

Effect of Communicable Disease on the Performance of Elementary School Students

A Case Study of Leishmaniasis among Syrian Refugees in Some Bekaa (Lebanon) Area Schools

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Abstract– It is well known that education in a child life has the power to develop him/her personally, socially, as well as economically. Due to the value of education and its significance, governments, Non-Governmental Organizations (NGOs), as well as educational institutions are investing more than ever before on education. In order to bring improvements to this sector, some of the factors influencing the academic performance of the students such as attitude of the students, the leadership aspects, and psychological and health related factors are being studied. Since the Syrian conflict started, Lebanon became a common destination receiving a huge number of Syrian refugees that are living in camps spread all over the country, with the largest concentration in the Bekaa Valley. Generous steps are being taken to increase the access to formal education, such as offering free public education and opening second shifts in the afternoon. Yet barriers, such as child labor and health related factors, like the spreading of the communicable disease leishmaniasis are keeping children out of classroom. The present study was done with the aim of investigating the effect of leishmaniasis on the performance and the academic achievement of Syrian children. The results showed varying degrees of knowledge and dealing with the case of leishmaniasis. The disease clearly had an effect on the students' attendance in schools, and by proxy on their academic performance.

Keywords–communicable diseases; leishmaniasi; Leishmania; attendance; absenteeism; Syrian refugees.

I. INTRODUCTION

Since the eruption of the Syrian conflict, Lebanon began hosting fleeing refugees. To date, the country has sheltered around 1.5 million Syrian refugees, as estimated by the Lebanese government and a number of local NGOs. According to a report published by the United Nations High Commissioner for Refugees (UNHCR) in 2016, the refugees were spread all over the country as follows: Bekaa (36%), Beirut (26%), North Lebanon (26%), and South Lebanon (12%) [1]. Unfortunately, Syrian refugees live under very poor conditions. Inadequate sanitation, lack of access to clean water, overcrowding in their temporary settlements as well as limited access to healthcare infrastructure favor the

spreading of communicable diseases, such as leishmaniasis. Leishmaniasis has emerged in Lebanon, but it has been mainly contained to refugee populations. Young people usually are the most affected due to their lack of previous exposure to the disease. The present study aimed at assessing the effect of leishmaniasis on the academic performance of elementary school students. The data was collected through a survey identifying the type of infection, the level of academic performance, the awareness among school's administration, teachers and parents. In addition, the negative impact of infection on the students' performance due to their absence from the class was investigated by directly interviewing the patients. The data clearly revealed that leishmaniasis has a direct effect on students' academic performance. This effect is in particular due to their absence from schools due to infection.

The remainder of this paper is organized as follows: Section II introduces the topic. Section III describes the methodology used. Section IV presents the results. Section V discusses the results obtained. The conclusion and acknowledgement close the article.

II. LITERATURE REVIEW

Leishmaniasis is an endemic disease in Syria, and the presence of war has greatly increased the risk for new cases in Syria as well as in the surrounding areas of the Middle East. The population displacement, poverty, and the poor living conditions, among other factors, help in the rapid transmission of the infection [2] [3]. Following the civil war in Syria, the Syrians started migrating to Lebanon and living in Syrian camps on the border with Syria, where the highest prevalence of leishmaniasis is recorded. School students are one of the main populations that are affected by this problem [4]-[6].

A. Communicable diseases

Communicable diseases are a main cause of morbidity and mortality caused by microorganisms in human beings [7] [7]. The risk of communicable disease is related to the characteristics of the affected population, such as malnutrition, host immune response, the access to health care

services, and availability of safe clean water. Leishmaniasis is a parasitic zoonosis caused by protozoans of the genus *Leishmania* transmitted by insects known as phlebotomines sand flies, which are found in wild or urban environments [8]. Transmission of the disease occurs mainly through the infected insects; non-vector transmission is rare. The *Leishmania* protozoan was first described by Leishmania and Donovan in 1903 [9] and more than 50 *Leishmania* species have been identified worldwide; at least 21 of these species have significant medical importance. This parasite is endemic in at least 98 countries, including the eastern Mediterranean region [10].

