Assessment Of Respiratory Infection Prevention And Control Practices Adopted In Governmental Preparatory Schools

Shatha Matar D Alsaedi[1], Fahad Ibrahim Hamedhi[2], Alotaibi Bandar Fahad S[3], Abdullah Abdulrahman Alhisan[4], Muaath Ahmed Alabdullatif[5], Ghosoon Ahmad Mohamed Osis[6], Salha Ahmed Mohamed Osis[7], Sharaf Naseer Ahmed Al Kiry[8], Basma Lubnan Zafir Aldossery[9], Abdulrahman Rahem AL-MAlki[10], Maher Taher Al Eid[11], Manal Sunaid Mohammed Al-Juhani[12]

Abstract

Background: Respiratory infection is a significant global public health problem. It causes considerable morbidity and mortality among all age groups especially in developing countries Aim: To assess respiratory infection prevention and control practices adopted in governmental preparatory schools in Alexandria Settings: The study was carried out at sixteen governmental preparatoryschools chosen by multistage stratified random sampling technique. These schools were affiliated to Makkah, Saudi Arabia. Research design: A descriptive research design was used to conduct this study Subjects: The study subjects were 384 preparatory students who selected randomly from the previous mentioned settings. Tools: Two tools were used. Tool one: Students Structured Interview Schedule that includes part one: Socio-demographic characteristics of the students and their family, part two: Students' Health and Educational Profile, part three: Students'awareness about Respiratory Infection Prevention and Control Practices, part four: Students' Practices about Respiratory Infection Prevention and Control. Tool two: School Physical Environment Observation Checklist. Results: The study showed that the majority (86.5%) of preparatory student's had fair level of practice while the rest (13.5%) had poor one. Regarding levelof awareness, more than half (60.8%) of the students had a fair level as compared to 30.2% who had poor level. There was a significant relation between student' place of residence as well as their academic achievement and their level of practice (P= 0. 0.008 and P= 0.000 respectively). More than two thirds (68.8%) of the observed school environment had a poor supportive level for prevention and control practices of respiratory infection Conclusion: Based upon the study findings it could be concluded that, student's practice level about infection prevention and control was only fair level and needs

[1]Preventive medicine, King Abdul Aziz hospital, Saudi Arabia.

[2]Pediatric Emergency Consultant, Prince mohammed bin nasser hospital, Saudi Arabia.

[3]Specialist Nursing, Dawadmi Hospital Khuraiman Health Center, Saudi Arabia.

[4]Nursing health assistant, Alquwayiyah general hospital, Saudi Arabia.

[5]Specialist Nursing, Prince Mohammed bin Abdulaziz Hospital in Riyadh, Saudi Arabia.

[6]Nurse, Ahad Almosariha General Hospital, Saudi Arabia.

[7]Nursing technician, Southern sector,Primary Care Center in Ahad Al-Masarha Specialization, Saudi Arabia.

[8]Nursing technician, Primary care center in Sabya, Saudi Arabia.

[9]Specialist Nursing, Riyadh first health cluster / Ghubaira Health Centre, Saudi Arabia.

[10]Nurse technician, King Abdulaziz Hospital Jeddah, Saudi Arabia.

[11]TECHNICAN NURSE, Al Jabr Eye, Ear, Nose and Throat Hospital in Al-Ahsa, Saudi Arabia.

[12]Nursing technician, Tabuk Al-Rawda Health Center, Saudi Arabia.

more intimate supervision for some poor behaviors done at school. **Recommendations:** *An intensive program should be planned periodically, executed, and monitored to improve awareness, and practice of the school students for prevention of respiratory infection. The school health committee/authority should seize every opportunity to prevent the transmission of respiratory infections by promoting healthy/safe school environment.*

Keywords: *ARI, Influenza like illness, COVID-19 prevention and control practices, Safe school environment.*

Introduction
Respiratory infection (RI) is a significant global public health problem. Itcauses considerable morbidity and mortality among all age groups especially in developing countries (De Conto et al., 2019;Tomczyk et al., 2019).

Worldwide Acute Respiratory infection (ARI) has been referred to as a "forgotten pandemic", as it causes around 4%of all deaths in children aged 0–14 years ARIs that lasting less than 30 daysconsidered the fourth leading cause of death among people of all ages, and responsible for both 11-22% of deaths among children aged less than 5, and 4 million deaths annually among adults aged 15-49 years. So it is estimated to be the most prevalent illnesses inlow-and middle-income countries (LMICs) (WHO, 2017). Respiratory infections are associated with misuse of antibiotics and finally relevant contributor to health care cost and indirect societal costs (Lewnard et al.,2021).

