Role of School Administration in Controlling Communicable Diseases

The Case of Influenza in Some West Bekaa (Lebanon) Area Schools

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Abstract–**Academic performance and students' success are closely related to school attendance based on the evidence provided by literature. Influenza, an infectious disease, is one of the factors that prevent the students from attending classes. To study the role of school administration in controlling and preventing this disease and its effect on the students' performance, a field study was conducted in the schools of West Bekaa, Lebanon. Data was collected from private and public schools, in addition to the data collected from the Lebanese Ministry of Public Health. The findings revealed that influenza is one of the important reasons behind students' absence, which affects their performance. Immunization and general infection-control measures can be organized by the schools' administration to control and prevent the spread of this disease.**

Keywords-influenza; communicable diseases; controlling measures; immunization; absenteeism; administration.

I. INTRODUCTION

Influenza is a pandemic disease that spreads worldwide. The Centers for Disease Control and Prevention (CDC) and global health partners record that between 291,000 and 646,000 people are dying each year from seasonal influenza [1]. Unfortunately, schools in the region of Bekaa, Lebanon, are not aware of the risks of influenza and they consider it as a regular infection. Schools' administration can play an important role in controlling and preventing the spread of this disease among students and staff and, therefore, their family members.

High class attendance is correlated with better school performance. Absence from school is one of many factors that affect students' academic success [2]. School absence could be a common source of knowledge to monitor and detect the early propagation of diseases in schools especially in the case of influenza [3]. Students in schools are exposed to many communicable diseases that spread easily among them due to direct contact, so an absenteeism reporting system is needed in order to control the prevalence of the disease and control students' absenteeism [3].

Kids of school age are the ones who transmit influenza the most in society [4]. As stated by American Academy of Pediatrics [5], the flu is a communicable disease caused by an influenza virus which is extremely contagious and causes serious symptoms, which may end in hospitalization or death. In addition to affecting the respiratory system, it affects the whole body.

The remainder of this paper is organized as follows: Section II reviews the literature. Section III describes the methodology used. Section IV presents the results. Section V discusses the obtained results. Section VI sets the conclusion. Acknowledgement and references close the article.

II. LITERATURE REVIEW

Schools have a major role in controlling and preventing the transfer of Communicable Diseases (CDs) among students [6]. According to Michigan Department of Education [7], these diseases can transfer through fecal, oral and respiratory contact, direct skin-to-skin contact, indirect contact with contaminated objects and surfaces and blood borne contact. They also listed the most common communicable diseases that can affect students in school such as: influenza, common cold, diarrheal illness, *E-coli*, hand- foot and mouth disease, head lice, pink eye, ring worm, chickenpox, tuberculosis, measles and many others.

CD, such as influenza, affects both the global health and the economy if they are not controlled as fast as possible [8]. So non-pharmaceutical intervention strategies, such as: "wearing masks, continuous hand washing and school closure" should be done in order to control the spread of the diseases [8]. School closure is one of these intervention strategies because children can be easily affected and schools are the most places where children get contact with each other. After applying the strategy of school closure, the results showed that closing schools for several weeks can decrease the spread of disease but in a very low percentage because the patients are still active in the community outside the school. Also, this strategy leads to a negative economic impact, that's why other strategies should be applied inside

the schools such as reducing the contact among students as much as possible [8].

Influenza is one of the most common communicable diseases that affect the students and the staff members [9]. It is a contagious respiratory illness caused by influenza viruses that infect the nose, throat and the lungs [10]. It can be transferred though coughing and sneezing when the distance between the infected and sick persons is less than one meter. The most effective way to prevent the infection could be to get immunized against the viruses through vaccination [10]. Antivirals, nutritional supplements such as vitamin D and physical barriers can also be used to decrease the viral infection among children [11].

Plaspohl *et al*. [12] stated that literature provides proof that school attendance correlates with educational performance and student success. Respiratory illness could be a conducive factor in high absences percentages of school students. The primary protection for respiratory illness is immunization. School-Located Influenza Vaccine (SLIV) programs offer larger access for college students to be vaccinated. A retrospective review of pre-existing information from four educational years was conducted to look at the link between SLIV participation and absence among students at eight public elementary faculties in Effingham County, Georgia. For the two SLIV years, results showed variations in average frequency of absences between SLIV and non-SLIV years also as between SLIV participants and nonparticipants. Implications for apply, embrace the potential for exaggerated herd immunity among students, which can conjointly reach different parties inside the college community and reception, so promoting overall healthy and successful students [12].

