COVID-19 preventive practices and associated factors among high school and preparatory school students in Dessie City, Ethiopia

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Background: As the COVID-19 pandemic continues to ravage the world, the most pretentious sector besides the economy is the education system. Ethiopia is not equipped with the infrastructure and facilities to provide online classes for students at all levels. Hence, all institutions were re-opened with mandatory infection prevention and control (IPC) protocols such as the use of face masks, physical distancing, shifts in classes, and routine hand washing practices with soap and water to restrict the spread of the virus. Nevertheless, there has been no monitoring and follow-up and there is no data on IPC compliance among school children in the country. The purpose of this study was to examine the COVID-19 preventive practices and their associated factors among high and preparatory school students in Dessie City, Ethiopia.

Methods: A cross-sectional study was carried out by using a pre-tested face-to-face applied structured questionnaire and direct observations from March 8 to March 20, 2021, in five high and preparatory schools in Dessie City. The sample size was proportionally allocated in each school based on the students’ total number registered in the first academic semester, then stratified by grade level, and proportionally allocated to each grade and section. Finally, a simple random sampling method was used to select study participants. Variables with $p$-values $< 0.25$ in the bivariate logistic regression analysis were entered into the multivariate logistic regression model.

Results: This study involved 422 students with a response rate of 98.8%. The level of good preventive practices was 43.7%. After adjusting for covariates, female, positive attitudes, received IPC training and clear accessible sharing of information and feedback with parents, students and teachers were identified as predictors of good precaution practices.
Introduction

COVID-19, caused by severe acute respiratory syndrome-coronavirus 2 (SARS CoV-2 virus) was first detected in Hubei Province of China in December 2019 (1, 2). The contagious nature of the virus led WHO to declare it in March 2020 as a global pandemic (3, 4). By September 17, 2022, the virus had infected 493,429 people in Ethiopia (5). The most common initial COVID-19 symptoms include fever, dry cough, fatigue, breathing difficulties, and diarrhea (6, 7). These symptoms are normally mild, develop gradually and sometimes lead to serious complications such as cardiac and respiratory failures and death, especially in patients with comorbidities and in older people (8). The manifestation and symptoms change with new emerging variants of the virus (9). The virus is transmitted from person to person by respiratory droplets during sneezing, coughing, talking (10, 11) and through contact with people and surfaces (12, 13). The pandemic has spread at a slower pace in Africa than in other parts of the world (14, 15), apparently due to previous exposure of Africans to other infectious diseases such as Ebola virus disease and measles and the relatively young African population (15). However, due to lack of infrastructure, qualified personnel, and other resources, African health care systems experienced major difficulties in providing care for infected persons (16). Owing to the scarcity of vaccines, preventive measures promoting behavioral change continue to be more commonly used than vaccines in Africa, in contrast to Europe, East Asia, the USA and other industrialized countries (17).

After the outbreak of COVID-19 in early 2020, WHO proposed effective IPC, including the use of face masks and other personal protective equipment (PPE), alcohol-based sanitizers, social distancing, regular hand washing, contact tracing, and quarantine (18). Compliance with IPC protocols have been difficult in minimizing the risk of virus transmission (19) and the COVID-19 pandemic has disrupted public education (20). Stay-at-home pronouncements caused the closure of educational institutions across the world, prompting the shift to online teaching. Ethiopia, one of the least developed countries, does not have the resources for distant learning (13). As the schools and families do not have the resources for distant learning, the Ethiopian government recommends starting the teaching and learning processes in schools by implementing the COVID-19 prevention protocol. Hence, the government instructed all Ethiopian institutions to continue classroom teaching with the IPC directives. However, there is no detailed information on the enforcement, monitoring and compliance with these regulations and no COVID-19 prevention studies have been carried out in schools. This study examines the preventive practices and their associated factors for students in five high schools and preparatory schools in Dessie City, Ethiopia.

Materials and methods

Study area and study design

A cross-sectional study was carried out by using a pre-tested face-to-face applied structured questionnaire and direct observations from March 8 to March 20, 2021 in the five schools in Dessie City. Dessie is located in the highlands of Amhara Region. Of the city’s five high schools and preparatory schools, three were government schools and two were private schools, with 9,024 students (4,341 males and 4,683 females) enrolled in March 2021.