In Egypt and other arab countries, the approximate prevalence of ARIs in school students was high and ranged from46-51% (Eneyew et al., 2021; Yousef & Hamed, 2016). Respiratory infectiousdiseases aren't new disease but spreading and identified from thousand years. It can be a major cause of death among school children and affect their schooling by causing absenteeism and delay school achievement.In Alexandria governorate different preparatory school based survey studies across a period from 2014 till 2019 had foundthat the most self-reported health complaints among school students were respiratory infections including common cold (khaled A 2019).
Poor environmental conditions support the transmission of respiratory infections and can worsen the morbidity from it. In fact schools are an important part of community's infrastructure, as they providesafe and supportive learning environments for students. But at the same time they provide an opportune setting for the spread ofinfectious diseases especially respiratory infections because students are in close social contact and share supplies and equipment with each other (Donnelly, P. H. R. A.,2021; Meinck et al., 2022).

Preventive measures contribute to reducing the risk of transmitting respiratory infections. In school settings there are many opportunities for students to learn goodhealth practices. These practices consist ofhand hygiene, respiratory hygiene, and usage of personal protective equipment as wearing face masks, maintain social distance at least 1meter away (Younie et al.,2020). Moreover, keeping well ventilation in indoor setting, avoiding crowds through commitment tosocial distancing by minimizing the numberof contacts, promote vaccination administration in addition to environmentalcleaning of frequently touched surfaces should be emphasized (WHO, 2017).
According to COVID-19 Preparedness and Prevention in Elementary Schools guidelines 2021; presence of common regulations and compliance for all students with health practices help in preventing infectious diseases especially respiratory ones. So it is very important to assess the students' related practices and the students' level of adherence to school

regulation (Ontario, 2021).

Aims of the Study

This study aims to assess respiratoryinfection prevention and control practices adopted in governmental preparatory schools in Makkah.

Research Questions

- What are the preventive and controlpractices followed by preparatory school students to protect themselves and others from respiratory infections?
- To what extent do the schools' environments support preventive and control practices for respiratory infection?

Materials and Method

Materials

Design: A descriptive research design wasused to conduct this study.

Settings:

 This study was conducted at sixteen governmental preparatory schools affiliated to Makkah

Subjects:

The study was conducted on 384 preparatorystudents from the previous mentioned settings. The sample size was calculated using Epi-info7 program based on the following parameters;:

Total population size = 240000 students Expected frequency =50%, Acceptance error =5%, Confidence coefficient =95%. Accordingly, the estimated sample size was 384 students aged 12-16 years .

-By using multistage stratified sampling technique, the following steps were conducted to select till the study subject selection..

-From each educational zone two preparatory governmental schools (one for boys and one for girls) were randomly selected from 288 governmental preparatory schools to be 16 schools.

-By using equal proportional allocation method, 24 Students were selected from each of the previously selected schools. (384students /16 schools) =24 students

-From each school; three classesrepresenting 1st, 2nd, 3rd grade were selected randomly to collect data and 8 students wereselected from each class by using systematicrandom sampling technique (from each classstudents 'name list, the researcher selected the first student randomly then every 2nd student was selected till got the needed subjects)

Tools:

In order to collect the necessary data for the study two tools were used:

Tool one: "Students Structured InterviewSchedule". This tool was developed by the researcher after reviewing related literature (Ministry of health and population Infection Prevention and Control guideline, 2022, World Health Organization key messages and Actions for COVID-19 Prevention and Control in Schools,2020). This tool was used to collect the required data frompreparatory school students. It consists ofthree parts:

Part I: Socio-demographic characteristics of the students and their health profile. Socio-demographic data included thefollowing; Age, sex, place of residence, crowding index,

students' scholastic achievement, school attendance..etc. This part included also data about previous infection with respiratory infections andfamily history of covid19..etc

Part II: Students' Awareness about Respiratory Infection Prevention and Control Practices. This part included 19 items/ statement to get a quick view on the students' awareness level regardingrespiratory infection etiology, mode of transmission, high risk population, symptoms, the different preventive and control measures e.g. hand hygiene, respiratory hygiene vaccination, social distance, nutritional status which increase body's immunity. Responses to each statement were scored two which was given for "correct complete response", while a score of one was given to "correct incomplete response" and a score of zero for "incorrect or don't know response". The total awareness score was calculated and transferred to percentage and classified into: Poor awareness scores were less than 50 % of scores.Fair awareness scores were ranged from 50 to less than 75% of scores.Good awareness scores were equal to or greater than 75% of scores.

