Master of Public Health

Master de Santé Publique

Comparative analysis of work-related burnout symptoms among teachers in private and public schools : a cross-sectional study in post-COVID Uganda

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List of acronyms

WRB: Work-Related Burnout

CBI: Copenhagen Burnout inventory

MBI: Maslach Burnout inventory

RRP: Regional Resource Person

MLHQ: Mental Health Literacy Questionnaire

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I can't stress enough how important teachers are to children and humankind. Unfortunately, our societies do not treat them as they deserve and do not give them the means to fulfil their essential missions. I would like to see this work as a small token of my gratitude to them.

Abstract English:

Context: Teachers globally, are facing mental health challenges and the literature shows that they have a higher level of mental health issues and particularly work-related burnout. Teachers' mental health has an impact their relationship with learners and their academic outcomes. COVID-19 pandemic worsens that situation. Ugandan educative system presents several challenges for teachers and those challenges might be unbalanced between private and public sectors. This study investigated the association between school type (private/public) and work-related burnout among teachers in Uganda, while also exploring their experiences during school closures due to the pandemic. The study aimed to fill gaps in the literature, specifically in the Ugandan context, regarding teachers' level of burnout, differences between public and private schools, factors associated with burnout, and the impact of COVID-19 school closures on teachers.

Methods: Data were collected from 1021 teachers in public and private schools. The schools were randomly sampled from a pool of educational institutions participating in a violence against children prevention program called the Good School Toolkit. We measured teachers' WRB using the Copenhagen Burnout Inventory. Descriptive and statistical analyses were conducted, including logistic regression to examine the direct effect of the type of school on the prevalence of burnout symptoms. Variables such as age, gender, marital status, seniority, and school level were included as potential confounders. The study also explored the factors related to school closures and their impact on teacher burnout.

Results: The prevalence of work-related burnout symptoms, assessed using the Work-Related Burnout scale of the CBI, was 21.8% (223 teachers) in the overall study population. This proportion was slightly lower in public schools (21.7% or 183 teachers) compared to private schools (22.5% or 40 teachers). Teachers in private schools had 1.60 times higher odds of experiencing work-related burnout symptoms compared to those in public schools, after adjusting for confounders. We identified several teachers' characteristics differing between public and private schools in Uganda such as median age, marital status, and gender. Factors associated with work-related burnout included symptoms of general anxiety disorder, mental health literacy, job satisfaction, perceived self-efficacy, and relationships with caregivers. Teachers' perceptions of life balance during school closure, relationships within the school, their work, coping strategies, and perceived support from the school were significantly associated with burnout.

Conclusion: Private schools teachers in our study had a higher odds ratio of WRB after adjusting for confounders using a logistic regression. A longitudinal study focusing on the different outcomes and factors influencing teachers' mental health should be done to refine and strengthen these results.

Abstract French:

Contexte : Le rôle d'enseignants de façon globale a un impact sur la santé mentale des éducateurs et la littérature montre qu'ils ont un niveau plus élevé de problèmes psychologiques et psychiatriques et en particulier d'épuisement professionnel (burnout). La santé mentale des enseignants a un impact sur les relations avec les élèves et sur leurs résultats scolaires. La pandémie de COVID 19 aggrave cette situation. Le système éducatif ougandais présente un certain nombre de défis pour les enseignants et ces défis pourraient être déséquilibrés entre les secteurs privé et public. Cette étude a examiné l'association entre le type d'école (privée/publique) et l'épuisement professionnel chez les enseignants en Ouganda, tout en explorant leurs expériences lors de la fermeture des écoles liés à la pandémie. L'étude visait à combler les lacunes de la littérature, en particulier dans le contexte ougandais, concernant le niveau d'épuisement des enseignants, les différences entre les écoles publiques et privées, les facteurs associés à l'épuisement et l'impact des fermetures d'écoles COVID-19 sur les enseignants.

Méthodes : Des questionnaires ont été recueillies auprès de 1021 enseignants d'écoles publiques et privées. Les écoles ont été choisies au hasard dans un groupe parmi un groupe d'établissement participant à un programme de prévention contre les violences faites aux enfants, appelé "Good School Toolkit". Nous avons mesuré l'épuisement professionnel des enseignants à l'aide du Copenhagen Burnout Inventory. Des analyses descriptives et statistiques ont été réalisées, y compris une régression logistique pour examiner l'effet direct du type d'école sur la prévalence des symptômes d'épuisement professionnel. Des variables telles que l'âge, le sexe, la situation matrimoniale, l'ancienneté et le niveau scolaire ont été incluses comme facteurs de confusion potentiels. Notre étude a également exploré les facteurs liés à la fermeture des écoles et leur impact sur l'épuisement professionnel des enseignants.

Résultats : La prévalence des symptômes d'épuisement professionnel, évaluée à l'aide de l'échelle d'épuisement professionnel du CBI, était de 21,8 % dans l'ensemble de la population étudiée. Cette proportion était légèrement inférieure dans les écoles publiques (21,7 %) par rapport aux écoles privées (22,5 %). Les enseignants des écoles privées avaient 1,60 fois plus de chances de présenter des symptômes d'épuisement professionnel que ceux des écoles publiques après ajustement. Nous avons identifié un certain nombre de caractéristiques qui diffèrent entre les enseignants des écoles publiques et privées en Ouganda, telles que l'âge médian, la situation matrimoniale et le sexe. Les facteurs associés à l'épuisement professionnel comprennent les symptômes d'anxiété générale, la littératie en matière de santé mentale, la satisfaction au travail, la perception des capacités professionnels et les relations avec les proches. La perception qu'ont les enseignants de l'équilibre de vie pendant la fermeture de l'école, des relations au sein de l'école, de la perception de leur travail, des stratégies d'adaptation et du soutien perçu de l'école était significativement associée à l'épuisement professionnel.

Conclusion : Dans notre étude, les enseignants des écoles privées présentaient un rapport de cotes plus élevé pour l'épuisement professionnel après ajustement des facteurs de confusion à l'aide d'une régression logistique. Une étude longitudinale axée sur les différents résultats et facteurs influençant la santé mentale des enseignants devrait être réalisée afin d'affiner et de renforcer ces résultats.

Introduction:

Context

Teachers' well-being.

The role of teachers in shaping the school environment is fundamental and multifaceted. Beyond the transmission of knowledge to students, teachers play a vital role in sharing values and acting as ethical role models. They facilitate the opening of students' minds to the world around them, contribute to their socialization, and guide them towards personal fulfilment. However, it is important to consider the weight of these responsibilities on teachers' well-being, especially since it is directly linked to the quality of their teaching.

In February 2009, the Teacher Support Network Research Services published a review of the evidence on "Teacher well-being"(1). It highlighted the "cultural construct of well-being as a shifting set of meanings" and define them as "what a group or groups of people collectively agree makes 'a good life'." The review also emphasizes how teachers' well-being is a complex notion, requiring taking into account multiple factors notably when we want to understand what the causes are of "teacher stress".

"Teacher stress" is defined by the Pr. Chris Kyriacou, a member of the department of Education of the University of York, as "the experience by teachers of unpleasant negative emotions, resulting from aspects of their work as a teacher that are triggered by a perception of threat in dealing with the demands made upon them" (2). He isolates three possible triggers: having to deal with the demand, the fear of being unable to deal the right way with the demand, and the fear that not dealing the right way with the demand may have negative consequences.

Focusing on teachers' mental health is a priority in itself. As it says in the introduction of the 2022 WHO guidelines on mental health at work: "Working people, like all people, deserve an inherent right to the highest attainable standard of mental health at work, regardless of their type of employment"(3). But it should also be considered as a condition *sine qua non* to students' achievements in school. Their mental health can significantly impact their relationships with students and student outcomes but also have a negative impact on school climate and relationship with the administration(4–6). Poor mental health can mean increased workloads, more problems to resolve, having to cover extra classes, difficulty in maintaining relationships, and difficulty with social or professional interactions(7). These considerations are all the more important given that teachers are at higher risk of mental health diseases such as anxiety, depression, and work-related burnout(8).

Work-related Burnout occupies a specific place in the literature on teachers' mental health with several studies exploring it. It was defined in 2021, in a Delphi consensus(9), by a multidisciplinary

panel of experts in occupational health, from 29 countries, as: “In a worker, occupational burnout or occupational physical AND emotional exhaustion state is an exhaustion due to prolonged exposure to work-related problems”. A 2020 meta-analysis explored the consequences on learners of teachers Burnout(10). This review based on the existing quantitative literature until June 2020, included 14 studies measuring both teachers’ burnout and students’ outcomes. The key consequences found in these studies are in student academic achievement, their motivation and behaviour.

