Use of Information and Communication Technologies as a Medium for Education in Albania

Loreta Axhami* and Mirdaim Axhami

***Abstract*—Information and Communication Technologies (ICTs) have impacted education by introducing new methods of teaching and learning. However, while there are some studies that highlight the role and impact of ICT in the educational system, there is little research on the use of ICT for pedagogical purposes in Albania. To address this gap, this study elaborates on ICT use for pedagogical purposes specifically in secondary schools in Albania. It investigates the relationship between ICT inclusion in teaching and the degree to which these factors are reflected in the education system. To do so, the study combines qualitative data from curricular frameworks, school textbooks, and the National Education Strategy with quantitative data from surveys of first-year students of the Faculty of History and Philology, Tirana University. Hence, the research focuses on descriptive analyses of students' opinions gathered through questionnaires and detailed analyses of the qualitative key documents: education strategies, curriculum framework and textbooks. The findings reveal that ICT use in the teaching and learning process (as a medium) is at a low level, while it is well established as an object of a course or as an aspect of a profession. Moreover, the results contribute to past research on the educational system and use of technologies in pedagogy by suggesting several barriers to effective ICT utilization for educational purposes. Such barriers include inadequate technological resources, limited availability of digital content in the native language, and restricted student internet access within school premises. Additional challenges are related to the overreliance on print textbooks, and the dominant role of teachers as the primary or sole source of knowledge and information. Finally, this study contributes to research on educational technology and pedagogy by emphasizing the urgent need for improvements in textbooks, comprehensive teacher training programs, and the adoption of contemporary pedagogical methodologies to foster critical thinking skills among the younger generation.**

***Index Terms*—Digital competence, education, information and communication technologies, learning media**

I. Introduction

The role of Information and Communication Technologies (ICT) in education is a concern of numerous scientific studies. Research has dedicated increasing attention to the role of ICT in education. The literature [1] acknowledges the power that technology has to completely revolutionize education by introducing a series of innovative teaching and learning paradigms. In addition to the positive effect ICT can have on learners' academic performance, according to Oki *et al*. [2], it can serve to encourage positive behavior.

Past research has acknowledged the importance of learning infrastructure—mainly thought of as a combination of teaching materials, learning content, and technical infrastructure—in the educational process [3]. This is evidence of the important effect of the methods of teaching and learning involving ICT on education. Educational technology is defined by Hennessy *et al*. [4] as "technologies—including hardware, software, and digital content—that are either designed or appropriated for educational purposes". According to Anderson [5], ICT can also be referred to as "technology, new media, or digital media, corresponding to "computer technology, multimedia, and networking, especially the Internet".

Hence, past research agrees on the importance of ICT in improving student education and lecture delivery in class. New ICT "break down" the barriers between school and society, as well as those between schools and the institutions and agencies that produce culture, scientific knowledge and news. Thanks to these technologies, the linear treatment of knowledge is completed by methodology, thus creating a harmonious mosaic of fragmented knowledge [6].

One of the most discussed topics regarding pedagogical methods is that of teacher-centered versus student-centered instruction. Relatedly, past research states that the utilization of ICT in education enables the shift from teacher-centered pedagogy to a more learner-centered approach [7]. Furthermore, as the literature on ICT suggests [8], this approach makes education less dependent on teacher quality. Digital technologies give students the opportunity to navigate an infinite number of sources of knowledge and information compared to books in print format. Moreover, past research [9] emphasizes another important potential of using technology in education, that of moving away from the previous rigid hierarchies in which educators and students were limited to using outdated curricula and assessment methods. At the same time, digital technology enables the combination of a variety of information sources, such as books, audio and video recordings [10].

Thanks to the diversity of information sources, the role of the teacher changes as well and is transformed from a single source into a guide or orientation for students. The circulation of information is not only done in a vertical manner according to the authoritarian model from the teacher to the student but also in a horizontal manner where the student obtains more advantages, since in a way, the student seeks the information by herself. This approach favors the work of education philosophers [11, 12], reinforcing the idea that students should not be seen as passive learners; instead, they should be considered active builders and contributors of knowledge through action and reflection. This active generation of

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knowledge by students can be achieved by encouraging and incentivizing them to ask questions, share concerns, opinions, ideas, and anecdotal evidence, reflect on raised problems and past experiences, and link theoretical knowledge to practical situations. Dewey's pragmatic theory [11] stresses active learning, experimentation and problem solving, as well as the theory of critical consciousness education according to Freire's dialogic problem-posing model [12], the essence of which is the development of a participatory discourse, which requires communication in the form of a dialogue between the students and the teacher where both sides teach each other.

