Antibiotic stewardship program: Barriers and enablers of implementation in primary health care in Emirates Health Services, United Arab Emirates

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Abstract

Background :Antimicrobial stewardship programs aim at promoting the appropriate use of antibiotics. The program is applied in UAE hospitals and primary health care settings to overcome the increasing antibiotic resistance. We have not come across any study regarding the barriers to antibiotic stewardship implementation in primary health care. The objective of this study is to explore these challenges and facilitators from the perspective of healthcare workers that might help build a strategic plan to enable healthcare workers to implement an antibiotic stewardship program.**Method**:This is a cross-sectional study on the ASPS program in the United Arab Emirates, the study was based on an electronic online questionnaire survey disturbed to all physicians and pharmacists in emirates health services primary health care centers in the United Arab Emirates. **Result** 192 responses were received from 7 primary health care centers. 85% were familiar with the concept of antimicrobial stewardship. The majority of participants thought that antibiotic resistance is a problem in our community and agree that the antibiotic stewardship program is effective in reducing the antibiotic (89% and 86% respectively). Around 97% of the respondents from the EHS PHCCs reported that Physician education and training about antibiotic stewardship is important for the implementation of the ASPs.87% agree that non-clarity of the guidelines could be a barrier to implementation of antibiotic stewardship.**Conclusion** Health care workers had a high perception of the antibiotic resistance problem, antimicrobial stewardship program, and its effectiveness. This study concluded that organizational support was the most perceived enabler of the program while the guideline-related barrier was the most perceived barrier by health care workers.

Introduction

Antimicrobial drugs are considered one of the most useful discoveries in the history of medicine as they successfully treated infectious diseases that were the cause of mortality and morbidity. However, the inappropriate use of antibiotics led to a decrease in the effectiveness of some of these agents and resistance. Antibiotic resistance forced clinicians to use expensive alternatives. (DeMallie et al,2018).

C Llor and L Bjerrum (2014) pointed to the risks of antibiotic overuse. It would cause more severe illnesses, more medicalization of self-limiting conditions, and Increase the duration of diseases and the risk of complications. The mortality rate would rise with antibiotic overuse. The most important and dangerous risk of antibiotic overuse is antibiotic resistance.

Antimicrobial resistance is considered a global health issue that increases the cost of both medication and health care services. The world health organization stated that an excess of US$ 20 billion has been caused by multidrug resistance. (Ababneh et al, 2021).

CDC (2018) Considered Antibiotic resistance as one of the biggest public health challenges at the current time and the most urgent health issue. In the US, at least 2 million people get an antibiotic-resistant infection yearly and at least 23000 persons die from it.

File et al (2014) stated that antimicrobial stewardship programs are cost-effective. $200 000–$900 000 are the estimated annual cost savings of stewardship programs in published studies.

Antimicrobial stewardship is defined as a group of strategies that aims in promoting the appropriate use of antibiotic in healthcare settings so the patient is ensured to get the appropriate antibiotic at the right dose, time, and duration. Therefore, decreasing the cost and antimicrobial resistance. (Nasr et al, 2017)

NICE (2015) recommended the implementation of an antimicrobial stewardship program in all health care settings and the allocation of resources to support the program such as IT support and laboratory testing. Monitoring antimicrobial resistance is a priority in the antimicrobial stewardship program.

During the covid 19 pandemic, the world health organization alerted that the use of antibiotics will lead to bacterial resistance and this will jeopardize antimicrobial stewardship. 72% of 2,010 COVID-19 patients were given broad-spectrum antimicrobial therapy in hospitals, in spite that only 8% had bacterial and fungal co-infection. (Majumder et al, 2020)

In 2014 the Gulf Cooperation Council Center for Infection Control (GCC-IC) developed a strategic plan to be adopted by GCC countries to implement plans to tackle antimicrobial resistance. Antimicrobial Resistance Surveillance System (AMRSS) established in 2010 in UAE collected data from the seven emirates. (Alshehhi et al,2020)

