Journal of Infectious Diseases & Preventive Medicine

Ibrahim and Bazzi, J Infect Dis Preve Med 2017, 5:3
DOI: 10.4172/2329-8731.1000168

Research Article Open Access

Assessment of Clinicians Knowledge and Perception on (As) Pre and Post (Asp) Intervention

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Received date: September 23, 2017; **Accepted date**: October 12, 2017; **Published date**: October 19, 2017

Abstract

Background: Mortalities due to super-infections and allergic reactions are taking place as a result of antibiotic use and misuse which in turn has led to bacterial resistance towards different antimicrobial agents.

Method: A cross-sectional study was carried out in a private 125-beds Lebanese hospital with the aim to assess clinicians' perception and knowledge at baseline and after the interventions have been implemented; and to educate clinicians about antimicrobial resistance, antibiotic prescribing practices, and antibiotic stewardship (AS).

Results: 6.3% of physicians strongly agreed that the antibiotic resistance is a significant problem in the hospital, compared to 100% of physicians who strongly agreed that the antibiotic resistance is a significant problem in the hospital after the antimicrobial stewardship program (ASP) was launched.

Discussion: An overall positive impression that clinicians had of the ASP was identified; more than 80% of clinicians believed that the program was improving antibiotic use and improving the overall quality of care of hospitalized patients.

Conclusion: Clinicians' responses found ASP beneficial to their acts and to the patients' sake, emphasizing the need for such interventions in all health care settings.

Keywords: Knowledge; Physicians; Practice; Antimicrobial; Hospital

Introduction

According to several reports published by the Center for Disease Control and Prevention in 2010, physicians prescribe approximately fifty percent of unnecessary antimicrobials to patients despite the frequent alarms that have been published about their adverse effect on health, medical services cost and the threatening antimicrobial resistance [1-4]. This observed phenomenon, whether in the community or hospitals, has led to serious medical problems and consequences which may have included the development of antibiotic resistance. Sivagnanam revealed that most physicians feel obligated to prescribe antibiotics to satisfy patients even in situations when they are not sure of the diagnosis or if they were not able to proceed a further investigation of the patient's complaint [5]. Physicians have also felt the pressure to prescribe antibiotics to patients in around 62% of the cases when the patients ask for it versus 7% of the cases when physicians depended only on their own decisions [6]. Mortalities due to super-infections and allergic reactions are taking place as a result of antibiotic use and misuse which in turn have led to bacterial resistance towards different antimicrobial agents. The misuse of antibiotics is not only limited to hospitals, observations reveal that antibiotics constitute between 20 to 50% of the total pharmacy drug spending [7].

As a result, and in an attempt to decrease the emergence of antimicrobial resistance and increase the awareness of people, it has been proposed to educate the public and patients about the adequate use of antibiotic [6]. On the other hand, while addressing the issue of antimicrobial misuse in hospitals, John states in a study of his that infectious disease physicians can help in controlling the misuse of antimicrobials among patients [8]. Whereas other studies revealed that addressing antibiotic prescribing to patients yielded more beneficial results if it was in the form of a team approach. This approach should focus on establishing different antimicrobial policies, implementing and observing the compliance with these policies, evaluating feedback, weighing up outcomes and discussing findings with physicians, revising the policy on annual basis based on the experience of clinicians and bacterial susceptibility patterns, and setting audit targets [3]. Moreover, several interventions were proposed to decrease the inappropriateness of antibiotic use in hospitals, these included but were not limited to antibiotic restriction policy, infection control program with a focus on antibiotics, and complying with scientifically based guidelines when prescribing antibiotics [9].

Appropriate prescription of antimicrobials was defined by WHO as "the cost-effective use of antimicrobial which maximizes clinical therapeutic effect while minimizing both drug-related toxicity and the development of antimicrobial resistance, a similar definition was provided by the 2001 inter agency taskforce on antimicrobial resistance action plan [10].

The process to prescribe an antibiotic appropriately comprises of three major steps:

1. Deciding if an antibiotic is necessary, judging the patient history and the examination, the clinician knowledge and suspicion of the presence of an infectious disease.