Past research is in conclusive agreement on the positive impact of ICT inclusion in educational institutions on the revolution of teaching and learning by also empowering students' roles in these processes through live and interactive participation during their studies [13, 14]. Moreover, the involvement of ICT tools and equipment leads to a more pleasant and interesting learning and teaching environment for all the parties involved [15].

To obtain maximum benefits from ICT use in the learning and teaching process, there are some criteria that must be met to enhance achievement in education. Hew and colleagues [16] identify numerous reasons that could impede the integration of ICT into the study curriculum, such as (a) technology that is not developed to a level that allows the inclusion of ICT in educational institutions, (b) lack of access to available technology that is appropriately developed, (c) lack of time, and (d) technical support. Equipment with educational digital infrastructure as well as the availability of a stable and fast internet connection is considered not only a condition for the implementation of ICT in different aspects of education but also a "key enabler of innovation in learning in general" [17]. In this context, access to the internet and the use of contemporary digital infrastructure creates more opportunities for the application of new pedagogical methods, especially those focused on interactive learning.

However, it must be noted that ICT use for pedagogical purposes may encounter different challenges, which exist alongside its advantages. Previous studies have identified some of the barriers that affect the implementation of ICT in the learning and teaching process, such as the conservatism that exists in the teaching profession [18], the resistance of some educators to the optimal integration of technology into their instruction [19], and teachers' lack of knowledge and ICT competencies [20]. Other authors [15, 20–23] have found that the distinctiveness of the levels of economic development, investments in education and innovation across countries are related to the degree to which ICT has been used or integrated into their educational systems.

However, its prevalence and knowledge in developing countries, such as Albania, is mostly absent. This is particularly important to study because the education system needs competent teachers who have the right knowledge in digital matters and who apply innovative and contemporary pedagogical methods by integrating ICT in their professional practice to enhance the quality and equality of learning [24–26]. Indeed, previous research [27] has defined teacher digital competence (TDC) as the skills and abilities that instructors possess to integrate ICT in their study programs and assessments in a way that meets the pedagogical criteria and safety criteria.

In this study, we address this problematic gap by focusing on ICT use for pedagogical purposes specifically in secondary schools in Albania, investigating the relationship between ICT inclusion in teaching and the degree to which they are reflected in the education system.

II. Methodology

This study combines qualitative and quantitative methods, using, specifically, a qualitative analysis around the mail elements that compose the ICT construct (e.g., informatics, computer education, and technology) and a quantitative analysis of primary data collected from respondents who have recently experienced some extent of presence (or absence) of ICT in their high school studies.

The qualitative analysis is based on a conceptual model presented by Plomp *et al*. [3], which includes three main components: (1). The use of ICT in education focuses on learning on the topic of information technology that corresponds to the subject of Information and Communication Technology (ICT) or Technology according to Albania's current curriculum framework; (2). ICT in the prospective professions that apply ICT in education in a similar way to that used in the industry, business and professional practice that is reflected in the national education strategy; and (3). ICT is a tool for teaching and delivering knowledge through different mediums in educational institutions, which is related to the pedagogical apparatus in schools and textbooks.

The qualitative method is based on the analysis of three main components: (1) the curricular framework of preuniversity education, which includes the Core Curriculum, Curriculum and programs according to teaching subjects as well as Curricular Guides; (2) the National Education Strategy 2021–2026 and Albania's digital agenda 2015–2020; and (3) textbooks, specifically the analysis of the questions and assignments rubric. Two criteria are used to select textbooks: 1) according to the subjects' content, there were chosen subjects that contain chapters/classes on information and communication technologies; and 2) the highest/conclusive scale of subjects in upper secondary education. In total, 21 textbooks of the compulsory and elective curricula were analyzed: ICT, Technology, Sociology, Albanian Language, History, (Year 12); Philosophy (Year 11); and Civic Education (Year 10), including alternative textbooks from publishing houses.

