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**“Knowledge, Attitudes and Practices towards Antimicrobial
Stewardship among Healthcare Providers at Beit Jala
Hospital”**

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“Knowledge, Attitudes and Practices towards Antimicrobial Stewardship among Healthcare Providers at Beit Jala Hospital”

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Thesis Approval

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Dedication

To the pure spirit of my father, to my beloved mother, to my dear wife, Mirvat, to my sons, Ibrahim, Abedalrhman and Ahmed, to my daughter, Nihad, to my brothers, Mohamed and Ahmed, to my sisters, Nisreen, Suha, Niveen and Nirmeen, to my aunts Ftema and Ina'm, to all my family, To my friends, Mahmoud Shobak, Ibrahim Alsahouri Ahmed Abu Sbitan and Dr. Ahmed Oda, , to all my colleagues at Al-Quds university, to all my colleagues at the Ministry of Health who offered me spiritual and emotional support.

Khalil Ibrahim Khalil Abu Sbitan

Declaration

I certify that this thesis submitted for the degree of masters in health policy and management is the result of my own research, except where otherwise acknowledged, and this thesis (on any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed: _____



Khalil Ibrahim Khalil Abu Sbitan

Date: 06/05/2018

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Abstract

Background

Several studies had been conducted about Antimicrobial Resistance (AMR) as a serious threat in both patient safety and public health which needs urgent interventions. An appropriate and judicious use of antibiotic is one of the important factors to curb this problem. Antimicrobial Stewardship Program (ASP) is an effective way of changing prescribing patterns and reducing inappropriate use in hospitals. The study revealed that Healthcare Providers (HCPs) are aware of the importance of AMR, and believe that an appropriate use of these agents will reduce this problem. They also agree that the implementation of ASP is necessary. Despite this concept, some HCPs lack consistency in practice and attitude towards antimicrobial use.

Objective

The aim of this study is to assess the level of Knowledge, Attitudes, and Practices (KAP) towards ASP among HCPs at Beit- Jala Hospital.

Method

A descriptive cross sectional study was conducted through an anonymous self-administered questionnaire given to HCPs at Beit- Jala Hospital in Bethlehem, Palestine from February 15 to May 15, 2018. The questionnaire was designed based on earlier studies to meet the study objectives and conceptual framework. In addition, some modifications were done to the questionnaire. The validity of the questionnaire was tested and the total instrument reliability test (Cronbach's Alpha) gave a score of 0.877. Stratified sampling with proportional allocation was applied for sampling. The inclusion criteria in this study included all healthcare providers Physicians, Pharmacists, Nurses and Lab technicians, who are willing to participate in the study, and the exclusion criteria included radiologists. The data were analyzed by using the Statistical Package for the Social Sciences Software (SPSS) version 20 using descriptive statistics, means and standard deviation and Chi-square test.

Results and Discussion

One hundred and eighty eight 188 out of 214 distributed questionnaire were returned successfully. Over half 116 (62%) of them were males. Ninety two percent (92%) of the participants had good knowledge, (44%) had positive attitude towards ASP and (70%) of HCPs had good practices related to ASP. The demographic character was not a significant predictor of HCPs knowledge, attitude and practices towards ASP. However, there was a significant predictor between practice, degree and certificate ($p=0.028$). There were a positive relationship at the level of significance $\alpha \leq 0.05$ between knowledge and attitude, knowledge and practices, and attitude and practice. Our results support the implementation of ASP by healthcare institutions to reduce inappropriate antimicrobial use, reduce adverse consequences of antimicrobial use, improve patient's outcome and safety, reduce costs and length of stay, and capture all AMs usage and containments of antimicrobial agent and decrease resistance.

Conclusions

Despite the fact that the ASP is not implemented in our hospitals, the majority of HCPs had good knowledge, and practices. However, most of them showed negative attitude towards it. The Ministry of Health should develop guidelines and policies to implement and monitor ASP in all governmental and private Palestinian hospitals.

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List of Abbreviations

AMR	Antimicrobial Resistant
AMs	Antimicrobials
AST	Antimicrobial Sensitivity Testing
ASP	Antimicrobial Stewardship Program
BA	Bachelor's degree
CDC	Centers for Disease Control and Prevention
CLSI	Clinical and Laboratory Standards Institute
CRE	Carbapenem-Resistant Enterobacteriaceae
DDD	Define Daily Dose.
ER	Emergency Room
ESBL	Extended Spectrum Beta-Lactamase
HCPs	Healthcare providers.
ICU	Intensive Care Unit
ID	Infectious Disease Specialist
IDSA	Infectious Disease of America
KAP	Knowledge, Attitudes, and Practices
LCHs	Large Community Hospitals
MA	Master
MDR	Multi Drug Resistant
MDROs	Multi Drug Resistant Organisms
MOH	Ministry of Health
MRSA	Methicillin-Resistant Staphylococcus Aureus
PGD	Post Graduated Diploma
Phd	Doctor of Philosophy
PNSP	Penicillin non-susceptible <i>S. pneumoniae</i>
SCHs	Small Community Hospitals
SPSS	Statistical Package for the Social Sciences Software
URTIs	Upper Respiratory Infections
UTIs	Urinary Tract Infections
VRE	Vancomycin-Resistant Enterococcus
WHO	World Health Organization

Chapter One

Introduction

1.1 Introduction:

Antibiotics are powerful antimicrobial agents that play a major role in controlling many infectious diseases, reduce the mortality and morbidity rates in both humans and animals and provide major gains and improvements in the life expectancy particularly in the later part of the last century Golub *et al.* (2012).

Laura (2011) describes antimicrobials as chemical compounds that act to inhibit or kill microorganisms, and are used in the treatment of microbial infections. Antimicrobials (AMs) include antivirals, anti-fungals, anti-bacterials and anti-protozoals. Microorganisms are termed antimicrobial resistance (AMR) or drug resistant when AMs cannot kill or inhibit their growth knowing that they might be previously sensitive to these AMs. Postma *et al.* (2015) explain that AMs are a general term for natural or synthetic compounds used to kill or inhibit the growth of microorganisms such as, antibacterials, antivirals, antifungals and antiprotozoals. AMR is the resistance of microorganisms to AMs. Multidrug resistant organisms (MDROs) is a term used to describe strains of bacteria that are resistant to more than one type or class of AMs. According to Baym *et al.* (2016), antibiotics are one of the most important drugs used in the treatment of infections caused by some types of bacteria, but nowadays antibiotics are threatened by the emergence of MDROs. Punnoose *et al.* (2012) state that antibiotics are compounds used to inhibit or kill microorganisms, but their incorrect and improper use leads to microorganisms adapting and resisting these antibiotics. Antimicrobial drugs played a major role and radically changed of the treatment of infectious diseases. Infections with MDROs remain a real problem in clinical practice that is rather difficult to solve Saga *et al* (2009).

Lee *et al.* (2013) reported that antimicrobial agents are cornerstones of clinical medicine: they have had a major role in saving the lives of a large number of people from life-threatening bacterial infections since the second half of the 20th century. However, during the last decade of the 20th century and the first decade of 21st century, AMR bacteria began to emerge and spread around the world. Those include Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant Enterococcus (VRE), Carbapenem-resistant Enterobacteriaceae (CRE),

Acinetobacter baumannii and other Multidrug-resistant organisms (MDROs) Meyer *et al.* (2010). It is evident that AMR is causing a problem worldwide Spellberg *et al.* (2008). Also, AMR microorganisms and strains are increasing greatly in Palestinian hospitals and Beit- Jala hospital is no exception (anti-biograms report of Beit- Jala Hospital 2017). However, AMR does not affect individuals only, but also the community as well. Resistance occurs when susceptibility patterns shown in anti-biograms change over time through different mechanisms by pathogens (CDC 2013). Rodrigues *et al.* (2016) AMR is critical and it is spreading globally which requires action across all health care systems. Also, AMR created a major challenge as it leads to increased costs by length of stay at hospitals increasing the morbidity and mortality rates and the use of more expensive drugs. Murthy (2001) reported there are several causes of MDROs but the main cause is the misuse of AMs. Realizing this fact among healthcare providers HCP is extremely vital. The appropriate use of AMs is an important habit to establish to help slow the progression of AMR infections, in addition to implementing an Antimicrobial Stewardship Program (ASP) Goldstein (2011).

ASP was designed to improve patient care, reduce hospital costs, minimize AMR, measure the appropriate use of AMs agent by promoting optimal selection of AMs dosing, duration of therapy, and route of administration Tegan *et al.*(2017).The design of the ASP should be based on the best understanding of the relationship between AMs use and resistance. Lack of knowledge, attitude, and practice will affect the program. Implementation of the ASP requires a multidisciplinary approach involving a variety of expertise include a clinical pharmacist, infectious disease physician, clinical microbiologist, and an infection control specialist Walia *et al.* (2015). Previous studies have shown that HCPs either lack or have a weak knowledge, attitude, and practice KAP when it comes to the ASP. A KAP study measures the knowledge, attitude, and practices of HCPs towards a certain issue. The knowledge will provide us with the understanding degree of the HCPs towards AMs use and ASP. Attitude is the perception and internal feeling that HCPs have towards ASP which may be positive or negative. Practice is defined as the activities of HCPs towards ASP (Tegan *et al.* 2017).