Studies on teachers’ mental health identify several groups of workplace stressors: low pay, heavy workload and extensive working hours, job satisfaction(11), relationships with colleagues, students(12–14), and management, shortages or absences of teacher leading to a disrupted organisation(15,16), poor working environment and lack of support(17), the pressure of school targets and inspections, coping with change and administrative duties(18). Those pre-existing problems were worsened by the 2020 “Syndemic”.

COVID and teachers

In his September 26, 2020 editorial, Richard Horton, editor-in-chief of the journal The Lancet, urges that the Covid-19 epidemic no longer be viewed as a pandemic but rather as a syndemic(19). His view is based on the complex interaction of a biological threat (SARS-COV2), with socio-economic disparity in our societies. The virus is not only threatening the biological health of the population it has also a variety of consequences on the other aspects of their life. Teachers well-being was threatened in two aspects: both their personal life balance and their environment of work were particularly troubled(20). The few studies on teachers mental health during and after Covid, draw a negative picture of the situation(21–23).

Consequences of COVID on children

School closures have been one of the most significant impacts of the pandemic on children, even more in countries with already fragile school systems and limited access to education(24–26). School environments provide a setting where children can develop their social skills, and learn how to interact with others, play a crucial role in the detection of domestic violence(27,28), and for children in the most deprived countries, are sometimes a vital safety net for children from low-income families through feeding programs(29,30). COVID-19 dealt a serious blow to the achievement of the Sustainable Development Goal 4(31) landmarks(32) which aims to ensure inclusive and equitable quality education for all, with the long-term goal of “peace and prosperity for people and the planet”.

School closure in Uganda

One year after the beginning of the pandemic, 168 million students in 14 countries missed almost all classroom instruction time due to school closure, with an estimated 90% of students affected at some point during the pandemic(33). In Uganda, the impact has been particularly severe, with the longest lockdown in the world. Schools closures in Uganda lasted almost two years: from March 2020 until January 2022(34).

Consequences for Ugandan children have been explored by teams of searchers: a 22.5% increase in pregnancies among school going-girls and women aged between 10-24 years between March 2020 and June 2021 and an increase in child labour from 21% to 36%, were measured. Statistical models predict 2.8 years of learning deficit(35). To have a better understanding of how schools closures affected children, interviews were conducted as part of the “Contexts of Violence in Adolescence Cohort “(CoVAC) Study(36). The interviews showed how COVID 19 created new challenges for children but mostly exacerbated existing flaws and inequalities in the educative system and Ugandan society more broadly. We can see how scarce literature was built around the question of the impact COVID-19 on Ugandan children, but nothing is known about the school workforce.

Ugandan education sector context

Uganda is a landlocked country located in East Africa, bordered by Kenya to the east, Tanzania to the south, Rwanda to the southwest, South Sudan to the north, and the Democratic Republic of the Congo to the west. 46 million Ugandans populate its 241 000 km² area (comparable to the area of the United Kingdom).

Children in Uganda make up a significant portion of the population, with around 56% of the population being under the age of 18. The government of Uganda considers education a basic human right, but the school system is fragile. Only eight out of ten children aged six to twelve years attend primary school and no more than one in four attend secondary school(37). The country gained independence from the United Kingdom on 9 October 1962. Before that and like most colonised countries, natives had little if no access to education. The education system in Uganda comprises pre-primary education, seven years of compulsory primary education (also called basic education), six years of secondary education, and a minimum of three years of tertiary education.

In 1993, the government of Uganda decided to liberalize the education sector,and thousands of schools and institutions have been set up by private investors. In the secondary sub-sector, the number of private schools, at about 4000, is more than double the number of government-funded schools, while the primary sub-sector has 12,000 public-funded schools for 8000 private schools(38).

In primary school, 8 million pupils attend a government-funded school and 1,8 million a private one. Private schools managed to make themselves significant and necessary actors in the Ugandan educative system, which without it could not absorb such a large number of students. Even more since Uganda's Universal Primary Education program was launched in 1997, provoking a large increase in the number of students. The importance of private schools, both in terms of numbers and given the seriousness of their tasks, justifies assessing the quality of the education they provide.

The private system is facing criticism and the closure of 63 Bridge International Academies schools might be a textbook case of the situation: this for-profit international, initially pushed by governmental and international actors as a solution for the lack of public infrastructure, failed to comply with the basic requirements and minimum standards for schools, as stated by the sectoral committee on education and sports of the Parliament of Uganda(39). The reasons mentioned are notably the risks to the health and safety of the children and the poor quality of the education offered. This situation is said to be partly explained by the lack of investment by the organisation in the infrastructures and in the training of teachers.(40)

Higenyi Franklin, a lecturer at the Uganda Management Institute, wrote a paper about the privatization of the educative system in Ibanda district, Uganda in 2020. She showed how "privatization in the education sector has not achieved what it set out to" and she makes the case that rural women are the most negatively impacted by the situation. She is not calling for the ban of the private sector, but for more governmental intervention to assure more equitable access to education for all in Uganda(41). In 2021, the Research for Equitable Access and Learning Group of the University of Cambridge performed a quantitative study on the impact of private schools on learnings based on the data of 560,000 children in India, Pakistan, Kenya and Uganda. The study shows that, on average, a significant portion of the educational advantages observed among privately educated students, when compared to their counterparts in public schools, can be attributed to their socioeconomically privileged backgrounds rather than the quality of their educational institutions. It also suggests that the actual impact of many private schools on students' academic achievements is minimal, with only a marginal increase of a few percentage points in some instances, and in certain cases, no discernible difference at all(42). Going back to Pr Kyriacou work(2), those signs of the private educative system failing children, might lead to "teachers stress" since they might feel unable to deal the right way with the demand, and fear the potential negative consequences.

The Education Policy Review Commission (part of the Ugandan ministry of Sport and Education) is considering those concerns around the private sector in education. The main function of the Education Policy Review Commission (EPRC) is to draft a new macro policy framework for education and sports in Uganda(43). This will replace the current Government White Paper on Education of

1992. The commission is trying to consult with stakeholders to grab a hold on the Ugandan schools' challenges(44). Among those stakeholders, teachers should have a prominent place.

A stressful environment for the school workforce

Going back to the COVID-19 specific context, significant issues emerged, taking potentially a toll on teachers' well-being : Forced adaptation to maintain education, while facing uncertainty, compounded by the fact that only 6 percent of households had access to computers, 99 percent relied on mobile phones for internet access, and a mere 8 percent reported school-aged children having access to the internet when available(37). The arduous task of helping students recover the years of lost learning due to the pandemic. Going back to crowded classes with concerns regarding their health, given the limited availability of vaccinations and PPE during the school reopening phase. The financial crisis resulting from the pandemic led to many teachers seeking alternative employment, exacerbating the existing shortage of teachers and burdening those who remained in the profession with increased workloads. This specific financial challenge for teachers is worst in the private sector who accumulated huge debts between 2020 and 2022(45–47). Teachers employed in private institutions, not being part of the government payroll, were subject to the discretion of their respective organizations regarding salary payments, which, unfortunately, were withheld by many.

The Ugandan educational system poses a challenging environment for teachers, which is further compounded by the ongoing pandemic and the potential for unbalanced workplace conditions in private and public schools. Despite this, there is no study from our knowledge exploring teachers' mental health in Uganda during COVID, or before, and no study comparing the mental health of private and public teachers. Therefore, we aim to explore the question: do private school teachers, in Uganda have a higher prevalence of work-related burnout symptoms, compared to public school teachers, after school reopening?

Aims of study

To determine whether teachers in private schools report higher levels of work-related burnout symptoms versus teachers in public schools, after covid schools reopening in Uganda.

Hypothesis

Teachers in private schools in Uganda are more likely to have a higher level of burnout during this specific period post COVID lockdown.

Objectives

1) Describe general schools' characteristics by type of school in Uganda.
2) Identify factors differentiating the experience of COVID between private and public schools in Uganda.
3) Estimated an unadjusted association between school type and work-related burnout in teachers.
4) Explore whether any association persists after adjustment for confounders.
5) Explore other factors' unadjusted association with Work-related Burnout in teachers.

Material and methods

Study design

This is a cross-sectional quantitative analysis of data collected during the "Regional Resource Persons" (RRP) Study in Uganda.
The larger "RRP study" goal is to test feasibility, acceptability, and fidelity of using Regional Resource Persons to deliver the Good Schools Toolkit in primary and secondary schools in Uganda. Raising Voices, a Ugandan NGO focusing on child protection, developed in 2010 the Good School Toolkit (GST), a whole-school intervention to prevent violence from school staff towards students, and peer violence between students. It was tested using a randomised controlled study and found to be effective in reducing violence against children. Following this successful evaluation of the intervention, Raising Voices is now scaling up GST implementation. Under the new GST delivery model, schools will have specific individuals assigned to train and support them. These individuals are called Regional Resource Persons (RRPs).