Rolfe et al (2021) explored the Barriers to antimicrobial stewardship of 45 physicians in tertiary hospitals in Sri Lanka, Kenya, and Tanzania and concluded these barriers to antimicrobials costs, availability, refusal to change current practices in antimicrobial prescribing, and insufficient diagnostic tools. Some of the physicians in this study never heard about the antimicrobial stewardship program. A study among health care providers in the Eastern province of Saudi Arabia Hospitals found that more than 50% of clinicians lack awareness of antimicrobial stewardship programs. Major barriers identified were lack of guidelines, lack of personnel, time limitation, limited training opportunities, lack of confidence, financial issue or limited funding, and lack of specialized AMS information resources. (Baraka et al,2019)

Most of the literature regarding the barriers and enablers to AMS programs pointed to the limitation of time and resources and lack of education as the major obstacles facing the program.
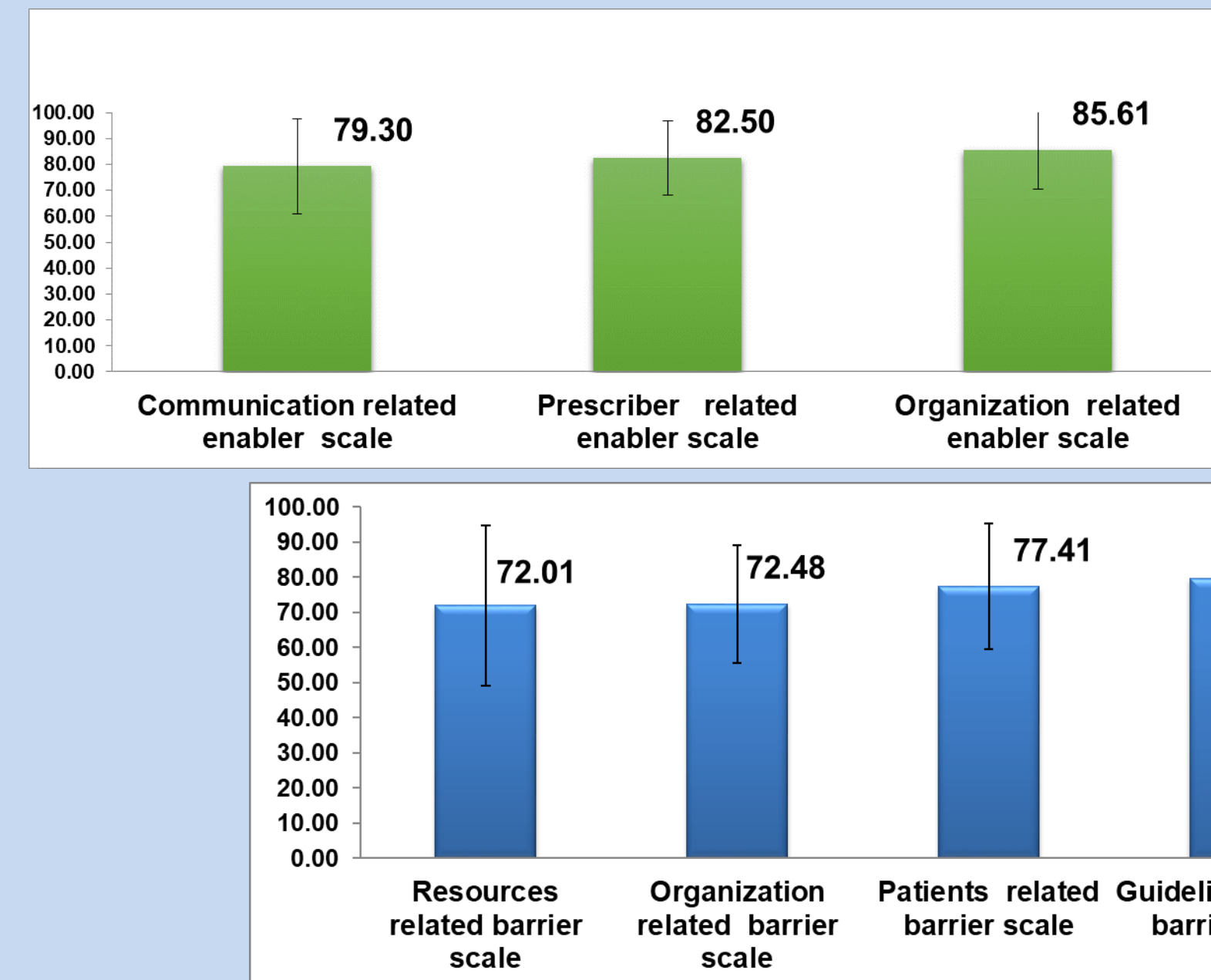
Methods and Materials