1.2 Study Problem

Studies have shown that antimicrobial resistance AMR is a worldwide problem and its strain is increasing greatly in our hospitals thereby influencing individuals and the community alike (Garcia *et al.* 2011, Rodrigues 2016, Baadani *et al.* 2015, Genga *et al.* 2017).

From 2016 to 2017 there was an increase in the number of MDROs cases in our hospitals. According to the anti-biogram report of Ministry of health (MOH) hospitals 2017, there is an increase in MRSA from 30% to 37%, compared to 22% in 2008, clindamycin inducible resistant 16.7%, ESBL from 47% to 67%, VRE 0.2%, CRE 0.2% there were 12 of them that were colistin-resistant. In Beit- Jala Hospital, there is an increase in MRSA from 2% to 5%, ESBL from 21% to 48%, VRE by 0.2% and CRE by 0.1% anti-biograms report of Beit-Jala hospital (2017). AMR contributes to increasing costs through extending the length of stay in hospitals and consequently using more expensive drugs, in addition to increasing the mortality and morbidity rates. HCPs have an important role in this issue because they are the main suppliers and regulators of antibiotics. Thus, they must have adequate knowledge about AMROs and ASP so as to regulate the use of antibiotics among HCPs.

Elevated rates of prescription and consumption of antibiotics contribute to antibiotic resistance. The design of antimicrobial management programs should be based on the best current understanding of the relationship between antimicrobial use and resistance. Thus, implementing an educational intervention ASP, and antibiotics use among HCPs at Beit- Jala Hospital will promote judicious use of antibiotics and decrease the spread of antibiotic resistance.

1.3 Study justification

Several studies indicate that the emergence of AMR is considered one of the main public health problems around the world due to the increase in the incidence rate of MDROs (Srinivasan *et al.* 2004 Garcia *et al.* 2011, Erku 2016).

The spread of AMs use is thought to be the main cause of AMR as it results in high mortality and morbidity rates and prolonged duration of hospitalization.

In 2014, the CDC recommended that all acute care hospitals implement ASP in order to meet the urgent need to improve AMs use in hospitals.

ASP is the practice of escalating and promoting the rational use of AMs, improving patient outcome and safety, reduce costs, capture overall AMs usage and containment of antimicrobial agents (MacDugall and Polk, 2005).

A study by Bronzwaer *et al.* (2002) showed that there is a strong relationship between AMs and AMR. Most studies confirmed that the inappropriate use of AM drugs is a major risk factor for the development of AMR, for examples infections with penicillin non-susceptible *S. pneumoniae* (PNSP), the previous use of β -lactam antibiotics such as penicillin is a huge risk factor. Studies on carriage of PNSP in children have shown that sulfamethoxazole-trimethoprim (co-trimoxazole) antibiotics and macrolides such as erythromycin have also been associated with the selection for PNSP Melander *et al.* (2000).

According to the Centers for Disease Control and Prevention (CDC), studies revealed that implementation of an ASP is essential to address the misuse and overuse of AMs, to improve the quality of antimicrobial therapy, to minimize antimicrobial resistance and optimize clinical outcomes (CDC, 2016).

In hospitals under the Palestinian Ministry of health (MOH), the implementation of ASP is not yet operational. This study will provide a good basis to assess the knowledge, attitudes, and practices (KAP) towards ASP among HCPs at Beit Jala hospital. The results of this study could be used to improve patient's outcome and safety, reduce costs, reduce length of stay capture over all AMs usage and containment of antimicrobial agent.

1.4 Aim of the Study

The aim of this study is to assess the level of Knowledge, Attitudes, and Practices (KAP) towards ASP among HCPs at Beit- Jala hospital.

1.5 Research Objectives:

- To assess the knowledge, attitude and practices towards ASP among HCP at Beit- Jala Hospital.
- To identify the relation between ASP and personal and demographic characteristics including age, gender, social status, profession, degrees and certificate and years of experience.

1.6 Research Question:

- Is there enough knowledge, attitude and practices towards ASP among HCPs at Beit Jala Hospital?
- Is there a relationship between ASP and personal and demographic characteristics?

Chapter Two

Literature Review

2.1 Introduction

Several research articles related to antimicrobial agents explain the importance of antimicrobial stewardship programs and their benefits. In this section, I will divide the literature review into two main sections which are the knowledge, attitude, and practices towards ASP and the association between antimicrobial use and resistance.

2.2 Association between antimicrobial use and resistance:

Sa'ed *et al.* (2015) in their cross sectional study in Palestine on knowledge, attitudes, and practices regarding antibiotic use for acute upper respiratory tract infections in children, show that a total of 79.7% of the parents were attentive to the fact that antibiotic misuse is the main cause of AMR. This study found that Palestinian parents' lack of knowledge on antibiotic use related to the Upper Respiratory Infections (URTIs) resulted in an inappropriate attitude, and practices. In addition, there was a trusted relationship between parents and pediatricians. Educational interventions for both parents and physicians will reduce unnecessary antibiotic use and resistance.

El Astal (2005) reported that the isolated bacteria causing Urinary Tract Infections (UTIs) among outpatients in Gaza Strip showed wide differences in their susceptibility on the tested antimicrobial drugs. The high resistance rate to some AMs was related to inappropriate prescribing of antibiotics, poor infection control strategies, in addition to the fact that some people take antimicrobial drugs without prescription or without performing the necessary culture testing. This study revealed that the increased resistance to the many commonly used agents should be further inspected and evaluated for the common antibiotics used in therapy of uropathogens.

Micek *et al.* (2005) reported that the immediate use of antimicrobial agents as the initial behavior to treat infections increases the prevalence rate of multidrug resistance organisms. In addition, it forces clinicians to expose patients to more than one broad spectrum of antimicrobial agents.

Empiric therapy is an antimicrobial agent that is prescribed during the period before identifying the sample culture isolate and before the availability of susceptibility testing results Perez *et al.* (2012);.

De-escalation is to change the antimicrobial agent of the patient to another narrow spectrum class of antibiotic or to decrease the antimicrobial agent from two or more agents to a single antimicrobial agent when clinically appropriate Dellit *et al.* (2007).

Early diagnosis of infections, rapid identification of the infectious organism, and the use of appropriate antibiotics improve the patient's health outcomes, and decrease cost and hospital length of stay Perez *et al.* (2012);.

The study by Abbo L *et al.* (2011) emphasized that the increasing rates of AMR has become a major issue evident in numerous studies in the last decade. These studies included health care providers, pharmacists, physicians and medical students. As a point of fact, there are several factors related to the misuse of antibiotics Suaifan *et al.* (2012) Despite the ongoing efforts to improve the prescription of AMs prescription and address certain issues such as AMs for viral infection, excessive duration of treatment, the rates of AMR continues to rise globally. Lucet *et al.* (2011);. reported that investigators in different parts of the world have identified that there are knowledge gaps in AMs description that led to a rise in AMR. One particular study conducted in Riyadh, Saudi Arabia between June and August 2013 and it investigated physicians' knowledge, prescription and attitudes towards AMs prescription. This study showed that there was a need to train and to educate physicians in the field of AMs prescription and to review the guidance of AM prescription. Baadani *et al.* (2015);

According to Srinivasan *et al.* (2004), there is a widespread agreement that the problem of AMR is growing and that it poses a major challenge to health care. May AK *et al.* (2000), data from both the CDC and the National Nosocomial Infections Surveillance (NNIS) systems indicate that there is a heavy use of AMs and that this use is unnecessary or inappropriate, and that decreasing the use of AMs is effective in reducing resistance. These facts prompted many to improve AMs prescribing practices and led to the creation of data and guiding principle for this phenomenon (from national infection disease (ID) organization) Shales *et al.* (1997). The CDC has introduced several measures, to prevent AMR in health care. Cabana MD *et al.* (1999); The change in

prescription patterns of AMs requires a change in the behavior of physicians and healthcare professionals. It is, therefore, very important to know what physicians know about AMs agents and how they acquire and maintain that knowledge; in addition to the factors that affect their prescribing of AMs. For this purpose studying the knowledge, attitude, and practices; of healthcare providers is very important in developing interventions to improve use of AMs to prevent resistance.

A study by Murthy (2001); explained that AMR is considered a global problem especially in developing countries. Several studies have found that this is due to misuse of AMs and due to non-compliance when it comes to taking the necessary precautions and infection control measures. Kapil (2013) reported that numerous studies in developing countries have highlighted the importance of the rational use of drugs in therapy through educational interventions, and ASP knowledge is the first step to modify this behavior in addition to the commitment of healthcare providers with the guidelines and protocols.