To pursue this aim, the study adopted a parallel mixed-methods design with the following components:

- quantitative survey of teachers: baseline and endline
- qualitative longitudinal research with Teacher Protagonists
- qualitative longitudinal research with RRPs

Our research question was explored in the quantitative survey taken by teachers at baseline.

Population

The study population consisted of primary and secondary school teachers, in the private or public sector, sampled in schools participating in the RRP program.

Sample size calculations

The sample size calculations were done to answer the RRP study goal and described in the research protocol quoted in appendix 1. For the quantitative data collection, sample size calculations were based on being able to detect similar differences between baseline and end-line to those observed in the original RCT examining the effectiveness of the GST in primary schools (48). This translates to sampling 60 primary and 40 secondary schools to get around 1000 teachers.

The sample size determination and power calculation were not re-executed in this study, since in the context of a secondary analysis, those processes are not necessarily considered relevant(49).

Sampling

840 schools, all over Uganda were included in the project. Raising voices reached them and offered them to volunteer for the program. Schools (60 primary and 40 secondary) were sampled randomly from those volunteer schools, within strata of geographical area, leading to a balanced number of schools by region.

Eighteen teachers were randomly sampled in schools where the total number of teachers was greater than 18. Systematic random sampling was used to identify teachers to participate in the study. A sample interval was used to identify selected teachers from a list of teachers provided by the school. If the school had less than 18 teachers, all teachers in selected schools were invited to participate.

Consenting process

The consent process was top-down: the administration of each school was asked to agree to participate in the study. If they agreed, they provided a list of teachers to the study team, which allowed the sampling process to continue. The team introduced the study to the sampled teachers and ensured that the process was informed and that all participants understood all the information in the consent form. Teachers were included after giving consent to participate in the study.

Data collection

AfriChild is a group generating research aiming to inform policy and practice for the well-being of children in Africa. The team is based in Makerere University in Kampala, Uganda. They supported the training, data collection, and management processes for the quantitative data. A team of five research assistants was then trained and deployed in the four regions of the country.

Survey tool

After the consenting process, the participants were given tablets to complete a self-administered questionnaire. In this activity, the teachers through the guidance of the team (if needed) navigated through the tool in the tablet until the submission level.

All individual survey measures were translated into the local languages and English. The survey went through a phase of cognitive testing, with a particular focus on new measures, to ensure that the items are understood by teachers. Baseline questionnaires have been structured and refined such that the average completion time is approximately 20-30 minutes.

Measures and data

Outcome

Our main outcome of interest is the prevalence of work-related-burnout symptoms among teachers. We used to measure it Copenhagen Burnout inventory (CBI)(50). The CBI has been validated and used in various research studies notably among teachers(51–54). The CBI consists of three subscales that measure different aspects of burnout. Personal burnout, work-related burnout and client-related burnout. We isolated the Work-related burnout section for our study. The reason for that decision was the particular focus we wanted to put on burnout related to school-related factors, and the practical issue of a questionnaire that would have been too long with the whole CBI. Theoretically, each subscale consists of several statements that respondents rate on a 5 degrees Likert-type scale, ranging from 4 to 0. The subscale has 6 questions, meaning a maximum of 24 points, with a cut of at 12 or higher, indicating the presence of symptoms of burnout.

In terms of the scoring, the original intention was to have a scale consisting of five response options: *always, often, sometimes, seldom, and never/almost never*, with scores ranging from 4 to 0, respectively. However, during the implementation of the survey on tablets, an incorrect response option format was used. Instead of the intended five options, the teachers in our study were

presented with four response options: *very often, often, occasionally, and never*, with scores ranging from 3 to 0, respectively. The reason for this modification was not identified.

As a result of this discrepancy, we needed to devise an appropriate approach to adapt the scoring calculation. To maintain equal weighting for each item, we divided the scores of the four-option items by 3 and multiplied the result by 4. Subsequently, we summed the scores obtained from all six items to calculate the composite score.

Exposure

Our main exposure of interest is the type of school in which the surveyed teachers are working. The teachers self-reported this information, and it was double-checked using the information the surveying team had on the schools. No discrepancy was found. The exposure was modelled as a binary variable: teacher in a private or teacher in a public school.

Measures

Potential factors helping us achieve our objectives were measured in the questionnaire.

Broad socio-demographic information was collected about teachers: age, sex, marital status, and number of children.

Questions about the schools and work as teachers were also asked: principal role in the school, seniority, school type, school level, working in another school at the same time, and workload.

Socio-demographic position is a potential confounding factor in the relationship between the level of burnout and the type of school. Information regarding the number of people sleeping in the same room and the number of meals eaten the day before, was collected during the first month of data collection. A second set was collected with information about items owned by the teacher's home from mid-March 2022, until the end of data collection. No teachers had the two sets of questions. We decided not to use either of these socio-economic position indexes in our analysis to simplify our analysis. We acknowledged that it's a limitation, and a sensitivity analysis using these indexes would be an interesting addition to complete this work.

We used several composite measures. Part of those are previously existing scales for the measures of General Anxiety Disorder (GAD2), Mental Health Literacy for young adult, perceived self-efficacy. The others are scales created, used, and validated in the past GST study: Job satisfaction, Attitudes toward discipline and gender-based violence, and perceived school climate. The items and details about the scores and scoring are given in appendix 2.

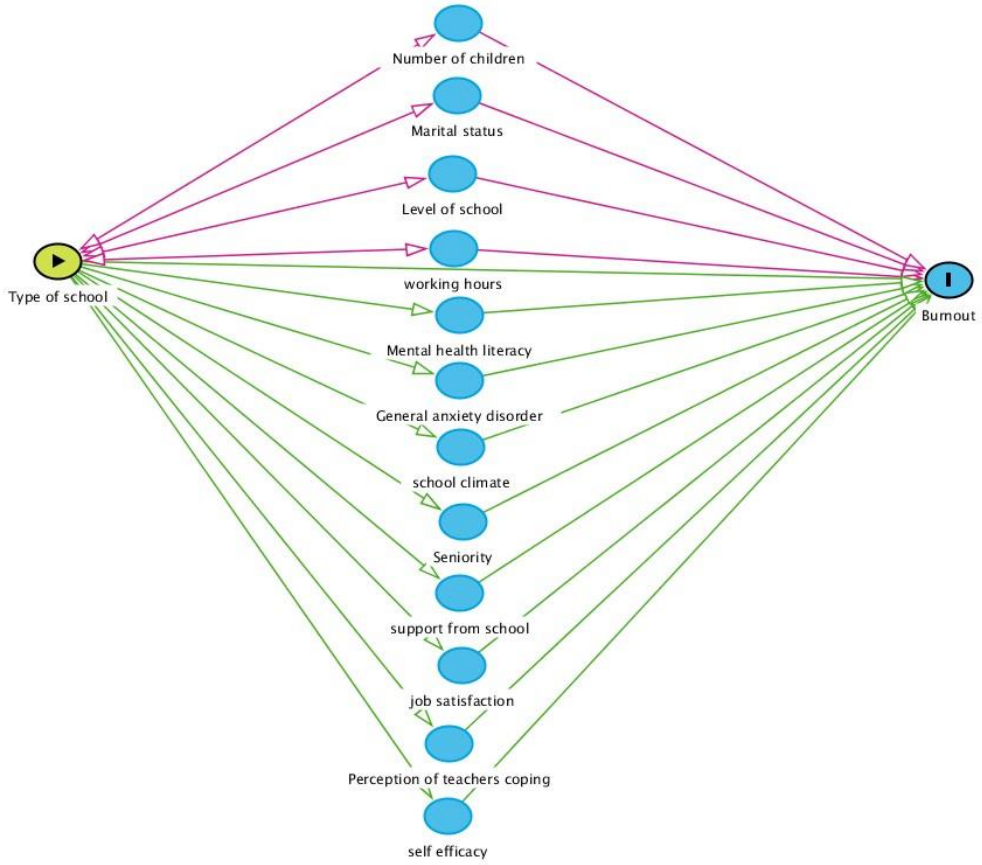
A list of items explored the teachers' experience of school closure: were they working during school closure, interacted with students (type and frequency of interaction), their incomes (by the school or other sources), how they perceived their life balance during school closure, their experience of

returning to school, the change in their numbers of hours worked, perceived changes in children's behaviour, how they perceive the way they teachers and student cope and school priority and support since reopening.