In this study, the aims were to analyze the role of school administration in controlling influenza in some Lebanese schools in West Bekaa region. Also the study aimed to assess the current situation of schools in coping with guidelines in terms of decisions, infection pathways, information sharing, communication, surveillance and to which extend they cooperate in this regard.

III. METHODOLOGY

A. Research and instrument design

As shown in the Figure 1, the research design used in this study is a mixed method that is called concurrent triangulation method (also called an integrative or convergent design) [13].

As per the conventions of mixed method notation, QUAN refers to quantitative methods and QUAL refers to qualitative methods. By using concurrent triangular design, described in the Figure 2, the researcher collects both qualitative and qualitative data, analyzes them and then interprets the results together for a better understanding of the topic [15].

In this research, a questionnaire was used – after being validated by the University's Institutional Research Board – to study the role of principals in controlling and preventing the prevalence of the influenza virus in West Bakaa's schools and its effect on students' performance. The questionnaire
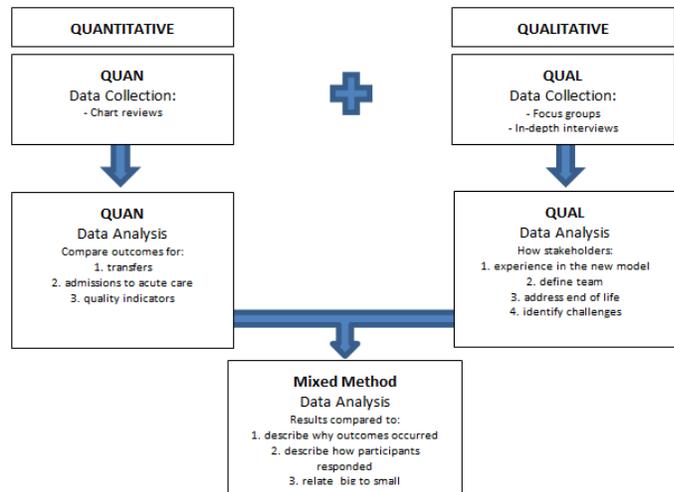

Figure 1. Concurrent Triangulation Design (adapted from [14])

questions were translated into Arabic to make sure that all the participants (principals) understand all the questions and answer accurately (validation).

The second source of data used in this study was the Ministry of Public Health (MoPH) database. All the information concerning the prevalence of the influenza virus in school aged children and its distribution according to the governorate was collected from the ministry's website [16].
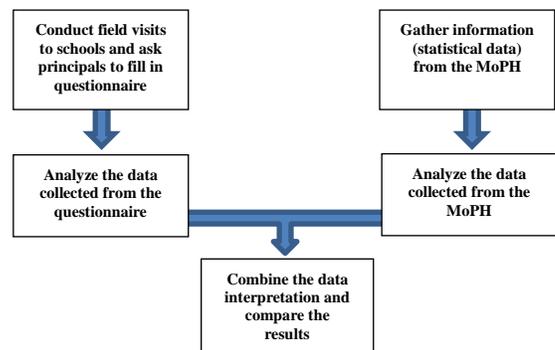

Figure 2. The design of the study used in this research (Concurrent Triangulation Design)

B. Data collection

Based on Figure 2, a questionnaire was distributed to 25 schools' principals in West Bekaa schools.

After that, a statistical data was collected from the Ministry of Public Health about the % of the infected people, their distribution according to the governorate and their age group. Data collected from the Ministry of Public Health covered the year 2017.

Then, the Concurrent Triangulation Design was applied in this study by analyzing all collected data and interpreting them. Finally, we combined and compared obtained results.

IV. RESULTS

14.2% of the private schools' principals attended a workshop about communicable diseases under the title of H1N1 and health care in schools. 57.1% didn't attend any workshop, but they are interested in attending one, 14.2% didn't attend any workshop and they are not interested in that and 14.2 didn't answer this question.

Concerning the public schools, no one attended any workshop about this topic, but 81.8% are interested in attending such workshops and 18.1% didn't attend and they are not interested in that.

14% of the private schools' principals knew the number of the immunized students in the school (very low numbers) and the rest didn't know. 28.5% of them knew the number of the immunized staff (very low percentage) and the rest didn't. 63% of the public schools' principals knew the number of the immunized students and staff in the school, while the rest didn't.

