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Short report

First Lebanese Antibiotic Awareness Week campaign: knowledge, attitudes and practices towards antibiotics

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SUMMARY

Antibiotic resistance (ABR) is a major global health threat that increases the risk of treatment failure and increases medical costs. One of the most common factors contributing to the spread of ABR is self-medication. The public, as well as workers in clinical and veterinary sectors, commit false practices towards appropriate antibiotic use, favouring the spread of resistance. As such, the first Lebanese Antibiotic Awareness Week campaign was initiated with a human-centred and interactive approach. The data showed a strikingly low level of antibiotic awareness. Cooperation between relevant stakeholders, policy-makers and health actors is crucial to control and overcome the problem of ABR.

Introduction

Antibiotic resistance (ABR) is a major global health threat worldwide, and is spreading more rapidly than the development of new agents [1]. The exceptional spread of multi-drug-resistant bacteria is of particular concern as this could lead to serious infections leaving patients with very limited, or no, therapeutic options.

Some countries have been able to contain the threat of ABR, but in most countries, particularly developing countries, the issue continues to grow [2]. The overuse and misuse of antibiotics in both the human and animal sectors has been a fundamental cause favouring the emergence, multiplication

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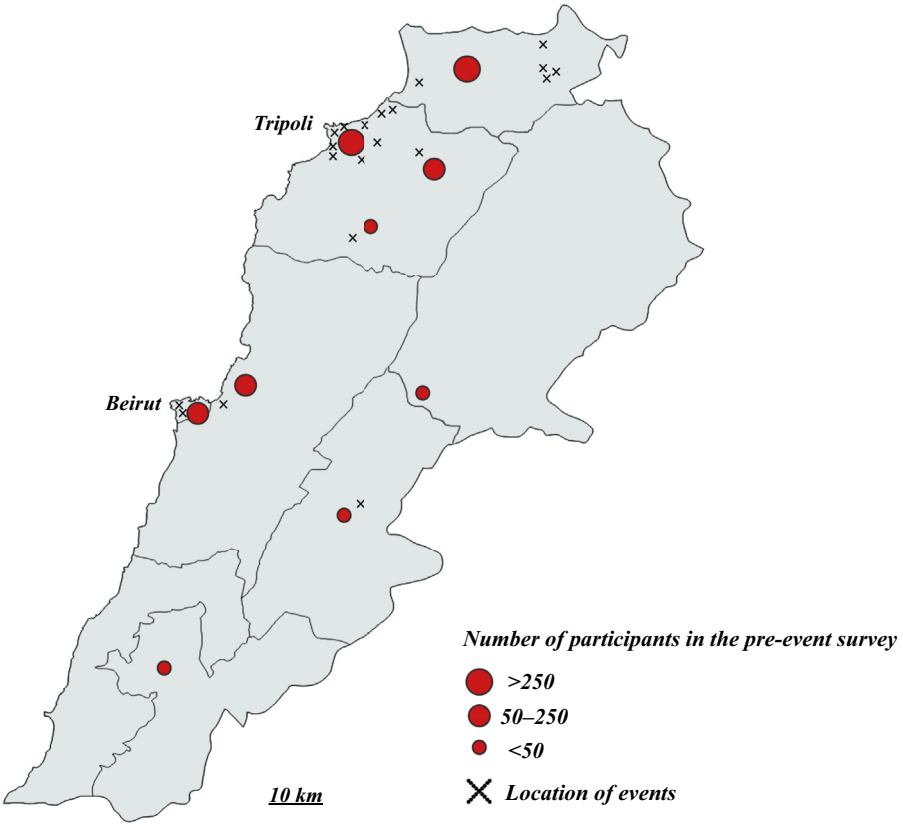

Figure 1. Geographic locations targeted in this study in Lebanon.

and spread of resistant strains. Worldwide, the most common factor contributing to the spread of ABR is self-medication [3]. The reasons for this behaviour are numerous, with the main reasons including expensive healthcare services, easy access to medication, smuggling and illegal sales of antibiotics, and lack of awareness about the concept of antibiotics, ABR and outcomes of overconsumption [4]. Hence, interventions to prevent and control the spread of ABR in the community and hospitals are needed urgently.