Confounders and mediators

The selection of variables, as potential confounding, and mediating factors in the relationship between the type of school and the level of burnout is based on research in the literature.

Those factors and their theoretical relationships are represented in a directed acyclic graph (figure 2). We only included in this figure, variables collected in the study and relevant to our relationship between our main exposure and main outcome.



causal path: potential mediators

biasing path: potential confounders

Figure 1 : Directed acyclic graph representing the variables potentially involved as confounders or mediators in the "Type of school" and "Symptoms of burnout" relationship.

Statistical analysis

All analyses were conducted using R version 4.3.0.
We did a complete case analysis. No variables we used in our analysis had more than 5% of missing values, with most variables showing less than 1%.
Staff responding to fewer than half of the items used to generate any of the composite measures were recorded as missing. For those participants who had answered at least half of the items, a weighting approach was employed to calculate a final score that fell within the same range as the scores of other respondents.

A descriptive analysis of the outcome, exposure, and possible confounding factors was realized usi ng mean, standard deviation for the continuous variable, median, and interval quartile range for the discrete variables, and count and percentages for the categorical variables.
We realized univariate analysis to estimate the association between our main exposure (type of sc hool) and our composite measures, with the aim to explore the differences between the public and private schools' teachers. We realized univariate analysis to explore the factors potentially associat ed with our outcome of interest (work-related burnout). Chi square were realized for categorical var iable, Wilcoxon test for discrete variables and t-test for continuous/ordinal variables.

We build a model to estimate the total effect of our exposure (type of school) on our outcome (work-related-burnout). Our outcome being a binary variable, we used a logistic regression.
We included in our model our potential confounders, but not our potential mediators.

Potential confounders were defined as such, because they are known in the literature, or we theorised them as affecting both on our exposure and outcome and as influenced by our exposure. Therefore, they can bias the total effect of our exposure on our outcome.

Potential mediators were defined as such, because they are known in the literature or we theorised them as affecting only on our outcome, influenced by our exposure and potentially in the pathway of the effect of our exposure on our outcome. Therefore, they don't bias the total effect of our exposure on our outcome but may explain partially or totally this effect.

We adjusted our model to our potential confounders, the age, gender, marital status, seniority of teachers and the schools' level (primary, secondary).

Ethical consideration

Ethical approval for the study was obtained from the London School of Hygiene & Tropical Medicine Ethics Committee (**LSHTM Ethics Ref:** 22887), the Mildmay Uganda Research Ethics Committee and the Uganda National Council for Science and Technology.

Results

Descriptive analysis

The data collection was conducted from 28 February 2022 to 4 April 2022. Schools were closed from March 2020 until January 2022(34). Therefore, teachers were back to school for 2 to 3 months.

A total of 840 schools across Uganda were supported by a Regional Resource Person. A random sampling approach was employed to select 58 primary schools and 40 secondary schools for the study. However, the administration of two secondary schools declined participation, and one school was unable to participate due to an ongoing week-long sports event that coincided with the survey period.

The study targeted 1356 teachers from the selected 95 schools. Of these, 244 teachers (82 in primary schools and 142 in secondary schools) were absent during the research team's visit and could not be reached to reschedule the survey. Additionally, five primary school teachers and six secondary school teachers refused to participate. Furthermore, 100 surveys were excluded from the analysis because the respondents did not declare their main position as teachers (see Figure 2). Unfortunately, we lack information on the characteristics of the absent and non-participating teachers, limiting our ability to compare them with the respondents who completed the questionnaire.

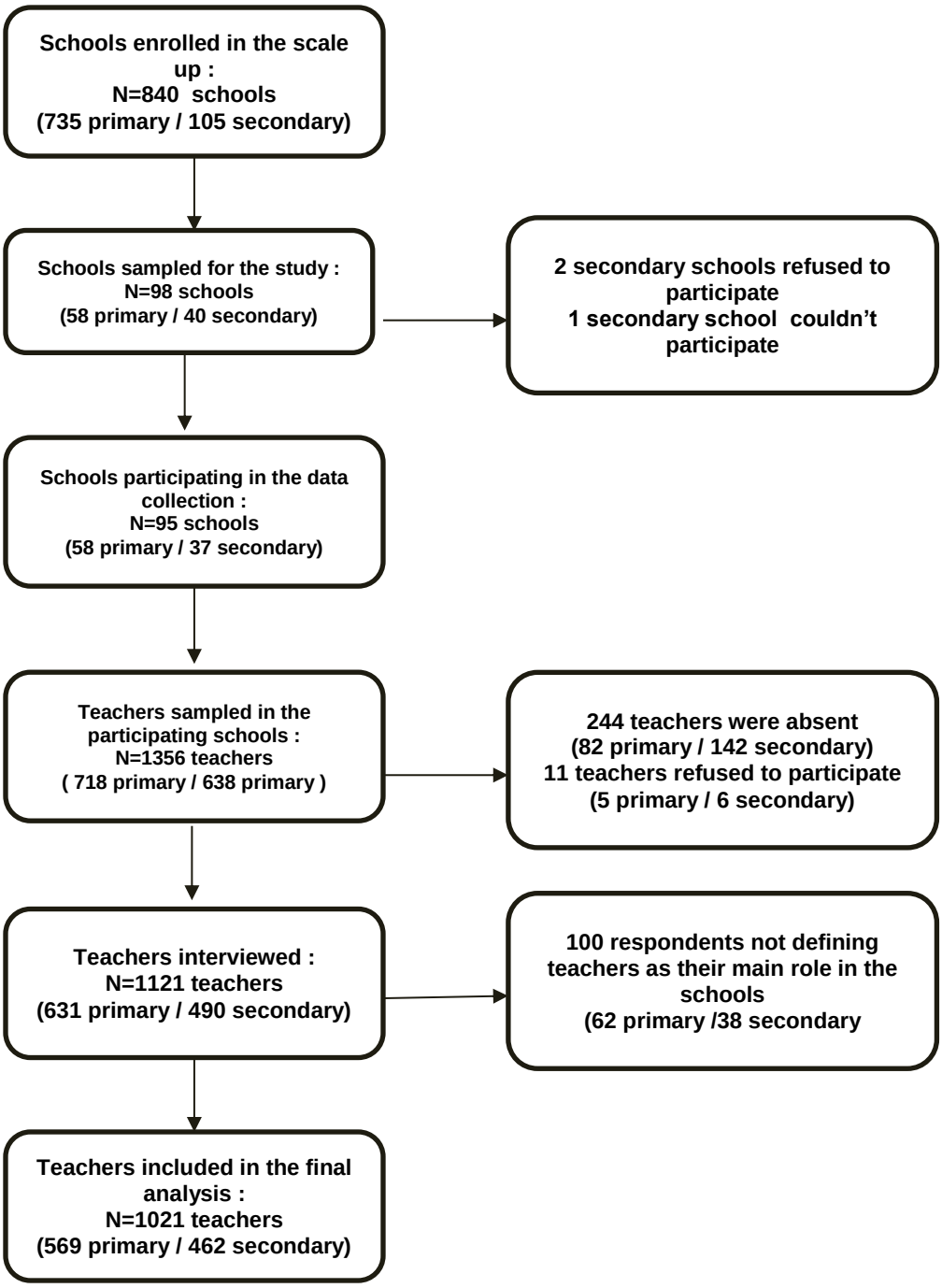


Figure 2 : Flow chart of the study population (N=1021)

Objective 1: Describe general schools characteristics by private or public schools in Uganda.

Table 1 presents a description of the study population, categorized by school type, which serves as the main exposure variable. In total, 1021 teachers successfully completed the survey, with 925 working in public schools and 196 in private schools.

Regarding socio-demographic characteristics, the mean age of the participants in our population was 38 years. Notably, teachers in public schools had a higher median age (39 years) compared to those in private schools (28 years). Female teachers accounted for 63.7% of the overall population, with a lower proportion in public schools (62.2%) compared to private schools (70.8%). Marital status differed between the two groups, with 36% of teachers in private schools declaring themselves as single, compared to 10.2% in public schools. Additionally, 53.9% of teachers in private schools reported being married, while the corresponding figure for public schools was 84.7%. The median number of children was higher for public schools' teachers (3), than for private (1).

Regarding work experience in the surveyed schools, teachers in public schools appeared to have more seniority, with 41.5% having worked for more than five years, compared to 19.7% in private schools. The mean number of days worked was higher in the public sector (4.55 days vs. 3.87 days), which was consistent with a lower proportion of public schools' teachers (12.5%) reporting concurrent employment in other schools, compared to their counterparts in private schools (34%).