Source population, inclusion and exclusion criteria

All Dessie City students in grades 9 through 12 enrolled from March 8 to March 20, 2021 were the source population and the sampled students who were available throughout the study period and willing to take part in the research were the study population. Students who were absent during the data collection period between March 8 and March 20 were excluded from the study.
Sample size determination

A single population proportion formula was used to obtain the sample size for this study.

The following assumptions were made: a 50% prevalence of preventive practices of students in high and preparatory schools since no study in Ethiopia on school students, a margin of error of 5%, a 95% CI, and a 10% non-response rate.

\[
\frac{Z\alpha/2}{Z\alpha/2} \frac{P[1 - P]}{d^2} = n
\]

By adding a 10% non-response rate, the final sample size was 422 students.

Sampling technique

The sample size was allocated proportionally in each of the five schools studied based on the number of students enrolled in the first academic semester. The samples were then proportionally allocated to the \(9^{th}\), \(10^{th}\), \(11^{th}\), and \(12^{th}\) grade levels, with each component of the relevant grade levels being further proportionally allocated. Finally, study participants were chosen by random sampling (lottery method) with classroom attendance as the sampling frame at the time of the survey.

Data collection methods and quality assurance

The face-to-face administered tools were adapted from the literature, the 2016 Ethiopian Demographic Health Survey (21), WHO (22), and UNICEF reports (23). Data were collected using structured questionnaire (self-reporting) and direct observation. The questionnaire consisted of five main sections: Section A contained 10 questions about socio-demographic status and sources of information on COVID-19; Section B contained 14 questions about water, sanitation, and hygiene behavior; Section C contained 17 questions about knowledge; Section D contained 15 questions about attitude, and Section E contained 22 questions about practice.

The data collectors were three environmental health professionals and three clinical nurses. One data collector was recruited for each school. The tool was prepared in English and then translated to Amharic, the local language, and back to English by two translators to check its consistency and completeness. The 2 days of training focused on instructing data collectors on how to collect data. The validity of the questionnaire was assessed by pretesting with 21 (5%) high and preparatory school students in nearby Kombolcha Town, and some amendments such as question order, avoiding less important questions, and editing questions that are unclear were made before the survey.

The reliability was determined by calculating the Cronbach’s alpha method, which demonstrated satisfactory internal consistency. The Cronbach’s alpha value for the preventive practice was 0.79, which indicates high reliability. No personal identifiers were obtained on the day of data collection, and COVID-19 prevention measures were implemented throughout the procedure. The principal investigator supervised the process of data collection and supported the data collectors. Each questionnaire was checked daily for completeness and consistency before entering into computer data collectors. To check the quality of the entered data, 10% of the entered questionnaires were randomly selected and re-entered to identify potential data entry errors.

Outcome and explanatory variables

The outcome variable was preventive practices (good or poor) and the explanatory variables were socio-demographic status, water sanitation, hygiene (WASH), and sources of COVID-19 information. Four basic divisions were used to organize the explanatory variables. Section 1: Socio-demographic variables and source of information include age, sex, religion, grade, and household size, updated information from television, face book, internet Wi-Fi, families/friends, and received IPC training. Section 2: WASH variables; They include ‘number of students per class room, ventilation of class rooms and toilets, availability of alternative classes, posting of COVID-19 information in schools, sharing of information and feedback mechanisms between parents, students and teachers, information posts for events related to COVID-19 in the schools, availability of psychosocial support, availability of piped water, availability of hand washing facilities, and availability of soap and alcohol-based hand sanitizer near wash basins. Section 3: Knowledge about coronavirus disease and its prevention and Section 4: Attitudes toward COVID-19 prevention.

Operational definitions

High school students: Students in grades 9 and 10 in 2020/21.
Preparatory school students: Students in 11th and 12th.
Knowledge: Respondents who scored equal to or above the mean value (\(\geq 14\) out of 17 questions), were considered as having good knowledge, whereas a score of less than the mean value was considered as having poor knowledge about COVID-19 precautionary measures (Appendix 1).
Attitudes: Respondents who scored equal to or above the mean value (\(\geq 10\) out of 15 questions), were considered to have a positive attitude, and scores of less than the mean value were considered to have a negative attitude about COVID-19 prevention (Appendix 1).
Practices: Respondents who scored equal to or above the mean value (≥11 out of 22 questions), were considered as having good preventive practices, whereas scores less than the mean value were classified as poor practices (see Table 4).

