to affect learners' participation in the examination registration. Family characteristics included: (1) income level (measured in monthly income in USD), (2) occupation type (source of livelihoods coded formal and informal), (3) educational level (measured in number of years spent at school by the learner's parent or guardian), (4) guardian or parent age, (5) family size (measured in the number of dependents in the family), (6) family access to resources (denoted to family access to educational materials outside school), and (7) parental involvement (measured in attitudes towards the learner's education).

The learner's characteristics were the second independent variable. These factors are related to the learners' characteristics and attributes. In this study, the sub-factors for the learners' characteristics included (1) gender (measured in binary as male or female), (2) learner motivation, (3) parental status (orphaned or not), (4) self-efficacy, (5) interest in the subjects, (6) career aspirations, (7) peer influence, and (8) physical characteristics. The third category encompassed broad factors beyond the learner's control, including family and school characteristics, referred to as access to education factors. These factors included (1) distance to the intended examination center (school location), (2) social and cultural norms, (3) climatic seasons, and (4) financial support (non-family). The final independent factors were school-level factors, which were associated with the impact of the school environment on promoting examination registration among learners in rural areas. (1) examination cost; (2) poor infrastructure; (3) availability of teacher support; (4) high teacher turnover; (5) availability of technology; (6) availability of special needs support; and (7) availability of career guidance.

Finally, the dependent variable (response) is the examination registration rate. We calculated this rate by multiplying the number of unregistered learners every year by the total cohort enrollment by five (5) and dividing by the total number of learners per year. We multiplied by five (5) to match the overall ranking of all independent variables, which we initially measured on a five-point Likert scale before transforming them into continuous variables for multiple linear regression modeling.

Research instrument

We used a survey questionnaire to collect data from 525 learners who failed to register for their ordinary level and advanced level examinations in the selected schools in Binga District between 2019 and 2023. The questionnaire consisted of five major sections that included Section A, which focused on the

learner's demographic data; Section B, which focused on the family's characteristics; Section C, which focused on factors affecting access to education; and finally, Section D, which focused on school-related characteristics. The questionnaire consisted of closed-ended questions measuring nominal, ordinary, and scale variables. We measured gender, parental status, and physical characteristics on a nominal level under learners' characteristics, while we measured other variables on a five-point Likert scale. We measured access to resources and parental involvement on a five-point Likert scale under family characteristics while we measured all other factors in the same format. We measured the distance to the school as a scale variable under access factors and used a five-point Likert scale for all other factors. We measured all factors under school characteristics on a five-point Likert scale. However, to meet the continuous data criteria for regression analysis, SPSS (v.28) transformed all nominal variables into dummy variables.

Data collection

We collected the data from 23 secondary schools in Binga District, Matabeleland North Province, Zimbabwe, over five years from April 2019 to June 2023. 25 Trained research assistants, also teachers in the selected schools, assisted in collecting the data. The research assistants facilitated the data collection by engaging the learners and their guardians. Thus, the research assistants and main researchers administered the questionnaire, with the learners focusing on Sections A, C, and D during the filling process. The learners then took the questionnaire for parents to complete Section B. However, in some cases, the research assistants and main researchers filled out the questionnaire for both the learners and guardians. We did this to ensure the accuracy of data capture. By personally administering the questionnaire, they can provide clear instructions, monitor the learners' understanding, and clarify any doubts or confusion that may arise (Edwards, 2010). This direct involvement allows researchers to address potential misinterpretations or errors, minimizing the chances of incorrect or incomplete responses. Thus, adapting to the learner's age, cognitive abilities, and communication skills was necessary, thereby obtaining more nuanced and insightful data. 525 out of the 663 learners completed the questionnaires, indicating a 79% response rate. Fincham (2008) recommended a response rate of 60%. Thus, we deemed this response rate sufficient to achieve statistical power in inferential statistical analysis.

Statistical analysis

We conducted various statistical analyses to check whether the variables met the criteria and requirements for predictive statistical modeling, as indicated below:

Reliability

We assessed all scale items using Cronbach's alpha in SPSS (v. 28). The Cronbach Alpha for each category of independent variables was as follows: family characteristics (0.92), learner characteristics (0.85), access factors (0.73), and school level factors (0.78). The overall Cronbach alpha was 0.82. Thus, all items were considered reliable as they exceeded the recommended level (0.7).