Variables		Overall (n =1021)	Type of school		p value*
			Public (n = 843)	Private (n= 178)	
Age (Median [IQR])		**37 [30-45]**	**39 [32-46]**	**28 [25-35]**	**<0.0001**
Women		**650 (63.7%)**	**524 (62.2 %)**	**126 (70.8 %)**	**0.0367**
Marital status	Single	**150 (14.7%)**	**86 (10.2%)**	**64 (36.0%)**	**<0.0001**
	In relationship	**35 (3.4%)**	**21 (2.5%)**	**14 (7.9%)**	
	Married/staying together	**810 (79.3%)**	**714 (84.7%)**	**96 (53.9%)**	
	Divorced, separated, widow	**21 (2.1%)**	**19 (2.3%)**	**2 (1.1%)**	
Number of children (Median [IQR])		**3 [2-5]**	**3 [2-5]**	**1 [0-2]**	**<0.0001**
School level	Primary	**569 (55.7%)**	**527 (62.5%)**	**42 (23.6%)**	**<0.0001**
	Secondary	**452 (44.3%)**	**316 (37.5%)**	**136 (76.4%)**	
Years of seniority	<1 year	**174 (17.0%)**	**121 (14.4%)**	**53 (29.8%)**	**<0.0001**
	1-2 years	**164 (16.1%)**	**129 (15.3%)**	**35 (19.7%)**	
	3-5 years	**296 (29.0%)**	**350 (41.5%)**	**54 (30.3%)**	
	5 +	**385 (37.7%)**	**383 (41%)**	**35 (19.7%)**	
Mean Number of workdays (per week)		**4.43 (0.96)**	**4.55 (0.86)**	**3.87 (1.20)**	**<0.0001**
Mean number of hours (per week)		39	39.11	36.22	**0.3852**
Working in an other school at least once per week		**166 (16.3%)**	**105 (12.5%)**	**61 (34.3%)**	**<0.0001**

*** Chi square were realised for categorical variables, t-test to compare means and wilcoxon test to compare median**

Table 1 : General characteristics of participants by type of school (n=1021)

In terms of composite measures (table 2), public schools exhibited a higher proportion of teachers in the top tier for job satisfaction (31.6% vs. 27.0%), self-efficacy perception (39.9% vs. 31.2%), and mental health literacy (46.4% vs. 43.8%). The school climate scores showed comparable levels of teacher satisfaction in both public (33.2%) and private schools (32.6%). However, public school teachers reported better relationships with colleagues and greater involvement of staff and

students in school operations, while private school teachers had stronger relationships with students and caregivers.

The prevalence of symptoms based on the general anxiety disorder scale was 17.0% (174 teachers) in the overall population. This proportion was slightly higher in public schools (18.0% or 152 teachers) compared to private schools (12.4% or 22 teachers).

Univariate analyses revealed significant differences between private and public schools across various characteristics. These differences included mean age, proportion of women, marital status, mean number of children, school level, years of seniority, mean number of workdays and hours per week, and proportion of teachers working in other schools. In terms of composite measures, statistically significant differences were found in attitudes toward physical discipline and attitudes toward gender-based violence. Regarding school climate scores and sub-scores, only the staff's perceived relationships with colleagues and caregivers showed significant differences.

Variables		Overall (n =1021)	Type of school		p value *
			Public (n = 843)	Private (n= 178)	
Job satisfaction score	High satisfaction	**314 (30.8%)**	**266 (31.6%)**	**48 (27.0%)**	**<0.0001 (chi2)**
	Medium satisfaction	**313 (30.7%)**	**280 (33.2%)**	**33 (18.5%)**	
	Low satisfaction	**387 (37.9%)**	**293 (34.8%)**	**94 (52.8%)**	
Perceived Self efficacy score	High	**248 (29.4%)**	**71 (39.9%)**	**319 (31.2%)**	**0.0034**
	Medium	**304 (36.1%)**	**43 (24.2%)**	**347 (34.0%)**	
	Low	**288 (34.2%)**	**60 (33.7%)**	**348 (34.1%)**	
Work Related Burnout score	No symptoms	763 (74.7%)	636 (75.4%)	127 (71.3%)	0.7255
	Symptoms	223 (21.8%)	183 (21.7%)	40 (22.5%)	
General anxiety disorder	No symptoms	822 (80.5%)	671 (79.6%)	151 (84.8%)	0.089
	Symptoms	174 (17.0%)	152 (18.0%)	22 (12.4%)	
Attitudes toward physical discipline score	High acceptance	**259 (25.4%)**	**191 (22.7%)**	**68 (38.2%)**	**<0.0001**
	Medium acceptance	**357 (35.0%)**	**303 (35.9%)**	**54 (30.3%)**	
	Low acceptance	**405 (39.7%)**	**349 (41.4%)**	**56 (31.5%)**	
Attitudes toward gender based violence	High acceptance	**249 (24.4%)**	**193 (22.9%)**	**56 (31.5%)**	**0.0488**
	Medium acceptance	**159 (15.6%)**	**132 (15.7%)**	**27 (15.2%)**	
	Low acceptance	**613 (60.0%)**	**518 (61.4%)**	**95 (53.4%)**	
Mean mental health litteracy (SD)	High litteracy	469 (45.9%)	391 (46.4%)	78 (43.8%)	0.8567
	Low litteracy	533 (52.2%)	441 (52.3%)	92 (51.7%)	
Perceived school climate	High satisfaction	336 (32.9%)	307 (33.2%)	58 (32.6%)	0.5748
	Medium satisfaction	287 (28.1%)	269 (29.1%)	55 (30.9%)	
	Low satisfaction	392 (38.4%)	349 (37.7%)	63 (35.4%)	
	Staff perceived relationship with students	8.48 (2.06)	8.42 (2.07)	8.73 (2.0)	0.0582
	Staff perceived relationship with colleagues	**4.13 (1.37)**	**4.17 (1.34)**	**3.88 (1.46)**	**0.012**
	Staff perceived relationship with caregivers	**2.15 (0.81)**	**2.15 (0.81)**	**2.33(0.81)**	**0.0038**
	Staff perceived involvement of staff in school operations	3.35 (1.47)	3.38 (1.80)	3.16 (1.76)	0.0800

*** Chi square were realised for categorical variables and t-test for continuous variables**

Table 2 : Composite scores of participants by type of school (n=1021)

Objective 2: Identify factors differentiating experience of COVID between private and public schools in Uganda.

The survey also explored the experiences of teachers during school closures (table 3). Most teachers, both in public and private schools, reported interacting with students during the lockdown (84% vs. 89%, respectively). However, a higher percentage of teachers in public schools (69%) reported being paid during the closure, while only 3% of private school teachers received payment. Both groups had a similar proportion of teachers engaged in other income-generating activities during the closure (46% vs. 50%). These percentages were lower when respondents were asked about income-generating activities at the time of the survey (32% for public schools, 36% for private schools).

Variables		Overall (n =1021)	Type of school		p value*
			Public (n = 843)	Private (n= 178)	
School closure	Interacted with students	660 (84%)	549 (82.9%)	111 (89%)	0.1249
	Paid during school closure	**643 (57%)**	**638 (69%)**	**5 (3%)**	**<0.0001**
	Already working in this school before school closure	**660 (77.6%)**	**665 (79%)**	**126 (71.6%)**	**0.0442**
	Another generating income during school closure	470 (47%)	381 (46%)	89 (50%)	0.405

Table 3 : Experience of teachers during school closures by type of school (n= 1021)

Objective 3: Estimate an unadjusted association between school type and work-related burnout in teachers

The prevalence of work-related burnout symptoms, assessed using the Work-Related Burnout scale of the CBI, was 21.8% (223 teachers) in the overall study population. This proportion was slightly lower in public schools (21.7% or 183 teachers) compared to private schools (22.5% or 40 teachers). No significant association was found in an unadjusted analysis (p-value = 0.7255).

Objective 4: Explore whether any association persists after adjustment for confounders.

We employed a logistic regression to estimate the total effect of school type (private or public), on the risk of symptoms of work-related burnout (table 4).

After controlling for age, gender, marital status, number of children and the school levels (primary or secondary), it was observed that teachers in private schools had 1.60 times higher odds of experiencing work-related burnout symptoms compared to their counterparts in public schools (95% CI [1.00; 2.53]).
We do not report the Odds ratio of the other variables of our model since this is not what we are exploring and therefore our model wasn't built to explore their direct effect on our outcome.