Ridhorkar *et al.* (2018); explains that AMR has developed with an inappropriate use of wrong indication, how to use, and weak adherence to the prescribed drugs. To reduce this problem, knowledge, attitude and practices (KAP) must be assessed among healthcare professionals. AMs play a very important role in reducing morbidity and mortality. It is well-known that misuse, abuse and overuse of antimicrobials intensify the problem of resistance. Our challenge is to reduce the prevalence and advancement of AMR. The CDC and WHO recommend implementing an ASP to combat this resistance. In their work Levy (2002); state-that the misuse of AMs as well as the MDROs issue is a global problem. There are several factors that play an important role in the emergence of MDROs including the excessive use of AMs and the lack of infection control policies and practices. A patient who is exposed to AMs is at a higher risk of being infected with MDROs and this would consequently increase the mortality and morbidity rate. Reducing the use of AMs is a cornerstone as it helps in the containment of MDROs, knowledge, attitude, and practices towards MDROs driving forces in reducing this phenomenon. The authors also report that knowledge was good in contrast to poor awareness of local AMR rates Okeke (2010);

Memish, *et al.* (2012); explain that AMs are very important in the treatment of patients and have been widely prescribed in hospitals because of their effectiveness in saving the lives of many

patients. However, overuse and misuse of AMs has been observed in previous studies, and it has continued in recent years and it is considered the major issue in the presence of AMR. According to Shibl *et al.* (2014); the increase in AMR nowadays is one of the most important concerns in global public health worldwide. Alothman, *et al.* (2016); the aim of their study is to assess knowledge and perception related to prescription of antibiotics among physicians. The study revealed that most of respondents (82%) perceived AMR to be a global problem, and 78% think that it is a very serious national problem. The spread of AMs use and their appropriate pre-subscribing was acknowledged by (81%) of the respondents. The physicians believed that the intervention of an educational program is the most effective way to improve prescription patterns and to reduce AMR. Half of the respondents believed that restriction of AMs will reduce AMR while almost all of the participants acknowledged the existence of complications due to infection with resistant organisms.

On a similar note, Hughe (2017); stated that the excessive and inappropriate use of AMs increases the spread of AMR.

2.3 The knowledge, Attitude, and Practices towards ASP:

Solomon *et al.* (2001); ASP is an effective way of changing prescribing patterns and reducing inappropriate use in hospitals. According to Cabana *et al.* (1999), in order to develop the effectiveness of ASP and change the prescribing behavior, physicians need to have better understanding of the proper ASP use and the issue of AMR. Cooke *et al.* (2004), effective ASP program need to include all health professionals, not only prescribers. It is worthy to note that earlier studies evaluated the KAP of physicians of AMs use and the resistance, however, only few studies, assessed the KAP among health care professionals.

Al-Harthi *et al.* (2015); studied knowledge and perception regarding antimicrobial stewardship among clinicians in Jeddah, Saudi Arabia. Their findings revealed that although the concept of AMR is clear among general physicians, they lack consistent practice resources, while all participants in the study were also obliged to follow the guidelines for AMs use. This study highlighted the need to adhere to ASP as a basic reference when prescribing AMs agents.

According to Tegan, *et al.* (2017); in their prospective cross-sectional study on KAP of healthcare providers towards ASP at Fitch hospital, there were multiple effects of misuse or inappropriate use of AMs; those include adverse reactions, rapid emergence of AMR; and

treatment failures. To reduce this problem, it is necessary to organize an ASP to be used by health care institutions to reduce the misuse of AMs, to improve the patient's health and to reduce negative effects of AMs. Through the results of this study, they noted that despite the fact that ASP is not implemented and not developed in most hospitals; the level of KAP towards ASP was good.

The research done by Erku (2016); entitled “Antimicrobial stewardship: cross-sectional survey Assessing Perception and practices of community pharmacists in Ethiopia” revealed positive perceptions and practices towards stewardship. Despite that, some areas of weakness in ASP were found to be not integrated in community pharmacies, and the importance of participation among inter-professionals as well as the dispensing of antimicrobials without a valid prescription needed to be improved.

The study of Spellberg *et al.* (2008); reported that the increase in the prevalence of MDROs bacteria has led to an increase in the mortality and morbidity rate in the world .The mortality rate among people in the United States alone is estimated to be at 26,000 people each year. The mortality rate in other parts of the world is estimated to be at 25,000 each year. Because of MDROs, the mortality rate in South Asia is estimated about 96,000 each year (CDC, 2013). Kardas *et al.* (2005); while there are many factors responsible for AMR, the injudicious use of AMs is one of the most important factors. Goldstein (2011) reported that several researchers have highlighted the relationship between the use of AMs and resistance.

De Kraker *et al.* (2011); AMR imposes a burden on the health system for its relationship with higher mortality and morbidity rates which increases the length of hospital stay. The increase of resistance to AMs is a global concern. There is a need to address some of the gaps in the perception and practices towards ASP. Developing customized intervention is important to bridge the gaps and to improve the perception and practices towards ASP. Huttner B, *et al.* (2014); emphasizes that ASP is a key component in reducing AMR crisis. It has also become clear that AMR is a problem that can not addressed by institution or physicians, but requires concerted action at the regional, national and supra-national levels. However it is easy to feel frustrated, given the problems that are often encountered when implementing ASP. Laxminarayan R, *et al.* (2013); AMR is a problem worldwide needs global solutions; ASP is the

main component in addressing this issue. However, many hospitals around the world still lack ASP programs, mainly due to lack of funding (P. Howard, 2014).

According to Khmour *et al.* (2017), a prospective audit and feedback study on the impact of ASP intervention on hospitalized patients in the intensive care unit (ICU) at Palestinian medical complex, it was shown that there was no program or evaluation of ASP in Palestinian hospitals, and it was observed that the ICU physicians were more likely to accept ASP interventions. However, approximately 22% of the ASP interventions were rejected by the physicians. The study also showed positive impact on AMs use, duration of therapy and length of stay. Moreover the study revealed that the acceptance rate of ASP interventions was 78.4%. The most accepted interventions were dose optimization (87.0%) followed by de-escalation based on culture results with an acceptance of 84.4%. ASP interventions significantly reduce antimicrobial use by 24.3%, in addition to the fact that the length of stay and duration of therapy reduced after implementation of ASP. Tacconelli *et al.* (2014) reported that many studies have been published about AMR as an important factor in both patient safety and public health. The way to improve the AMs prescribing and reduce AMR has been addressed by implementation of ASP (Shah, 2008). Dellit *et al.* (2007) explained that the most important targets of an ASP is to control misuse and overuse of broad spectrum antibiotics. It is estimated that there is 50% misuse of antibiotics in hospitals. Buckel *et al.* (2016),—in their study on KAP among healthcare professionals at small community hospitals state that HCPs are aware of inappropriate use and acknowledge that AMR is a serious problem worldwide. Despite the fact that ASP has received national attention recently, it is not a new concept for HCPs. Furthermore, HCPs are aware of the importance of ASP in restriction of AMs use and improving the quality of health. Their study showed that HCPs at SCHs had less KAP towards ASP and were less likely to contact ID for information compared with HCPs at LCHs. Their results support the development of ASP at SCHs and recognize the significance in availability and utilization of resources.

Although there has been an improvement in the transmission of infectious diseases, regular large immunization, and discovery of antimicrobials helped in the reduction of the morbidity and mortality rates. However, the emergence and global increase of AMR is a challenge that threatens to negate the gains made by the discovery of AMs agent. Resistance emerged due to irrational and indiscriminate use of AMs. Along with poor infection control practices, this leads

to the spread of MDROs between patients and inter hospitals, in addition to the decline in the development of new antimicrobials. ASP should be designed to improve the use of AMS, to insure cost efficiency, patient outcome, duration of therapy, and length of stay (Kadavanu, & Mathai 2012).

Siomes *et al.* (2015),—in their study in practical guide of ASP implementation in Portuguese hospitals in order to improve the quality of AMs prescription and contribute to better clinical outcomes and develop effective strategies to prevent and control infections based on social, education, and cultural Portuguese reality. The study summarized the best practices for the implementation of ASP in the hospital context. However, the study revealed that the management of AMR is a small part of the problem of health care associated infections. Factors such as hand hygiene, nurses working conditions, rate of occupancy beds, and nurses ratio per patient should be taken into account and should be addressed in future documents.

Chapter Three

Conceptual Framework

The conceptual framework of this study includes various factors which influence the Knowledge, Attitudes, and Practices (KAP) of the following variables:

3.1 Dependent Variable:

A dependent variable is a variable that depends on other measurable factors. It is expected to change as a result of an experimental manipulation of the independent variable or variables. It is the presumed effect (Cramer, Duncan and Howitt, 2004). The dependent variables of this study are knowledge, attitudes, and practices.

3.2 Independent Variable:

The independent variable is a variable that is stable and unaffected by other variables. It refers to the condition of an experiment that is systematically manipulated by the investigator. It is the presumed cause (Cramer, Duncan and Howitt, 2004). The independent variable includes the socio-demographic character of the health care providers age, gender, experience, marital status, certificates, and profession.