The quantitative method is used to gather students' opinions on ICT use as a medium in school. The data are gathered by surveying first-year students of the Faculty of History and Philology, Tirana University, related to their secondary education experience.

A. Research Context

While there are some studies that highlight the role and impact of ICT in the educational system, in Albania, there is a lack of scientific research that specifically sheds light on the use of ICT for pedagogical purposes. The aim of the study is to provide detailed information related to access, knowledge, use and attitudes toward the use of ICT as a medium in education.

B. Participants

The population sample analyzed was taken from students between 18 and 19 years of age in Albania. There were 80 first-year students engaged in the study, 77.5% females and 22.5% males. The study sample was selected randomly from the student list of the Faculty of History and Philology, Tirana University. The students were from 12 large cities: Tirana, Shkodra, Lezha, Tropoja, Kukësi, Dibra, Durrës, Elbasani, Fieri, Berat, Korça and Vlora. For some reasons, it was decided to survey first-year students at the university regarding their experience with ICT during high school. First, the students feel free and are not influenced by any form of pressure to express opinion about their experience in high school since it is now a closed cycle for them. Second, the students came from different cities from the north to the south of Albania, which have differences in terms of access to the internet, technological infrastructure in schools, etc., enabling us a more complete study landscape. Students' origins were categorized as rural versus urban. We use this categorization to investigate potential differences in ICT involvement in secondary school education in Albania, expecting ICT to be more prevalent in urban, rather than rural, areas.

C. Research Questions

This paper aims to answer the following research questions regarding ICT use in the teaching and learning process in secondary schools during 2022:

1) How is ICT integrated into the teaching and learning process in Albanian secondary schools?
2) Does the existing technological infrastructure in the school encourage or hinder the use of ICT for pedagogical purposes?
3) What factors affect teachers' use of ICT in their pedagogical methods?
4) What is the level of teachers' digital competence?
5) Does the prevalence of ICT differ across rural vs. urban areas?

D. Instruments

A questionnaire as a research instrument was created and conducted by the Department of Journalism and Communication in the framework of the collective study for media education of youth in Albania. The questionnaire considered the fact that the opinions of these students were more objectively related to ICT use during high school. From this point of view, data gathered by this questionnaire were a key element that shows ICT use in the learning and teaching process. To evaluate ICT use as a medium of education, two types of questions were used: open-ended questions and Likert scale questions to assess the frequency and agreement with the questions presented. In this online survey, students were asked questions related to the following:

- technological equipment available during high school;
- experiences related to internet access on school premises;
- use of additional materials online in continuation of the educational process;
- technological devices used as a function of the educational process at school;
- perceptions related to the digital competence of teachers during the teaching process.

We have conducted an exploratory factor analysis using unweighted least squares to measure knowledge on ICT, combining the items "To what extent do you consider yourself knowledgeable about media now that you have finished your secondary school education" and "To what extent do you consider yourself knowledgeable in ICT now that you have finished your secondary school education?", measured on a 5-point scale with higher values indicating greater ICT knowledge. The exploratory factor analysis with varimax rotation, based on eigenvalues greater than 1, yielded one distinct factor, explaining approximately 80% of the variance, with Kaiser–Meyer–Olkin (KMO) = 0.500 and a significant Bartlett's test of sphericity (chi-square = 26.74, $p < 0.001$). Given these results, we can conclude that ICT knowledge is a distinct construct and will be treated as such in the following analyses. This is also supported by the value of Cronbach's alpha being greater than the 0.7 threshold ($\alpha = 0.77$).

E. Data Analysis

The collected data were analyzed using SPSS version 28 and STATA, both of which are useful software for quantitative data analysis for descriptive analyses, factor analyses, and predictive analyses. The results were interpreted in line with the research aims and questions raised in this study.

III. Results and Findings

Education infrastructure, access to the internet and technology equipment: Fig. 1 indicates that 8% of respondents did not have any technological equipment at school, whereas 76% had cellular equipment, 23% had laptop equipment and 20% had a desktop computer at their disposal. Furthermore, according to the National Education Strategy 2021-2026 (2021), "the number of nonfunctional computers reaches 25% of their total number".