This is a cross-sectional study on the ASPS program, in the United Arab Emirates, the study was based on an electronic online questionnaire survey disturbed to all physicians and pharmacists in emirates health services primary health care centers in the United Arab Emirates. The survey was filled on a google form, and this the link
https://docs.google.com/forms/d/e/1FAIpQLSe5oWAQqSgXfWgXxUS4yK6YktPjywKRLI3WIeH5G17rBdBshQ/viewform?usp=sf_link

The sample size was calculated using Leslie Fischer's formula. According to the MOHAP website, open data of the year 2017, published in 2021 the estimated number of physicians (GPs, specialists) and pharmacists working in primary health care centers was about 550. The confidence interval was set at 95%, the desired margin of error (d) was 5% and the sample proportion was believed to be 80% So the required sample size was 171, out of which, the number of participants who responded to the survey was 192 of physicians and pharmacists from EHS PHC. The sample size included two criteria: Inclusion Criteria :All physicians and pharmacists in emirates health services' primary health care centers agree to participate in the survey.Exclusion Criteria:Those who disagree to participate in the survey ,Non-pharmacist, non-physicians.We distributed an online questionnaire survey among general physicians, specialists, and pharmacists in primary health care centers in Emirates Health Services to explore barriers affecting the implementation of antibiotic stewardship. Invitations to answer the questionnaire were sent through EHS email. Questionnaires were collected between January 2022 till March 2022, The questionnaire was formed of two parts.

I. The first part of the questionnaire included: The sociodemographic section of the questionnaire obtained information regarding, the place of work, Doctor Age, years of experience, position, and membership in the AMS team .one question about the knowledge of the AMR concept.

II. The second part included:10 Questions were divided into 2 sections the first section include 2 questions (7 & 8) regarding their perception of the AMR problem and the program. The second section question from 9 to 18 about enablers and barriers of the program from the physician and pharmacist point of view. The level of agreement or disagreement with the statements from question 7 to question 18 was measured by a five-point Likert scale (1 =strongly disagree and 5 = strongly agree).