85.5% of the private schools' principals stated the number of the students that absent due to influenza (the numbers varied between 1 to 10 students per day), 7% stated that no one absent and the rest didn't know or they didn't answer (Figure 3). 42% of them stated that the number of the staff absent due to influenza varied between 1 to 2 members per day, 14.2% stated that none of the staff members were absent due to influenza and the rest didn't know or they didn't answer (Figure 4). Concerning the public schools, 81% knew the number of the students absent due to influenza (the numbers varied between 2 to 10 students per day), 9% of them said that no one of them absent and the rest didn't know (Figure 5). 63.6% of the public schools' principals announced that one of the staff members was absent due to influenza per day and the rest announced that no one was absent due to that (Figure 6).

78% of the private schools' principals and 54% of the public ones considered that influenza was a serious disease and the rest of both didn't consider it serious. 92.8% of the private schools' principals and 81.8% of the public ones agreed that all the students and the staff members should be immunized against influenza and the rest didn't.

None of the private schools provided vaccines for students against influenza although they had a nurse in each of the schools, and 18.8% of the public schools did that, yet they all didn't have a nurse in any of the schools. 42.8% of the private schools and 27.2% of the public schools educated the students and the staff members about the symptoms of this virus, while the rest of both didn't.
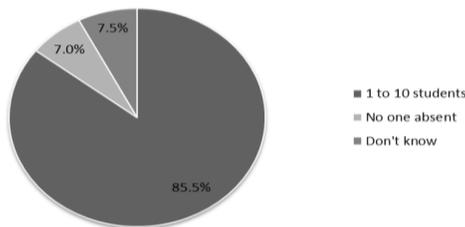

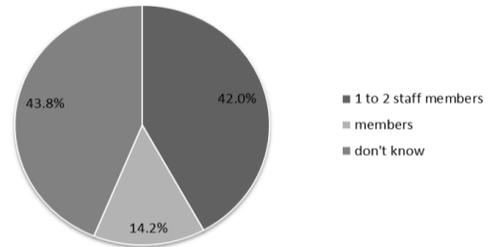Figure 3. Number of the students absent due to influenza in private schools.

Figure 4. Number of the staff absent due to influenza in private schools.

All of the principals of private schools and 92.8% of the public ones were aware of the symptoms of the influenza and each one mentioned at least two of them. The answers varied between (fever, body aches, red eyes, runny nose, coughing, sneezing, sore throat and nasal congestion).
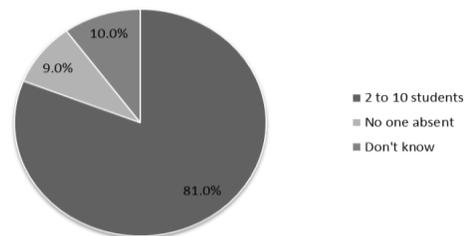

Figure 5. Number of the students absent due to influenza in public schools.

Principals were not aware enough about of the different types of influenza (A, B and C) and the one that affects students the most. 64.3% of the private schools' principals and 72.8% of the public ones were not aware about that. The rest answered that they were aware, but they incorrectly named the types such as swine and bird flu. Only few said that types A and B are the most common among students, they come from animals and have vaccine while C has no vaccine.
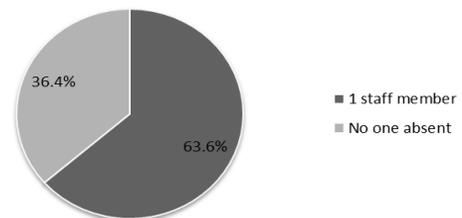

Figure 6. Number of the staff absent due to influenza in public schools.

All of the principals in both schools knew the ways of spreading of influenza. Each one of them mentioned at least one way. The answers were: touching, direct contact, sharing the same materials, coughing, sneezing, play grounds, toilets, low hygiene and drink tap water.

85.7% of the private schools' principals and 90.9% of the public schools' principals took decisions to control the spread of the influenza among the students in the school. Most of them focus on hygiene (personal hygiene, hand hygiene, the places where the students sit, and the materials that they use and share). The rest of the decisions were: eat healthy food, use tissues when coughing and sneezing and stay at home the first 48 hours when the symptoms appear. 7.1% of the private schools' principals said that they need to attend workshops concerning that. The rest didn't answer.

All the public schools and 92.8% of the private ones took measures concerning the infected students. Most of them called the parents and asked them to keep the student at home until full recovery. Around 4% of all exposed the patient to a specialist to receive the suitable medicine, advised the patient to drink more liquids, not to have direct contact with others and to get rest when feeling tired. Few of them asked the infected student to stay away and wear a mask. The decisions were taken by a health counselor and not by the administration in 9% of the public schools. 7.1% of the private schools' principals said that they need a workshop concerning that.