In Lebanon, numerous studies have investigated the epidemiology of certain types of resistance which seem to grow rapidly and uncontrollably [5,6]. Behaviours at individual level play a major role in the spread of resistant pathogens. Therefore, an initiative was planned in the form of an awareness campaign of multiple events in diverse regions and settings, mainly to target vulnerable populations. The Lebanese Association for Development initiated the first Lebanese Antibiotic Awareness Week campaign, synchronized with the World Health

Table I
Beliefs regarding antibiotics and antibiotic resistance among resident communities in Lebanon ($N = 1187$)

Variables	Cluster 1			Cluster 2			Cluster 3		
N (%)	True	False	*P*-value (OR [95% CI])	True	False	*P*-value (OR [95% CI])	True	False	*P*-value (OR [95% CI])
	1367 (57.6)	1007 (42.4)		393 (33.1)	794 (66.9)		1572 (66.2)	802 (33.8)	
Sex									
Female	1066	852	0.001 (0.69 [0.55–0.86])	301	658	0.04[a] (0.72 [0.53–0.99])	1271	647	0.75 (1.04 [0.83–1.3])
Male	259	143		78	123		263	139	
Age (years)									
>18	859	599	0.31 (1.1 [0.92–1.31])	221	508	0.007[a] (0.7 [0.54–0.91])	993	465	0.016[a] (1.26 [1.04–1.51])
≤18	432	330		146	235		480	282	
Education									
School	584	722	<0.001[a] (0.29 [0.25–0.35])	211	442	0.52 (0.92 [0.72–1.18])	772	534	<0.001[a] (0.48 [0.41–0.58])
University	783	285		182	352		800	268	

OR, odds ratio; CI, confidence interval.
[a] Statistically significant.

Organization's (WHO) Antibiotic Awareness Week (13th–19th November 2017), to highlight the issue of ABR and the misusages that lead to its incredible spread in the community.

The objectives of this campaign were to explore beliefs about antibiotics, and knowledge and awareness of the appropriate use of antibiotics and ABR among Lebanese and non-Lebanese individuals from different backgrounds and age groups. In addition, the campaign aimed to examine how their beliefs, knowledge and awareness may be related to their behaviours regarding the use of antibiotics in infections. Finally, the campaign sought to reinforce the key messages about appropriate use of antibiotics in targeted populations.

Materials and methods

In order to tackle the problem of ABR successfully, it is necessary to raise general awareness and knowledge about this serious public health issue. Unfortunately, according to recent national reports, both ABR and self-medication are increasing to dangerously high levels in Lebanon. For these reasons, members of the Lebanese Association for Development, who are also researchers in clinical and food microbiology, took the initiative to supervise, plan and execute the campaign on the ground. Subsequently, a team of Lebanese university students specializing in health sciences were recruited as volunteers to organize and execute the campaign. The team was divided into committees, each of which was responsible for executing a cluster of tasks.

The target segments of the awareness campaign were mothers (as they are the main actors in consumption of antibiotics in the household, especially by children) and university students (seen as future parents and educated influencers in their respective communities). The campaign was delivered via interactive awareness lectures in various locations in Lebanon, a documentary featuring interviews from the streets of Tripoli to highlight the wide spread of misconceptions among the public, research questionnaires which aimed to measure the knowledge of the population regarding antibiotics, and posters and a Facebook page in order to raise awareness of the issue.