2. Selecting the right antibiotic based on the likely pathogen, clinical significance, antibiogram, best-evidence, efficacy, toxicity, adverse events, drug interactions, contra-indications, the presence of antibiotic resistance, antibiotic availability and cost.

3. Selecting the right dose, route, interval, and duration [11]. Thus such prescribing decisions are an intricate and multi-faceted complex process.

On the other hand, an antimicrobial agent is inappropriate if 1. It is more costly than a similar agent, 2. If it spectrum is so broad, too narrow or otherwise inappropriate. 3. If not indicated. 4. Inappropriate route. Inappropriate antibiotic prescribing can result in: rise in mortalities and morbidities, costly treatment ADE, length of stay (LOS), and acquiring antibiotic resistant organisms [12].

Methods

In March 2013, a cross-sectional survey was carried out amongst all physicians (72 full-time physicians) working in a private 125-beds Lebanese hospital. This hospital provides the highest standards of quality care to patients across Lebanon and the surrounding countries in some incidences. The hospital is committed to improving the delivery of healthcare in Lebanon. It has variety of services which include: cardiothoracic surgery, paediatric, surgical units, internal medicine units, obstetrics, oncology, neonatal intensive care unit, medical intensive care unit, cardiac intensive care unit, post-open heart surgery intensive care unit, paediatric intensive care unit, cardiac ward, haemodialysis unit, rehabilitation centre. This survey was designed to serve two purposes: to assess clinicians' perception and knowledge at baseline and after the interventions have been implemented; and to educate clinicians about antimicrobial resistance, antibiotic prescribing practices, and antibiotic stewardship programs (ASP). The results of the survey may provide important information about barriers that may be encountered by the ASP and topics for which educational interventions are needed. Participation was anonymous and without compensation. The researcher assured that anonymity would be maintained, and ethical principles would be followed i.e. physicians' names were not written on the survey. Following approval of the ethical committee and the medical administration at the hospital, the background and intentions of the survey were explained in an introductory letter attached with the survey form. Returning of the completed survey was the responsibility of the secretaries in the clinics who collected the survey responses after one week of distribution. All physicians were asked to fill the survey anytime during this week where they were given flexibility in "responding time" but not in "rejection".

The questionnaire was adapted by Greater New York Hospital Association/United Hospital Fund "Antimicrobial Stewardship Toolkit-Best Practices from The Gnyha/Uhf Antimicrobial Stewardship Collaborative" (Appendix A). It consisted of 20 questions categorized into three parts: antimicrobial resistance, antibiotic prescribing practices, and antimicrobial stewardship (AS) where each of these parts consisted of several questions assessing their knowledge and attitude. A 5-point Likert-scale, whose responses ranged from "strongly disagree "to" strongly agree, was used. The advantageous side of the Likert Scale is that it is a universal method for survey collection. The responses are easily quantifiable and subjective to the computation of some mathematical analysis. Since it does not require the physicians to provide a simple and concrete yes or no answer, it does not force the physicians to take a stand on a particular topic, but allows them to respond to a degree of agreement; this makes question answering easier on the respondent. Also, the responses presented accommodate neutral or undecided feelings of physicians.

After the physicians have filled the survey and before the statistical analysis was done, some questions were inverted to reach a consistency in summing up the scores i.e. "antibiotics are overused at this institution" was inverted to "antibiotics are not overused at this institution". Also, several questions were multiplied with '2' or '3' based on their weight and in relation to their effect on the problem and/or the implemented intervention. The researcher independently used principal components analysis to assign question weights, which provided insight into the true significance/relevance of the problem and the importance of the antimicrobial stewardship program. These questions included the following: The hospital does not do enough to control the development of MDROs (3x), a patient is not likely to develop a MDROs infection during their stay in the hospital, microbiology lab results are efficiently communicated to the treating physician (2x), I regularly refer to the susceptibility/sensitivity patterns in the hospital (e.g., an antibiogram) when prescribing antibiotics (2x), antibiotics are not overused at this institution (2x), s can improve patient care (3x), s reduce the problem of antimicrobial resistance (3x).