Part III: Students' Reported Practices about Respiratory Infection Prevention and Control. This part contained 31 statements to assess students' actual various preventive and control measures of respiratory infections such as personal hygiene such as (hand-washing technique,coughing and sneezing practices. Thereported practice responses were scored as "correctly done" equal two, while a score of one given to "somehow correctly done" anda score of zero was given for "Incorrectly done or not done practice". The total practice score was calculated and transferredto percentage and classified into: Poor practice scores were less than 50 % of scores. Fair practice scores were ranged from 50 to less than 75% of scores. Good practice scores were equal to or greater than 75% of scores.

Tool II: School Physical Environment Observation Checklist. This tool was developed by the researcher to identify to what extend the school environment issupportive for prevention and controlpractices of respiratory infection. It contained data about the school building characteristics, school classes (student's number in each classroom, number of seats, seat's inserts cleanliness, ventilation, distance between seats, and presence of trash bins, and disinfectants as alcohol, educational posters encouraging hygienic practices). Toilets, water and sanitation facilities as (number of hand washing basins,toilets, cleanliness, ventilation, odor, water flow, maintenance, cleaning and disinfectantmaterials availability. School clinic (cleanliness, ventilation, lightening, trashbins , hand washing basins, cleaning and disinfectant materials availability as ,soap, alcohol, disposable towel..etc. School emergency and contingency plans.(presence of health committee to monitor the preventive measures, sterilization gate at entrance to take thermal scanning, isolation room, records for administering vaccinations to students and infectious disease outbreaks. The tool included 74 items/statements with the answer of either "Yes", or "NO". (Cleveland, & Fisher, 2014; Ministry of Health and Population guideline, 2022). The score one for "Yes" answer and zero for"No" answer. The total score was calculated and transferred to percentage and classified into: Poor environment with a score Lessthan 65.% . Fair environment with a Score from 65 % to less than 75.% and Good environment with a Score equal to or greaterthan 75%

Method

Approval from the Ethical Research Committee, was obtained.
. The tools were subjected to a jury composed of five experts in the field for content validity. Recommended modifications were doneaccordingly. A pilot study was carried out on 10% of the study sample in order to test the clarity and applicability of the research tools. Reliability

of the tools was tested using Cronbach's Alpha test. The reliability coefficient was 0.780 for tool I-(partII), 0.805for tool I-(part III) and was 0.834 for tool II which is acceptable. Data was collected bythe researchers during the period from October 2021 to May 2022.

The study was conducted in three phases: Phase I: The students were individually interviewed by the researcher to collect necessary data by using tool I after holding an appointment with them attheir schools during break and activity time. The interview took approximately 45-60 minutes for each student**. Phase II:** By using tool II each school environment was observed by the researchers within 3 to 5 days for each school to assess if each school environment is supportive for respiratory infection prevention and control measures.

Ethical considerations:

A written informed consent from thestudy subjects was obtained after explanation the aim of the study . Confidentiality of the data was maintained. Anonymity of the study subjects was maintained and participation was on a voluntary basis. The study subjects were assured that they have the right to withdraw from the study at any time. The researcher will credit the study subjects and everyone who assisted in the study in the research acknowledgment .

Statistical Analysis

The collected data were organized, tabulated and statically analyzed using the statistical package for social studies (SPSS) Version 25.0. Qualitative data were described using number and percent. Quantitative data were described mean ± standard deviation. Finally analysis and interpretation of data were conducted. P- values of 0.05 or less were considered statistically significant.

Results

Table (1) shows the socio-demographic characteristics and health profile of the studied students regarding the students' age;it was ranged from 12 to 16 years with amean of 13.76 ±0.72 years. Slightly less than half (47.4%) of the students were rural residents. Regarding the crowding index, it ranges form 1-4 persons/bed room with a mean of 2.42 ±0.69. The table also showsthat, only18.5% of students didn't suffer fromrespiratory infections in the last 6 months compared to a nearly equal percent (31.0% and 29.4 %) of them who always or sometimes suffered respectively. Regardingthe family history of Covid19, less than three less than one third (29.9%) of the students' families had exposed to Covid19 More than half (51.3%) of those exposed to covid19 were home isolated.