Data management and analysis

Prior to exporting the data to SPSS version 25.0 for analysis, it was cleaned, coded, and entered into EpiData version 3.1. Descriptive statistics were employed to evaluate the overall distribution, including means with standard deviations for continuous variables and frequencies and percentages for categorical variables. A binary logistic regression model with a 95% confidence interval was used to analyze the data (CI). A bivariate logistic regression analysis (crude odds ratio (COR)), as well as a regression of multivariate logistic analysis (adjusted odds ratio (AOR)), were carried out. Variables having a p < 0.250 were chosen for the analysis of multivariate logistic regression from the bivariate analysis (24). Variables having a significance level of <0.05 from the analysis of multivariate logistic regression were considered statistically significant and independently linked with good preventive measures among students.

Standard error with a cut-off value of 2 was used to check for multi-collinearity among independent variables. We discovered that the greatest standard error was 0.839, indicating that there was no multi-collinearity. The Hosmer Lemeshow test (24) was used to assess model fitness, yielding a p-value of 0.347, indicating that the model was fit.

Results

Socio-demographic characteristics of participants

Of the 422 students selected, 417 participated in the study, with a response rate of 98.8%. More than half of the students were Orthodox Christians [245 (58.8%)] and 89.4% of the participants were between 15 and 18 years old. The mean [±SD (standard deviation)] age of the students was 16.97 (±1.28), three-fifths [256 (61.4%)] were females and almost all (402, 96.4%) were single. Nearly three-fourths (65.2%) of the participants were living in households with 4–6 members. Almost all participants got updated information on COVID-19 from television (377, 90.4%), families/friends (395, 94.7%) (Table 1).

WASH and preventive behavior

The main water source at all the schools was piped water in the school yards. There was no water interruption during the 2 weeks preceding the study (Table 2). The schools also posted some COVID-19 related information in its compounds (Table 3). There were hand-washing facilities in all five schools but no water and soap, and alcohol-based hand sanitizers were not available in any of the five schools during the observation period. Three-quarters (75.1%) of the students said that their classes had 39 or more students (Table 2), resulting in crowded conditions.

More than half (247, 59.2%) of the students said that they always washed their hands using soap and water for a minimum of 20 s. Similarly, 218 (52.3%) allegedly used alcohol-based hand sanitizers. One-fourths (102, 24.5%) of the study participants washed their hands before entering the classroom, 94 (22.5%) before putting on and 92 (22.1%) after taking off a facemask and after sneezing and coughing (Table 2). Two-thirds (279, 66.9%) of the students supposedly wore a face mask or face covering cloth every time they left their home. Of the 417 participants, 145 (34.8%) stated that they always tried to maintain a 2- meter social distance when in public areas. Most
TABLE 2 Water, sanitation, and hygiene practices at high school and preparatory school students in Dessie City, Northeast Ethiopia.

| Independent variables | Category | Frequency (n = 417) | Percentage (%) |
|-----------------------|----------|---------------------|----------------|
| Number of students in your class? | <39 | 104 | 24.9 |
| | ≥39 | 313 | 75.1 |
| Are classrooms well-ventilated (open windows)? | Yes | 417 | 100 |
| Are classrooms well-ventilated | Yes | 417 | 100 |
| Is piped water available in this school? | Yes | 417 | 100 |
| Was the water supply interrupted in this school during the last 2 weeks? | No | 417 | 100 |
| Are hands washing facilities available in this school? | Yes | 417 | 100 |
| If yes, are soap and water available at the wash basins? | No | 417 | 100 |
| Is alcohol-based hand sanitizer available at the wash basins? | No | 417 | 100 |
| Are the toilets well-ventilated? | Yes | 417 | 100 |

of the study participants (345, 82.7%) had not reduced visits with friends and families, 254 (60.9%) continued to make non-essential trips outside their home and 238 (57.1%) and had no aversion to visiting crowded places. Nearly two-fifths (161, 38.6%) of the students avoided shaking hands, hugging and kissing during greetings since the advent of the coronavirus pandemic (Table 4).

Overall, more than half (237, 56.8%) (95% CI: 52.3–61.9) of the students revealed that they had poor preventive practices and only 180 (43.2%) (95% CI: 38.1–47.7) had good practices (Table 4).