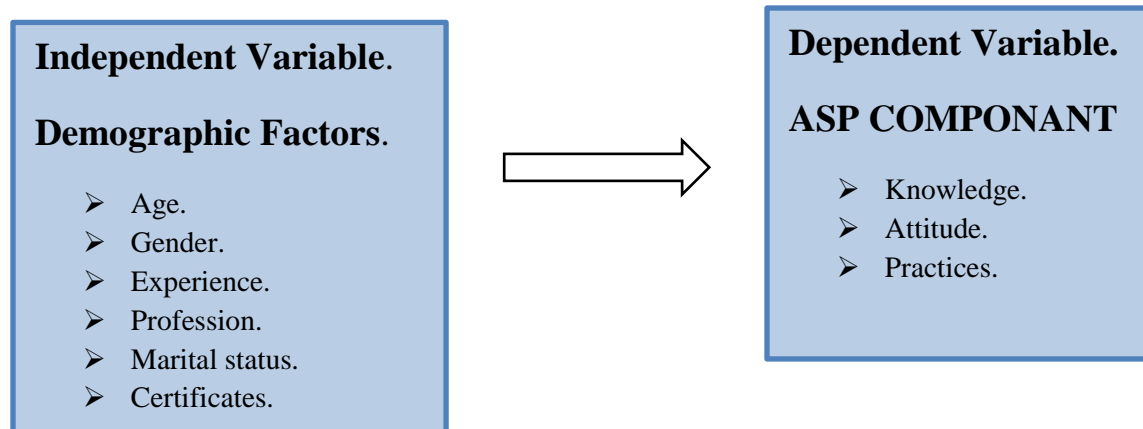


Figure 3.1: Conceptual framework of the study; different factors affecting Knowledge, Attitude, and Practices.

3.3 Conceptual definitions:

ASP: is the systematic effort to educate and persuade prescribers of antimicrobials to follow evidence-based prescribing; in order to stem antibiotic overuse, and thus antimicrobial resistance (Lee, 2013).

Antimicrobial stewardship, refers to a set of coordinated interventions which promote the optimal selection, dosing and duration of antimicrobial therapy. (Doron, *et al.*2011).

Antimicrobial resistance is the ability of microbes to resist the effects of drugs that is the germs are not killed, and their growth is not stopped (CDC, 2015).

KAP: is a measure of the Knowledge, Attitude and Practices of the HCPs (Kaliyaperumal, 2004).

3.4 Operational definition:

The tool used in this study is a KAP questionnaire. The first dependent variable: knowledge is the understanding degree of HCPs towards the ASP. The second dependent variable: Attitude is the perception and internal feeling that HCPs have towards ASP, which may be positive or negative. As for the third variable, practice is defined as the activities of the HCPs towards ASP. Healthcare providers (HCPs): in this regards it mean any healthcare providers. Tegan, *et al.* (2017).

Good knowledge: When the respondents agree on $\geq 65\%$ of the statement of knowledge.

Poor knowledge: When the respondents agree on $< 65\%$ of the statement of knowledge.

Positive attitude: When the respondents agree on $> 75\%$ of the statements of attitude.

Negative attitude: When the respondents agree on $< 75\%$ of the statements of attitude.

Good practice: when the respondents agree on $> 70\%$ of the statement of practice.

Poor practice: when the respondents agree on $< 70\%$ of the respondent of practice (Tegan, *et al.*, (2017).

Dependent variable:

B. Knowledge:

Familiarity with terms:

B.1 Are you familiar with the term “**antimicrobial stewardship**”?

B.2 Are you familiar with the term “**antibiogram**”?

B.3 Are you familiar with **DDD** “**Define daily doses**”?

B.4 Are you familiar with the term **antimicrobial resistance**?

Very familiar (I am engaged in the practice of antimicrobial stewardship (ASP)).

Familiar (I have heard the term and have some familiarity).

Not familiar (I’ve heard the term but I’m not sure what it is).

Not at all familiar (I’ve never heard of it).

Knowledge of the following statements:

B.1 Inappropriate antibiotics use can lead to resistance.

B.2 Inappropriate antibiotics use can lead to increased adverse events.

B.3 Inappropriate antibiotics use results in an additional burden on the medical cost to the patient and health care system.

B.4 Antimicrobial stewardship helps to select an appropriate antibiotic before and after culture results.

B.5 The patient should not be given a broad-spectrum antibiotic if the narrow-spectrum antibiotic is effective.

B.6 There is a misuse of antibiotics in our country.

B.7 Urinary tract infections in pregnancy require broad-spectrum antibiotics.

B.8 Antibiotics should only be used when necessary.

B.9 Antimicrobial stewardship program effectiveness interim of :

B9.a Improving patient outcome.

B9.b Improving Patient Safety (Minimizing unintended consequences of antimicrobials).

B9.c Reducing healthcare costs (without adversely impacting quality of care).

B9.d Reducing resistance of bacteria.

B9.e Reducing patient length of stay.

C. Attitude:

Attitudes about antimicrobial use and resistance:

C.1 Does your hospital **provide guidelines** for the diagnosis and management of patients with infective problems?

C.2 I would like more education on the appropriate use of antimicrobials.

C.3 New antimicrobial development will keep up with our current resistance needs.

C.4 Do you follow the recommendations of your hospital's antimicrobial guidelines?

C.5 Antimicrobials are overused in my hospital.

C.6 Antimicrobial resistance is a great problem in my hospital.

C.7 The antibiotic can be replaced after two or three days if the patient health does not improve.

C.8 Restriction on antimicrobial use is a reasonable method for controlling antibiotic use.

C.9 Antibiotic resistance is an important and serious public health issue worldwide.

C10 Encouraging medical conferences about antibiotics and participating in them is essential.

C11 I consult an infectious disease specialist before prescribing any antibiotic.

C12 Does the laboratory personnel at your institution use **CLSI guidelines** to perform and interpret antimicrobial sensitivity testing (AST)?

C13 Sources of information about the treatment of infectious diseases:

C13.a Hospital Guidelines

C13.b Asking a colleague

C13.c Asking an Infectious Diseases specialist

C13.d PubMed /online resources

C13.e Smart phone medical applications

C13.f Clinical textbooks

C13.g Clinical experience

13.h CDC studies and reports

D. Practices:

Antibiotic prescribing and other practices:

D.1 Broad spectrum antibiotics should be used in place of narrow spectrum antibiotics to reduce resistance.

D.2 This institution should provide adequate staff education regarding MDROs

D.3 Microbiology lab results must be provided to the treating physician.

D.4 More cautious use of antibiotics would decrease antimicrobial resistance.

D.5 Patient rooms are cleaned according to hospital cleaning protocols which are evidence-based.

D.6 I can give the patient ceftriaxone if the result culture is pseudomonas.

D.7 If medically appropriate, IV antibiotics should be stepped down to an oral alternative if possible.

D.8 Does the laboratory use **rapid methods** to detect MDRO's like ESBL, MRSA, VRE or CRE?

D.9 Does your institution build a yearly **antibiogram**?

D10 Important to enhance education

D10.a Appropriate use of antibiotics.

D10.b Understanding basic mechanisms of antimicrobial resistance.

D10.c Properly handling patients demanding unnecessary antibiotics.

D10.d Interpreting antibiograms.

D10.e Transitioning from intravenous to oral antibiotics.

Independent variable:

Demographic factor:

A.1 Gender.

A.2 Age.

A.3 Social Status.

A.4 Profession.

A.5 Degrees & Certificates.

A.6 Years of Experience.

Chapter Four

Methodology

4.1 Study area

The study was conducted at Beit- Jala hospital starting 15 February to 15 May 2018 in Beit- Jala town. Beit-Jala hospital is located to the south of Jerusalem at a distance of 5 km. The hospital was founded in 1957. It is one of the main governmental hospitals of the Palestinian Ministry of Health. It is the main hospital for patients with cancer in the West Bank. The hospital has 153 beds including 5 beds in the Intensive Care Unit (ICU) and 17 beds in the Emergency Room (ER). It employs 387 employees from different disciplines. Beit- Jala hospital has different departments such as the outpatient department, the medical words, the Pediatric ward, the surgical ward, the gynecology and obstetrics ward, Huda- Almasri ward for Pediatric oncology and Adult oncology ward. It delivers diversified health services and has clinics that include emergency services. To name a few, there is the eye clinic, the ear, nose and throat clinic, the urology clinic, the orthopedic clinic, the nitration clinic, cardiology clinic, the oncology clinics, the histopathology lab, the medical laboratory, the blood bank, the pharmacy, social services, x-ray, physiotherapy, daily care, dialysis and follow up of chronic disease like oncology patients, and renal failure patients.

4.2 Design:

A descriptive cross sectional study was conducted through an anonymous self-administered questionnaire given to HCPs at Beit- Jala Hospital.

4.3 Study setting:

The study was conducted at the Beit- Jala hospital .The settings below were selected as they are appropriate for the purpose of this study.

Specialization	Number
Physician.	81
Lab technicians.	22
Nurses.	105
Pharmacists.	6
Total	214

Table (4.1): Total study population that fulfills the inclusion criteria.

4.4 Population:

Source population: All health care providers at Beit- Jala Hospital.

Study population: The study population is all healthcare providers who fulfill the inclusion criteria and who work at Beit- Jala Hospital during the study period.

4.5 Sampling method:

Convenient stratified random sampling is used with proportional allocation to each stratum.

Target groups:

Physicians.

Lab technologists.

Nurses.

Pharmacists.

Inclusion criteria: All healthcare providers, who are willing to participate in the study.