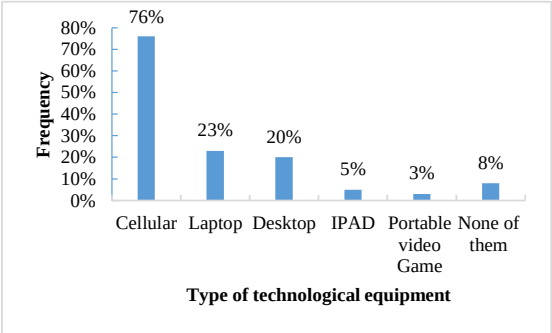

Fig. 1. Technological equipment available during high school.

While the practice of using mobile devices such as tablets, smartphones, etc., is now known for educational purposes, specific to Albania, since 2018, it has been forbidden for students and teachers to keep mobile phones in the premises of preuniversity educational institutions. Referring to the survey with students, it turns out that the regulation in question was not fully implemented in all secondary schools, as 30% of the respondents stated that they took technological equipment to school all the time; 27.5% were not allowed to use any equipment; 23.8% took them with them but did not

use them, and 18.8% did not take any equipment.

Regarding access to the internet at school, only 13.8% of the respondents had internet access throughout the school, compared to 45% who stated that they never had internet provided by the school; 37.5% of the respondents had access to the internet in special laboratories where computer courses were conducted, while 3.7% had access only in the classrooms where they studied but not in other school premises (see Fig. 2). Additionally, students do not have access to digital content in their native language.

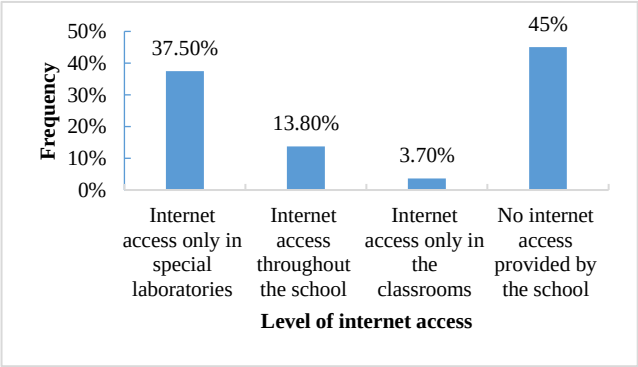

Fig. 2. Internet access on school premises.

ICT as the object of a course: Digital competence in preuniversity education is achieved through technology and ICT subjects. It is one of the seven key competences alongside the competence of communication and expression; thinking competence; learning competence; competences for life, entrepreneurship and the environment; personal competence; and civic competence. As such, digital competence is intended to be acquired by all students after the completion of higher secondary education. As a result, ICT is introduced in primary education (grade four) up to grade 12 (higher secondary education) as part of the core curriculum.

ICT as an aspect of professions: The curriculum reflects the lack of treatment of subjects according to an interdisciplinary focus to respond to the challenges and needs of the time. Based on the analysis of the ICT and technology program, there is more emphasis on the knowledge and advantages of using information and communication technologies than on the ability to analyze and evaluate the information received or created through these technologies.

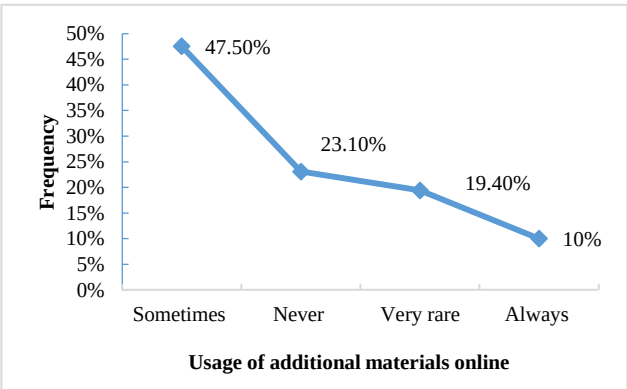

Fig. 3. Additional materials online in continuation of the educational process.

ICT use as medium (in teaching and learning process): Fig. 3 shows that the textbook in print format continues to be the main source of knowledge and information in high school. Specifically, only 10% of the respondents stated that in secondary school subjects, in addition to the textbook, additional materials were always provided with links online as a continuation of the learning process, compared to 47.5% sometimes, 19.4% very rarely and 23.1% never.

Fig. 4 shows that 37.5% of respondents used technological devices to search for information on the web, 12.5%, to request additional information on the topic of the day and 25%, to make multimedia presentations: video, audio, graphics, etc.