Factors associated with COVID-19 prevention

In the multivariable analysis, females, having received IPC training, sharing information and feedback established by parents, students and teachers who had a positive attitude were significantly associated with good preventive practices. Good preventive measures were 1.96 times more prevalent in females than in males (AOR = 1.96, 95% CI [1.24–3.10]). Students who received IPC training were 1.91 times more likely to practice prevention than those without training (AOR = 1.91, 95% CI [1.23–2.96]). Those who shared information and feedback with parents and teachers had a 2.11 times higher preventive practices score (AOR = 2.11, 95% CI [1.37–3.25]), and those with a positive perception of coronavirus precautionary measures were 3.33 times more likely to properly practice preventive practices (AOR = 3.33, 95% CI [2.10–5.27]) than their counterparts (Tables 5, 6).

Discussion

The low prevalence (43.2%) of good preventive practices for COVID-19 among students in Dessie City is similar as in other studies in Ethiopia (25–28), Bangladesh (29), Sudan (30), and Egypt (31) and is lower than in other studies conducted in Ethiopia (32–35), Nepal (36), Syria (37), China (38), Uganda (39), and Pakistan (40). These discrepancies may be caused by variations in socio-demographic characteristics of the study populations, study areas, the time studies were carried out, occupation (health professionals vs. students), and the effectiveness of local COVID-19 programs. Probable reasons for the low preventive practices in this study may include the absence of an effective and comprehensive COVID-19 prevention program in the schools.

The higher prevalence of good preventive practices in Dessie schools than in three other communities in Ethiopia (41–43) is difficult to explain because they were carried out in general populations and among healthcare workers.
In this study, 247 (59.2%) participants allegedly washed their hands for a minimum of 20 s using soap and water, corroborating findings in Pakistan (56.0%) (44). But this rate is lower than those reported by two other studies in Ethiopia (81.4%) (32), (77.3%) (44) and studies in Pakistan (85.5%) (45), (94.0%) (46), Iran (82.2%) (47) and Beijing, China (91.3%) (48). These high rates were due to the relatively high socioeconomic level of participants, good WASH facilities, commitment of the government, and the recent study periods. The proportion of students washing their hands after contacting any surface (176, 42.2%) was similar in our study as the one by Gebretsadik et al. among hospital visitors in another Ethiopian community (48.1%) (44).

The proportion of students reportedly wearing face masks when leaving home (66.9%) was similar to that reported by Jemal et al. (67.3%) (33) among Ethiopian health care workers and internet users in Nigeria (65.0%) (45), and high school students and young adults in Bangladesh (70.6%) (46). But our rate was higher than those reported for hospital patients (28) and a general population in Ethiopia (47), shoppers in the USA (41.0%) (48), a rural population in Egypt (47.3%) (49), and a general population in Syria (27.9%) (37). These variations may be due to differences in study dates and the effectiveness of local COVID-19 programs.

Only 38.6% of the students avoided shaking hands, hugging and kissing during greetings, a lower rate than those reported for Ethiopian health care workers (50), hospital visitors (48), and a predominantly rural population (44) and Syrian youth and adults on a social platform (92.5%) (37). Although the heterogeneity of these populations makes comparisons difficult, the absence of a COVID-19 prevention program in Dessie schools appears to be a significant factor in their low rates.

### TABLE 4 COVID-19 prevention measures among high school and preparatory school students in Dessie City, Northeast Ethiopia.