Collected survey answers were entered into an excel sheet and a simple descriptive analysis was done for all respondents. A straightforward form of analysis was used where the researcher decided to tabulate results, question by question, as 'one-way tables'. This was done using an original questionnaire and writing on it the frequency or number of people who 'ticked each box'. This, of course, does not identify which respondents produced particular responses, but this is often a first step where a simple summary is required.

Survey coding was done where each part was coded according to the initials of the title (Table 1).

Coding	
AR	Antimicrobial Resistance: Scope of the problem and Key contributors.
APP	Antibiotic Prescribing Practices
AS	Antimicrobial Stewardship
B	Before
A	After
OR	Overall Score
Example	
BASP 1	Before Antimicrobial Stewardship Programs-Question 1
AASP 1	After Antimicrobial Stewardship Programs-Question 1

Table 1: Survey coding according to the initials of the titles.

Percentages and statistical descriptions were then calculated for each question and for each set of questions. The researcher calculated the summation of each question's response and then divided the number by the total number of physicians. After that, he calculated the whole score for each part (AR, AP, AS). These Likert scale data were analyzed at the interval measurement scale and were created by calculating a composite score (sum or mean) from the five Likert-type items; therefore, the composite score for Likert scales was analyzed at

the interval measurement scale. Descriptive statistics such as the mean and standard deviations for variability were then calculated.

A pilot test of the physicians' survey was conducted with ten part-time physicians in the hospital. These physicians were visiting the hospital on a part-time basis and rotate in different floors as requested by the medical administration. The physicians were handed the survey and were required to return the survey to the researchers after one week. Physicians were asked about the clarity of the questions and their suggestions were used to modify the survey. None of the pilot group participants were included in the main survey.

In addition to the method explained in section 1.2.1, the researcher has analyzed and compared the data of survey I and survey II results. Proportions were calculated for all responses, and the 2-sample difference in proportion tests as well as chi-square (χ^2) test was performed to identify significant differences in response rates. P-values less than or equal to 0.05 were considered statistically significant. All statistical analyses were conducted using SPSS.

Results

The physicians' survey was distributed and collected from 63 full-time attending physicians in the hospital. These physicians were the same in both surveys as they constituted all physicians working inside the hospital (full time). They were distributed as follows:17 (26.9%) were surgeons, 5 (7.9%) were pulmonologists, 2 (3.1%) were haematologist, 7 (11.1%) were general practitioners, 6 (9.5%) were Obstetricians (OBS), 4 (6.3%) were cardiologists, 4 (6.3%) were paediatricians, 7 (11.1%) were internal medicine, 3 (4.7%) were neurologists, 3 (4.7%) were ophthalmologists and 5 (7.9%) were gastroenterologists.

Before ASP, 28.6% of physicians agreed that the antibiotic resistance is a significant problem in the hospital and 6.3% of physicians strongly agreed with this statement, compared to 100% of physicians who strongly agreed that the antibiotic resistance is a significant problem in the hospital after the ASP was launched. We deduced an important improvement in the physicians' perception regarding the antibiotic resistance after the ASP (Appendix B).

Before ASP, 50.8% of physicians agreed that patient rooms are cleaned according to hospital cleaning protocol once an MDRO infected patient had been discharged and 15.9% of physicians strongly agreed with this statement, compared to 31% of physicians who agreed that patient rooms are cleaned according to hospital cleaning protocol once a MDROs infected patient has been discharged and 52% of physicians who strongly agreed on this statement after the ASP was launched. We deduced an important improvement in the physicians' perception on the application of hygiene's standards after the ASP (Appendix B).

Before ASP, 54% of physicians agreed that the adherence to hand hygiene protocol is excellent at the hospital and 7.9% of physicians strongly agreed with this statement, compared with 31% of physicians who agree that the adherence to hand hygiene protocols is excellent at the hospital and 31% of physicians who strongly agreed with this statement after the ASP was launched. We deduced an improvement in the physicians' perception on the hand hygiene and on the application of the protocols after the ASP. (Appendix B)

Before ASP, 46% of physicians agreed that the adherence to isolation and contact precautions is excellent at the hospital and 12.7% of physicians strongly agreed with this statement, compared to 39% of physicians who agreed that the adherence to isolation and contact precautions is excellent at the hospital and 39% of physicians who strongly agreed on this statement after the ASP was launched. We deduced an improvement in the physicians' perception of the action taken to isolate infected patients and to prevent contamination by contact precautions after the ASP (Appendix B).