Students' socio demographic characteristics	Total N=384	
	No.	**%**
Age (years)		
- 12-	98	25.5
- 13-	123	32.0
- 14-	110	28.6
- 15-16	53	13.8
Min -Max 12-16 **X ± SD**	13.76 ±0.721	
Sex		
- Male	192	50.0

- Female	192	50.0
Place of residence		
- Urban	118	30.7
- Squatter	84	21.9
- Rural	182	47.4
Crowding index		
- 1	108	28.1
- 2	199	51.8
- ≥3	77	20.1
Min -Max 1-3.5 **X ± SD** 2.419 ±0.689		
Health profile of the studied students		
Previous exposure to respiratory infections in the last 6 months		
- Never	71	18.5
- Sometimes	113	29.4
- Always	119	31.0
-Don't remember	81	21.1
Family history of covid19	**n= 384**	
- No	269	70.1
- Yes	115	29.9
Home isolation after Covid 19	**n= 115**	
- Home isolation done	59	51.3
- Home isolation not done	56	48.7

Figure (1) reveals the total student awarenesslevel regarding respiratory infection preventionand control practices; more than half (60.8%)of them had a fair level of awareness while therest (30.2%) of them had a poor one.
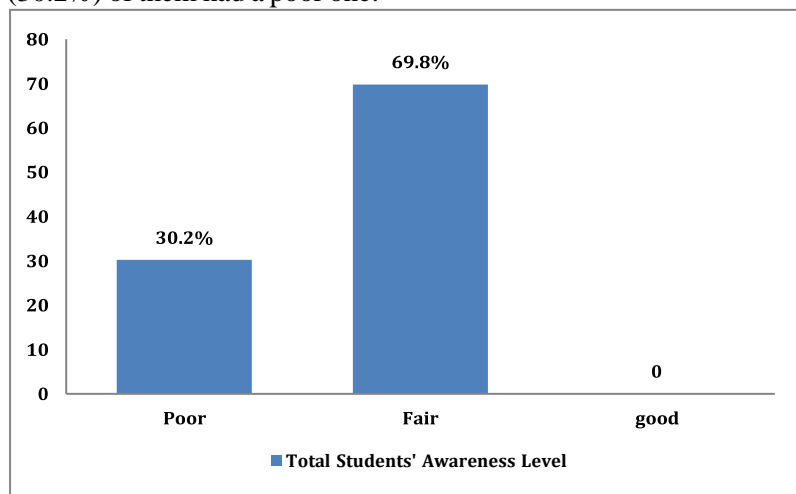

Table (2) shows students' reported practices levels about respiratory infections by domains

This table portrays that, the majority (88.8%) of students had a fair level of hand washing practice. Regarding share personnel equipment, it was found that more than half (57.8%) of the students had a good level. While more than two fifths (42.2%) of them had a poor one. Regarding respiratory hygienic practices, it was found that morethan half (57.3%) of the students had a poor level while more than two fifths (42.7%) of them had a fair one. Regarding social distance, it was found that more than three quarters (76.6%) of the students had a fair

level and 16.1% had a poor level while only 7.3% of them had a good one. Concerning applying the received health education messages, more than two thirds (69.8%) of the students had a poor level while less than one third (30.2%) of them had a good level. Itwas observed that all of the students (100.0%) had a fair level concerning bodyimmunity and maintain healthy schoolenvironment. The total student's practices level showed that the majority (86.5%) ofthem had a fair level in another meaning they had fair adherence to the prevention and control practices while 13.5% had pooradherence to the preventive and controlpractices.