There are three main forms of leishmaniasis: visceral leishmaniasis (VL), cutaneous leishmaniasis (CL) and mucocutaneous leishmaniasis (ML). CL is the most common form of leishmaniasis, characterized by skin manifestation causing skin lesions, papules, and nodules that may ulcerate leaving scars and serious disability. Despite a wide distribution, around one third of CL cases occur in the Americas, the Mediterranean basin, mainly in Iraq, Afghanistan, Iran, and Syria [10]. Mucocutaneous leishmaniasis is the result of untreated lesions of cutaneous infection causing total or partial destruction of mucous membrane of mouth, throat, and nose, and may spread to the adjacent mucosal surface. The most severe form of leishmaniasis is VL that is potentially fatal in over 95% of cases, if left untreated. VL affects internal organs including kidney, bone marrow, liver and spleen, causing enlargement in these organs, weight loss, fever and anemia. The epidemiology of these types of leishmaniasis depends on the characteristics of each parasite species [11].

Even though the risk of leishmaniasis is increasing worldwide due to many factors, they are gaining lesser attention than other communicable disease such as Malaria and AIDS [12]. Every year, 1.3 million new cases are reported with 20000 to 40000 cases of death [12]. According to the World Health Organization (WHO), the major risk factors of leishmaniasis are socioeconomic conditions, where poverty increases the risk of infection due to lack of waste management, little access to health care services, and open sewerage. These conditions may increase the breeding of female sand fly. In addition, lacking of different proteins, some vitamins and minerals due to undernourishment have been shown to increase the risk of VL [11]. Moreover, climate change such as change in temperature, rainfall and humidity affect strongly the distribution of vectors and reservoir hosts and their survival. More importantly, population mobility and displacement of non-immune people into areas with existing transmission cycles will increase the spread of the infection [11].

According to Alawieh *et al.* [3], no vaccine for *Leishmania* is available even though vaccination remains the most promising approach for the prevention. Nevertheless, the main way to prevent leishmania infection is by limiting exposure to the vector through insect repellent, insecticide, and controlling sand flies multiplication [4]. Another efficient method of prevention is through the establishment of a control program, awareness campaign for the community, in addition to increase coordination among the

agencies [11]. Early diagnosis helps in reducing the prevalence of leishmaniasis and its spreading. The diagnosis of different forms of leishmaniasis is based on clinical manifestation with serological tests and it is type dependent [4].

B. Communicable disease among Syrians

Leishmania is one of the most important protozoan infections in Middle East and North Africa region [4]. One of the endemic countries of CL is Syria [13]. 90% of CL in Syria are caused by *Leishmania tropica* and the remaining cases are caused by *Leishmania infantum* [13]. Since Syria has the highest prevalence of CL mainly in Aleppo, leishmaniasis is known there as “Aleppo boil” [4]. The socioeconomic and environmental factors in 1990 caused the rapid spreading of CL in Syria [14]. During this time, the Syrian people migrated from rural to urban areas, thus, resulting that people with no or low immunity became highly exposed to CL. Despite the governmental effort in controlling sand fly multiplication through insecticidal treatment in 1991 [14], the CL incidence in Syria began to rapidly rise again. The increase in CL incidence was mainly due to the inability of municipal departments to provide adequate health care services, sanitation hygiene, and insecticide treatment [15].

C. Student performance in relation to class attendance

Education is a special process that improves skills and knowledge of individual to be able to participate in social activities and to promote and empower a community. However, Sintayehu Mekonnen in his study conducted to examine problems that confronted academic performance [5] concluded that the end result of educational process is challenged by different factors that may affect high quality of academic performance of learners.

Different studies explored factors affecting student's performance and student's achievements [16]-[18]. In a study published in 2011 by Saleem and Qureshi to identify different factors affecting student's achievements in higher education revealed that achievements are directly affected by academic factors, personal factors and socio-economic factors [16].

In addition, the academic performance of individuals is strongly affected by the type of education and the ability to provide the appropriate environment to accommodate individuals learning and educational needs. Karemera *et al.* [19] found that technology including computer lab, and the quality of library in institutions are directly related to students' performance. The study also revealed that student's achievement is positively affected by the service received and concluded that academic performance and school achievement are not associated with family income level. Furthermore, a study by David Romer confirmed that absenteeism and entry qualification affect learning; attendance should be mandatory [20]. In addition, the study found that environmental and motivational factors have a moderate effect in student academic performance.

In accordance with the above study emphasizing the effect of absenteeism on student's performance, Harb and El-

Shaarawi examined the effect of family size, gender, and place of living on students' performance [18]. They concluded that the most important factor affecting students' academic performance is class participation and students' competence in English [18].

Shehry and Youssif in their assessment of factors affecting student's performance [21] attributed the bad academic performance to the long distance between schools and home. In addition to repeated absence, arriving home late and tired, the inability to complete and concentrate on homework, were additional factors that affected significantly students' performance [21].