Results

Around 89% of the participant thought that antibiotic resistance is a problem in our community.86% agree and strongly agree that the antibiotic stewardship program is effective in reducing the antibiotic. Years of experience have no statistically significant relation to the Perception of antibiotic stewardship program effectiveness nor the perception of the antibiotic resistance problem. Those who had an experience above 20 years and shorter than 5 years had the highest mean score of perception toward antibiotic resistance program .At the same time, those with long experience had a higher perception of antibiotic stewardship program effectiveness ,as well as those who had experience from 6-10 years. Around 88% agree and strongly agree that feedback from the ASP committee enables them in implementing antibiotic stewardship. Around 97% of the respondents from the EHS PHCCs reported that Physician education and training about antibiotic stewardship is important for the implementation of the ASPs. Most of them (95%) agreed that Proper documentation can improve the implementation of the antibiotic stewardship program. Most of them (95%) reported that Organizational Support can help implement the antibiotic stewardship program .94 % agree that Patient education about antibiotic stewardship is important for the implementation. Organization related enabler scale was the highest (means 85.61-SD= 15.31) followed by Prescriber related enabler scale(Mean =82.50, Sd=14.23) and the Communication-related enabler scale (mean 79.30, SD=18.39).the relation between the three groups of enablers was statistically significant. The position has no statistically significant relationship with any of the enablers, however, specialist tends to have higher mean values for all Communication enabler, Prescriber   related enabler, and Organizational enabler .87%   reported that the non-clarity of the guidelines can be a barrier to antibiotic stewardship program implementation.76% show that Limited diagnostic tests are a barrier to antibiotic stewardship programs.67% show that Limited consultation time is also a barrier to antibiotic stewardship .81% experience pressure from patients for prescribing antibiotics .85 % agree that Unrestricted patient access to antibiotics can be a barrier to ASP implementation. The guideline-related barrier of antibiotic ASPs had the highest scale (means 79.82-19.64= SD) followed by patient-related barrier scales (Mean=77.41, SD=17.9) while Resources-related barrier and Organization related barrier scale was the lowest (means 72.01, SD=22.76) (means 72.48 -16.76=SD) respectively. The relation between the barriers scale was highly significant (P<0.001). The relation between the Position and barriers had a statistically highly significant relation only with resources-related barriers(P < 0.01, HS), but no statistically significant relationship with other barriers. Whoever the Pharmacists had a statistically highly significant mean compared to other groups (means=79.35, Sd=14.24).