Items	Total n=384	
	No.	%
Hand washing		
- Poor	10	2.6
- Fair	341	88.8
- Good	33	8.6
Share Personal Equipment		
- Poor	49	42.2
- Fair	113	0.0
- Good	222	57.8
Respiratory hygienic practices		
- Poor	220	57.3
- Fair	164	42.7
- Good	0	0.0
Social distance		
- Poor	62	16.1
- Fair	294	76.6
- Good	28	7.3
Applying the received health education messages		
- Poor	268	69.8
- Fair	0	0.0
- Good	116	30.2
Keep and increase their Body immunity		
- Poor	0	0.0
- Fair	384	100.0
- Good	0	0.0
Maintain healthy school environment		
- Poor	0	0.0
- Fair	384	100.0
- Good	0	0.0
Total students' practices' level		
- Poor	52	13.5
- Fair	332	86.5
- Good	0	0.0

Figure (2) shows physical school environment supportive level for prevention and control of respiratory infection; more than two thirds (68.8%) of the observed school environment had a poor level for prevention and control of respiratory infection while one third (31.3%) of them hada satisfactory one.
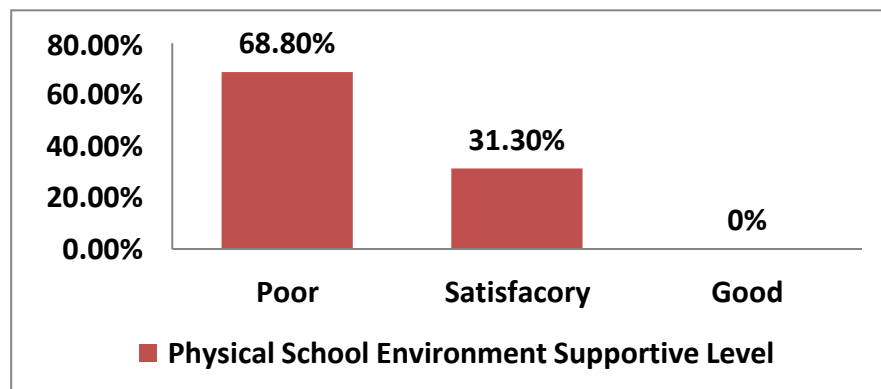
Table (3) shows the relationship between the students' level of practice and their socio demographic characteristics; their health profile and their level of awareness about prevention and control of respiratory infections; statistically significant differences were found between student's place of residence, their academic achievement and their practice level ($X^2= 9.723$, P= 0.008 and $X^2= 13.00$, P= 0.000 respectively). Poor practice level was more prevalent among squatter residents and those student with a poor academic achievement. Moreover, a significant relation was noted between family history of Covid19 and students' practice level ($X^2= 19.532$, P= 0.001). As families who hadn't exposed to Covid19 had a poor practice level as compared to those who had exposed.

Students' characteristics	Level of Practice				Total n=384		Test of Significance
	Poor (n= 52)		Fair (n= 332)				
	No.	%	No.	%	No.	%	
Age (years)							
- 12-	17	17.3	81	82.7	98	25.5	$X^2= 5.686$
- 13-	20	16.3	103	83.7	123	32.0	P= 0.128
- 14-	8	7.3	102	92.7	110	28.6	
- 15-16	7	13.2	46	86.8	53	13.8	
Sex							
- Male	21	10.9	171	89.1	192	50.0	$X^2= 2.224$
- Female	31	16.1	161	83.9	192	50.0	P= 0.136
Place of residence							
- Urban	12	10.2	106	89.8	118	30.7	$X^2= 9.723$
- squatter	20	23.8	64	76.2	84	21.9	P= 0.008*
- Rural	20	11.0	162	89.0	182	47.4	
Grade level							
- First	19	14.8	109	85.2	128	33.3	$X^2= 2.981$
- Second	21	16.4	107	83.6	128	33.3	P= 0.225
- Thirds	12	9.4	116	90.6	128	33.3	
Academic achievement							
- Poor	7	53.8	6	46.2	13	3.4	$X^2= 13.00$
- Good	5	20.0	20	80.0	25	6.5	P= 0.000*
- Very good	19	14.2	115	85.8	134	34.6	
- Excellent	21	9.9	191	90.1	212	52.1	
Absenteeism from school							

- One	4	5.9	64	94.1	68	17.7	X²= 1.070
- Two	20	13.1	133	86.9	153	39.8	P= 0.072
- Three or more	28	17.2	135	82.8	163	42.4	
- Previous exposure to resp. infections in the last 6 months							
- Never	8	11.3	63	88.7	71	18.5	X²= 0.733
- Sometimes	15	12.6	104	87.4	113	29.4	P= 0.865
- Always	17	15.0	96	85.0	119	31.0	
Don't remember	12	14.8	69	85.0	81	21.1	
- Family history of Covid 19							
- No	50	18.6	219	81.4	269	70.1	X2= 7.884P=
- Yes*	2	1.7	113	98.3	115	29.9	0.005*
- Level of awareness							
- Poor	16	13.8	100	86.2	116	30.2	X²= 0.009
- Fair	36	13.4	232	86.2	268	69.8	P= 0.925