Multiple linear regression

The central question of this study was: What are the risk factors that predict low examination registration by learners in rural secondary schools in Zimbabwe? We adopted multiple linear regression to assess the influence of selected independent variables (explanatory variables) on the dependent variable (low examination registration). We adopted five regression models to delineate the influence of each category of independent variables, summarized as follows (Table 1):

- Regression model 1 focused on the influence of family characteristics on the other three categories.
- Regression model 2 focuses on how learners' characteristics influence the other three categories.
- Regression model 3 focuses on the impact of access factors on the other three categories.
- Regression model 4 focuses on the impact of school-level characteristics on the other three categories.

Table 1. Regression analysis showing five regression model on independent variables* and overall rate of examination registration as dependent variable.

Factors	Model 1	Model 2	Model 3	Model 4	Model 5
Family characteristics					
Family income level (USD monthly)	−0.520***				−0.541***
Occupational type	−0.241**				−0.346**
Educational level	−0.060				−0.034
Family size	−0.317**				−0.307**
parent/guardian's age	−0.292**				−0.289**
Family access to resources	0.163**				0.174**
Parental involvement	−0.078				−0.063
Learner's characteristics					
Gender		−0.259**			−0.373**
Learner's motivation		0.016			0.033
Parental status		0.450**			0.461**
Self-efficacy		0.022			0.011
Interests in the subject		−0.057			−0.0490.
Career aspirations		0.088			0.071
Peer influence		0.019			0.027
Physical characteristics		−0.311**			−0.343**
Access to education factors					
School location			−0.201**		−0.192**
Social and cultural norms			0.021		0.033
Climatic seasons			−0.010		−0.013
Financial support (non-family)			0.437***		0.479***
School level factors					
Examination cost				0.253**	0.251**
Infrastructure				0.142**	0.137**
Teacher support				0.246**	0.257**
Teacher turnover				0.014	0.022
Technology				0.018	0.030
Availability special needs support				0.237**	0.244**
Availability of career guidance				−0.053	−0.044
N	525	525	525	525	525
Constant (β)	5.505	2.189	48.37	1.101	7.104
Correlation (R)	0.613	0.497	0.374	0.400	0.923
Adjusted R^2	0.354	0.247	0.133	0.160	0.852
df (model-residual)	7–517	8–516	4–520	7–517	32–492
F	23.209***	19.248**	13.177**	14.069**	127.341***

*Standardised coefficients **$p \leq .05$; ***$p \leq .01$.

- Regression model 5 focused on the influence of the combined four categories of independent variables on low examination registration rates.

Before performing regression analysis, we verify that the data are typically distributed, have multiple correlations, are autocorrelated, and are independent when assessed continuously. We employed the Kolmogorov–Smirnov test to assess data normality in a sample size 525 ($n \geq 50$). All independent variables showed normality ($\rho > .05$). In SPSS, we performed a regression model with multi-collinearity diagnostics and found a tolerance of less than 0.9 and a variance inflation factor (VIF) of less than 10. This is suitable for multi-collinearity testing. We used Durbin-Watson's test to check for autocorrelations and found 1.985. This lay between 1 and 3, signifying the absence of autocorrelations among independent variables. We used ANOVA output in regression analysis to test our models' reliability. We found all regression models (Table 1) were reliable in predicting the low examination rate among secondary school learners in rural Zimbabwe.

Ethical consideration

In line with the Helsinki Declaration on studies involving human beings, the researcher adhered to ethical obligations. The Binga District Council Research and Community Development Committee approved the study on 13 February 2019, with reference number BRDC/A/017. We also copied this approval letter to the district ministry of primary and secondary education and the school heads at the targeted schools. The researcher then created a parent/guardian consent form to allow their learner and themselves to participate in the study. Prior to data collection, parents or guardians signed the consent form. Before commencing the data collection, the researchers affirmed oral consent in addition to written

consent. To ensure confidentiality and anonymity, the researcher ensured that the research instrument included direct identifiers, such as the respondent's name. The researchers also assured the learners that their participation was voluntary, and that they could withdraw from the study at any time, they felt the need to do so.