Before ASP, 27% of physicians agreed that the hospital does not do enough to control the development of MDRO's and 3.2% of physicians strongly agreed with this statement, compared to 31% of physicians who agreed that the hospital does not do enough to control the development of MDROs and 47% of physicians who strongly agreed on this statement after the ASP was launched (Appendix B).

Before ASP, 36.5% of physicians agreed that the hospital provides adequate staff education regarding MDROs and 7.9% of physicians strongly agreed with this statement, compared to 63% of physicians agree that the hospital provides adequate staff education regarding MDROs and 31% of physicians who strongly agreed on this statement after the ASP was launched. We deduce that the physicians' perception of the staff education regarding MDROs has improved after the ASP (Appendix B).

Before ASP, 44.4% of physicians agreed that the patient is likely to develop a MDROs infection during their stay at the hospital and 4.8% of physicians strongly agreed with this statement, compared to 49% of physicians who disagreed that the patient is likely to develop a MDROs infection during their stay at the hospital and 15% of physicians who strongly disagreed with this statement after the s was launched. We deduced that the physicians' perception of the existence of MDROs infection had improved after the ASP (Appendix B).

A score, "Antimicrobial Resistance" (AR) was performed by adding all the variables corresponding to the "AR". By summing up scores, each physician had a score "AR" before and after the ASP.

The mean score "AR" of all the physicians before the ASP was 30.98 with a minimum score of 22 and a maximum score of 40, compared to "AR" after the ASP with a mean score equal to 39.22 with a minimum score of 33 and a maximum score of 42. The descriptive analysis shows that "AR" after the ASP is higher than "AR" before the ASP, and a statistically significant correlation exists between the 2 scores (paired t-test; $p<0.05$) (Appendix C).

Questions 4, 5, 6 and 7 were automatically inverted to maintain consistency in gradual increasing score order (1 to 5). The descriptive data found in the table represent the final statistics after being inverted.

Before ASP, 39.7% of physicians agreed that the microbiology laboratory results are efficiently communicated to the treating physician and 9.5% of physicians strongly agreed with this statement, compared to 19% of physicians who agreed that the microbiology laboratory results are efficiently communicated to the treating physician and 66.7% of physicians who strongly agreed on this statement after the ASP was launched (Appendix D).

Before ASP, 78.2% of physicians regularly refer to the susceptibility/sensitivity patterns at the hospital when prescribing antibiotics, compared to 95.2% of physicians who agreed on this statement after the s. The data showed that the physicians' perception of the antibiotic prescription norms had improved after the ASP was launched (Appendix D).

Before ASP, 76.2% of physicians agreed that intravenous antibiotics should be stepped down to an oral alternative after 3 days when it is

appropriate, compared to 100% of physicians who agreed on this statement after the ASP was launched (Appendix D).

Before ASP, 41.2% of physicians agreed that the restrictions on antibiotics impair their ability to provide good patient care, compared to 84.1% of physicians who strongly agreed that restrictions of antibiotics impair their ability to provide good patient care after the ASP was launched. As a conclusion, the physicians' perception of the antibiotics' availability had improved after the ASP (Appendix D).

Before ASP, 49.2% of physicians agreed that antibiotics are overused at the institution and 4.8% of physicians strongly agreed with this statement, compared to 95.2% of physicians who strongly agreed that the antibiotics are overused at the institution after the ASP was launched. As a conclusion, the physicians' perception on the antibiotic usage had improved after the ASP. Physicians are now more aware that some antibiotics were not necessary and were being misused inside the hospital before the AS intervention. After the implementation of the antimicrobial stewardship intervention, physicians noted that the consumption of antibiotics has decreased without negatively affecting the patients. This fact showed that physicians can reach their target in treating patients with a new regimen of antibiotic prescription (Appendix D).

