Knowledge, attitude, and preventive practices of infectious diseases among student-athletes in selected senior high schools in Ghana

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ABSTRACT

Although outbreaks of infectious diseases are uncommon, specifically in sports settings, effective information distribution may aid in managing difficult conditions and enhance preparedness for future pandemics. Hence, the study assessed the knowledge, attitude, and preventive practices of infectious diseases among student-athletes in selected senior high schools (SHS) in Ghana. The descriptive cross-sectional study recruited 405 SHS student-athletes (160 males, 245 females) with a mean age of 17.86 ± 2.19. A modified and re-validated knowledge, attitude, and practice questionnaire was administered. Sixty three percent had adequate knowledge about infectious diseases, 54.1% had a positive attitude towards infectious disease prevention, and 59.5% had good practices regarding infectious diseases. Sixty-two percent opined that viruses, 27.2% bacteria, 6.9% parasites, and 4.0% fungus cause infectious diseases. Participants' knowledge significantly correlated with attitudes and prevention practices ($p = .001$). Attitudes positively correlated significantly with knowledge and preventive practice ($p = .001$). Age classification, class, household size, and type of sports positively correlated with knowledge, attitude, and preventive practices of infectious diseases. Younger student–athletes more often had adequate knowledge, a positive attitude, and good preventive practices regarding infectious diseases compared to older colleague-athletes. Student-athletes from lesser household sizes, dormitory sizes, and class sizes more often had adequate knowledge, positive attitudes, and good preventive practices for infectious diseases. Student-athletes' knowledge positively influences their attitudes and preventive practices regarding infectious diseases. Teachers should be exposed to sustainable infection preventive knowledge to foster, promote and monitor infectious diseases among the students.

Keywords:

infectious disease, knowledge, attitude, preventive practice, senior high schools, student-athletes

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Introduction

Infectious diseases are transmitted through direct contact between individuals or indirectly through other mediums, such as contaminated food, water, faeces, bodily fluids, or animal items (Nash et al., 2015; Steffan et al., 2020). These diseases were responsible for the most terrifying plagues throughout history, with new ones always appearing (Foege, 2020). As influenza epidemics have demonstrated, a novel pathogen that first manifests locally somewhere in the world might spread over entire continents in days or weeks (Ford, 2020).

Infectious diseases continue to devastate human health, negatively affecting various aspects of life, including education and sports (Palmer et al., 2020). Infectious diseases are a prominent factor contributing to mortality globally, especially in less developed nations like Ghana, and they tend to be widespread among various populations, including school students, particularly young children (Ohene et al., 2011).

Schools are a major avenue for infectious disease transmission due to the close proximity of young people, some of whom may not practice basic personal hygiene or have sufficient immunity to certain diseases (World Health Organization, 1999). Diseases can also be transmitted through airborne means, where agents have a higher potential to infect more individuals compared to those transmitted via direct contact (Jones & Brosseau, 2015).

Athletes participate in sports, often engaging in direct skin-to-skin contact, which can facilitate the spread of infections (Nowicka et al., 2020). As a result, there is growing concern surrounding infectious disease outbreaks among athletes participating in sports. These outbreaks can impact coaches, support personnel, spectators, and the entire school community, potentially leading to severe health issues (Nowicka et al., 2020; Peterson et al., 2019; Raji et al., 2023). Therefore, it is vital to explore athletes' knowledge of infectious diseases, attitudes towards infection prevention, and potential preventive measures, especially in developing countries with limited healthcare resources.

Methods

Ethics

The Committee on Human Research Publications and Ethics reviewed and approved the study (CHRPE/AP/498/23). Permission was taken from the various school heads to conduct the study. Participants were briefed on the study's objectives and the various sections of the questionnaire and assured of the confidentiality of the information they provided. Their consent was sought, and after gaining a personal understanding of the study, they were made to sign a consent form of participation. The study posed no harm or physical risk to the study participants.

The study employed a descriptive cross-sectional study design. The study employed both convenience and purposive sampling methods.