Findings

Demographic information

Of the 525 learners, 73% ($n = 381$) were from the ordinary level (lower secondary level) compared to 27% ($n = 144$) from the advanced level (upper secondary level). Current practices in the Zimbabwean education system, which allow only those with at least five ordinary level subjects to enroll in an advanced level, can explain the dominance of ordinary level subjects. The majority (63%, $n = 331$) were female learners, and 37% ($n = 194$) were male learners. This shows that many learners who failed to register for the examination were female. The learners' average age was 17.23, with a minimum of 15 and a maximum of 19.3. From an age perspective, the study also showed the prevalence of late entry into secondary school; some learners had reached 18 years old, the majority according to Zimbabwe's Constitution. Of the 525, the majority (56%; $n = 294$) were not staying with biological parents, while 44% ($n = 231$) stayed with biological parents.

Risk factors predicting the low examination registration by secondary school learners

In this section, we present the findings from the regression analysis focusing on the five models, showing the overall contribution of each category of independent variables. Table 1 below presents the influence of each sub-factor using standardized coefficients, illustrating the comparative analysis of each factor.

As indicated in Table 1, we conducted five regression models to explain learners' low examination registration variation in Zimbabwe's secondary schools. When we looked at the first four models that show how different types of independent variables affect each other, findings showed that family traits had the most significant effect, with an adjusted R^2 of (0.354), which equals 34.5%. The model was also statistically significant, with ($F = 23.209$, $\rho < .01$. The next model looked at the learner's characteristics that explained low examination registration. It had an adjusted R^2 of (0.247), which was 24.7%. The model was statistically significant at ($F = 19.248$, $\rho \leq .05$). The characteristics of the school explained why 16% of secondary school learners in rural areas did not register for their examinations, as shown by the adjusted R^2 value of 0.160. This model was statistically significant at ($F = 14.069$, $\rho \leq .05$). Finally, model 4 on access factors explained the low examination registration by 13.3%, as shown by the adjusted R^2 of 0.133. This model was statistically significant at ($F = 13.177$, $\rho \leq .05$). Thus, regression analysis shows that all categories of factors were statistically significant in predicting low examination registration rates among secondary school learners in rural areas. However, the findings primarily attribute low examination registration to family- and learner-related factors. A model with all four main factors correctly predicted (85.2%) variation in low examination registration examination among learners in rural secondary schools, as shown by an adjusted R^2 of 0.852. This model was also statistically significant at ($F = 127.341$, $\rho \leq .01$).

Using standardized coefficients for sub-factor analysis reveals that family characteristics, precisely the level of family income (Beta = −0.520), family size (Beta = −0.317), parent/guardian's occupation (Beta = −0.241), parent/guardian's age (Beta = −0.292), and access to education resources (Beta = 0.263), mostly predicted low examination registration, statistically significant at both the ($\rho<.01$ and $\rho<.05$) level of significance However, at both the ($\rho<.01$) and ($\rho<.05$) level of significance, the parent or guardian's educational level and parental involvement were not statistically significant in predicting the low examination rate registration under family characteristics. Reduced income level (ranked first), increased guardian or parent's age (ranked third), guardian or parent's employment in the informal sector (ranked fourth), and increased family size (ranked second) all predicted a decreased probability of learners registering for the examination under family factors. In contrast, increased family access (ranked fifth) to educational

resources predicted an increased chance of learners registering for the examination. About family characteristics, standardized coefficients show that only three sub-factors under learner's characteristics were statistically significant at ($\rho \leq .01$) and ($\rho \leq .05$). These included gender (Beta = −0.259), parental status (Beta = 0.450), and physical characteristics (Beta = 311). Comparing the co-effects, the results indicate that being an orphan was a significant factor in predicting low examination registration under the learner's characteristics, followed by living with disabilities and being a female. However, the findings show that the learner's level of motivation, self-efficacy, interest in subjects, career aspirations, and peer influence did not have any statistical significance in predicting the secondary learners' failure to register for non-examination. This demonstrates that learners in rural areas demonstrated motivation, self-efficacy, clarity in their career aspirations, and interest in school subjects and remained unaffected by peer pressure to register for examinations. Thus, the factors that prevented them from registering for examinations were beyond their intrapersonal and interpersonal characteristics.