Before ASP, 28.6% of physicians used to prescribe, most of the time, at least one antibiotic during their patients hospital stay and 3.2% of physicians used to frequently prescribe at least one antibiotic during their patients hospital stay, compared to 54% of physician that were more stimulated to reduce the number of antibiotics after the ASP was launched (Appendix D).

Before ASP, 38.1% of physicians used to treat their patients most of the time 5 or more days of antibiotics during their stay at this institution and 4.8% used to treat their patients frequently 5 or more days of antibiotics during their stay at this institution, compared to 95.2% of physicians that were more stimulated to treat their patients frequently 5 or more days of antibiotics during their stay at this institution after the ASP was launched (Appendix D).

The score "Antibiotic Prescribing Practices" (APP), was performed by adding all the physicians' scores corresponding to the "APP". By adding physicians' scores, each physician had a score "APP" before and after the ASP.

The mean score "APP" of all the physicians before the ASP was 45.37 with a minimum score of 36 and a maximum score of 54, compared to "APP" after the ASP with a mean score equal to 62.9 with a minimum score of 54 and a maximum score of 66. The descriptive analysis shows that "APP" after the ASP is higher than "APP" before the ASP, and a statistically significant correlation exists between the 2 scores (paired t-test; $P<0.05$) (Appendix E).

Questions 5, 6 and 7 were automatically inverted to maintain consistency in gradual increasing score order (1 to 5). The descriptive data found in the table represent the final statistics after being inverted.

Before ASP was launched, 63.5% of physicians agreed that the ASP can improve patient care and 23.8% strongly agreed with this statement, compared to 11.1% of physicians who agree the ASP can improve patient care and 88.9% who strongly agreed on this statement after the ASP was launched. As a conclusion, the ASP had a positive impact on the physicians' knowledge regarding the patient care and the patient safety (Appendix F).

Before ASP was launched, only 1.6% of physicians strongly agreed that the ASP reduced the problem of antimicrobial resistance, compared to 100% of physicians who agreed on this statement after the ASP was launched. As a conclusion, the ASP had a positive impact on the physicians' knowledge regarding the antimicrobial resistance (Appendix F).

Before ASP was launched, 63.5% of physicians agreed that the ASP can impact this institution's MDROs rates, compared to 100% of physicians who agreed on this statement after the ASP was launched. As a conclusion, the ASP had a positive impact on the physicians' knowledge regarding the MDROs (Appendix F).

Before ASP was launched, 35% of physicians agree that the hospital had an effective, compared to 92.1% of physicians who agreed on this statement after the ASP was launched. Before ASP was launched, 7.9% of physicians strongly agreed that an additional staff education on antimicrobial prescribing was needed, compared to 12.7% of physicians who strongly agreed on this statement after the ASP was launched (Appendix F).

Before ASP was launched, 50.8% of physicians agreed that prescribing physicians are the only disciplines who needed to understand antimicrobial stewardship, compared to 71.4% of physicians who agreed on this statement after the ASP was launched. We deduced that this program highlighted on the write antibiotics usage (Appendix F).

The score "AS" was performed by adding all the physicians' scores corresponding to the Antibiotic Stewardship Programs. By computing the variables, each physician had a score "AS" before and after the ASP.

The mean score "AS" of all the physicians before the ASP was 45.13 with a minimum score of 37 and a maximum score of 54, compared to "AS" after the ASP with a mean score equal to 62.83 with a minimum score of 58 and a maximum score of 68. The paired t-test shows that a statistically significant correlation exists between the 2 scores ($p<0.05$) where the "AS" after the ASP is higher and better than "AS" before the ASP (Appendix G).

In order to assess the efficacy of the ASP, an overall score "OS" was computed by adding the three scores: "AR"+"APP"+"AS".