Variables		Odds ratio	p value	OR CI [2.5%;97.5%]
School type	**Private (v.public)**	**1.60**	**0.0459**	**[1.00 ; 2.53]**
School level	**Secondary (v.primary)**	**0.71**	**0.0498**	**[0.50 ; 0.99]**
Marital status	In relationship (vs.single)	1.06	0.9019	[0.34 ; 2.59]
	Married/staying together (vs.single)	1.23	0.4289	[0.71 ; 1.92]
	Divorced, separated, widow (vs.single)	**3.17**	**0.0260**	**[1.14 ; 8.87]**
Mean number of children	1-2 years (v.<1 year)	1.01	0.7612	[0.93 ; 1.10]
Gender	female (v.male)	0.88	0.4452	[0.63 ; 1.22]
Age		1.01	0.6211	[0.93 ; 1.10]

Table 4 Logistic regression results

Objective 5: Explore other factors' unadjusted association with Work-related Burnout in teachers.

Table 4 presents factors associated with work-related burnout among teachers, as explored in the study. We didn't report standard deviation in this table for clarity purpose, but we made sure that they were in a range making the comparisons meaningful. Work-related burnout symptoms were found to be associated with symptoms of general anxiety disorder, mental health literacy, job

satisfaction, perceived self-efficacy, and relationships with caregivers (sub-score). A number of factors related to school closures were associated with the presence of symptoms of WRB: factors related to life balance during the lockdown (food security and physical health), with lower scores for teachers with symptoms of burnout. Associations were also present for items related to the perception of teachers work, their relationship within the school, the coping of teachers and students and the support from school. In all of these categories.

Variables			Overall (n =1021)	Work related burnout		p value*
				No symptoms (n=763, 77.4%)	Symptoms (n= 223, 22.6%)	
Job satisfaction score		High satisfaction	**314 (30.8%)**	**246 (32.2%)**	**60 (26.9%)**	**0.0192**
		Medium satisfaction	**313 (30.7%)**	**243 (31.8%)**	**102 (45.7%)**	
		Low satisfaction	**387 (37.9%)**	**274 (35.9%)**	**58 (26.0%)**	
Perceived Self efficacy score				**24.49 (4.46)**	**23.71 (4.83)**	**0.03184**
General anxiety disorder		No symptoms	**822 (80.5%)**	**630 (82.6%)**	**168 (75.3%)**	**0.0076**
		Symptoms	**174 (17.0%)**	**119 (15.6%)**	**53 (23.8%)**	
Age [median (IQR)]			37 [30-45]	36 [29-45]	38 [32-45]	0.0854
Mean number of children [median (IQR)]			3 [2-5]	3 [1-5]	3 [2-5]	0.149
Mean mental health litteracy (SD)		High litteracy	**469 (45.9%)**	**381 (49.9%)**	**73 (32.7%)**	**<0.0001**
		Low litteracy	**533 (52.2%)**	**375 (49.1%)**	**149 (66.8%)**	
Perceived school climate		High satisfaction	278 (33.0%)	247 (32.4%)	80 (35.9%)	0.5748
		Medium satisfaction	232 (27.5%)	229 (30.0%)	50 (22.4%)	
		Low satisfaction	329 (39.0%)	286 (37.5%)	93 (41.7%)	
		Staff perceived relationship with students	8.3	8.50 (2.	8.42	0.0582
		Staff perceived relationship with colleagues	**4.13**	**4.21**	**3.90**	**0.012**
		Staff perceived relationship with caregivers	**2.15**	**2.18**	**2.12**	**0.0038**
		Staff perceived involvement of staff in school operations	3.35	3.29	3.56	0.0800
		Staff perceived involvement of students in school operations	3.23	3.21	3.25	0.6664
School closure	**Life balance during school closure**	Financial security	4.06	4.08	4.07	0.9703
		Food security	**5.16**	**5.24**	**4.88**	**0.0612**
		Emotional and psychological health	4.52	4.56	4.36	0.28
		Physical health	**5.76**	**5.88**	**5.35**	**0.0046**
		Relationship with intimate partner	**5.78**	**5.93**	**5.23**	**0.0011**
		Relationship with other family members	**6.45**	**6.62**	**5.88**	**0.0002**
		Work-life	4.43	4.42	4.45	0.873
	Perception of their work	Your motivation to be a teacher?	5.43	**5.55**	**4.98**	**0.0044**
		Overall, how you feel about your job as a teacher?	7.29	**7.51**	**6.55**	**<0.0001**
		Your relationship with staff in school	7.44	**7.62**	**6.85**	**<0.0001**
		Your relationship with students in school	7.17	**7.49**	**6.93**	**0.004**
		Your relationship with parents of your students	**6.50**	**6.59**	**6.16 (2.5)**	**0.03**
	Teachers and students coping	Teachers in my school are adequately managing their workload	**2.16**	**2.21**	**2.00**	**0.0006**
		Students in my school are adequately managing their learning	1.50	1.93	1.85	0.1633
		Students in my school are feeling more stressed or anxious than normal at school	**1.41**	**1.35**	**1.62**	**<0.0001**
	Support from school	To perform my role at this time	**2.12**	**2.15**	**2.02**	**0.0100**
		.Support the mental health of other teachers at this time	**1.89**	**1.91**	**1.78**	**0.0125**
		Support the mental health of students at this time	**2.06**	**2.09**	**1.96**	**0.0088**
		Support children with child protection concerns	**2.16**	**2.19**	**2.07**	**0.0130**

*** Chi square were realised for categorical variables, t-test to compare means and wilcoxon test to compare median**

Table 5 : Bivariate analyses between other factors and main outcome (N=1021).

Discussion

Summary of main results

The present study aimed to investigate the relationship between the type of school and work-related burnout among teachers in Uganda. No crude significant association was observed but after adjusting for identified potential confounders (school type, school level, marital status, age and gender) we observed that teachers in private schools had 1.60 times higher odds of experiencing work-related burnout symptoms.

Comparison with the literature

We found a prevalence of work-related burnout symptoms, assessed using the Work-Related Burnout scale of the CBI, of 21.8% in the overall study population. This prevalence is in the lower range of other quantitative studies assessing teachers burnout using or not the CBI, in COVID context and notably a 2023 meta-analysis(55,56). We acknowledge that the response options were modified in our study and thus prevent us from approaching the real prevalence of WRB in our population. Nevertheless, being in the range of the literature for this prevalence comfort us in the reliability of our method to assess burnout. In the light of the above and considering that it might be the only evaluation of teachers' burnout in Uganda in this specific context, we emphasize the need for another quantitative study to confirm our results.

We found only one other study published by Dr Sangeeta Sood in 2019(57), comparing burnout prevalence between private and public school teachers. This quantitative cross-sectional study surveyed 150 teachers. It's worth noting that only primary schools were explored, moreover, this study took place in India and finally used the Maslach Burnout Inventory (MBI) to measure the different components of burnout. Those differences make the results of this study hardly directly comparable to ours. Nevertheless, we can draw some parallels: since we adjusted for the school level in our model, we can assume that the difference observed would still exist if we isolated the primary school. While India's and Uganda's educative systems are different, they seem to be comparable regarding the challenges of education privatisation in the Global South. In the 2019 study, the Maslach Burnout inventory emotional exhaustion (MBI-EE) was significantly higher for the private schools' teachers. A 2021 Nigerian cross-sectional study(58) compared the MBI and CBI and showed a high level of correlation between the MBI-EE and the CBI work-related burnout score ($r = 0.79$, $p < 0.001$). Therefore, keeping in mind the limits of this comparison, it seems that the Dr Sangeeta Sood study's results and our results are going in the same direction.

We explored factors differing between private and public schools to identify potential factors mediating a difference in level of burnout between private and public teachers. We found significant differences in terms of socio-demographic, workload and experience of the schools' closure. Numbers of those elements fit into the categories identified by the systematic reviews on the "determinants of burnout among teachers"(59). For this 2022 systematic review, with a protocol registered in PROSPERO, a literature search was performed from 1990 to 2021 in three databases: MEDLINE, PsycINFO and Embase. The study included were longitudinal studies. Both a quantitative and a qualitative analysis of the studies were conducted. Therefore, those factors being associated both with the type of schools and burnout should be explored in a future mediation analysis, that we didn't perform here, since it is beyond the scope of this work.

Finally, we should not omit the specific context of our study. We identified unique covid-related factors significantly associated with work-related burnout comprised of five main categories: the perceived life balance during school closure, the relationships within the school, the teacher's perception of their work, coping with the new situation and the perceived support from the school. Those factors were also identified in studies gathered in a 2023 systematic review on "the impact of the COVID-19 pandemic on the mental health of teachers and its possible risk factors"(60). This qualitative systematic review, of quantitative longitudinal and cross-sectional studies, was conducted to investigate the occurrence of psychiatric disorders and burnout syndrome in teachers during the COVID-19 pandemic. Regarding the potential risk factors, while they all make sense conceptually, and could be, for some of them, identify in our analysis, their mechanisms should be better understood to guide future studies and interventions.