Participants

The study recruited 450 student-athletes from 10 different selected senior high schools in Ghana and the number of athletes selected in each school was 45. Four hundred and five questionnaires were retrieved for data analysis, while 45 (10%) were not returned and could not be recovered despite follow-up. The study included students who were not sick, on any medication for health issues, available during data collection, participated in sporting activities, were able to read and write in English and were not living with any disability.

Instrumentation

The study adopted, modified and re-validated a pretested face-to-face Knowledge, Attitude and Preventive Practices structured questionnaire originally designed by Feleke et al. (Feleke, Adane, et al., 2022; Feleke, Gebrehiwot, et al., 2022). The initial reliability value of the instrument was 0.79. After modifications and re-validation, the Cronbach's Alpha reliability value for all variables tested was 0.76, and the Cronbach's Alpha based on Standardized Items was 0.77, signifying strong reliability. The questionnaire was divided into four main sections: Section A encompassed demographic details with nine questions, Section B covered infectious disease knowledge, Section C delved into attitudes toward infectious disease prevention, and Section D explored infectious disease preventive practices, all with 15 questions each. Personal identifiers were not collected during data collection to ensure participant confidentiality.

Prior to collecting data, all participants received a comprehensive explanation of the research objectives. Participants were informed about their right to withdraw from the study at any point and were assured that their responses would remain anonymous and confidential. Informed consent was obtained through a consent form, indicating their approval for participating in the research. Upon granting consent, participants proceeded to answer questions related to the variables assessed in the study.

Statistical Analysis

Statistical Package for Social Sciences (SPSS) version 27.0 was used for data entry and analysis. Descriptive statistics presenting means with standard deviations were used for continuous variables and frequencies and percentages for categorical variables to gauge student-athletes' overall understanding of infectious diseases, their attitudes toward disease prevention, and the variety of preventive approaches adopted by senior high school student-athletes in Ghana. Chi-square tests and Pearson correlation coefficient values (p-values) were utilized to examine the relationship between demographics and knowledge, attitude, and preventive practices of infectious diseases among student-athletes. Respondents scoring above or equal to the mean value [mathematically straightforward and commonly understood (Habibzadeh et al., 2017)] were categorized as having adequate knowledge, positive attitude and good preventive practices toward infectious disease prevention. Conversely, those scoring below the mean value were classified as having inadequate knowledge, a negative attitude, or poor practices toward infectious disease prevention. The significance level was set at $\alpha = 0.05$.

Results

Table 1 reveals that 60.5% of the study participants were female and 39.5% were male. There were 61.5%, 27.4%, and 11.1% participants in forms 3, 2 and 1, respectively. Most participants were Christians 91.6%, Muslims were 7.7%, and the remaining 0.7% belonged to other religions. The mean age of the study participants was 17.86 ± 2.19, with a household size average of 7.00 ± 5.64, an average of 44.24 ± 16.17 of students in a class, and an average of 29.04 ± 21.53 of students in a dormitory. 67.4% of the participants fall between the ages of 17-19 years, 63.2% are found in household sizes of about 3-6 members, 88.1% stay in dormitories

of less than 50 people and 67.4% are in classes of less than 50 people. 40.5% of the participants participated in athletics (track and field events), 22.0% in football, and 14.6% in basketball.

Table 1
Participants' Demographic Data

Variables	Categories	Frequency (F)	Percent (%)	Mean ± SD
Age (years)	12-16	83	20.50	17.86 ± 2.19
	17-19	273	67.40	
	20-25	43	10.60	
	26+	6	1.40	
Gender	Male	160	39.50	
	Female	245	60.50	
Religion	Christianity	371	91.60	
	Islam	31	7.70	
	Other	3	0.70	
Type of sports	Basketball	59	14.60	
	Hockey	13	3.20	
	Handball	31	7.70	
	Netball	23	5.70	
	Soccer	89	22.00	
	Volleyball	22	5.40	
	Table tennis	4	1.00	
	Track and Field events	164	40.50	

Table 2
Descriptive Statistics of knowledge on hand-washing among participants

Hand Washing	Frequency (F)	Percent (%)
1 minute of hand washing	171	42.20
20 seconds of hand washing	141	34.80
10 seconds of hand washing	65	16.00
5 seconds of hand washing	28	6.90

Table 2 reveals that 42.2% of the study participants stated that the minimum time needed for hand washing was one (1) minute, 34.8% said that the minimum time required for hand washing was twenty (20) seconds, 16.0% stated that the minimum time needed for hand washing was ten (10) seconds, and the remaining 6.9% said that the minimum time required for hand washing was 5 seconds.