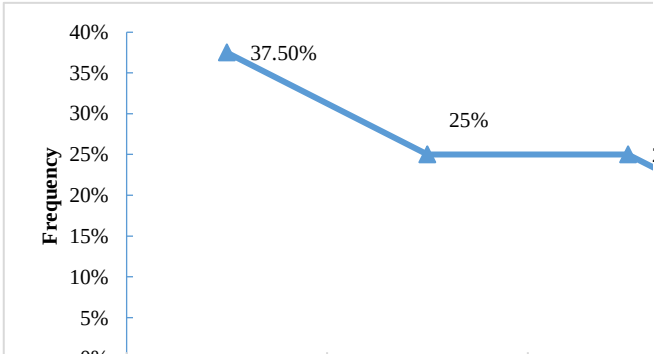

Fig. 4. Technological device use as a function of the educational process at school.

Fig. 5 presents the perception of students on the abilities of high school teachers for the use of ICT in the teaching process. The results show that only 20.3% of students think that all of the teachers were proficient in using ICT, while 73.4% think that some of the teachers were proficient in using ICT in the teaching process.

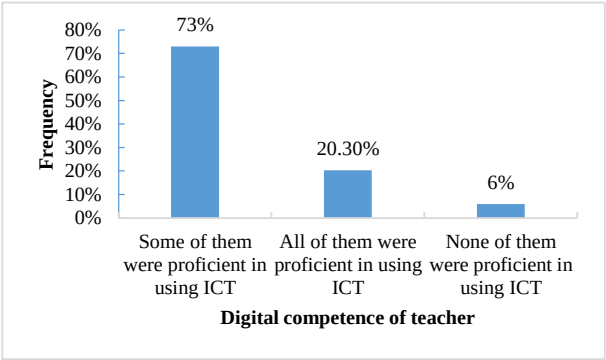

Fig. 5. Digital competence of teachers during the teaching process.

ICT knowledge across urban vs. *rural areas:* To test our prediction that ICT knowledge is greater in urban versus rural areas, we conducted a oneway ANOVA, with the dichotomous variable Urban (vs. Rural) taking the value 1 for respondents residing in urban areas (N = 48) and 0 for those residing in rural (N = 31) areas. As predicted, the results suggest significantly greater scores of ICT knowledge in urban (M_{urban} = 3.70, SD = 0.87) versus rural (M_{urban} = 3.24, SD = 0.96) areas (F = 4.76, p = 0.032). This result supports our prediction of differences in ICT knowledge across geographical areas of possibly different economic development.

Based on the analysis of the didactic apparatus, in all the textbooks included in the study, over 50% focused on memorizing knowledge and rote learning in relation to critical

thinking and learning through experience and creative practical work through ICT. Focusing on the 'memorization of knowledge' and not on their use in certain contexts brings the problem of overloading students with information and the lack of a sustainable education [28].

IV. Discussion

The ICT use in school for pedagogical purposes is related to the fulfillment of several criteria, such as access to the internet and access to high-speed internet, necessary technological equipment, access to digital content, and teachers being capable of using new technologies. The lack of a single link in this chain makes the benefits from the ICT application in the educational system minimal. Although technology promises inclusion for many of the world's students, it offers only exclusion because educational inclusion, quality and equity require access to digital devices, the internet, and qualified teachers [29].

In Albania, many schools in rural areas suffer from a lack of technological infrastructure [30]. In addition, the prohibition by the Ministry of Education and Sports of mobile phones and personal laptops in school is a policy that discourages (hinders) the use of technology by students and teachers in service of the teaching process. This policy also contradicts the new framework of key competences for lifelong learning according to the directive of the European Union (EU, 2018), which Albania intends to integrate. Such an approach does not enable the fulfillment of the basic competences of the preuniversity education curricular framework, especially digital competence, which is also a component of national education strategy. In these circumstances, there can be no knowledge and renewal of the educational process to reach the standards of developed countries if technology is excluded.

Lack of contemporary technological infrastructure and limited access to the internet in schools implies poor quality of teaching and learning, especially for subjects such as ICT, where access to the internet and equipping with the necessary infrastructure are essential to meet subjects' goals. Likewise, the lack of digital content in the Albanian language constitutes another obstacle for ICT advancement and integration in the educational process, i.e., the platforms dedicated to online learning.