Discussion

The main goal of public health as well asinfection prevention and control is the prevention of infectious disease transmission in population and community settings.Emerging infectious disease outbreaks brought on by respiratory viruses, including severe acute respiratory syndrome (SARS),Middle East respiratory syndrome (MERS), pandemics of influenza A and H1N1, and finally to the latest novel coronavirus (COVID-19) pandemic, have recently attracted significant global attention (Husseinet al., 2021).

ARIs is highly prevalent among school aged children that ranged from 46-51% asreported by Eneyew et al in 2021 in Ethiopia (Eneyew et al .,2021). The overall prevalenceof ARI was 60.8% in study done in 2022 in Kathmandu Valley which revealed higher prevalence percentage of respiratory infectionthan the national data findings in a study done in 2016 in Egypt that revealed a significant frequency of ARI (51.23%) (Ghimire et al., 2022; Yousef, F. M., and Hamed, A. F., 2016). The current study findings also revealed that, a significant number of students (60.4%) always andsometimes exposed to respiratory infections during last 6 months from collecting data andthese infections hindered them to go their schools

The main findings of the current study revealed that significant percentage of the students had only fair level of awareness (lessthan three quarters 69.8%, and about one third of them had low level and none of them showed good awareness level regarding infection prevention and control practices. The same result was unfortunately observed regarding their level of practice. Similarly studies conducted by Naseef et al., 2022; Yesuf & Abdu, 2022; Hussein et al.,2021;Shehata et al., 2021.

With respect to the total student's practice level; it was noted that the majority (86.5%) of them fairly adhere to preventive practices guidelines while 13.5% of them not adhere to these practices and none of them showed good adherence level to infection prevention and control practices.

Therefore, the student's practice level about infection prevention and control needs more intimate supervision for some poor behaviors done at school as well as more improvements through organizingeducational campaigns especially in the area of sharing personal equipment, respiratory hygienic practices, social distance, applying the received health education messages. The study results are incongruent with another studies done in Egypt in 2021 that

revealed the majority of the students (96.9%) had high performance of preventive behavior and another study done in Iran (Bashirian et al., 2021; Hussien et al., 2021).

In the current study results, a significant relation was noted between place of residenceand student's practice level about infectionand prevention and control practices as the findings showed that, poor practice level was more prevalent among squatter and rural residents than urban ones. As well as similar studies done by ALBashtawy, 2017; Naila Nisar et al., 2017; and Yuan et al., 2015 revealed that, rural residents' awareness and practice level was quite low.

School absenteeism is another issue facing students as it increases the likelihood of their academic failure as students who are repeatedly absent from school do not performas well academically as students who are rarely absent as reported by Klein et al (2022). The present findings revealed that,high percentage of students was irregularly attending at school with absence period three days or more per week. Moreover, thehighest percentage (96.1%) for their absenteeism causes was fear of cross infection and to get infected with COVID-19.This finding was disagree with Ali (2016) who reported lower school attendance rate bystudents in study done among school studentsin Alexandria and of course this results before COVID-19 (Ali M.,2016).

In fact, Healthful physical school environment is very essential for students' wellbeing and safety because students are constantly interacting with their physical environment consciously or unconsciously (Cleveland, & Fisher, 2014).

Surprisingly, in the era of COVID-19 pandemic the present study revealed that, more than two thirds (68.8%) of the studied schools had poor environmental condition in relation to respiratory infection and control practices. More than half of them had a poor building cleanliness due to unavailability of covered garbage pins with plastic bags and presence of garbage at playground and classrooms, unavailability of disinfectant at entrance &exits also poor classrooms due to absence of hand sanitizers or disinfectant materials and also poor sanitary system. The present findings were in line with a recent study conducted by El-Sartaway et al who reported that the vast majority of schools weren't adapted for school students (El-Sartaway et al.,2015).

Conclusion

Despite, students had a good awareness level in hand washing, a significant percentage of them hadn't washed their hands at school, and those who washed it, not maintain the appropriate technique of hand washing. Students also weren't carrying hand sanitizer in their bag and those who carrying it didn't use it. Moreover, they had a poor respiratory hygiene practice as they cough/sneeze in front of others, not maintain wearing facemask also its use correctly. They were sharing personal equipment as drink from each other's bottles. Poor practice level was more prevalent among student with a poor academic achievement which resultedfrom their high school absenteeism and their poor awareness level.