Exclusion criteria: Radiologists.

Sample size and sample technique:

Minimum Sample size determination: Minimum Sample size is calculated from the total population of the study that fulfills the inclusion criteria according to the following formula:

$$n = Z^2 P(1-P)/D^2$$

Where:

n-Sample size;

Z-Confidence level =95% (1.96);

P-Anticipated proportion =50% (0.5) to allow maximum sample size;

D-Margin of errors=5% (0.05).

There were 214 healthcare professionals who fulfilled the inclusion criteria.

$$N=214$$

Therefore the corrected sample size is calculated as follows:

$$N_0 = n / (1 + n / N)$$

$$N_f = 384 / (1 + 384 / 214) = 138$$

$$\text{Allowance of } 5\% = 0.05 \times 138 = 7$$

Therefore total minimum sample size ≥ 145

The proportional sampling technique will be used. The proportion of the candidates of the study from their respective profession is calculated as follows:

Physicians =81, then the sample will be taken $145/214(81) =55$;

Pharmacists = 06, then the sample will be taken $145/214(6) = 4$;

Nurses =105, then $145/214(105) =71$;

Lab technicians = 22 then $145/214(22) =15$;

Total=145.

The sample included HCPs between 25 -60 years old. These age groups formed the majority of HCPs at Beit Jala hospital.

One hundred and eighty eight (88%) of the 214 questionnaire were returned successfully, (188 out of 214 HCPs).

Specialization	No. healthcare providers	Sample Size
Physician.	81	67
Nurses.	105	95
Lab technicians.	22	20
Pharmacists.	6	6
Total	214	188

Table (4.2): Sample size in relation with number of HCPs at Beit-Jala hospital.

4.6 Reliability and Validity:

Validity and Reliability are important concepts in this research.

Validity:

It is essential to consider the content validity of the questionnaire; that is to test whether it actually measures what it is intended to measure. In this questionnaire, the validity depends on subject-matter experts and previous peered researches covering this topic (Tegan, *et al.* 2017).

Reliability (Test-retest reliability & internal reliability):

It is also crucial to consider the reliability of a questionnaire. Put differently, it helps to examine whether similar results will be obtained by the questionnaire when conditions have not changed.

In this study, if the questionnaire is administered to the same workers soon after the first one, the researchers would expect to find similar levels of KAP. If the levels haven't changed, the "repeatability" of the questionnaire would be high. This is called test-retest reliability.

Another aspect of reliability is internal consistency among the questions. Do similar questions give rise to similar answers?

Although reliability or validity cannot be proven conclusively, results are more accurate when the measures in a study are as reliable and valid as possible (De Zwart, 2002).

Two experts from College of Pharmacy and two experts from Medicine college at Al-Quds University, were selected to assess face and content validity of the questionnaire. For assessing the face validity of questionnaire, we requested from experts to write their comments about the location of items, correct scaling and grammatical structure of each item, and the necessity of adding new items or removing existing items. Regarding content validity, we requested from experts to review the questionnaire and assess each item based on 4 criteria including relevancy, clarity, simplicity, and necessity.

4.7 Study Tool:

The self-administered questionnaire was designed based on earlier studies to meet the study objectives and conceptual framework. The questionnaire originally made by (Tegan, *et al.* 2017). Electronic letters were sent to him via e-mail to obtain his permission to use the questionnaire in our study and permission couldn't obtained. The questions were translated into Arabic. In addition, some modifications were done to the questionnaire to ensure that all variables are covered. The questionnaire was evaluated by four experts. The questionnaire items will measure the knowledge, attitude, and practices among HCPs towards ASP and antimicrobial misuse. The questionnaire consists of four parts: demographic data, knowledge, attitude, and practices.

4.8 Data Collection:

After making arrangements with the officials at the hospital, and explaining the purpose of the study, permission was granted.

With the permission to conduct the study, the questionnaire was distributed and collected during the period of three weeks from the HCPs at Beit Jala Hospital under the name of Al-Quds University with no reference to the researcher, as it was distributed in envelopes in line with confidentiality policies. The HCPs at Beit Jala Hospital filled the questionnaire that was distributed and collected via the assistants.

4.9 Pilot study:

The validity of the instrument, which refers to the adequacy with which the method of measurement is able to measure the issues or phenomena under study, was checked via a pilot study on ten samples. More development on the instrument of the study will be done based on the results of the pilot study.

The filled in questionnaires in the pilot phase were not used in the study.

4.10 Data Analysis:

The data were analyzed by using the Statistical Package for the Social Sciences Software (SPSS) version 20.

Data analysis was completed in 6 steps:

- 1) Descriptive statistics were used (frequency and percentages) for demographic data.
- 2) Means and standard deviation to answer the questions of the study.
- 3) Chi-square test to test relationship between categorical variables.
- 4) Chronbach alpha to check the reliability of the questionnaire.
- 5) Pearson correlation coefficient to test relationship between variables.

4.11 Ethical considerations:

In order to gain access to the healthcare providers at Beit Jala Hospital, the Ministry of Health (MOH) was formally approached by means of an introductory letter which presents information about the proposed study and its objectives. The Ministry of Health was asked to give their permission to conduct the study before the study's starting date the proposal was also submitted to the Public Faculty at Al- Quads Ethics committee.

The participants were assured that anonymity and confidentiality are maintained at all times, and that the data provided by the participants would be used for research purposes only and would be expressed only in general terms. No names or codes or any other mechanisms was used to trace responses back to an individual participant. Moreover, participation in this study was voluntary and participants gave their informed consent to participate.

Chapter Five

Results

5.1 Introduction

This chapter presents the results of the statistical analysis of the data. Descriptive analysis presents the characteristics of the respondents at Beit- Jala Hospital in addition to the analysis of Knowledge, Attitudes and Practices towards Antimicrobial Stewardship. The relation between selected variables and socio-demographic characters, as well as the main factors influencing of Knowledge, Attitudes and Practices towards Antimicrobial Stewardship among HCPs at Beit Jala hospital.

Upon receiving the collected data, the data was numerically coded to prepare it for statistical analysis through SPSS.

5.1.1 Descriptive analysis:

It includes descriptive analysis of socio-demographic factors such as gender, sex, profession, marital status, degrees and certificates and years of experience (Table 5.1.).

Table 5.1: Demographic data of the respondents.

Variable	Group	Number	Percent
Gender	Male	116	61.7
	Female	72	38.3
	Sum	188	100.0
Age	Less than or equal 25 years old	12	6.4
	46-55 years old	12	6.4
	26-35 years	93	49.5
	More than 55 years old	2	1.1
	36- 45 years old	69	36.7
	Sum	188	100.0
Marital Status	Single	43	22.9
	Divorced	1	0.5
	Married	143	76.1
	Widowed	1	0.5
	Sum	188	100.0
profession	Doctor	67	35.6
	Nurse	95	50.5
	Pharmacist/Clinical Pharmacist	6	3.2
	Medical /Lab Technologist	20	10.6
	Sum	188	100.0
Degrees & Certificates	Bachelors degree	129	68.6
	Masters degree	28	14.9
	Post graduate diploma (PGD)	14	7.4
	Phd	17	9.0
	Sum	188	100.0
Years of Experience	1-5 years	47	25.0
	16-20 years	23	12.2
	6-10 years	66	35.1
	More than 20 years	16	8.5
	11-15 years	36	19.1
	Sum	188	100.0

1- Gender

The study included a total male HCPs of 116 (61.7%), and a total female HCPs of 72 (38.3%) (Figure 5.1).

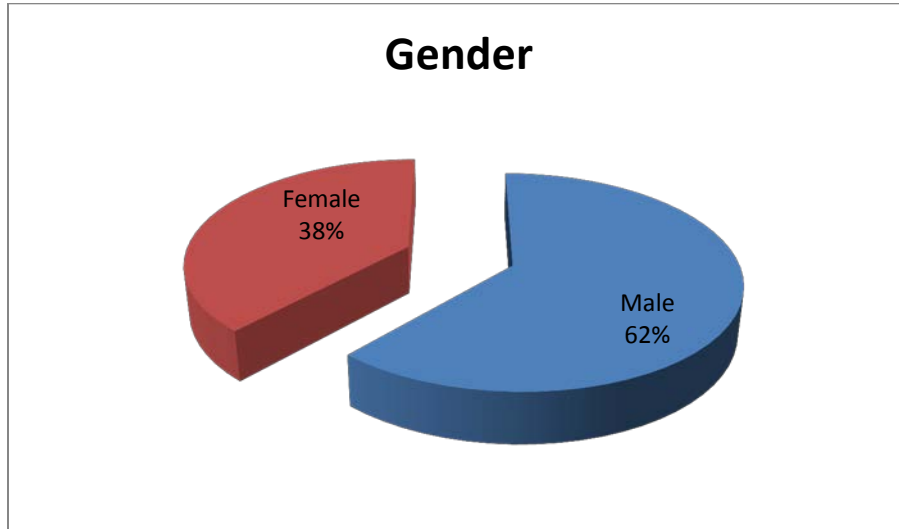


Figure 5.1: A graphical representation of the gender of the sample participants.