In parallel with the awareness campaign, a quantitative, cross-sectional epidemiological study was conducted in the same period, between 13th and 19th November 2017. The study population consisted of participants from seven governorates: Akkar, Baalbek-Hermel, Bekaa, Beirut, Mount Lebanon, Nabatieh and North Lebanon. Although many studies have been conducted to assess antibiotic awareness, to the authors' knowledge, this is the first study in Lebanon covering a wide range of educational, regional and age ranges. The investigation was conducted in accordance with the Declaration of Helsinki and national and institutional standards. Survey volunteers informed the participants about the research purpose of the survey, and that their participation was voluntary. All participants gave verbal consent to participate. The identity of participants was anonymized through the process of data analysis. Survey responses with non-missing data on age, sex and education were included in the final analyses.

The sample size was calculated using the Raosoft sample size calculator with a margin of error of 5%, a confidence interval (CI) of 95%, a population size of 7,000,000 people living in Lebanese territories (including Syrian and Palestinian refugees), and an expected response rate of 50% [7]. The minimum sample size estimated for the study was 385. The study population was selected from various Lebanese areas in order to increase the reliability of the findings.

In each event, a pre-event survey approach was used to understand the prevalence of misconceptions about the concept of antibiotics, their use and ABR. The inclusion criterion was that participants had not attended an awareness lecture. Participants completed questionnaires, and volunteers assisted illiterate members of the public. Based on the key messages of the WHO Antibiotic Awareness Week campaign, a nine-item multiple choice paper-based survey was developed to measure the concepts of interest: individual knowledge about the target fought by antibiotics (Cluster 1), perception of ABR (Cluster 2), perception of the misuses of antibiotics that lead to resistance (Cluster 3), awareness about the implications of ABR (Cluster 4), and awareness about the magnitude of the issue of ABR (Cluster 5). Validation of the content was undertaken by experts in antimicrobial resistance and epidemiology. The questionnaire was pretested for content comprehension by 20 individuals, and modifications were made accordingly so that it was simple to understand and respond. All questions are shown in Appendix 1.

Cluster 4			Cluster 5			All clusters		
True	False	*P*-value (OR [95% CI])	True	False	*P*-value (OR [95% CI])	True	False	*P*-value (OR [95% CI])
608 (51.22)	579 (48.77)		2338 (65.65)	1223 (34.34)		6278 (58.8)	4405 (41.2)	
465	494	0.003[a] (0.62 [0.46–0.85])	1874	1003	0.47 (0.93 [0.78–1.13])	4977	3654	<0.001[a] (0.83 [0.75–0.92])
121	80		402	201		1123	686	
348	381	0.008[a] (0.71 [0.56–0.91])	1398	789	0.001[a] (0.77 [0.66–0.9])	3819	2742	0.04[a] (0.91 [0.84–0.99])
214	167		796	347		2068	1361	
268	385	<0.001[a] (0.4 [0.31–0.5])	1169	790	<0.001[a] (0.51 [0.44–0.59])	3004	2873	<0.**001**[a] (0.48 [0.44–0.52])
340	194		1251	433		3356	1532	

Statistical analysis was performed using EpiInfo with Chi-squared tests to compare differences categorized by sex, level of education and age group. The tests were two-sided, with a type I error set at $\alpha = 0.05$.

Results and discussion

Despite the limited resources, this campaign was able to reach out to more than 10,000 individuals and spread the key messages to tackle the problem. The audience were supported and encouraged in active participation rather than passive attendance, and a variety of open questions were used that allowed participants to learn more about antibiotics and ABR. Moreover, a verbal commitment was made by all participants to stop using antibiotics without prescription.

The paper-based survey was administered to all the participants in the awareness lectures in the 20 different settings. In total, 1187 surveys were completed by people from different Lebanese regions (Figure 1), educational backgrounds, sexes and age groups. Each of these variables was correlated separately with the correctness of the answers.