57.1% of the private schools' principals and 72.7% of the public ones believed that influenza can be prevented from spreading by following several ways such as: spread awareness, take the suitable decisions, remind them about the importance of the hygiene, eat healthy food, and provide vaccine. The rest of both didn't believe that influenza can be prevented from spreading.

57.1% of the private schools' principals and 72.7% of the public ones agreed that influenza affects the students' performance. Some said that it makes them loose their focus and concentration; the others said it is due to absence because students depend on working in the class and doing activities. Few of them said that it affects their performance if the teacher is absent for a long time due to influenza. The rest of both said that it has poorly or no effect.

To analyze the collected data, the results were compared to data retrieved from the website of the Ministry of Public Health. Table 1 shows the data collected from the Ministry of Public Health. Out of 1214 SARI cases from 11 sentinel sites in Lebanon 98% of the cases were tested (1186), where 9% of these cases were influenza (105). Out of these 9% cases 58% of them were influenza A (H3N2) (61). This % decreased to 42 % for influenza B (44). As for influenza A (H1N1), (H5N1), (H7N9) and others the % decreased to null (0%). As for the geographical distribution (Table 2), the % of influenza in Great North (North and Akkar) was the lowest (9%) followed by 26% in Great Bekaa, Beirut and Mount Lebanon (28%) and the highest recorded was in Great South (38%).

The % of influenza was 10% in age group between 5 and 14. This % increased slightly to 11% as the age group ranges between 50 and 64 and then it increased slightly to 13% as the age group ranges between 2 and 4. The influenza % increased to 16% as the age group ranges between 0 and 1. This % increased to 24% with a slight increase to 25% as the age group ranges between 15 and 49 and 65+ respectively.

As shown in Figure 7, at week 46, in 2016 and from week 10 to week 13, number of H3N2 cases was reported. However influenza B was reported but the number of cases was very low varying between 1% and 4% but with reported cases of H1N. However H3N2 appeared between week 49, 2016 and week 6, 2017 with a peak at week 52, 2016 with a value of 18% and type B also appeared between week 52, 2016 to week 8, 2017 with a peak at week 6, 2017 with a value of 10%.

TABLE I. THE PREVELANCE OF RESPIRATORY INFECTIONS IN SEASON 2016- 2017 [16]

Indicator	Nb	%
Sentinel	11	
SARI cases	1214	
Tested Cases	1186	98%
Influenza cases	105	9%
Influenza A	61	58%
Influenza A (H1N1)	0	0%
Influenza A (H3N2)	61	58%
Influenza A (H5N1)	0	0%
Influenza A (H7N9)	0	0%
Influenza A (other)	0	0%
Influenza B	44	42%

Between weeks 36 and 45 of year 2016, the number of SARI cases was very low, which varied between 0% and 25% however there was no influenza cases reported in this time interval. At week 45 of the same year, SARI cases increased slightly to become around 40% and influenza testing showed a slight increase to 2% and such value increased to 20% with the increase of SARI cases from 40% to 90% between weeks 50 and 52. However, such value decreased to nil with the decrease of SARI cases to 20% in the second week of 2017 while it peaked back to 28% at the 6th week of 2017 with the increase in SARI cases. But it decreased back with the decrease in SARI cases to become nil as long as number of SARI cases was low and below 20%.

Most principals in public schools and private ones were aware of severity and seriousness of the effect of influenza infection on students' performance and this was greatly obvious in the quantitative data since the percentage of the principals attended workshops on communicable diseases was very low (14.2% in private schools and null in public ones).

TABLE II. DISTRIBUTION OF PATIENTS BY GOVERNORATE (MOHAFAZA)

Mohafaza	Influenza %
Great North (North and Akkar)	9%
Great Bekaa (Bekaa & Baalbeck Hermel)	26%
Great South (South and Nabatieh)	38%
Beirut and Mount-Lebanon	28%

V. DISCUSSION

Regarding the question of being interested in attending workshops on communicable diseases and based on the measurements of principals who didn't attend any workshop but interested in, we can tell that both private and public schools show a high motivation and interest towards attending workshops that might come in handy in decreasing the severity of communicable diseases in schools. Thus, this can be shown by the high percentage that is scored in the data analysis (57.1 % for private schools and 81.8% for public ones).

86% of the principals of the private schools and 71.5% of the public ones didn't know the number of the immunized students against influenza in their schools. This is indeed a high percentage and consequently it shows that neither the principals of the private schools nor the public ones knew well the health status of their students. In addition, they aren't aware of the consequences that infection with influenza virus will reveal sooner on their achievement and academic performance.