2- Age

All respondents' age was between 25-60 before sampling. A total of 12 HCPs (6.4%) were less than or equal to 25 years old, 93 HCPs (49.5%) were between 26-35 years, 69 HCPs (36.7%) were between 36-45 years, 12 HCPs (6.4 %) were between 46-55 years and 2 HCPs (1.1 %) were more than 55 years old, as shown in (Figure 5.2).

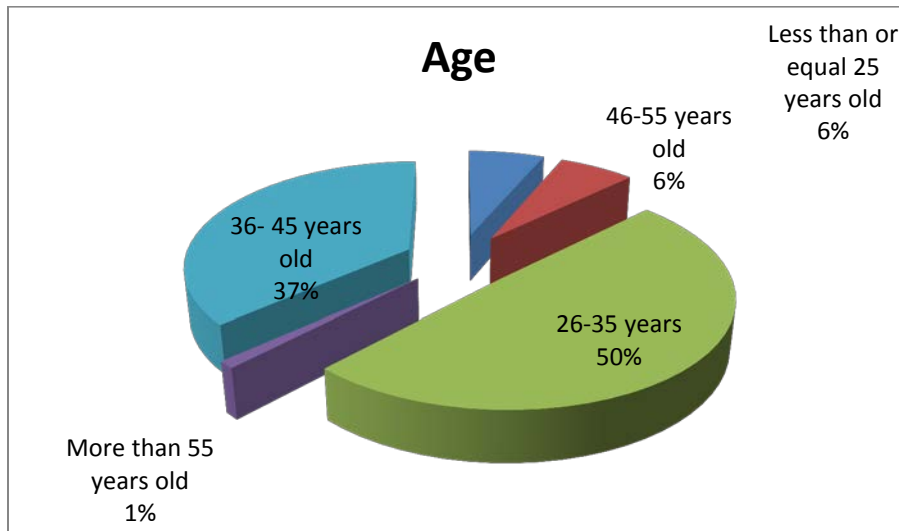


Figure 5.2: Age of participants

3-Marital status

As shown in Figures 5.3., the majority of HCPs (76.1%) were married, 22.9% were single, 0.5% were divorced and 0.5% were widowed (Figure 5.3).

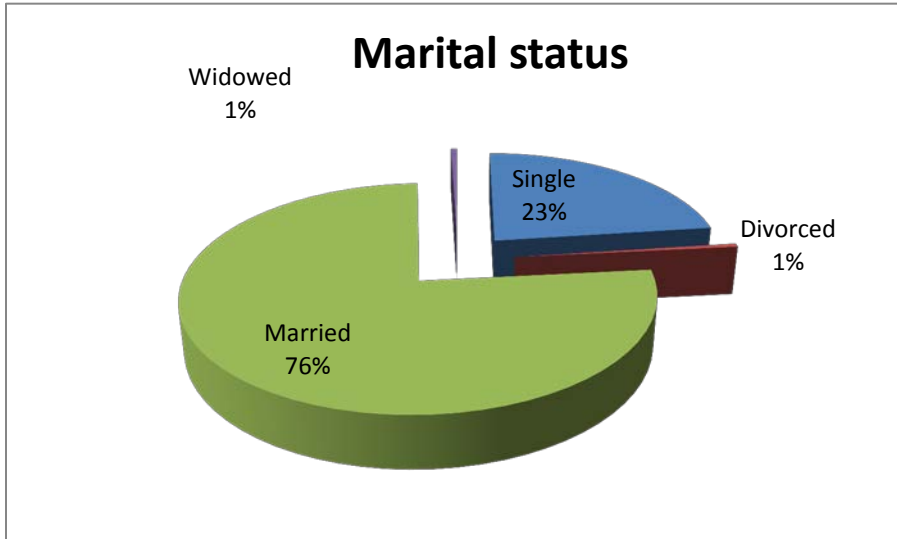


Figure 5.3: A summary of the marital status of the sample studied.

4- Degrees and Certificates

As shown in Figures 5.4., 68.6% of HCPs have a Bachelor's degree, 14.9% of HCPs have a Master's degree, 7.4% of HCPs have Post graduate diploma (PGD) and 9.0% of HCPs were Phd (Figure 5.4).

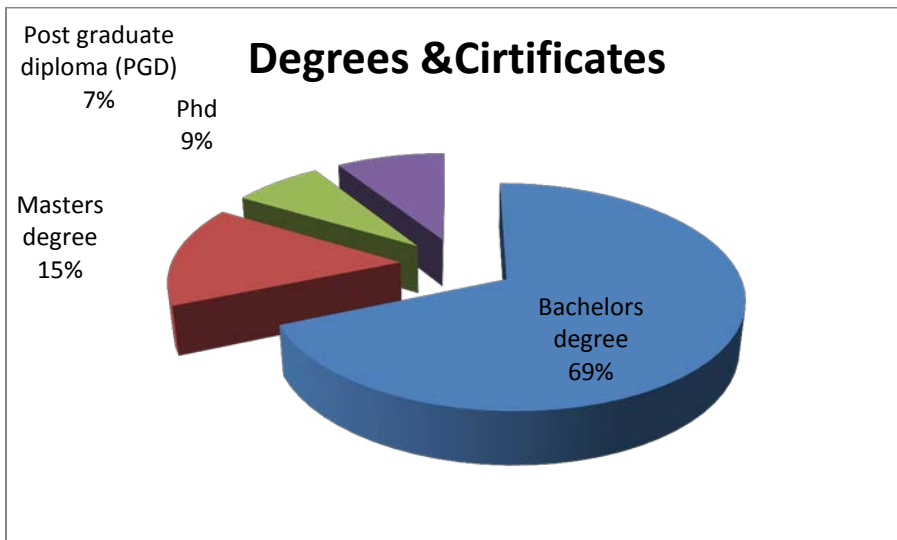


Figure 5.4: A graphical representation showing the Degrees and Certificates of the sample participants.

5- Profession

Half of HCPs in this study were nurses 50%, followed by doctors at 36%, medical technologists were 11%, and pharmacists at 3% (Figure 5.5).

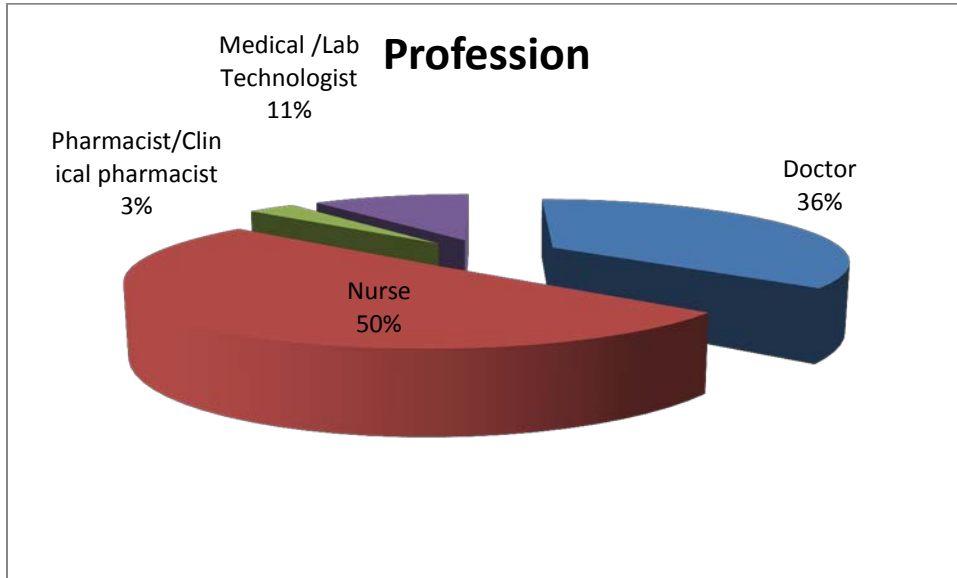


Figure 5.5: A summary showing the Profession of the sample population.

6- Years of Experience

The majority of HCPs 66 (35.1%) have experience between 6-10 years, followed by 1-5 years of experience 47(25%), 16-20 years of experience were 23(12.2%), about 36(19.1%) had 11-15 years of experience, and nearly 16(8.5%) of them had more than 20 years (Figure 5.6).

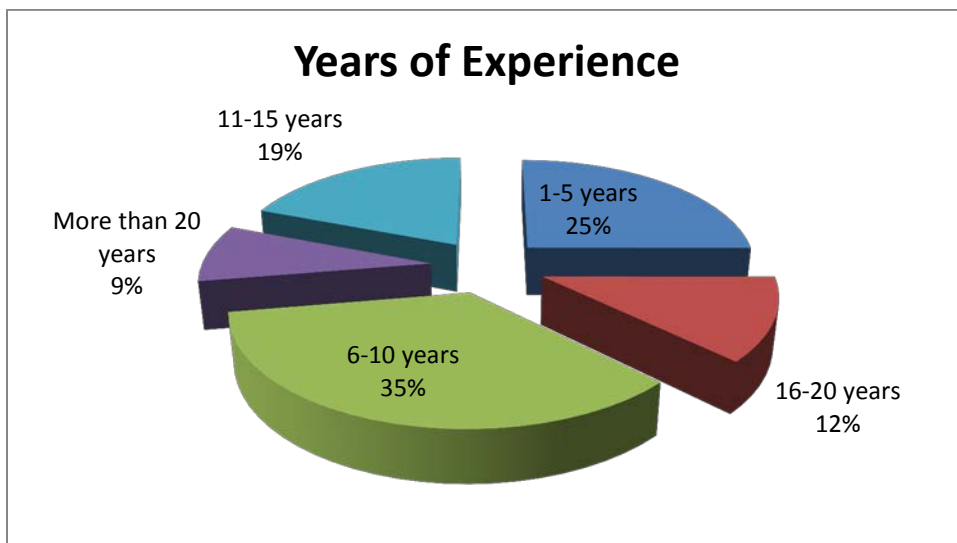


Figure 5.6: A graphical representation showing the years of Experience of HCPs.