The mean score "OS" of all the physicians before the ASP was 121.48 with a minimum score of 102 and a maximum score of 142, compared to "OS" after the ASP with a mean score equal to 164.95 with a minimum score of 156 and a maximum score of 172. The descriptive analysis shows that "OS" after the ASP is higher than "OS" before the ASP, with a statistically significant correlation exists between the scores (paired t-test; $p<0.05$) (Appendix H).

The number of physicians, who agreed that antibiotic resistance, was a significant problem in the hospital, increased from 22 (34.9%) before launching the ASP to 63 (100%) after the ASP was launched. Also, the number of physicians, who strongly agree that patient rooms were cleaned according to hospital cleaning protocol once a Multi-drug Resistant Organisms (MDROs) patient had been discharged, increased from 10 (15.9%) before the ASP to 33 (52%) after the after the ASP was launched. Regarding the physicians' perception on hand hygiene, the number of physicians, who strongly agreed that the adherence to hand hygiene protocols was excellent at the hospital, increased from 5 (7.9%) before the ASP to 20 (31%) after the ASP was launched. As per patients' isolation and contact precautions, the number of physicians, who strongly agreed that the adherence to isolation and contact precautions was excellent at the hospital,

increased from 8 (12.7%) before the ASP to 25 (39%) after the ASP was launched. Also, after it was launched, the number of physicians, who strongly agreed that the hospital did NOT do enough to control the development of MDROs, increased from 2 (3.2%) to 30 (47%). Furthermore, the number of physicians, who strongly agreed that the hospital provided adequate staff education regarding MDROs, increased from 5 (7.9%) before the ASP to 20 (31%) after the ASP was launched. The physicians' perception on the transmission of MDROs infections were changed significantly where the number of physicians, who agreed that the patient was likely to develop a MDROs infection during their stay at the hospital, decreased from 32 (49.2%) to 13 (19%). The mean score "Antimicrobial Resistance" (AR) of all the physicians before the ASP was 30.98, compared to "AR" after the ASP was launched with a mean score equal to 39.22 ($p<0.05$).

After the ASP was launched, the physicians' perception of the antibiotic prescription norms has improved where the number of physicians, who strongly agree that, the microbiology lab results are effectively communicated to the treating physician, increased from 6 (9.5%) to 42 (66.7%). Also, after it was launched, the number of physicians, who always refer to the susceptibility/sensitivity patterns at the hospital (e.g., an antibiogram) when prescribing antibiotics, increased from 5 (7.9%) to 15 (23.8%). If medically appropriate antibiotics, the number of physicians, who stepped down to an oral alternative after 3 days, increased from 39 (61.9%) to 54 (85.7%) after the ASP was launched. Furthermore, the number of physicians, who strongly agree that the restrictions on antibiotics impaired their ability to provide good patient care, increased from 5 (7.9%) before the ASP, to 53 (84.1%) after the ASP was launched. The physicians' perception on the antibiotic usage has improved after the ASP where 3 (4.8%) physicians strongly agree that the antibiotics are overused at the institution before the ASP and 60 (95.2%) physicians strongly agreed on this statement after the was launched. Before the ASP, only 2 (3.2%) physicians used to prescribe at least one antibiotic during patients' hospital stay, while 11 (17.5%) physicians used to prescribe at least one antibiotic to the majority of patients admitted to the hospital after the ASP was launched. In addition, before ASP, 3(4.8%) used to treat their patients frequently for 5 or more days of antibiotics during their stay at this institution, compared to 60 (95.2%) physicians that were more stimulated to treat their patients frequently by 5 or more days of antibiotics during their stay at this institution after the ASP was launched.

The mean score "APP" "Antibiotic Prescribing Practices" of all the physicians before the ASP was 45.37, compared to "APP" after the ASP with a mean score equal to 62.9 ($p<0.05$).