A significant hope can be observed based on the analyzed data regarding the presence of the foundation of the prior knowledge concerning the main issue of our study. This can be shown in the percentage recorded by both private and public schools principals about the agreement on immunizing both the students and the staff members (92.8%

and 81.8% respectively).

Despite the fact that the percentage of providing vaccine in public schools is low in comparison with the average percentage however, it is still acceptable compared with the private ones, which is null. Therefore, public schools took the initiative even if it is very slight to be observed as it is known regarding fighting against influenza virus but private ones didn't.

There is a low percentage in both private and public concerning raising the awareness among students and staff members about the symptoms of this virus (42.8% and 27.2% respectively).

Now, let us move towards discussing if the principals are aware of the symptoms of influenza. We could tell that they are totally aware of them. On the contrary, they aren't aware of the different types of influenza. This is absolutely referring back to the fact that they aren't enrolled in any workshops under this issue.

There is a high percentage which is observed in reference to both schools' principals with respect to taking decisions in controlling the spreading of influenza. This might be a good indicator if the taken decisions are right ones however, it might be not if vice versa.

Most of the principals of the schools followed the same strategies when dealing with infected students; however, few of them advocated different strategies that also came in handy in healing.

There is a great agreement by both principals on the fact that influenza can be prevented from spreading according to the percentage (57.1% for the private schools' principals and 72.7% for the public ones) whereas, the rest believe the opposite.

The majority of the principals of both schools agreed on the fact that influenza directly affects the performance and the achievement of the students whether the teacher is absent or the student is absent because of the influenza (57.1% for the private schools' principals and 72.7% for the public ones). Moreover, they also agreed that influenza affects their performance in different ways.

Based on the data collected from the Ministry of Public Health, influenza A and B are the most spread types of influenza and they are highly exposed to have Severe Acute Respiratory Infections.

Despite the fact that the percentage of influenza in Great Bekaa might appear low (26%) and with respect to the age
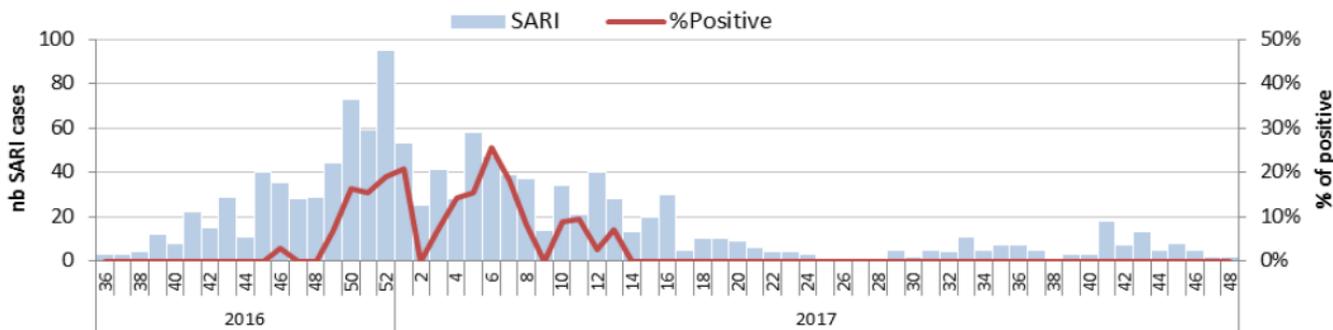

Figure 7. Distribution of Influenza Positive Patients by Week of Admission, 2016W36-2017W48 (Reproduced from [16])

group from 2-14 (23%) however, we can't deny its severity as one of the communicable diseases. Thus, it might be alerted percentage.

After analyzing Figure 3, " Distribution of Influenza positive patients by week of admission, 2016W36-2017W48" we concluded that influenza is mostly spread in winter season which is consistent with the results about influenza illness in England [17].

Our findings necessitate having a trained nurse in each school and establishing an awareness program to educate the school managers about the importance of management practices such as immunization programs, send sick students back to their homes, hand hygiene [18], school closure [19], and balanced meals with more fruits and vegetables.

VI. CONCLUSION

The results of the current study revealed that influenza is one of the important reasons behind students' absence. This affects their performance and achievements. Although most of the schools' principals were aware of some symptoms of influenza, they were not aware of the prevention measures to be taken to minimize transmission of the virus. Proper management of influenza in schools requires a plan to educate the schools principals about prevention measures and the ways to implement them.

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