In another study published by Hijazi and Naqvi, the authors have investigated different factors affecting student's performance, such as mothers' age, mothers' education, family income, study hours, and class attendance percentage. The data collected by authors showed clearly that class attendance is one of the main factors that have a positive effect on student's performance; regular attendance in college does contribute to a student's performance [22]. In addition, the authors found that educated mothers significantly affected their children performance, as compared to non-educated mothers, by keeping proper check on kids' activities [22].

Osaikhiwu investigated, in his study, the institutional factors affecting students' performance, such as overcrowded lecture rooms, students' relationships, water supply, physical environment, and conditions of the facilities in higher educational institutions [17]. The author found that facilities in the system and favorable learning environment including water and electricity supply enhance students' performance. These findings are consistent with Karemeras' study [19] where he found that students' academic performance significantly correlated with overcrowded lecture rooms that cause unfavorable learning environment. In addition to institutional factors, other factors such as self-motivation, socioeconomic status, students' age, and some others could play a major role in determining students' performance [5].

III. METHODOLOGY

For this study, we use and apply a descriptive mixed method. Creswell defines the term mixed method as a research approach that arises from merging both qualitative and quantitative methods in a constant long term program of investigation to address their research questions. Such integration allows more harmonious usage of data than selectively using each type alone [23]. According to the author, using mixed study has several advantages:

1. In a mixed method, we confirm our quantitative results using qualitative experiment. As a result, this method will enable the researcher to relate and confirm the effect of leishmaniasis on the performance of elementary school students, by using the data from both an interview (qualitative), as well as a survey (quantitative), in the Bekaa schools.

2. The mixed method gives us multiple perspectives and more understanding of the topic by having results not only from Bekaa schools but also from directly interviewing parents of infected students at refugee camps.

This study is classified as descriptive mixed method as it analyses data collected from survey, interviewing teachers/parents of infected students and managers at Bekaa schools.

A. Data collection

Primary approval from the University's Institutional Review Board (IRB) was granted to conduct research at Bekaa schools, where students are potentially infected by leishmaniasis. The surveys were distributed, and the data were collected by hand, to ensure that the queried people understood the questions: an important aspect due to the social circumstances in which the study was conducted. Also, personal interviews with Bekaa school principals, the head of Communicable Diseases Department at the Lebanese Ministry of Public Health (MoPH), some NGOs, and managers of drug dispensaries in Western Bekaa were also conducted.

B. Data analysis

For quantitative data, all statistical analysis was done using the statistical package SPSS [24]. Analysis of the Variance (ANOVA) was used to see if there is a relation between student absence and academic achievements. For qualitative data, the interviews were analyzed.

IV. RESULTS

Ninety percent of the surveyed schools reported having Syrian refugees among their student bodies. 83.6% of these schools testified that they have formal medical supervision of the students. What was alarming, however, was that only 20% of the schools had a formal awareness campaign about communicable diseases. While 4% of the schools had no form of health awareness, 53% did have some scattered activities in that regard, ranging from seminars, to weekly sessions, to some publications, with the different schools approaching the matter differently. Such a fragile awareness affected – of course – the student knowledge about the disease. Only 27% answered correct queries about leishmaniasis, whereas 20% had completely wrong answers, and the rest showed some degree of knowledge. The above information becomes somehow important when the sample showed that 97% of the interviewed reported encountering at least one case of leishmaniasis.

In terms of gender, the percentages of affected boys and girls were 60.3 and 39.7, respectively. The reported cases ranged from 3 to 14 years of age, with 52% of the cases in the 6-10 years bracket, 7% in the upper age (10-14 yrs) and 7% in the lower age (3-5 yrs) brackets. 93% of the reported cases were of the type "visceral leishmaniasis".

The academic performance of the students under survey was probed prior, during, and after being diagnosed with – and later on treated from – leishmaniasis. The data is presented in Table I. Next, the effect of attendance was investigated, and the results are shown in Table II.

As for the parents of affected students, 75.9% of them received general health awareness, 3.4% received published material specific to the disease, and 3.4 % were trained to deal with such cases, whereas some 17.2 % showed complete indifference. It was worth noting that 80% of the institutions

(schools, NGOs, etc.) dealing with the above cases provided access to social workers that were trained to deal with both the infected students, their parents, and their teachers.

TABLE I. THE ACADEMIC PERFORMANCE OF THE STUDENTS IN THE DIFFERENT PHASES OF THE INFECTION.