Strengths

From our knowledge, this study is the first to evaluate teachers' level of Burnout in Uganda. It is part of the scarce literature on teachers' mental health in West Africa and Sub-Saharan Africa in a more general way. Those results will help to get a better understanding of this specific context. We used a sound and efficient random sampling method. Our study population is large enough to give us the possibility to have strong and reliable results.

Even though we explored work-related burnout, several of our questions were linked to non-professional life, as the number of children or the marital status. Even though they might not be accessible to intervention in schools, it is important to take them into account in the analysis of the effect of work-related factors.

Limitations

Firstly, the cross-sectional nature of the study design precludes the establishment of causal relationships. Future longitudinal studies are warranted to explore the temporal dynamics of the relationship between school type and work-related burnout. Secondly, this study was built in the first place to test the feasibility, acceptability and fidelity of the scale up, not to explore teachers' mental health, or characteristics of schools in Uganda, Nevertheless, the large number of schools and the tools used to sample them, give us trust in the representativeness of our results. Nevertheless, we acknowledge that specific studies to strengthen those results should be performed. Third, the survey response rate and the exclusion of some teachers due to missing data may introduce potential selection bias. But we did a complete case analysis and we had very few missing values, therefore we limited the bias of our results. Fourth, the study population also experienced the challenge of absent teachers during the research team's visit. We did not collect data from these staff and are therefore unable to compare them with the study population Out of the targeted 1356 teachers, 244 were absent and could not be reached to reschedule the survey. While we lack specific information on the reasons for their absence, it is plausible to consider that a portion of these teachers may have been facing burnout or experiencing related health issues. The absence of teachers, particularly if attributed to burnout, highlights the urgency of addressing this issue within the education system. Further research is warranted to explore the underlying factors contributing to teacher absenteeism and its association with work-related burnout. Fifth, modifications were made in the programming of the questionnaire in the tablets, leading to modifications in the response options offered for the work-related burnout scale. Nevertheless, we argue that since the response options were the same for the whole study population, it doesn't affect our capacity to reach our main objective. Additionally, the reliance on self-report measures and the use of composite measures may be subject to response bias and measurement error.

Our study didn't address the environmental source of stress, and workplace hazards that teachers are exposed to. These hazards include physical, biological, and chemical exposures, as well as ergonomic hazards. These hazards, if not adequately addressed, can contribute to increased stress levels and potentially exacerbate work-related burnout among teachers. A complementary study could try to explore those questions.

Lastly, we did not realize a power calculation for our study, based on the assumption that our secondary data are coming from a well-designed primary study with large and representative sample size. We therefore, argue that the sample is sufficiently powered to detect meaningful effects. This assumption is based on the premise that the original study was adequately powered,

and the secondary data preserves the same characteristics, demographics, and effect sizes as the original sample.

Implications

It is noteworthy that the public and private teachers in our study had several differences in their general characteristics. Those differences should be considered when developing interventions in schools targeting teachers' mental health. For instance, in private schools, high turnover of teachers may explain their low seniority and lower mean age. An intervention in private school, may want to work on the reason for this high turnover and find a way to encourage them to stay longer. This could be achieved at least partly by increasing the level of job satisfaction in private schools. A lower resignation level may lead to a lower burnout level for the teachers who stay and have to assume more responsibility, therefore increasing job satisfaction and contributing to a virtuous circle.

School's intervention implementation, often rely on teachers. Work-related burnout is associated with teachers perceived self-efficacy in our study. Our study design does not allow to assume causation, but future evaluation of interventions in the school context could try to evaluate the impact of teacher's mental health on the quality of implementations of programs. Potentially even more in interventions focusing on mental health issues, as the MLHQ of the teachers in our study population was associated with WRB, with a lower score for the professional experiencing symptoms of burnout. Those considerations should include the fact that WRB has a deprecating effect on the capacity of workers to evaluate their potential and accomplishments(61). Therefore, we shouldn't automatically consider teachers with mental health issues as less capable than the rest of the school force. Finally, following the result of our adjusted analysis, organisation wishing to implement programs in schools, relying on teachers, might face a higher challenge in private schools in Uganda.

In addition to the academic dimension, decision-makers and stakeholders of the Ugandan educative system should start developing contingency plans to react to future school closures. In fact, after the reopening in January 2022, schools in Uganda were again closed due to an Ebola outbreak. From our data, the life balance of teachers during the school closure was associated with symptoms of burnout. Specifically, the perception of food security, physical health, and relationship with other family members. Going further on the implications of those associations could give leads on potential targets of intervention. How to take into account, preserve and, if needed support teachers' mental health, must be part of the Education Policy Review Commission new macro policy framework. As Dr Simone Datzberger and *Musenze Junior Brian conclude in an article for "The conversation"*: "novel strategies and more resources are urgently needed to finally address

deeply rooted social injustices in and outside education that arise before, during and after public health emergencies”(62).

Conclusion

Ugandan private teachers in our study had a higher risk of work-related burnout, after adjusting for potential confounders and mediators, compared to public teachers. Furthermore, we identified differences between private and public schools that could be necessary to consider in adapting future interventions in the school environment. Finally, we identified factors associated with work-related burnout, some as potential causes, others as potential consequences and some with a probable bidirectional relationship with burnout. Those results could help feed future policies and interventions directed towards addressing teachers’ mental health for the overall quality of education. Continued research and targeted interventions are necessary to alleviate burnout among teachers, support their mental health, and foster a conducive and supportive work environment within Ugandan schools.

Appendixes

Appendix 1: "Sample size calculations" from the research protocol of the RRP study.

"Sample size calculations

For the quantitative data collection, sample size calculations were based on being able to detect similar differences between baseline and endline to those observed in the original RCT examining the effectiveness of the GST in primary schools. There is one binary and three quantitative outcomes measured in teachers which showed a significant difference at endline between the intervention and control arms in this trial[12]. These are staff self-reported use of physical violence within the past week, staff acceptance of physical violence at school, staff perceived involvement of staff in school operations and staff perceived involvement of students in school operations, as well as a composite measure of school climate which encompasses staff perceived involvement of staff in school operations and staff perceived involvement of students in school operations, and other things.

Calculations were conservative and based on being able to detect a similar difference to that seen in the RCT for the smallest mean difference (which was a mean difference of 0.42 (0.17-0.68) for staff perceived involvement of school staff in school operations) and to detect a 40% reduction in self-reported use of physical violence within the past week. This would require a sample size of 700-750 depending on the outcome assuming 95% power, an alpha of 0.01, an ICC of 0.03 and 20 teachers participating per school. Analyses will be stratified by school level (primary or secondary) since the original trial was only in primary schools. This translates to sampling 40 primary and 40 secondary schools. Since there are a total of 740 primary schools in the study and some of these have already been engaged with the GST, we have increased the sample of primary schools by 50% to 60 schools, to allow us to further stratify the analysis by prior exposure to the GST."

Appendix 2: Items and composite measures generated to measure attitudes, social norms and workplace related stressors.

Demographic				
Source	Questions	Variable type	Response options	notes
No specific source	Record sex of respondent	Nominal Binary	Male/Female	
	How old are you?	Continuous	Open numeric	
	What is your current marital status ?	Categorical	Single ; In relationship ; Married/staying together ;	
	How many children do you have?	Discrete	Open numeric	

Norms discipline				
Source	Questions	Variable type	Response options	notes
Good school toolkit studies (Merril et all 2018)	Teachers must hit students to make them listen.	Ordinal	3= Strongly agree 2 =Agree 1 = Disagree 0 = Strongly disagree	Score range = 0-18. Scores were summed and grouped in thirds to represent low, medium, and high acceptance of physical discipline.
	Students who misbehave should be physically disciplined.			
	Teachers must hit students to make them learn.			
	Teachers must be in control of students at all times.			
	Sometimes physically disciplining students is the only way to make them respect.			
	Students should fear their teachers.			

Norms gender/sexual abuse				
Source	Questions	Variable type	Response options	notes
New	Some female students want to date teachers because they are looking for somebody to buy them thing.	Ordinal	3= Strongly agree 2 =Agree 1 = Disagree 0 = Strongly disagree	
	Children lie about sexual abuse to get attention.			