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Discussion

85 % of healthcare workers were familiar with the concept of antimicrobial stewardship while in a study in Jordan by Nassar et al (2022),76% of participants were aware of the presence of AMS plans and those who work in private were more aware of its existence. On the other hand, a study by Atif et al (2021) found that 12 of 17 doctors in three tertiary care public hospitals in Pakistan misunderstood the term antimicrobial stewardship and are not familiar with it.Around 89% of the participant were thinking that antibiotic resistance was a problem in our community. All of the respondents in Atif et al (2021) study agree that inappropriate use of antibiotics is a problem in Pakistan. A national online survey in the United States found that 94% of respondents agreed that antibiotic resistance was a problem in the United States and 91% thought that inappropriate antibiotic prescribing was a problem in outpatient settings. 91% believed that antibiotic stewardship was proper in office-based practices, but they believed that antibiotic resistance was a less important problem than other health issues such as obesity, diabetes, opioids, smoking, and vaccine hesitancy. (Zetts et al,2020).In our study 86% agree and strongly agree that the antibiotic stewardship program is effective in reducing antibiotic resistance.These results are constant with a study by Nassar et al (2022) where 80% of healthcare workers agreed that antimicrobial stewardship would reduce antimicrobial resistance.70 % of participants in Alghamdi et al (2021) study in 147 Saudi hospitals strongly agree that the AMS program will reduce antimicrobial resistance. We have found that Years of experience had no significant relation to the Perception of antibiotic stewardship program effectiveness nor the Perception of the antibiotic resistance problem. Those who had an experience above 20 years and shorter than 5 years had the highest mean score of perception toward antibiotic resistance program. At the same time, those with long experience had a higher perception of antibiotic stewardship program effectiveness as well as those who had experience from 6-10 years. A similar finding by a study from Malaysia by Khan et al (2016) on the perception of pharmacists toward antimicrobial stewardship where pharmacists with more than 10 years of experience had a positive perception toward antimicrobial stewardship on other less than one year of experience had affected the perception negatively. Alamin and Kheder (2020) found that Age, occupation, and experience were the only factors that significantly predict the prescriber's knowledge and attitude towards antibiotic stewardship in hospitals in Khartoum, Sudan.In Our study, primary care providers value the importance of feedback about antibiotic prescriptions from the ASP committee. 88% agree and strongly agree that feedback from the ASP committee enables them in implementing antibiotic stewardship. Studies agree that Audit and feedback on antimicrobial prescribing is a recommended activity for improvement. (Sanchez et al,2016).Hallsworth et al (2016) in a notional randomized controlled trial in the UK, found improvement in antibiotic prescribing among GPs after intervention using feedback by 3.3% relative difference from the control group over 6 months. On the other hand, Meeker et al (2014) in a study from the USA involving patients and clinicians stated that simple feedback from an audit is not effective in improving clinical decisions regarding antibiotic prescribing. Szymczak et al (2014) reported a disadvantage of feedback is that they are ignored and doubted by practitioners in an interview-based study that included 24 pediatricians from 6 primary care practices.In our study, we found that 97% of participants reported that education and training about antibiotic stewardship are important for the implementation of the ASPs.Tahoon et al (2020) found that educational programs were successful in enhancing the knowledge, practice, and attitude of health care workers in Egypt. The percentage of good knowledge increased from 39.3% to 100% post-intervention. A similar study from Nigeria by Kpokiri et al (2020) regarding the result of training in changing the practice leading to reduce prescribing, better patient counseling and education, and a better understanding of antibiotic utilization.Another pre-post study in Jordan by Saleh et al (2021) showed a significant difference in knowledge and perception of antimicrobial stewardship among pharmacists after an educational intervention.Rolfe et al (2021) interview-based study on 45 physicians at tertiary care hospitals in Sri Lanka, Kenya, and Tanzania stressed the role of clinical training and experience in antibiotic stewardship programs.In this study, we found that 95% of respondents agreed that proper documentation can improve the implementation of antibiotic stewardship programs. Rolfe et al (2021) participants pointed to the importance of Documenting the reasons for antibiotics use which would lead to better communication between physicians and other staff. This will also give chance to think more about antimicrobial use but it may be limited by high clinical volume. van Daalen et al (2016) highlighted the importance of including documentation in the daily workflow of antibiotic prescribing. Standardized documentation is essential for the assessment of the quality of antibiotic use, to improve the implementation of an antibiotic stewardship program. (Berrevoets, et al,2017).Most respondents in this study reported that Organizational Support could help implement the antibiotic stewardship program. Pharmacists in Appaneal et al (2018) indicated that having supportive and committed leadership was vital for the antibiotic stewardship program strength. Centre of disease control (2018) stated that one of the key supporters of the antibiotic stewardship program was the Hospital leadership which is responsible for making all the departments cooperate with the program. Support from clinical and pharmacy heads is important in including the stewardship program in the workflow. Alghamdi et al (2019) found that the top management team in Saudi MOH hospitals lacked support for ASP which is considered a significant barrier as their role is to ensure adherence to the ASP policies. Patient education regarding antibiotic stewardship is important for implementation, according to 94 % of the