The ASP has a positive impact on the physicians' knowledge regarding the patient care and the patient safety where the number of physicians, who strongly agreed that the ASP can improve patient care, increased from 15 (23.8%) to 56 (88.9%) after the ASP was launched. Also, the ASP has a positive impact on the physicians' knowledge regarding the antimicrobial resistance where the number of physicians, who strongly agreed that the ASP can reduce the problem of antimicrobial resistance, increased from only 1 (1.6%) to 63 (100%) after the ASP was launched. Also, after it was launched, the number of physicians, who strongly agreed that the ASP can impact this institution's MDROs rates, increase from 10 (15.9%) to 53 (84.1%). Furthermore, the number of physicians, who strongly agreed that the hospital has an effective, increased from only 3 (4.8%) to 51 (81%) after the ASP was launched. All the physicians agreed that the hospital provides adequate training on antimicrobial prescribing and use after the ASP was launched, whereas none of them agreed on this statement before the launching of the program. Before ASP was launched, 32 (50.8%) physicians agreed that prescribing physicians are the only disciplines who need to understand antimicrobial stewardship, compared to 45 (71.4%) physicians who agreed on this statement after the ASP was launched. The mean score "Antibiotic Stewardship" (AS) of all the physicians before the ASP was 45.13 compared to "AS" after the ASP with a mean score equal to 62.83 ($p<0.05$).

The mean score of all the physicians before the ASP was 121.48 compared to after the ASP with a mean score equal to 164.95 ($p<0.05$).

Discussion

It was clearly noted that during the clinicians' responses to the survey before the implementation of the ASP, a large proportion had identified ASPs as a limitation to their practices through restricting their abilities to prescribe the antibiotic therapy they prefer. This could be linked to their perception that the more and wider antibiotics they prescribe would be directly linked to patients' outcomes. However, after implementing the ASP and noticing that patients were properly treated and became well when limiting the use of antibiotics, this was an encouraging finding for clinicians to decide on implementing the ASP in the hospital. In general, the comparison between the pre and post survey responses showed that physicians were more aware of the concept beyond ASP and its beneficial effect in the hospital. In addition, it showed that the study has succeeded in reaching the objective, which was raising the awareness of physicians toward ASP and limiting their inappropriate use of antibiotics in the hospital. ASPs are considered a new patient safety initiative, which is being recommended by international accrediting agencies aiming at optimizing antibiotic therapy. Currently, only a few hospitals in Lebanon started thinking to implement ASPs inside their hospitals where most of these hospitals will only apply it to particular departments. The results of this survey showed that physicians feel that ASPs give an added service not only to the patients but also to their attending physicians.

This is the first study in Lebanon to assess such attitudes among Lebanese clinicians and to describe the steps necessary for developing and implementing an ASP intervention. An important finding in our study was the overall positive impression that clinicians had of the ASP; more than 80% of clinicians believed that the program was improving antibiotic use and improving the overall quality of care of hospitalized patients. Data from our study support the improvement in antibiotic use because an average yearly decline has been realized for the antibiotics monitored by the ASP [13].

In a study involving residents at an adult institution, 90% wanted more education on antibiotic use and 67% requested more feedback on their antibiotic choices [14]. These data illustrate 2 important points about education [15], ASPs can provide needed education through its day-to-day operation, and more formal education regarding antimicrobial use is wanted by trainees and attending physicians [16]. ASPs should develop curricula to address this need.

In both pediatric and adult studies, antimicrobial use and resistance have been perceived as less problematic at the facility in which one currently works compared with other facilities or national data [17]. In our institution, the presence of an ASP likely gives some confidence that the antibiotic use and resistance are less of a problem, although this is only part of the explanation; this view was also observed in

another study among clinicians who worked in institutions without ASPs.

Conclusion

It is believed that behavioral determinants of physicians prescribing practices in hospitals influence antibiotic prescribing and yield a variation in this practice internationally [18]. The constituent part of ASP's in hospitals relies widely on behavior change of physicians. When trying to shift prescribing behavior, it is important to ensure opinion leader buy/in and to seek the involvement of senior clinicians and multidisciplinary teams. A significant change is expected to be seen, only after the engagement of senior colleagues in the development of the policy and implementation of the intervention. To ensure effective intervention, the researcher established a multidisciplinary team, which consisted of physicians, pharmacists, and infection control professionals to move away from the traditional single/disciplinary approach and towards a multidisciplinary team approach.