Table 3
Common Infectious Diseases known among Participants

Common Infectious Diseases	Frequency (F)	Percent (%)
Candidiasis	8	2.00
Chicken Pox	38	9.40

Common Infectious Diseases	Frequency (F)	Percent (%)
Cholera	20	4.90
Common cold	20	4.90
Covid-19	70	17.30
Ebola	10	2.50
Flu	20	4.90
Gonorrhea	30	7.40
Hepatitis B	5	1.20
HIV/AIDS	72	17.80
Malaria	28	6.90
Measles	16	4.00
Ringworm	8	2.00
Syphilis	30	7.40
Tuberculosis	20	4.90
Whooping Cough	10	2.50
Total	**405**	**100.00**

Table 3 revealed that HIV/AIDS, with 17.8% is the most common infectious disease known by the participants, followed by COVID-19 with 17.3%. Diseases less known are Hepatitis B, Ringworm and Candidiasis (2% or less).

Table 4
Sources of Information on Infectious Disease Knowledge by Participants

Sources of Infectious Disease Knowledge	Frequency (F)	Percent (%)
Friends & Family	72	17.80
Hospital Workers	76	18.80
Internet	101	24.90
Posters & Flyers	4	1.00
Teachers	129	31.90
Others	23	5.70
Total	**405**	**100.00**

Table 4 showed that most of the study participants (31.9%) stated that their source of information about infectious diseases was from their teachers, 24.9% found out about infectious diseases on the internet, and 18.8% got information from hospital workers.

Table 5
Knowledge, Attitude, and Preventive Practices

Components	Response Grading	Frequency (F)	Percentage (%)	Mean ± SD
Knowledge	Adequate Knowledge Inadequate Knowledge	255 150	63.00 37.00	9.67 ± 1.72
Attitude	Positive Attitude Negative Attitude	219 186	54.10 45.90	11.52 ± 1.91
Preventive Practice	Good Practice Poor Practice	241 164	59.50 40.50	10.80 ± 3.31

According to table 5, majority of the participants (63.0%) had adequate knowledge about infectious diseases, with a mean knowledge score of 9.67 ± 1.72, 54.1% had a positive attitude towards infectious disease prevention, with a mean attitude score of 11.52 ± 1.91 and a mean preventive practice score of 10.80 ± 3.31, 59.5% of the study participants had good practices regarding the acquisition of infectious diseases.

Table 6
Correlation between knowledge, attitude and preventive practices of infectious diseases

Variables		Attitude towards infectious disease	Preventive Practice of infectious diseases
Knowledge of infectious diseases	*r*	0.313	0.216
	p	<0.001	<0.001
Attitude towards infectious diseases	*r*	1	0.363
	p		<0.001

From table 6, the correlation coefficient (0.363) of attitude towards infectious diseases and preventive practices of infectious diseases indicates a moderate to strong positive relationship, while the correlation coefficient (0.313) of knowledge of infectious diseases and attitude towards infectious diseases indicates a moderate positive relationship, and the correlation coefficient (0.216) of knowledge of infectious diseases and preventive practice indicates a weak to moderate positive relationship; however, the relationship is not as strong as that between attitude and practice.

Table 7
Correlation between participants' demographics and knowledge of infectious diseases.

Variables	Categories	Knowledge		Chi-square	p
		Inadequate	Adequate		
Age classifications	12-16 17-19 20-25 26+	34 92 20 4	49 181 23 2	5.767	0.124

Variables	Categories	Knowledge		Chi-square	p
		Inadequate	Adequate		
Class/Form	1	20	25	1.238	0.538
	2	41	70		
	3	89	160		
Gender	Female	87	158	0.620	0.431
	Male	63	97		
Religion	Christian	138	233	1.437	0.487
	Muslim	10	21		
	Other	2	1		
Household size	Less than 3	1	7	4.805	0.187
	3-6	92	164		
	7-9	28	51		
	10+	29	33		
Dormitory size	Less than 50	127	230	2.764	0.096
	50+	23	25		
Class size	Less than 50	99	174	0.215	0.643
	50+	51	81		
Type of sport	Basketball	15	44	14.588	0.042*
	Netball	8	15		
	Volleyball	14	8		
	Handball	14	17		
	Hockey	3	10		
	Football	33	56		
	Table tennis	0	4		
	Athletics (Track & Field Events)	63	101		

*Significant at 0.05

Table 7 reveals that all the demographics positively correlated with knowledge, but the type of sport played by each participant correlated significantly.