| Practice question                                                                 | Response | Frequency | Percentage (%) |
|-----------------------------------------------------------------------------------|----------|-----------|----------------|
| Do you always wash your hands with soap and water for at least 20 s?              | Yes      | 247       | 59.2           |
| No                                                                                | 170      | 40.8      |                |
| Do you wash your hands before contact of things?                                  | Yes      | 137       | 32.9           |
| No                                                                                | 280      | 67.1      |                |
| Do you wash your hands after contact with any surface?                            | Yes      | 176       | 42.2           |
| No                                                                                | 241      | 57.8      |                |
| Do you wash your hands if you look or feel dirty?                                 | Yes      | 317       | 76.0           |
| No                                                                                | 100      | 24.0      |                |
| Do you wash your hands before entering the classroom?                              | Yes      | 102       | 24.5           |
| No                                                                                | 315      | 75.5      |                |
| Do you wash your hands after exiting the classroom?                                | Yes      | 109       | 26.1           |
| No                                                                                | 308      | 73.9      |                |
| Do you wash your hands after use of the toilet?                                   | Yes      | 283       | 67.9           |
| No                                                                                | 134      | 32.1      |                |
| Do you wash your hands after playing?                                              | Yes      | 106       | 25.4           |
| No                                                                                | 311      | 74.6      |                |
| Do you wash your hands after sneezing/coughing?                                   | Yes      | 92        | 22.1           |
| No                                                                                | 325      | 77.9      |                |
| Do you wash your hands after touching public goods, including money?              | Yes      | 107       | 25.7           |
| No                                                                                | 310      | 74.3      |                |
| Do you wash your hands after coming home from school and other public places?     | Yes      | 123       | 29.5           |
| No                                                                                | 294      | 70.5      |                |
| Do you wash your hands before and after wearing a mask?                            | Yes      | 94        | 22.5           |
| No                                                                                | 323      | 77.5      |                |
| Do you frequently use alcohol-based hand sanitizer?                                | Yes      | 218       | 52.3           |
| No                                                                                | 199      | 47.7      |                |
| Do you always wear a face mask/face covering cloth every time you leave your home to prevent COVID-19? | Yes | 279 | 66.9 |
| No                                                                                | 138      | 33.1      |                |
| Do you throw used tissues after blowing your nose in the trash?                    | Yes      | 311       | 74.6           |
| No                                                                                | 106      | 25.4      |                |
| Do you always cover your mouth and nose with an elbow when coughing and sneezing? | Yes      | 272       | 65.2           |
| No                                                                                | 145      | 34.8      |                |
| Do you always avoid touching your nose, mouth and eyes with unwashed hands?        | Yes      | 227       | 54.4           |
| No                                                                                | 190      | 45.6      |                |

(Continued)
TABLE 5  Bivariate analysis of socio-demographic characteristics and sources of information on COVID-19 at high schools and preparatory schools in Dessie City, Northeast Ethiopia.

| Variables | Category | Practice | COR (95% CI) | P-value |
|-----------|----------|----------|--------------|---------|
| Age       | 10–14 years | 7 | 5 | Ref. |
|           | 15–18 years | 167 | 206 | 0.58 (0.18–1.86) | 0.358 |
|           | ≥19 years    | 6 | 26 | 0.17 (0.04–0.70) | 0.015 |
| Sex       | Male        | 109 | 52 | Ref. |
|           | Female      | 128 | 128 | 2.09 (1.39–3.16) | 0.000 |
| Religion  | Orthodox    | 100 | 145 | Ref. |
|           | Muslim      | 80 | 92 | 1.26 (0.85–1.87) | 0.248 |
| Grade     | 9           | 21 | 29 | Ref. |
|           | 10          | 48 | 67 | 0.99 (0.51–1.94) | 0.975 |
|           | 11          | 21 | 33 | 0.88 (0.40–1.93) | 0.747 |
|           | 12          | 90 | 108 | 1.15 (0.61–2.16) | 0.661 |
|           | 39          | 56 | 48 | 0.56 (0.36–0.88) | 0.012 |
|           | ≥39         | 124 | 189 | Ref. |
| Household size | 1–3 | 9 | 27 | 0.49 (0.21–1.15) | 0.101 |
|           | 4–6         | 127 | 145 | 1.29 (0.82–2.03) | 0.263 |
|           | >6          | 44 | 65 | Ref. |
| Do you get COVID-19 information from television? | Yes | 164 | 213 | 0.87 (0.45–1.68) | 0.671 |
|           | No          | 16 | 24 | Ref. |
| Do you get COVID-19 information from Facebook? | Yes | 147 | 184 | 0.78 (0.48–1.27) | 0.314 |
|           | No          | 33 | 53 | Ref. |
| Do you get COVID-19 information from online sources? | Yes | 154 | 202 | 0.97 (0.56–1.69) | 0.926 |
|           | No          | 26 | 35 | Ref. |
| Do you get COVID-19 information from your families/or friends? | Yes | 167 | 215 | 0.76 (0.37–1.56) | 0.453 |
|           | No          | 13 | 22 | Ref. |
| Did you receive IPC training? | Yes | 101 | 89 | 0.47 (0.32–0.69) | 0.000 |
|           | No          | 79 | 148 | Ref. |
| Number of students in your class | <39 | 56 | 48 | 0.56 (0.36–0.88) | 0.012 |
|           | ≥39         | 124 | 189 | Ref. |
| Is information about COVID-19 transmission posted in the school? | Yes | 118 | 144 | 0.81 (0.54–1.22) | 0.316 |
|           | No          | 62 | 93 | Ref. |
| Is information and feedback mechanisms shared between parents, students and teachers? | Yes | 112 | 94 | 0.40 (0.2–0.59) | 0.000 |
|           | No          | 68 | 143 | Ref. |
| Is information on COVID-19 regularly provided in the school on events related to COVID 19? | Yes | 87 | 104 | 0.84 (0.57–1.23) | 0.386 |
|           | No          | 93 | 133 | Ref. |
| Is there psychosocial support for COVID-19 cases in this school? | Yes | 76 | 103 | 1.05 (0.71–1.56) | 0.800 |
|           | No          | 104 | 134 | Ref. |
| Overall knowledge | Good | 143 | 169 | 1.56 (0.98–2.46) | 0.059 |
|           | Poor        | 37 | 68 | Ref. |
| Overall attitude | Positive | 136 | 115 | 3.28 (2.14–5.02) | <0.001 |
|           | Negative    | 44 | 122 | Ref. |