Mental health norms				
Source	Questions	Variable type	Response options	notes
MLHQ young adult (Pedro Dias et all 2018)	If someone I know had a mental health problem, I would offer her/him help.	Nominal binary	1 = Yes 0 = No	Score range = 0-18. Scores were summed and grouped in two to represent low, and high mental health literacy
	Physical exercise contributes to good mental health			
	A person with depression feels very miserable.			
	If I had a mental health problem I would seek help.			
	If someone I know had a mental health problem, I would encourage her/him to seek			
	The sooner mental health problems are addressed, the better.			
	Sleeping well contributes to good mental health			
	If I had a mental health problem, I would go to hospital.			
	Alcohol use may cause mental health problems.			
	If someone I know had a mental health problem, I would listen to her/him without			
	People with mental health problems belong to low-income families.		1 = No 0 = No	
	Mental health problems don't affect how people feel.			
	Mental health doesn't affect how people behave.			
	Only adults have mental health problems.			

School climate				
Source	Questions	Variable type	Response options	notes
Good school toolkit studies (Merril et all 2018)	How often do you feel that students respect their peers and adults?	Ordinal	3 = All the time 2 = Most of the time 1 = Sometimes 0 = Never	Score range= 0-48. Scores were summed and grouped into thirds as high, medium, and low perceived quality of school climate.
	How often do you feel that school staff respect their students?			
	In your opinion, how often do you have opportunities to say what you think and c			
	How often do students in your school have an opportunity to say what they think?			
	How often do students in your school have an opportunity to contribute to how th			
	How often do you feel that your views on how the school's policies could be impr			
	Do you have a good relationship with the students?			
	How often do you take any actions to change how your school is run?			
	How often do you feel that there is anybody at your school you can talk to if yo			
	Thinking about your school as a whole, how often do you feel like you are part o			
	Would you say that students feel comfortable talking to you/want to confide in y			
	Do you have a good relationship with parents?			
	How often do you feel concerned about how other school staff members behave at school		0 = All the time 1 = Most of the time 2 = Sometimes 3 = Never	
	How often does your school experience problems with bullying (e.g. verbal abuse)			
	How often does your school experience problems with physical violence?			
	How often do you have staff meetings in this school?		3 = Weekly 2 = Every two weeks 1 = Monthly 0 = Less frequently	

Staff perceived relationship with students	Would you say that students feel comfortable talking to you/want to confide in you ?	Ordinal	3 = All the time 2 = Most of the time 1 = Sometimes 0 = Never	score range = 0-12
	How often do you feel that students respect their peers and adults?			
	How often do you feel that school staff respect their students?			
	Do you have a good relationship with the students?			
Staff perceived relationship with colleagues	How often do you feel that there is anybody at your school you can talk to if you need to ?			score range = 0-6
	Thinking about your school as a whole, how often do you feel like you are part of a team ?			
Staff perceived relationship with caregivers	Do you have a good relationship with parents?			score range = 0-3
Staff perceived involvement of staff in school operations	How often do you take any actions to change how your school is run?			score range = 0-6
	How often do you feel that your views on how the school's policies could be improved are heard ?			
Staff perceived involvement of students in school operations	How often do students in your school have an opportunity to say what they think?			score range = 0-6
	How often do students in your school have an opportunity to contribute to how the school works ?			

Job satisfaction				
Source	Questions	Variable type	Response options	notes
Good school toolkit studies (Merril et all 2018)	How often would you say you feel that you enjoy your job?	Ordinal	3 = All the time 2 = Most of the time 1 = Sometimes 0 = Never	Score range= 0-15. Scores were summed and grouped in thirds to represent high, medium, and low job satisfaction.
	How often do you feel adequately rewarded financially for what you do?			
	How often do you feel valued as an employee?o?			
	How often do you take pride in your work?			
	How often do you feel that your employers care about your wellbeing?			

Appendix 2 (suite): Items and composite measures generated to measure attitudes, social norms and work place related stressors.

School closure related				
Source	Questions	Variable type	Response options	notes
New	Were you working in this school before the school closures in March 2020 because	Binary	No; yes	
	Were you doing any work for this school?			
	Did you do any work to support learning during the most recent school closure			
	Did you interact with any of the students during the most recent school closure			
	If yes, what was the purpose of these interactions Tick all that applies	Binary	No; yes	
	If yes, what was the purpose of thes : School's formal educational program			
	If yes, what was the purpose of th : Private tuition (one-to-one or group)			
	If yes, what was the purpose of these interactions Tick all : counselling			
	If yes, what was the purpose of these interaction : Other (please specify)			
	If yes, what was the purpose of these interactions Tick all : No response			
	Please specify other	Character	Open text	
	If yes, how frequently did you interact with the students face to face?	Ordinal	1=Daily , 2=Less than daily but more than once per week, 2=Weekly 3=Every two weeks, 4=Every month, 5=Less than monthly , 6=Never	
	How frequently did you interact with the students online (including telephone)	Ordinal	1=More than once per week, 2=Weekly, 3=Every two weeks, 4=Every month, 5=Less than monthly, 6=Never	
	Did you have other income-generating activities / paid work during school closures?	Binary	No; yes	
	Did you continue to be paid by the schools during the school closures?	Binary	No; yes	
	A) financial security	Ordinal	Scale from 1 to 10	
	B) food security			
	C) emotional and psychological health			
	D) physical health			
	E) relationship with intimate partner			
	F) relationship with other family members			
	G) work-life			
	Are you working more or less hours for this school compared to the period before	Categorical	1=More hours now 2=Less hours now 3=The same number of hours	
	your motivation to be a teacher?	Ordinal	Scale from 1 to 10	
	your relationship with the school administration			
	your relationship with staff in school			
	your relationship with students in school			
	your relationship with parents of your students			
	overall, how you feel about your job as a teacher?			
	Teachers in my school are adequately managing their workload since the return to	Ordinal	Strongly agree = 01, agree = 02, Disagree = 03, Strongly disagree = 04	
	Teachers in my school are feeling more stressed or anxious than normal at school			
	Students in my school are adequately managing their learning since the return to			
	Students in my school are feeling more stressed or anxious than normal at school			
	In my school we have experienced more problems with student behaviour since school reopening	Ordinal	Strongly agree = 01, agree = 02, Disagree = 03, Strongly disagree = 04	
	Since reopening, boy students in my school have been absent more than they were			
	Since reopening, girl students in my school have been absent more than they were			
	Which of the following is the priority and focus for your school at this time?	Ordinal	1=Academic performance, 2= Staff wellbeing, 3= Student wellbeing, 4=Extra-curricular activities	
	....Perform my role at this time	Ordinal	Strongly agree = 01, agree = 02, Disagree = 03, Strongly disagree = 04 Don't know = 97	
	....Support the mental health of other teachers at this time			
	....Support the mental health of students at this time			
	....Support children with child protection concerns			

Mental health : Burnout scale				
Source	Questions	Variable type	Response options	notes
Copenhagenburnout scale (Tage.S et all 2007)	Is your work emotionally exhausting?	Ordinal	4= Always, 3=Often, 2= Sometimes, 1= Seldom, Never/almost never.	A total sum score between 0 and 24 was generated for each individual and dichotomized into ≤11, indicating no symptoms of burnout, and > 11
	Do you feel burnt out because of your work?			
	Does your work frustrate you?			
	Do you feel worn out at the end of the working day?		3= Very often, 2= Often, 1=occasionnaly, 0=never	
	Are you exhausted in the morning at the thought of another day at work?			
	Do you feel that every working hour is tiring for you?			
	Do you have enough energy (/time) for family and friends during leisure time?		0 = Very often, 1 = Often 2 =occasionnaly, 3 =never	

Mental health : Generalized anxiety disorders				
Source	Questions	Variable type	Response options	notes
General anxiety disorder (Kroenke K et all	Feeling nervous, anxious or on edge?	Ordinal	1=Not at all, 2= Several days, 3 = More than half the days , 4= Nearly every	Theoretically 7 items, Likert-type response mode ranging from 0 to 3
	Not being able to stop or control worrying?			

Self efficacy				
Source	Questions	Variable type	Coding	notes
Dimensions of self efficacy (Skaalvik et all 2007)	...motivate students who show low interest in schoolwork	Ordinal	1=All the time, 2=Most of the time, 3= sometimes, 4= Never	Scores range from 0 (low) to 30 (high).
	...involve students in the development of classroom rules and consequences.			
	...make sure all students understand expectations on classroom behaviour.			
	...communicate and provide encouragement for students to have good conduct.'			
	...get students with behavioural problems to respect classroom rules.			
	...maintain active class participation even with large class sizes			
	...maintain discipline in any class or group of students without using verbal or			
	...help even the most aggressive students to follow classroom rules.			
	...find peaceful solutions to conflicts in the class.			
	...maintain discipline even with large class sizes without shouting			

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