Table 8
Correlation between participants' demographics and their attitude toward infectious diseases.

Variables	Categories	Attitude		Chi-Square	p
		Negative	Positive		
Age classifications	12-16	43	40	2.801	0.423
	17-19	119	154		
	20-25	20	23		
	26+	4	2		

Variables	Categories	Attitude		Chi-Square	p
		Negative	Positive		
Class/Form	1 2 3	21 40 125	24 71 124	6.214	0.045*
Gender	Female Male	116 70	129 90	0.504	0.478
Religion	Christian Muslim Other	168 17 1	203 14 2	1.245	0.537
Household size	Less than 3 3-6 7-9 10+	3 122 39 22	5 134 40 40	3.636	0.304
Dormitory size	Less than 50 50+	166 20	191 28	0.398	0.528
Class size	Less than 50 50+	134 52	139 80	3.364	0.067
Type of sport	Basketball Netball Volleyball Handball Hockey Football Table tennis Athletics (Track & Field Events)	35 10 9 13 8 42 3 66	24 13 13 18 5 47 1 98	9.568	0.214

*Significant at 0.05

Table 8 reveals that all the demographics positively correlated with attitude, but the class/form of each participant correlated significantly.

Table 9
Correlation between participants' demographics and preventive practices toward infectious diseases.

Variables	Categories	Preventive Practices		Chi-Square	p
		BAD	GOOD		
Age classifications	12-16 17-19 20-25	43 105 12	40 168 31	9.410	0.024*

Variables	Categories	Preventive Practices		Chi-Square	p
		BAD	GOOD		
	26+	4	2		
Gender	Female Male	97 67	148 93	0.209	0.647
Class/Form	1 2 3	23 49 92	22 62 157	4.018	0.134
Religion	Christian Muslim Other	146 16 2	225 15 1	2.644	0.267
Household size	Less than 3 3-6 7-9 10+	7 96 33 28	1 160* 46 34	8.902	0.031*
Dormitory size	Less than 50 50+	144 20	213 28	0.031	0.860
Class size	Less than 50 50+	108 56	165 76	0.303	0.582
Type of sport	Basketball Netball Volleyball Handball Hockey Football Table tennis Athletics (Track & Field Events)	21 8 5 12 5 32 2 79	38 15 17 19 8 57 2 85	8.767	0.270

*Significant at 0.05

Table 9 reveals that all the demographics positively correlated with attitude, but age and household size correlated significantly.

Discussion

The main objective of the study was to investigate the knowledge, attitude, and preventive practices of infectious diseases among senior high school student-athletes in Ghana, which is novel in this sense.

According to the study, a sizeable portion of the study subjects (more than half) disclosed that they adhered to the advised practice of washing their hands for at least twenty seconds, a good habit for maintaining hygiene and preventing the spread of infections (germs and illnesses) as shown in table 2. This finding aligns with earlier studies (Feleke, Adane, et al., 2022; Feleke, Gebrehiwot, et al., 2022; Jackson et al., 2021).

Table 3 revealed that the most common examples of infectious diseases known by the respondents were HIV/AIDS and COVID-19, as earlier reported (Aliyu et

al., 2013). This may be due to the prevalence of HIV/AIDS in Ghana over the decade, as well as the current outbreak of the COVID-19 pandemic. Also, it implies effective public health campaigns, media influence, and the global significance of the diseases mentioned above. It also raises questions about the extent of awareness regarding other infectious diseases [Hepatitis B (1.2%), Candidiasis & Ringworm (2.0%), Ebola & Whooping Cough (2.5%)] and underscores the importance of well-rounded health education.