Moreover, more than two thirds of the observed schools weren't suitable for prevention the infection due to lack ofcleaning supplies and materials regarding sanitation, sinks, toilets according to standards and guidelines which created great challenges for full school participation of students and school personnel.

Yet less attention is paid to theimportance of physical environment for learning as it should be neat and tidy to encourage all school personnel to get happily especially the teachers in their

classrooms to be focus on their lessons. But when the school is equivalent to a garbage bag, all theirenergies are drained out while dealing with the dust and grime and it can distract both teachers and students from their lessons in the classrooms and so on it could affect the student's performance and scholastic achievement. When the classroom is free from bacteria and germs, the teachers andstudents stay away from diseases. Hence,school cleanliness is a vital issue that must be followed each day for ensuring the health andsafety of the students and the teachers.

Recommendations

In line with the findings of the study,the following recommendations are made:

- An intensive program should beplanned periodically, executed, andmonitored to improve awareness, and practice of the school students forprevention of respiratory infection.

- Integrate students in group activities e.geducational plays and drama to enhance learning more about respiratory infections/diseases and how to prevent it and the importanceof the personal hygiene practices

- The school health committee/authorityshould seize every opportunity to prevent the transmission of respiratoryinfections by promoting healthy/safe school environment

- Supervise all staff workers following the isolation guidelines for COVID-19to prevent the occurrence of outbreakin accordance with Ministry of healthand population guidelines, 2022.

References
- ALBashtawy, M. (2017). Assessment of hand-washing habits among school students aged 6–18 years in Jordan. British Journal of School Nursing, 12(1), 30–36. https://doi.org/10.12968/bjsn.2017.12.1.30
- Ali M. Pschological and Behavioral Problems of Deaf and Mute School Students in Alexandria.Master Thesis. Faculty ofNursing .Univeristy of Alexandria, Egypt;2016.
- Bashirian S, Jenabi E, Khazaei S, Barati M, Karimi-Shahanjarini A, Zareian S et al. Factors associated with preventive behaviours of COVID-19 among hospital staff in Iran in 2020: An application of the protection motivation theory. Journal ofHospital Infection. 2020;105(3): 430-3.
- Cleveland, B.,&Fisher,k.(2014).Theevaluation of physical learning environments: Acritical review of theliterature.Learning EnvironmentsResearch,17,1-28.
- De Conto, F., Conversano, F., Medici, M. C., Ferraglia, F., Pinardi, F., Arcangeletti, M. C., Chezzi, C., & Calderaro, A. (2019). Epidemiology of human respiratory viruses in children with acute respiratory tract infection in a 3-year hospital-based survey inNorthern Italy. Diagnostic microbiology andinfectious disease, 94(3), 260–267. https://doi.org/10.1016/j.diagmicrobio.2019. 01.008
- Donnelly, P. H. R. A. (2021, April 2). The Impact of COVID-19 on Education – Recommendations and Opportunities for Ukraine. World Bank. https://www.worldbank.org/en/news/opinion /2021/04/02/the-impact-of-covid-19-on- education-recommendations-and- opportunities-for-ukraine
- El-Sartaway A, El mohery O, Abadat M,Taha B. Degree of Appropriateness of Governmental and Private Schools for Inclusion of Students With Disabilities in Abozabie. Journal of special education and rehabilitation 2015;2(6):1-26 .

- Eneyew, B., Sisay, T., Gizeyatu, A., Lingerew, M., Keleb, A., Malede, A., ... & Adane, M. (2021). Prevalence and associated factors of acute respiratory infection among street sweepers and door-to-door waste collectors in Dessie City, Ethiopia: a comparative cross-sectionalstudy. Plos one, 16(5), e0251621 .
- Ghimire, P., Gachhadar, R., Piya, N.,Shrestha, K., & Shrestha, K. (2022). Prevalence and factors associated with acuterespiratory infection among under-fivechildren in selected tertiary hospitals of Kathmandu Valley. PLoS ONE, 17(4 April), 1–11.

https://doi.org/10.1371/journal.pone.026593 3

☐ Hussein, R. S., Manzour, A. F., & Wahdan, M. M. (2021). COVID-19 knowledge, risk perception, and precautionary behavioramong medical students in Egypt. Journal of High Institute of Public Health, 51(1), 25- 32.