While ICT as the object of a course is well established, the design of subject programs on the basis of competences highlights the lack of treatment according to an interdisciplinary focus to respond to the challenges and needs of the time. This evidence shows that the Albanian education system has not been adapted to the latest curriculum trends across countries, as it is "connecting topics/themes or developing competencies across learning areas" [31].

Placing more emphasis on technical knowledge and the advantages of using information and communication technology rather than on creating skills to analyze or use them reflects a lack of a dynamic learning process. Learning by doing could serve to better understand and analyze professionally produced content and to open new horizons of internet use [32].

ICT use in the teaching and learning process is directly related not only to internet access and technological equipment but also to teachers' digital competence. In fact, access to technological equipment would fulfill just the first requirement for the involvement of ICT in education, but it would clearly not be fully sufficient. To promote effective learning opportunities, in addition, instructors and educators must have a necessary and sufficient understanding of the types of technology available and what these technologies are designed to do [33].

Our findings indicate that, in Albania, the lack of teachers' digital competence is evident; according to the data, less than half of them were able to use communication and information technologies in the teaching process. This relates to our main aims of this research, understanding factors that could affect the implementation of ICT in high-school education in Albania and the knowledge and attitudes towards it. This fact reinforces the findings of a previous study that evidenced the predominance of teacher-centered methodology rather than student-centered techniques [34]. Caird and Lane [35] insists on the need for a clear conceptualization of the complex and evolving role of ICTs in teaching models that would enable the assessment of the benefits and limitations of ICT use in teaching methods. It is difficult to evaluate the benefits and limitations of ICT use in teaching models.

V. Conclusions

Access to the internet is considered very limited in secondary schools, as only 13.8% of the respondents stated that they had internet access in the school, mainly in the designated computer labs where the subject of ICT is conducted. These results mean that the equipment with technological infrastructure is at a low level since more than 25% of the respondents did not have any technological equipment at school, while the possibilities to use the equipment inside the classrooms were very limited since there was a lack of a wireless network and other accessories used for this purpose, for instance internet speed in most cases did not meet the demands of the users. The existing technological infrastructure in the school does not encourage the use of ICT for pedagogical purposes.

Print textbooks continue to be the main source of knowledge, which shows the lack of diversification of information and knowledge sources. During the teaching process, teachers rely mainly on traditional education materials (textbooks), while technology is used in limited ways as an alternative source of information and knowledge. This technique can hinder students' critical and creative thinking, especially then the learning relies mainly on a combination of fixed texts, rigid pedagogy, and monotone social perspectives.

Teachers use ICT as an "appendix" or "extension" in service of traditional pedagogical methods, and therefore, there are no significant changes in teaching practices. Although it is known that the potential of ICT is considered as an essential factor in Albania's education system, the challenge remains to make ICT an effective element that is part of the new innovative learning curriculum. In the future,

teacher training programs should focus more on the integration of ICT in current pedagogical methods than on technological aspects.

To increase ICT use in the education process, specifically for pedagogical purposes, it is recommended to improve the school infrastructure with contemporary technological equipment, develop and enrich digital teaching materials in the native language, completely reconceptualize the curriculum and textbooks, implement innovative teaching and learning methods by integrating ICT, and continuously train teachers to improve digital competence as a function of the teaching process.

This study comes with some empirical limitations. While our sample includes 12 main cities of Albania, it is limited in size and fails to capture insights from students of the same age group in other towns and villages. This hinders our possibility of generalizing our findings to a broader area. Moreover, there is a lack of information about infrastructure at home and the digital activities students and teachers are involved in at home. Finally, we could not observe a longitudinal aspect of the effects of ICT in education due to a lack of studies specifically related to this topic in Albania, which makes it impossible to compare the findings to create a more complete framework of the way the object of study has evolved. Future research could focus on extending these findings to other countries similar to Albania in terms of economic development and culture but also compare them to countries that present greater development in education and technology. Similarly, future research would benefit from employing an experimental approach by exposing a sample of students to ICT and comparing that to a control group.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Both authors worked extensively and were involved in all stages of the research development. LA organized the data collection and conducted the preliminary data analyses. LA wrote the first draft of the manuscript. MA supervised the data analyses and contributed to the manuscript preparation and formatting. Both authors approved the final version.

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