Table 4 indicates that the participants largely depended on their teachers as their primary source of infectious disease knowledge, followed by the Internet, consistent with a study among Secondary School Youth in Zaria, Nigeria (Aliyu et al., 2013). This emphasizes the importance of education and the digital world in changing people's awareness of health-related issues.

Results from Table 5 showed that infectious disease health education initiatives among student-athletes have been successful, as more than half of the participants showed adequate knowledge, positive attitudes, and good preventative practices. This demonstrates recommendable behaviour, increased health literacy, and decreased infection risks in the setting of sports. The findings from the current study correlate with a study (Alrasheedy et al., 2021) which discovered that students had good knowledge, as well as positive attitudes and good practices towards infectious diseases like COVID-19.

Table 6 suggests that knowledge, attitude, and preventive practice of infectious diseases among student-athletes are interconnected. The results revealed a positive correlation between knowledge and attitude; attitude and practice, as well as knowledge and preventive practice among students-athletes, as earlier submitted (Adli et al., 2022). Improving knowledge about infectious diseases can lead to positive attitudes, encouraging individuals to adopt and maintain the desired preventive practices. This insight is valuable for designing educational campaigns or interventions promoting specific behaviours, such as health-related preventive practices.

Student-athletes in Ghana senior high schools have adequate knowledge, positive attitudes, and good preventive practices toward infectious disease prevention, whereby their level of knowledge influences their attitude and preventive practice of infectious disease. With respect to age and gender, younger and female student-athletes have adequate knowledge, positive attitudes, and good preventive practices compared to their older and male counterparts. These findings could imply that the younger and female populations were smart, more adaptable, and had better access to technology (Bello et al., 2021).

SHS sports teachers should be exposed to sustainable infection preventive programmes to foster, promote and monitor existing infectious disease levels among the student-athletes. Seminars should be organized for the second cycle schools' sports officials to enlighten them on infectious diseases, their causes, transmission mode, treatment and management. The study is limited by a small sample size that might not speak for all student–athletes in Ghana's various senior high schools.

References

Adli, I., Widyahening, I. S., Lazarus, G., Phowira, J., Baihaqi, L. A., Ariffandi, B., Putera, A. M., Nugraha, D., Gamalliel, N., & Findyartini, A. (2022). Knowledge, attitude, and practice related to the COVID-19 pandemic among undergraduate medical students in Indonesia: A nationwide cross-sectional study. *PLOS ONE*, *17*(1), e0262827. https://doi.org/10.1371/journal.pone.0262827

Aliyu, A., Dahiru, T., Ladan, A., Shehu, A., Abubakar, A., Oyefabi, A., & Yahaya, S. (2013). Knowledge, sources of information, and risk factors for sexually transmitted infections among secondary school youth in Zaria, Northern Nigeria. *Journal of Medicine in the Tropics*, *15*(2), 102–106. https://doi.org/10.4103/2276-7096.123582

Alrasheedy, A. A., Abdulsalim, S., Farooqui, M., Alsahali, S., & Godman, B. (2021). Knowledge, attitude and practice about coronavirus disease (COVID-19) pandemic and its psychological impact on students and their studies: A cross-sectional study among pharmacy students in Saudi Arabia. *Risk Management and Healthcare Policy*, *14*, 729–741. https://doi.org/10.2147/RMHP.S292354

Bello, A., Blowers, T., Schneegans, S., & Straza, T. (2021). To be smart, the digital revolution will need …. In *UNESCO science report: The race against time for smarter development* (p. 109). UNESCO Publishing.

Feleke, A., Adane, M., Embrandiri, A., Berihun, G., Walle, Z., Keleb, A., & Kloos, H. (2022). Knowledge, attitudes, and misconceptions about COVID-19 prevention practices among high and preparatory school students in Dessie City, Ethiopia. *Journal of Multidisciplinary Healthcare*, *15*, 1035–1055. https://doi.org/10.2147/JMDH.S325636

Feleke, A., Gebrehiwot, M., Kloos, H., Embrandiri, A., Daba, C., Hassen, S., & Adane, M. (2022). COVID-19 preventive practices and associated factors among high school and preparatory school students in Dessie City, Ethiopia. *Frontiers in Public Health*, *10*, Article 1019584. https://doi.org/10.3389/fpubh.2022.1019584

Foege, W. (2020). Plague revisited. In A. Mack (Ed.), *In time of plague: The history and social consequences of lethal epidemic disease* (pp. 241–245). Johns Hopkins University Press.