Under access to education factors, only two factors predicted (both at $\rho \leq .01$ or 0.05) low examination registration by secondary school learners in rural areas. These factors included school location (Beta = 0.201) and financial support (Beta = 0.437). This shows that increased financial support from outside the family predicted increased chances of examination registration, while increased distance walking to school corresponded with a decreased level of examination registration. Under access factors, social and cultural norms and climatic seasons were found not to have a statistical significance at both ($\rho \leq .01$) and ($\rho \leq .05$). Finally, under school characteristics, low examination registration by learners in rural secondary schools was predicted by the examination costs (Beta = 0.253), infrastructure (Beta = 0.142), teacher support (Beta = 0.246), and availability of special education needs support (Beta = 0.237). These coefficients indicate that increased access to resources, improved infrastructure, teacher support, and special education needs support predict an increased likelihood of examination registration among secondary school learners in rural areas. However, under school characteristics, factors such as teacher turnover, technology, and availability of career guidance were not statistically significant in predicting the examination registration rate at $\rho \leq .01$ and .05.

The overall model that includes all the factors shows that family income level (Beta = −541), followed by financial support from non-family income (Beta = 479), and parental status (Beta = 461), was the most critical predictor of secondary school learners in rural areas not registering for examinations. The key lesson from these top three factors is that financial factors primarily influence low examination registration. Low family income levels and high non-family financial support indicate a decreased and increased likelihood of examination registration, respectively. The overall model also indicates that orphaned learners are likelier to fail to register for their examinations. Further analysis reveals that the 4th factor was gender (Beta = −0.373), the 5th factor was the occupation of the guardian or parent (Beta = −0.347), and the 6th factor was the learner's physical characteristics (Beta = −0.343). The key lesson from these factors was that a female learner, a parent or guardian in informal employment, and a learner with disabilities further increased the risk of low examination registration among learners in rural secondary schools.

Discussion

After conducting regression analysis, we have identified several key themes related to low examination registration among learners in rural secondary schools in Zimbabwe. Firstly, family characteristics emerged as the most significant factor influencing low examination registration, accounting for 34.5% of the variation. We found that income, family size, parent or guardian's occupation, parent or guardian's age, and access to educational resources were statistically significant predictors. To corroborate the findings, lower income levels (Muzingili & Muchinako, 2016), larger family size (Gao et al., 2024; Kazeem et al., 2010), older parent/guardian (Gasanga & Ubayubayb, 2024; Kazeem et al., 2010), and employment in the informal sector (Mwiinde & Muzingili, 2020) decreased the probability of learners registering for examinations. On the other hand, increased access to educational resources positively impacted examination registration. The second theme revolves around learner traits. These factors explained 27.7% of the variation in low examination registration. We found gender, parental status, and physical characteristics statistically significant predictors on non-examination registration in rural areas. In concurrence with

previous studies (Banaag et al., 2024; Guill et al., 2020; Moyo, 2024; Muzingili et al., 2018), being an orphan, living with disabilities, and being female decreased the likelihood of non-registration. Previous research has shown that a parent's level of education (Roby et al., 2016) and parental involvement (Banaag et al., 2024) directly affect a child's ability to attend school. However, this study found that these factors did not affect a student's decision to register for an exam. This shows that parents in rural areas, despite their educational level, embrace the importance of education for their learners. Factors such as learners' motivation, self-efficacy, career aspiration, interest in the subject, and peer influence, which were not directly involved in predicting the examination registration rate, confirm our argument. Introspection of family and learner characteristics reveals a high awareness of the importance of education, but factors based on affordability, exacerbated by various vulnerabilities, influence school completion.

The results confirmed what other studies had found: the location of the school (Adeleke & Alabede, 2022; Muzingili et al., 2017; Okunlola & Hendricks, 2022) and the availability of financial aid (Garcia et al., 2023; Muzingili et al., 2024) were the most important factors that led to learners not registering. Regression analysis showed that increased financial support from sources outside the family positively influenced examination registration, while longer distances traveled to school corresponded with higher registration rates. Previous studies (Moyo et al., 2020; Muzingili et al., 2024; Tokotore, 2017) have confirmed the impact of social and cultural norms, as well as climatic seasons (Randell & Gray, 2016; Zimmermann, 2020), on examination registration, but found them to be statistically insignificant in predicting non-registration. The inconclusive influence of cultural and social norms on examination registration may indicate that these factors are becoming less significant in rural areas due to increased educational awareness, as observed by Muzingili & Taruvinga, 2024; Robb, 2021. This suggests that interventions to improve educational awareness could be effective in increasing examination registration rates. Lastly, school characteristics were found to play a role in the low examination registration. Significant predictors included the availability of resources, infrastructure, teacher support, and special education needs support. Improved access to resources (Adebayo et al., 2020; Adeyemi & Adeyemi, 2014), better infrastructure (Muzingili et al., 2018; Wilson Fadiji & Reddy, 2021), teacher support (Adebayo et al., 2020), and availability of special education needs support (Alsolami, 2024) all increased the likelihood of examination registration, as supported by previous studies. These findings suggest that investing in these areas could lead to improved examination registration rates. However, factors like teacher turnover, technology, and the availability of career guidance did not show statistical significance. Despite the significance of these factors in rural education, their inconclusive influence may indicate that low examination registration represents a distinct stage in educational achievement and attainment, unique to each learner.