participants in our survey. More than half of the participants in Atif et al(2021) study in Pakistan suggested that the public should be aware of proper antibiotic use. Another study concluded that education about antibiotics to patients treated for Upper respiratory tract infections may reduce the rate of antibiotics prescribed in primary care as the rate of total antibiotic prescriptions decreased by 13% and the rate of repeat consultation antibiotic prescriptions decreased by 12% after providing education. McNicholas & Hooper (2021).Regarding the previous findings, We found that Organization related enabler (physician education and organizational support) scale was the highest followed by Prescriber related enabler (proper documentation and patient education) scale and Communication-related (feedback from ASP) enabler scale. The position as physicians, specialists, or pharmacists had no statistically significant relationship with any of the enablers, however, specialists tended to have higher mean values for all Communication enablers, Prescriber related enablers, and Organizational enablers.87% reported that the non-clarity of the guidelines could be a barrier to antibiotic stewardship program implementation. These results were consistent with a study by Sharaf et al (2021) that explores barriers to appropriate antibiotic prescription from the physicians' and pharmacists' perspectives at primary healthcare centers in Qatar where Around 30 physicians and 20 pharmacists mentioned that the clinical guidelines for antibiotic prescribing were not popular, not easily accessible and knowledge of their content was insufficient. Only 20% of Egyptian physicians follow international antibiotic guidelines while 15% follow national guidelines(El-Sokkary et al,2021). A study on 70 hospitals in 12 countries showed that antibiotic Guidelines significantly differ in their content and structure and the rules that control them were deficient. Recommendations from different guidelines did not agree on the standard treatment for some infections. (Rost et al,2020).In this study,76% agreed that Limited diagnostic tests were a barrier to antibiotic stewardship programs. Atif(2021) also raised the concern regarding the lack of diagnostic tests and the trust issues mentioned by the physician in their study although most of them agree that the microbiological results impact the decision on antibiotic use and course.Some physicians in A study by bogers et al (2019) showed that barriers regarding diagnostic tests including insufficient time, inadequate quantity, and the late result limited their use and thus would influence appropriate antibiotic prescribing. Sayegh et al (2021) reported about 98.7% of respondents emphasized the importance of the presence of rapid microbiological tests.We concluded that the Position of the participants had a high statistically significant relation with resources-related barriers.Around 67% showed that limited consultation time was also a barrier to antibiotic stewardship.Primary care clinicians reported that they need more time to persuade and educate the patient about appropriate antibiotic use. (jeffs et al, 2020).Appaneal et al(2018) Respondents described lack of time as a barrier to antibiotic stewardship activities. As described by Sharaf et Al (2021), Workload and Restricted Time of Consultation prevented physicians (70%) from giving adequate health education about antibiotic use to the patients.According to our findings, the majority of respondents (81%) have experienced patient pressure to prescribe antibiotics. Stivers (2021) mentioned that physicians tend to cite patient demand for antibiotics. They added that several physicians were experiencing increasing demands from both their patients and society. Although evidence was scarce on the consequences of this pressure on physicians' decision-making. A theoretical framework and prediction were presented where they concluded that increased pressure may have an impact on physicians making them disregard patients' welfare.This finding was supported by Jeffs et al (2020) who stated that patients frequently pressurize their physicians to prescribe antibiotics based on their previous experience. Participants admitted that patients felt disappointed when not given an antibiotic prescription.Sharaf et al(2021) reported that patient pressure has been highlighted in the PHCC practices by physicians across Qatar. 100% of physicians and 70% of pharmacists agreed that patients push the physicians to prescribe them antibiotics.In our study, we found that 86% agreed that unrestricted patient access to antibiotics can be a barrier to ASP implementation. A large number of countries globally consider access to antibiotics a major concern due to low economic status, inappropriate use, high cost of the new and effective antibiotics, large "over-the-counter" use, and the marked increase in antimicrobial resistance.Carlet & Pittet (2013).Gebretekle et al (2018) mentioned that (82%) of pharmacists and physicians agreed that improper use and easy access to antibiotics were a barrier to antibiotic stewardship programs.Al-Kubaisi et al (2018) surveyed first-year healthcare university students in UAE about the reasons of their counter use of antibiotics, they revealed that the main reasons include saving money, urgent need, prior prescription, and advice from family and friends in addition to worrying about not to get them from the physician at the first visit.315 participants in a study from the united Arab emirates regarding of prevalence antibiotic self-medication,32% of respondents reported the use of antibiotics without prescription. Prior experience with the disease was the reason for that reported by 22%. The sources of antibiotics were either bought from community pharmacies(22.2%) or households (6.7%). Self-medication with antibiotics is a common habit among the United Arab Emirates (UAE) residents, and hence the Ministry of Health issued a health rule that forbid the dispensing of antibiotics without a medical prescription. (Abduelkarem et al,2019).

Conclusions

Health care workers had a high perception of the antibiotic resistance problem, antimicrobial stewardship program, and its effectiveness. This study concluded that organizational support was the most perceived enabler of the program while the guideline-related barrier was the most perceived barrier by health care workers.

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