Ford, D. R. (2020). Review of the monster enters: COVID-19, avian flu, and the plagues of capitalism (by M. Davis, 2020). *Postdigital Science and Education*, *2*(3), Article 00176. https://doi.org/10.1007/s42438-020-00176-7

Habibzadeh, F., Habibzadeh, P., & Yadollahie, M. (2017). Criterion used for determination of test cut-off value. *Diabetes Research and Clinical Practice*, *128*, 138–139.

Jackson, O., Rivera, M., Games, K., & Eberman, L. (2021). Athletic trainers' hand hygiene behaviors during the COVID-19 pandemic. *Internet Journal of Allied Health Sciences and Practice*, *19*(4), Article 11. https://doi.org/10.46743/1540-580x/2021.2105

Jones, R. M., & Brosseau, L. M. (2015). Aerosol transmission of infectious disease. *Journal of Occupational and Environmental Medicine*, *57*(5), 501–508. https://doi.org/10.1097/JOM.0000000000000448

Nash, A. A., Dalton, D. R., & Raffell, F. J. (2015). *Mims' pathogenesis of the infectious disease* (6th ed.). Academic Press. https://shop.elsevier.com/books/mims-pathogenesis-of-infectious-disease/nash/978-0-12-397188-3

Nowicka, D., Bagłaj-Oleszczuk, M., & Maj, J. (2020). Infectious diseases of the skin in contact sports. *Advances in Clinical and Experimental Medicine*, *29*(12), 1491–1497. https://doi.org/10.17219/ACEM/129022

Ohene, S. A., Tettey, Y., & Kumoji, R. (2011). Cause of death among Ghanaian adolescents in Accra using autopsy data. *BMC Research Notes*, *4*, Article 353. https://doi.org/10.1186/1756-0500-4-353

Palmer, K., Monaco, A., Kivipelto, M., Onder, G., Maggi, S., Michel, J. P., Prieto, R., Sykara, G., & Donde, S. (2020). The potential long-term impact of the COVID-19 outbreak on patients with non-communicable diseases in Europe: Consequences for healthy ageing. *Aging Clinical and Experimental Research*, *32*(7), 1189–1194. https://doi.org/10.1007/s40520-020-01601-4

Peterson, A. R., Nash, E., & Anderson, B. J. (2019). Infectious disease in contact sports. *Sports Health*, *11*(1), 18–23. https://doi.org/10.1177/1941738118789954

Raji, Y., Knapik, D. M., Schroeder, A. N., & Voos, J. E. (2023). Common sports infectious disease. *HSS Journal*, *19*(3), 292–299. https://doi.org/10.1177/15563316221149025

Steffan, J. J., Derby, J. A., & Brevik, E. C. (2020). Soil pathogens that may potentially cause pandemics, including severe acute respiratory syndrome (SARS) coronaviruses. *Current Opinion in Environmental Science & Health*, *17*, 8–13. https://doi.org/10.1016/j.coesh.2020.08.005

World Health Organization. (1999). *Improving health through schools: National and international strategies*. World Health Organization.

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Author contributions

Conceptualization was done by ANAA, PDD, and MOM; methodology was done by ANAA, EA, RA, EA, and PDD; formal analysis was done by ANAA, EA, and RA; investigation was carried out by ANAA, EA, RA, EA, and PDD; Resources were handled by ANAA and MOM; Writing – original draft preparation was done by ANAA, EA, RA, EA, and PDD; Writing – reviewing and editing was done by ANAA, EA, RA, EA, and PDD. All authors have read and agreed to the last version of the manuscript.

Data availability statement

The data that support the findings of this study are available from the corresponding author (MOM) upon reasonable request.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

This study was conducted according to the Declaration of Helsinki for research involving human participants and approved by the Committee on Human Research Publications and Ethics reviewed and approved the study (CHRPE/AP/498/23).

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