This investigation revealed insufficient knowledge, poor attitudes and inadequate practices towards antibiotics among the population. The data showed a strikingly low level of awareness about the concept of antibiotics and their usage, and the issue of ABR (Table I). Out of 1187 individuals who agreed to participate in the pre-event survey, only 48 (4%) answered all the questions correctly. Regarding the type of micro-organisms targeted by antibiotics, 58% of individuals believed that antibiotics worked on bacteria and should not be used on cold sores. Thirty-three percent of individuals had knowledge about the perception of ABR, and 51% of individuals were aware of the risk attributed to ABR. Overall, the highest percentages of correct responses by survey participants were to questions concerning the perception of misuses of antibiotics that lead to ABR (66%), and awareness about the magnitude of the issue of ABR (66%).

A logistic regression model was created to identify the risk factors associated with low awareness towards antibiotics and ABR among resident communities in Lebanon. Adults [odds ratio (OR) 1.1, 95% CI 1.01–1.78, $P = 0.04$], female sex (OR 1.2, 95% CI 1.08–1.33) and school level education (OR 2.1, 95% CI 1.93–3.4, $P < 0.001$) were significantly predictive of insufficient knowledge towards antibiotics in resident communities in Lebanon.

This study found that there is poor understanding of the concept and use of antibiotics, as well as inability to differentiate between the different types of germs, leading to confusion about the use of antibiotics to treat viral infections (e.g. cold). This confusion is probably attributed to the lack of proper communication by physicians prescribing antibiotics, and lack of awareness by educational settings (schools and universities) and governmental agencies. Younger participants seem to be more aware of the issue, and this might be attributed to the fact that they are more exposed to social media platforms where knowledge about antibiotics can be published. In addition, it is evident that university students are more likely to answer correctly because students that specialize in health receive in-depth knowledge, and students of other specializations can also receive some information about the issue. Overall, the results of this study are consistent with other studies in Lebanon [8] and in nearby Middle Eastern countries such as Kuwait [7], Jordan [9] and Saudi Arabia [10], which also reported a significant lack of awareness about this global health issue.

To the best of the authors' knowledge, this campaign is the first national awareness initiative to target the problem of ABR in Lebanon. One of the main strengths of the campaign was the resilient management and sense of responsibility of the volunteers towards the issue and the community. Three important lessons were learned from this campaign: (i) even with limited resources, action can be implemented and impact can be made; (ii) there is high agreement of individuals regarding application of the recommendations and the behavioural changes needed when the approach is human-centred and interactive; and (iii) more cooperation is needed between stakeholders, policy-makers and health actors to control the problem of ABR, induce more impact and reach out to greater segments in both clinical and veterinary sectors.

In the authors' opinion, there is a need for more awareness interventions involving health and political stakeholders throughout the year, using not only methods that reach the target segments indirectly (e.g. media and online content), but also approaches that include direct contact and communication. This study has shown high agreement of individuals regarding application of the recommendations and the behavioural changes needed.

However, the main limitations remain those related to the healthcare system and socio-economic factors. In Lebanon, most people are of low socio-economic status, with only 45.9% of the population covered by the governmental health insurance. In addition, there is a lack of primary healthcare facilities. Moreover, due to the ongoing Middle Eastern conflicts, huge numbers of immigrant populations, including Syrian and Palestinian refugees displaced in Lebanon, face dire levels of poverty and vulnerability, and represent an ideal environment for the development and dissemination of infectious diseases. Thus, a remarkable percentage of the community cannot afford to see a medical doctor for a proper medical prescription of antibiotics under the worsening economic circumstances. To save money, people usually go to the pharmacist and take the antibiotic immediately. Pharmacists do not abide by the regulations and sell antibiotics without prescription.

In conclusion, a further movement needs to be initiated to take the change to a policy-based level. This includes, in addition to extended awareness campaigns targeting the public with various means, a pressing movement to ensure more surveillance of pharmacists and doctors by the Lebanese Government, as well as enhancing the coordination between healthcare facilities and the Ministry of Public Health to further control the spread of resistance in the hospital setting. An urgent intervention is needed in the animal sector which serves as a significant reservoir of resistant bacteria.

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Conflict of interest statement
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Appendix A. Supplementary data

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