The survey distributed to hospital clinicians, agreement on the value of ASP's is becoming widespread. Many healthcare accrediting bodies are urging hospitals to implement ASPs. Our survey results would appear to support the implementation of this program inside the hospital, showing that most of the clinicians' responses found ASP beneficial to their acts and to the patients' sake. A large number of clinicians reported that they felt that their antibiotic prescribing has improved one day when the ASP was implemented inside the hospital. Although it is human nature for individuals to have a more positive view of their own current situation, in regards to antibiotic use and resistance, we must remain vigilant in teaching that the continued use and misuse of antibiotics locally will affect antibiotic resistance.

References

1. CDC (2014) Core Elements of Hospital Antibiotic Stewardship Programs.
2. Beilby J, Marley J, Walker D, Chamberlain N, Burke M (2002) Effect of changes in antibiotic prescribing on patient outcomes in community settings: A natural experiment in Australia. Clin Infect Dis 34: 55-64.
3. Barenfanger J, Short MA, Groesch AA (2001) Improved antimicrobial interventions have benefits. J Clin Microbiol 39: 2823-2828.
4. Datta S, Wattal C, Goel N, Oberoi JK, Raveendran R, et al. (2012) A ten year analysis of multi-drug resistant blood stream infections caused by Escherichia coli & Klebsiella pneumoniae in a tertiary care hospital. Indian J Med Res 135: 907-912.
5. Sivagnanam G, Mohanasundaram J (2004) A survey on current attitude of practicing physicians upon usage of antimicrobial agents in southern part of India. MedGenMed 6: 2-11.
6. Salahi L (2010) When the best medication for kids is no medication at all. ABC News.
7. Pestotnik SL, Classen DC, Evans RS, Burke JP (1996) Implementing antibiotic practice guidelines throught computer-assisted decision support: clinical and financial outcomes. Ann of Intern Med 124: 884-890.
8. John JF Jr, Fishman NO (1997) Programmatic role of the infectious diseases physician in controlling antimicrobial costs in the hospital. Clin Infect Dis 24: 471-485.
9. Berild Dag, Ringertz Signe H, Lelek M, Brita F (2001) Antibiotic Guidelines Lead to Reductions in the Use and Cost of Antibiotics in a University Hospital. Scand J Infect Dis 33: S63- 67.
10. Ganguly NK, Arora NK, Chandy SJ, Fairoze MN, Gill JP, et al. (2011) Rationalizing antibiotic use to limit antibiotic resistance in India. Indian J Med Res 134: 281-294.
11. Colgan R, Powers JH (2001) Appropriate antimicrobial prescribing: approaches that limit antibiotic resistance. Am Fam Physician 479-486.
12. Hecker MT, Aron DC, Patel NP, Lehmann MK, Donskey CJ (2003) Unnecessary use of antimicrobials in hospitalized patients: Current patterns of misuse with an emphasis on the antianaerobic spectrum of activity. Arch Intern Med 163: 972-978.
13. Newland JG, Stach LM, De Lurgio SA (2012) Impact of a Prospective-Audit-with-Feedback Antimicrobial Stewardship Program at a Children's Hospital. J Pediatric Infect Dis Soc 1: 179-186.
14. Srinivasan A, Song X, Richards A (2004) A survey of knowledge, attitudes, and beliefs of house staff physicians from various specialties concerning antimicrobial use and resistance. Arch Intern Med 164: 1451-1456.
15. Rammelkamp CH, Maxon T (1942) Resistance of Staphylococcus aureus to the action of penicillin. Proc Soc Exp Biol Med 51: 386-389.
16. Clatworthy A, Emily P, Deborah T Hung (2007) Timeline of antibiotic deployment and the evolution of antibiotic resistance. Nat Chem Biol 3: 541-548.
17. Abbo L, Sinkowitz Cochran R, Smith L (2011) Faculty and resident physicians' attitudes, perceptions, and knowledge about antimicrobial use and resistance. Infect Control Hosp Epidemiol 32: 714–718.
18. Mol PG, Wieringa JE, NannanPanday PV (2005) Improving compliance with hospital antibiotic guidelines: a time-series intervention analysis. J Antimicrob Chemother 55: 550–557.