Conclusion and recommendations

Overall, family income level, financial support from non-family sources, and parental status were the most important predictors of non-registration. Financial factors have a significant influence, with low family income levels and high non-family financial support indicating a decreased and increased likelihood of examination registration, respectively. Furthermore, factors such as gender, the parent or guardian's occupation, and the learner's physical characteristics increased the risk of low examination registration among learners in rural secondary schools. These findings emphasize the need for targeted interventions to address family-related factors, improve access to education resources, and provide financial support for learners. Efforts should also be made to support orphaned learners, those with disabilities, and female learners. Educators, policymakers, and organizations focused on education equity have a crucial role in supporting these vulnerable learners. By addressing these key themes, we can promote examination registration and enhance educational opportunities for learners in rural secondary schools. The findings reveal several policy and programmatic gaps in assisting vulnerable learners in registering for their examinations. In summation, we recommend the following:

- Targeted financial support for families: The findings highlight that low family income is the most significant predictor of low examination registration. Thus, targeted financial support programs should

be developed to assist low-income families in rural areas, particularly those with larger family sizes and parents employed in the informal sector. Government and non-governmental organizations (NGOs) could provide direct subsidies or scholarships to cover examination fees and related expenses. By relieving financial burdens, these programs can increase the likelihood of learners registering for examinations, as supported by the positive effect of increased financial support from non-family sources.

- Support for vulnerable learners: The study found that being an orphan, having a disability, and being female significantly reduced the likelihood of examination registration. To address this, community-based interventions should focus on providing these vulnerable groups with targeted scholarships, mentorship, and emotional support. Additionally, disability-inclusive education practices, such as providing assistive technologies and ensuring accessible school infrastructure, would improve examination registration rates among learners with disabilities. Programs should also focus on raising awareness about the importance of girls' education and providing gender-specific support to ensure that female learners are not left behind.
- Improving school infrastructure and teacher support: The availability of school resources and teacher support positively influenced examination registration. Therefore, investments should be made to improve the physical infrastructure of rural schools, such as building more classrooms and upgrading sanitation facilities. Additionally, reducing teacher turnover and providing continuous professional development for educators, especially in rural areas, would enhance teacher support and engagement, thus improving learners' preparedness and motivation to register for exams.
- Reducing distance to schools: The study showed that the distance learners travel to school negatively affects examination registration. Practical solutions like providing transportation or building more schools closer to rural communities could significantly reduce this barrier. By minimizing travel distances, more learners will be encouraged to attend school regularly, increasing examination registration rates.
- Harmonizing existing educational support programs: Harmonizing existing educational support programs, including those led by NGOs like CAMFED, with government initiatives to maximize impact is essential. Aligning these efforts will ensure that resources are used efficiently and that all vulnerable learners, particularly those from low-income families, orphans, and learners with disabilities, receive adequate support to register for examinations.

Limitations

The study provides a unique analysis of various factors contributing to low examination registration among high school learners in Zimbabwe's rural areas. The study, employing statistical analysis, encompassed numerous factors and sub-factors, offering a thorough overview of risk factors that some qualitative studies cannot thoroughly investigate. Despite this study's unique strength, the findings are only based on the learners and their families' views. Incorporating key informants into qualitative studies could enhance the debate surrounding the findings. The study relied heavily on a reductionist quantitative approach, which restricted the exploratory or phenomenological experiences of the affected learners and their families in qualitative studies.