	Weak	Acceptable	Good	Very Good	Excellent
Pre-infection	0 %	10.3 %	75.9 %	6.9 %	6.9 %
During infection	55.2 %	34.4 %	10.4 %	0 %	0 %
Post-infection	24.2 %	41.4 %	27.6 %	3.4 %	3.4 %

V. DISCUSSION

The Lebanese health system is composed of services rendered by the public and the private sectors, as well as the nongovernmental organizations’ sector. The dominant sector is the private one, since it provides most of the services [25]. In addition, there is a large number of primary health care centers that provide health services, including vaccination, management of communicable diseases, and medicines [25]. Around 50% of Syrian refugees live in the poorest areas of Lebanon informally [25]. According to an assessment conducted by UNHCR in 2016, 310,000 individuals among the Syrian refugees in Lebanon received primary healthcare, and 98,861 individuals benefitted from several lifesaving and obstetric healthcare services. According to Reidner and Sabbah, “limited funds are available for ensuring equitable provision of health services to meet essential health needs at the primary, secondary and tertiary health care levels.” Consequently, in the six years of the Syrian crisis, the healthcare services rendered across the Syrian refugee population in Lebanon remain a serious concern [25].

TABLE II. THE ATTENDANCE OF THE STUDENTS IN THE DIFFERENT PHASES OF THE INFECTION.

	Extremely low	Lower than Normal	Normal*	Permanent‡
Pre-infection	0 %	0 %	62.1 %	37.9 %
During infection	6.9 %	72.4 %	20.7 %	0 %
Post-infection	6.9 %	41.4 %	44.8 %	6.9 %

* Normal attendance was based on the average attendance of non-infected students in the same class

‡ No absence was reported during the timeframe of the study

The wide distribution of Syrian refugees in Lebanon caused sudden increase in leishmania cases, where this new outbreak of leishmaniasis in Lebanon is the first of its kind for more than a decade [4]. According to [4], the Lebanese Ministry of Public Health (LMoPH) implemented an active surveillance for leishmaniasis since the beginning of the Syrian conflict; LMoPH diagnosed the cases by traditional techniques of smear, histological analysis of skin biopsies and parasite culture [4]. The USA and several developed countries put together collaborative efforts to prevent the

globalization of this disease through its transmission by troops, travelers, immigrants, NGO workers and tourists visiting or passing through countries with endemic leishmaniasis in the Middle East [4]. According to Tokajian et al. [2], leishmaniasis is considered one of the most neglected diseases in the world, in the time where the parasite may be able to propagate in different areas in Lebanon, particularly in Bekaa district, where the vector may find a favorable habitat and where appropriate zoonotic reservoirs are present [4].

The current study was conducted solely on students aged 3-14 years, and who were – at the time of the data collection – matriculated in some West Bekaa area schools. The results showed varying degrees of knowledge and dealing with the case of leishmaniasis. The disease clearly had an effect on the students’ attendance in schools, and by proxy on their academic performance.

Part of the causes of such variations in dealing with the problem is due to the political strings attached to the different Lebanese ministries (e.g., Public health, Social affairs, Refugees and Displaced, Education, etc.), and the conflicts that may exist between the heads of these ministries. A clear indication to such an argument was the lack of coordination between the schools (under the control of the Ministry of Education), the NGOs (under the control of the Ministry of Social Affairs), and the Primary Healthcare Centers (under the control of the Ministry of Public Health). Our study reported that 64.3 % of the schools lacked any kind of coordination with the MoPH centers, whereas on 28.6 % of the schools were in direct relationship with the MoPH offices. Such an argument is further corroborated by the fact that the MoPH provided the necessary medicines and vaccines to 70% of the reported cases.

VI. CONCLUSION

More evidence is accumulated that refugee camps are not good for anyone, especially for kids. In this study, we addressed one communicable disease; however, there are still more issues that will remain to be answered. These factors include – but are not limited to – psychological stresses during and post-migration, challenges that affect the ability of the refugee students to adapt to the host schools system, etc. This is despite the fact that educational access and opportunities for camps refugee children remains low. In conclusion, our study raises a critical point of the effect of communicable diseases on the performance of elementary students, in particular the Syrian refugees. Leishmaniasis is an example of one factor that keeps children out of the classroom. How other health related factor may also affect could be further evaluated. In addition, public awareness within Syrian refugees might also be a subject of further investigation to assess its effect on children education. This can be further implemented by school administration and their partnership with parents and/or guardian of the refugee students. The main question that remains to be answered with respect to the Lebanese community is whether the Lebanese authorities have enough knowledge in dealing with

such education-related health problems despite the fact that leishmaniasis is not endemic in Lebanon.

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