☐ Khaled, A. M. (2019). Effect Of Applying preventive Interventions On Substance Abuse Behaviors On Male Perperatory School Students In Alexandria. Alexandria University.

☐ Klein, M., Sosu, E. M., & Dare, S. (2022). School Absenteeism and AcademicAchievement: Does the Reason for Absence Matter? AERA Open, 8. https://doi.org/10.1177/23328584211071115

Lewnard JA, King LM, Fleming-Dutra KE, Link-Gelles R, Van Beneden CA. Incidence of Pharyngitis, Sinusitis, Acute Otitis Media,and Outpatient Antibiotic Prescribing Preventable by Vaccination Against Group A Streptococcus in the United States. Clin Infect Dis. 2021 Jul 1;73(1):e47-e58. doi:10.1093/cid/ciaa529. PMID: 32374829.

☐ Meinck, S., Fraillon, J., & Strietholt, R. (2022). The impact of the COVID-19 pandemic on education International evidence from the Responses to EducationalDisruption Survey (REDS). http://www.unesco.org/open-access/terms- use-ccbysa-en

☐ Naila Nisar, Muhammad Khalid Mahmood, & Ashiq Hussain Dogar. (2017).Determinants of Students ' AcademicAchievement at Secondary School Level. Bulletin of Education and Research, 39(1), 145–158.

☐ Naseef, H. A., Al-Shami, N. A., Hadba, L. S. A., Humos, L. A., Shaheen, R. N., Mitwasi, T. T., & El-Khairy, L. (2022). Knowledge, attitudes, and practices about coronavirus disease (COVID-19) among Birzeit University students: a cross-sectionalstudy. Journal of Public Health (Germany), 30(9), 2139–2152. https://doi.org/10.1007/s10389-021-01665-0

☐ Ontario, P. H. (2021). COVID-19 Preparedness and Prevention in Elementary and Secondary (K-12) Schools. 1–26.

☐ Shehata, M. A., Adel, A., Armaneous, A. F., Sonbaty, M. M. E. L., Atti, M. A., Mohamed, H., Hariri, E., & Kamel, I. H.(2021). Egyptian school children awareness and precautions in Covid19 pandemic : a cross sectional survey study. Bulletin of the National Research Centre. https://doi.org/10.1186/s42269-021-00495-0

☐ Tomczyk, S., McCracken, J. P., Contreras, C. L., Lopez, M. R., Bernart, C., Moir, J. C., Escobar, K., Reyes, L., Arvelo, W.,Lindblade, K., Peruski, L., Bryan, J. P., & Verani, J. R. (2019). Factors associated with fatal cases of acute respiratory infection (ARI) among hospitalized patients in Guatemala. BMC Public Health, 19(1), 1– 11. https://doi.org/10.1186/s12889-019-6824-z

World Health Organization. (2017). AcuteRespiratory Infection. Retrieved from https://www.who.int/ Respiratory Infection /about/ipc/en/

☐ Yesuf, M., & Abdu, M. (2022). Knowledge,attitude, prevention practice, and associated factors toward COVID-19 among preparatory school students in Southwest Ethiopia, 2021. PLoS ONE, 17(1 January), 1–12. https://doi.org/10.1371/journal.pone.0262907

☐ Yousef, F. M. A., & Hamed, A. F. (2016). International Journal of Current Research in Medical

Sciences www.ijcrims.com Prevalence of acute respiratory infection and related risk factors in school-age children in Egypt: a cross-sectional study. Int. J. Curr. Res. Med. Sci, 2(2), 50–58. http://ijcrims.com/pdfcopy/july2016/ijcrims 8.pdf

☐ Younie, S., Mitchell, C., Bisson, M. J., Crosby, S., Kukona, A., & Laird, K. (2020).Improving young children's handwashing behaviour and understanding of germs: Theimpact of A Germ's Journey educational resources in schools and public spaces. PLoS One, 15(11), e0242134.

☐ Yuan, F., Qian, D., Huang, C., Tian, M., Xiang, Y., He, Z., & Feng, Z. (2015). Analysis of awareness of health knowledge among rural residents in Western China. BMC Public Health, 15(1), 1–8. https://doi.org/10.1186/s12889-015-1393-2