Ref., reference category.

The rate of reporting good preventive practices was 1.9 times higher in females than in males. Similar ratios were reported by three other studies in Ethiopia (42, 51, 52) and by studies in Bangladesh (53), Uganda (54), Syria (37), Jordan (55), Iran (56), Beijing (57), Bangladesh (29), and in Saudi Arabia (58).

The positive attitude of the students about coronavirus prevention 3.33 times had better preventive practices than those who had a negative attitude. Similar rates were reported by a study in Sidama Region, Ethiopia (41), in northwest Ethiopia (52), Karachi, Pakistan (59), and north-central Nigeria (60), among primary, middle school students (57), and university students of China (38) and in the Sudanese population (30).
TABLE 6 Multivariate study of socio-demographic characteristics and sources of information regarding COVID-19 at high schools and preparatory schools in Dessie City, Northeast Ethiopia.

| Variables                          | Category                | Practice | AOR   | P-value | 95% CI |
|------------------------------------|-------------------------|----------|-------|---------|--------|
| Sex                                | Male                    | 109      | 52    | Ref.    |        |
|                                    | Female                  | 128      | 128   | 1.96    | (1.24–3.10) |
| Did you receive IPC training?      | Yes                     | 101      | 89    | 1.91    | (1.23–2.96) |
|                                    | No                      | 79       | 148   | Ref.    |        |
| Is information and feedback shared | Yes                     | 112      | 94    | 2.11    | (1.37–3.25) |
| between parents, students, and     | No                      | 68       | 143   | Ref.    |        |
| teachers?                          |                         |          |       |         |        |
| Overall attitude                   | Positive                | 136      | 115   | 3.33    | (2.10–5.27) |
|                                    | Negative                | 44       | 122   | <0.001  |        |

Ref., reference category.

Students who had received IPC training were 1.91 times more likely to mention good preventive practices than those without IPC training, corroborating a study on health workers in Uganda (54) and frontline health workers in Nepal (61).

Study limitations

One possible limitation is that some students may appear to have given socially desirable response, mostly to questions about preventive behavior, although the extent of social desirability bias could not be determined.

Conclusion

This study revealed low rates of preventive behavior for COVID-19 and a wide gap between students’ knowledge and practices. Scarcity of sanitary media, absence of accessible prevention and control training programs, and failure of parents and students to share information were major factors in the low prevention rates. We recommend that the Health and Education departments of Dessie City and administrations of the high schools and preparatory schools implement comprehensive COVID-19 prevention programs that address deficiencies in environmental health and promote health-enhancing behavior and attitudes. Furthermore, these entities should provide free personal protective equipment such as facemasks and alcohol-based hand sanitizer.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethical Review Committee of Wollo University’s College of Medicine and Health Sciences gave their approval (Protocol number: CMHS/146/03/2021). Written informed consent to participate in this study was provided by the participants’ legal guardian/next of kin.

Author contributions

All authors made a significant contribution to the work starting from the conception, study design, execution, acquisition of data, analysis and interpretation, in drafting, revising, or critically reviewing the manuscript. The authors also gave final approval of the version to be published, have agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2022.1019584/full#supplementary-material
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