5.1.2 The analysis of Knowledge, Attitudes and Practices dimensions

Reliability:

Chronbach's alpha used to test the reliability of the questionnaire where it is from where by a value of 0.877 means that the questionnaire has a very good reliability score as in the (Table 5.2).

Table 5.2: Test reliability of the questionnaire.

Domain	Chronbach Alpha	N. items	Sample size
Knowledge	0.877	17	188
Attitude	0.865	20	188
Practices	0.828	14	188

5.2 Knowledge:

What you think about the following statements and whether you're familiar with them?

To answer the questions, the frequency and the percentages are calculated for item one then the means and standard deviations were used for the other items.

Table 5.3: Means and standard deviations of the familiarity items.

N.	Item	Mean	Standard dev.	Percentage	Degree
4	Are you familiar with the term antimicrobial resistance?	3.85	0.94	77%	Agree
1	Are you familiar with the term "antimicrobial stewardship"?	3.41	1.09	68%	Neutral
2	Are you familiar with the term "antibiogram"?	3.26	1.09	65%	Neutral
3	Are you familiar with DDD "Define daily doses"?	3.19	1.12	64%	Neutral
Total		3.43	0.89	69%	Agree

Table 5.3 shows that a good majority of the HCPs (77%) are familiar with the term **antimicrobial resistance** with a mean value of 3.85 while 68% of them are Neutral in their familiarity with the term "**antimicrobial stewardship**" with a mean of 3.41 and familiar with **DDD "Define daily doses"** with mean 3.15 (Figure 5.7).

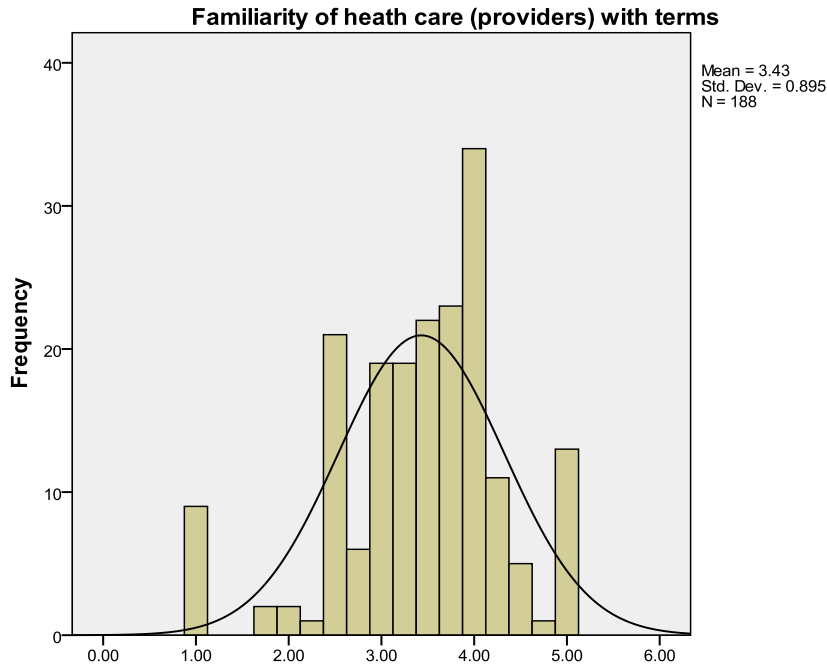


Figure 5.7: Familiarity of health care providers with terms.

What you think about the following statements and whether you agree/disagree?

Table 5.4: Means and standard deviations of the basic knowledge items.

N.	Item	Mean	Standard dev.	Percentage	Degree
1	Inappropriate antibiotics use can lead to resistance.	4.34	0.81	87%	Strongly agree
8	Antibiotics should only be used when necessary.	4.27	0.94	85%	Strongly agree
3	Inappropriate antibiotics use results in an additional burden on the medical cost to the patient and health care system.	4.24	0.81	85%	strongly agree
2	Inappropriate antibiotics use can lead to increased adverse events.	4.19	0.82	84%	Strongly agree
4	Antimicrobial stewardship helps to select an appropriate antibiotic before and after culture results.	4.09	0.80	82%	Agree
6	There is a misuse of antibiotics in our country.	3.99	0.99	80%	Agree
5	The patient should not be given a broad-spectrum antibiotic if the narrow-spectrum antibiotic is effective.	3.93	0.81	79%	agree
7	Urinary tract infections in pregnancy require broad-spectrum antibiotics.	3.21	1.07	64%	Agree
Total		4.03	.57	81%	Agree

Table 5.4 shows that 87% of HCPs strongly agree that there is an inappropriate antibiotics use which can lead to resistance with a mean value of 4.34 and they strongly agree that antibiotics should only be used when necessary with a mean value of 4.27. The item, with the smallest mean value (3.21) is “Urinary tract infections in pregnancy require broad-spectrum antibiotics” (Figure 5.8).

Basic knowledge of the healthcare providers about antimicrobial stewardship

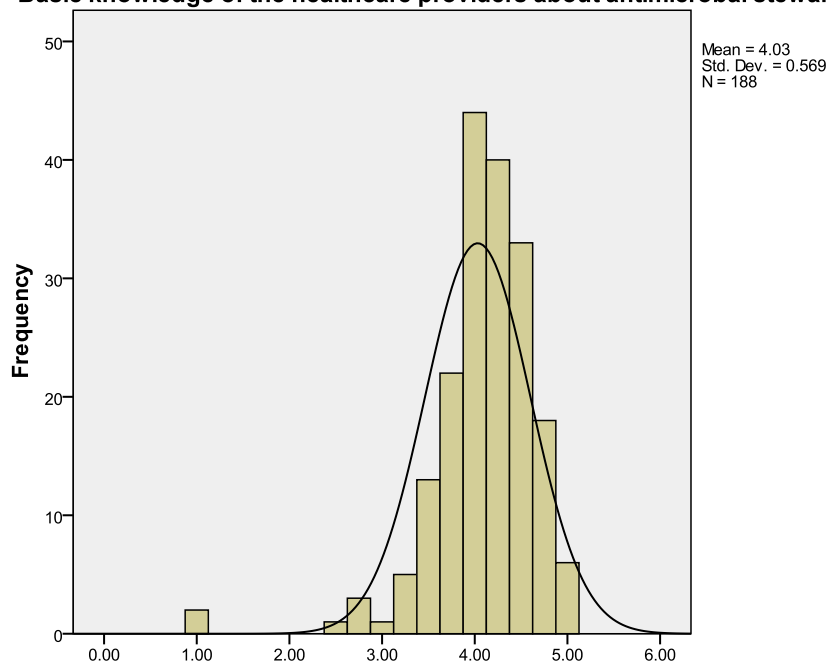


Figure 5.8: Basic knowledge of health care providers towards antimicrobial stewardship.

Antimicrobial stewardship program effectiveness?

Table 5.5: Means and standard deviations of effectiveness.

N.	Item	Mean	Standard dev.	Percentage	Degree
A	Improving patient outcome.	4.03	0.70	81%	Effective
D	Reducing resistance of bacteria.	4.03	0.77	81%	Effective
B	Improving Patient Safety (Minimizing unintended consequences of antimicrobials).	4.01	0.69	80%	Effective
E	Reducing patient length of stay.	3.96	0.74	79%	Effective
C	Reducing healthcare costs (without adversely impacting quality of care).	3.92	0.75	78%	Effective
Average Effectiveness		3.99	0.62	80%	Effective

Table 5.5 shows that a decent fraction of HCP (81%) agree that antimicrobial stewardship has contributed to improving patient outcome with a mean of 4.03 and that it reduces resistance of bacteria with a mean of 4.03. On the other hand, 78% of HCPs think that antimicrobial stewardship does not have an impact on reducing healthcare costs (without adversely impacting quality of care) with a mean value of 3.92 (Figure 5.9).