The future study

Future studies could focus on the same topic but incorporate a qualitative approach to understand the risk factors affecting the examination registration rate in rural areas. Future studies should also integrate the views of multiple stakeholders, including the assessment of current educational support programs. Future quantitative studies should also include statistical analysis, such as survival analysis, to predict the likelihood of learners failing to register and take appropriate steps to prevent the same phenomenon. Cox regression can be further used to predict the proportion of hazards associated with each of the examined risk factors. This will be important in coming up with intervention priorities.

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About the authors

Taruvinga Muzingili is a senior lecturer at Midlands State University in the Department of Social Work, Harare campus. He has a Bachelor of Social Work Honours Degree, Master of Social Work, Bachelor of Social Science Honours Degree in Monitoring and Evaluation, Master of Social Science in Monitoring and Evaluation, Diploma in Data Analysis (SPSS), Diploma in Mental Health, and Diploma in Project Management Practice. He has ten years of experience in both academic and industrial practice as a social worker. He also officer consultancy work in monitoring and evaluation, organizational capacity development, policy analysis, and project management. His research interests include child protection, specifically on child well-being indicators, predictive risk modeling, clinical studies, family violence, and cross-cutting issues in gender and climate change. He was responsible for methodology, data presentation, and discussion in this study. He also coordinated with other researchers to develop manuscripts, including quality assurance.

Willard Muntanga is a holder of a Master of Social Science degree in Disaster Risk and Livelihoods, Bachelor of Arts History, Peace and Conflict Studies, Bachelor of Social Science Special Honours degree in Monitoring and Evaluation, Diploma in Agriculture Food Security and Livelihoods, and Executive Certificate in Humanitarian Assistance and Programme Management. He has published 15 research papers, one book, and four book chapters. He has been awarded an award as an emerging researcher for an increase in research and research publication by Africa Social Work & Development Network at Indaba Africa Day, 24 May 2024. He is an Editorial and creative Board member of Owia Bulletin for Social Work and Development Network (ASWDNet) Ubuntu Journal. He is an Assistant Program Officer (Child sponsorship and local rights program) at Basilwizi Trust in Binga rural district, Zimbabwe. He was the principal lead in data collection and ethical approval in this study and contributed to the data presentation. He also participated in the literature review.

Laison Mwiinde holds a Bachelor of Sociology Honours Degree and a Master of Public Policy. He is currently engaged in community development practices focusing on philanthropic support to vulnerable children and providing education support. He is also engaged in career guidance programs that inspire children in rural areas through career mentorship. He has authored many books used in education and sociology that secondary school learners use. He worked with the other researchers on data collection, literature review, and the study's key conclusions and recommendations. He was also responsible for editing the first draft of the manuscript.

Quegas Mutale holds a Master of Science in Disaster Management from the National University of Science and Technology, Zimbabwe. He also holds a Bachelor of Science in Local Governance Studies from the Midlands State University in Zimbabwe. Further, Quegas holds a Bachelor of Science Special Honours Degree in Monitoring and Evaluation from the Lupane State University, Zimbabwe. He has about eight years of experience working for donor-funded Non-Governmental Organisations in Zimbabwe, mainly in rural areas. Quegas worked for programs on Child protection and safeguarding, inclusive education, education and life skills, resilience building, livelihood development, and emergency response. He authored published journal articles and book chapters on Child protection, education, climate change, governance, indigenous knowledge systems, and environmental management. In this study, he was responsible for the other section of the literature review, editing the second draft of the manuscript, data collection, and final proofreading of the submitted manuscript.

Weston Chidyausiku is a Lecturer in the Department of Social Work at Eswatini Medical Christian University in Eswatini, Mbabane. He holds a Bachelor of Social Work Honours Degree and a Master of Social Work. He has over 10 years of experience in the academic field, teaching mostly Project Management, Social Work, Law, and Community Development. His research interests include community development, corporate social responsibility, social work regulation, and cross-cutting issues in community health. In this current study, he was responsible for literature on an overview of the education system in Zimbabwe, quality control, and worked with the first author to develop methodological conceptualisation. He also coordinated with authors in data quality management before analysis in SPSS.

ORCID

Taruvinga Muzingili http://orcid.org/0009-0008-7406-4935

Data availability statement

Due to ethical restrictions in ethical approval protocols, public repositories cannot share the raw data. However, the corresponding author can request the sharing of the anonymized SPSS data set.

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