Knowledge of healthcare providers on effectiveness of antimicrobial stewardship

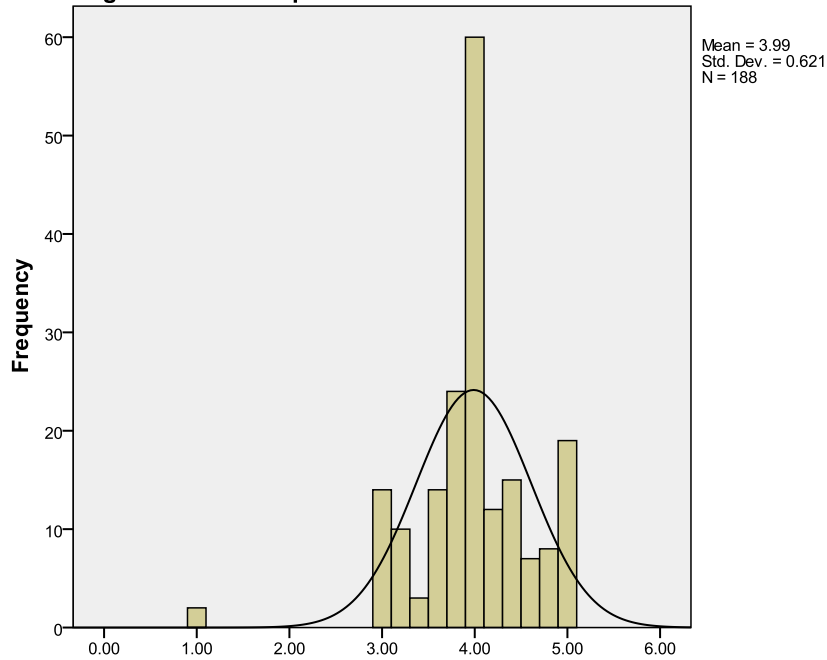


Figure 5.9: Knowledge of health care providers on effectiveness of antimicrobial Stewardship.

What is the range of the knowledge?

Table 5.6: Means and standard deviations of the range knowledge items.

N.	Item	Mean	Standard dev.	Percentage	Degree
	Health care(providers)	3.43	0.89	69%	Familiar
	Basic knowledge	4.03	0.57	81%	Agree
	Effectiveness	3.99	0.62	80%	Effective
	knowledge	3.88	0.52	78%	Agree

Table 5.6 shows that the overall fraction of HCP are knowledgeable (78%) Sixty nine (69%) of HCP are familiar with the terms, 81% have the basic knowledge and 80% have the knowledge on effectiveness.

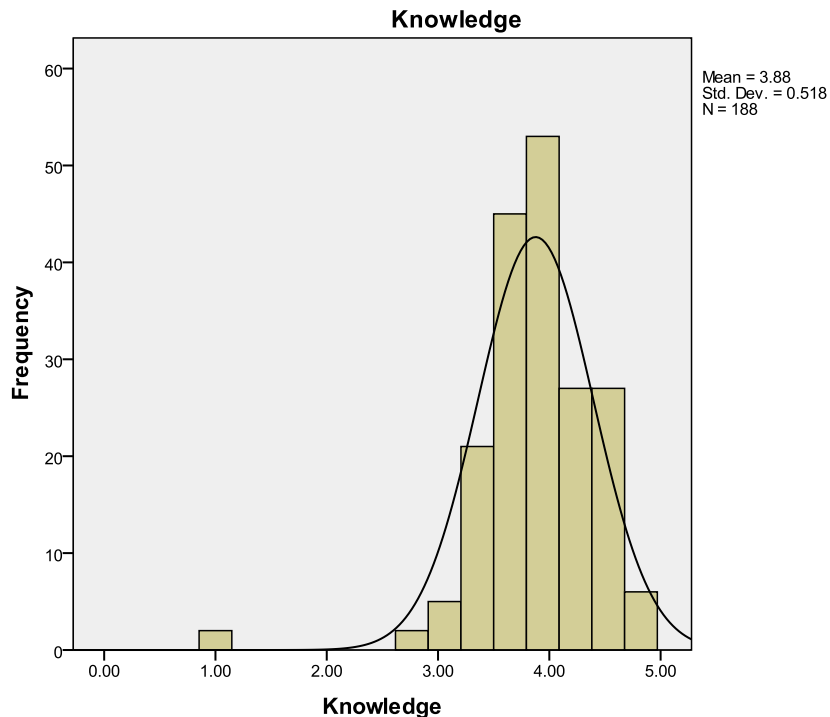


Figure 5.10: Range of the Knowledge of health care providers.

5.3 Attitudes

What is the reflection of your attitudes about antimicrobial use and resistance?

The frequency and the percentages were calculated for item one and the means and standard deviations were used for the other items.

What you think about the following statements and whether you agree/disagree?

Table 5.7: Means and standard deviations of the attitude of antimicrobial use and resistance items.

N.	Item	Mean	Standard dev.	Percentage	Degree
9	Antibiotic resistance is an important and serious public health issue worldwide.	4.06	0.82	81%	Agree
10	Encouraging medical conferences about antibiotics and participating in them is essential.	3.98	0.80	80%	Agree
2	I would like more education on the appropriate use of antimicrobials.	3.97	0.87	79%	Agree
8	Restriction on antimicrobial use is a reasonable method for controlling antibiotic use.	3.93	0.80	79%	Agree
3	New antimicrobial development will keep up with our current resistance needs.	3.80	0.80	76%	Agree
5	Antimicrobials are overused in my hospital.	3.78	0.89	76%	Agree
6	Antimicrobial resistance is a great problem in my hospital.	3.71	0.86	74%	Agree
11	I consult an infectious disease specialist before prescribing any antibiotic.	3.64	0.97	73%	Agree
4	Do you follow the recommendations of your hospital's antimicrobial guidelines?	3.57	0.88	71%	Agree
12	Does the laboratory personnel at your institution use CLSI guidelines to perform and interpret antimicrobial sensitivity testing (AST)?	3.47	1.00	69%	Agree
1	Does your hospital provide guidelines for the diagnosis and management of patients with infective problems?	3.43	0.98	69%	Agree
7	The antibiotic can be replaced after two or three days if the patient health does not improve.	3.41	1.09	68%	Agree
Total		3.73	0.48	75%	Agree

Table 5.7 shows that the HCPs agree that antibiotic resistance is an important and serious public health issue worldwide with a mean of 4.06. They also agree on encouraging medical

conferences about antibiotics and participating in them is essential with a mean of 3.41 and that the antibiotic can be replaced after two or three days if the patient health does not improve with a mean value of 3.41 (Figure 5.11).

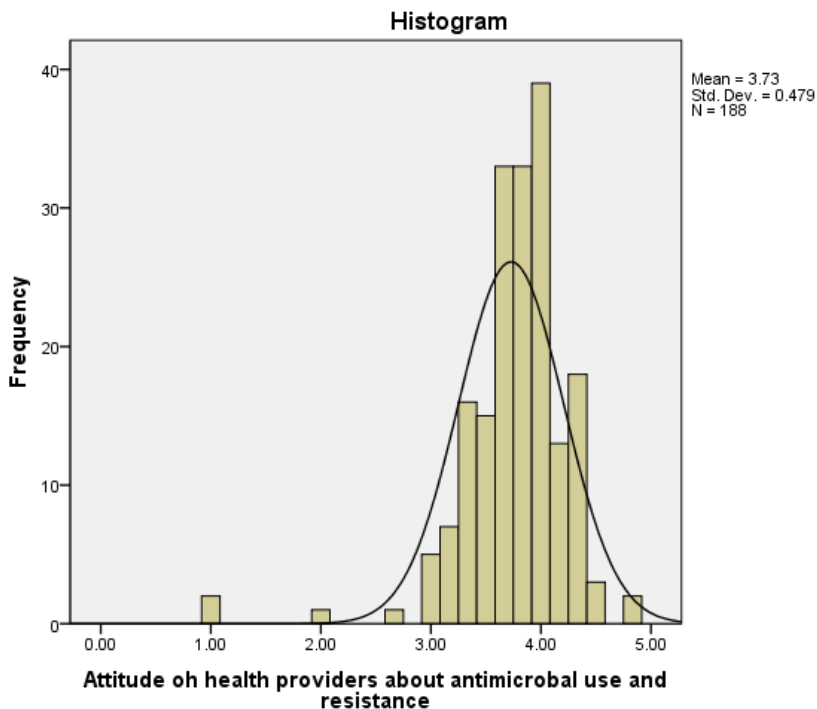


Figure 5.11: Attitude of health care providers about antimicrobial use and resistance.

To what extent do you rely on the following sources of information about the treatment of infectious diseases?

Table 5.8: Means and standard deviations of the source of information items.

N.	Item	Mean	Standard dev.	Percentage	Degree
g.	Clinical experience	3.77	1.12	75%	Some what
f.	Clinical textbooks	3.73	1.12	75%	Some what
a.	Hospital Guidelines	3.67	0.98	73%	Some what
b.	Asking an Infectious Diseases specialist	3.63	1.11	73%	Some what
c.	Asking a colleague	3.60	1.03	72%	Some what
d.	PubMed /online resources	3.47	1.15	69%	Some what
e.	Smart phone medical applications	3.44	1.19	69%	Some what
h.	CDC studies and reports	3.44	1.25	69%	Some what

Table 5.8 shows that the source of information of 75% of HCPs is from clinical experience with a mean of 3.77 followed by clinical textbooks with a mean of 3.73. 69% of HCP information comes from CDC studies and reports with a mean value of 3.44 (Figure 5.12).

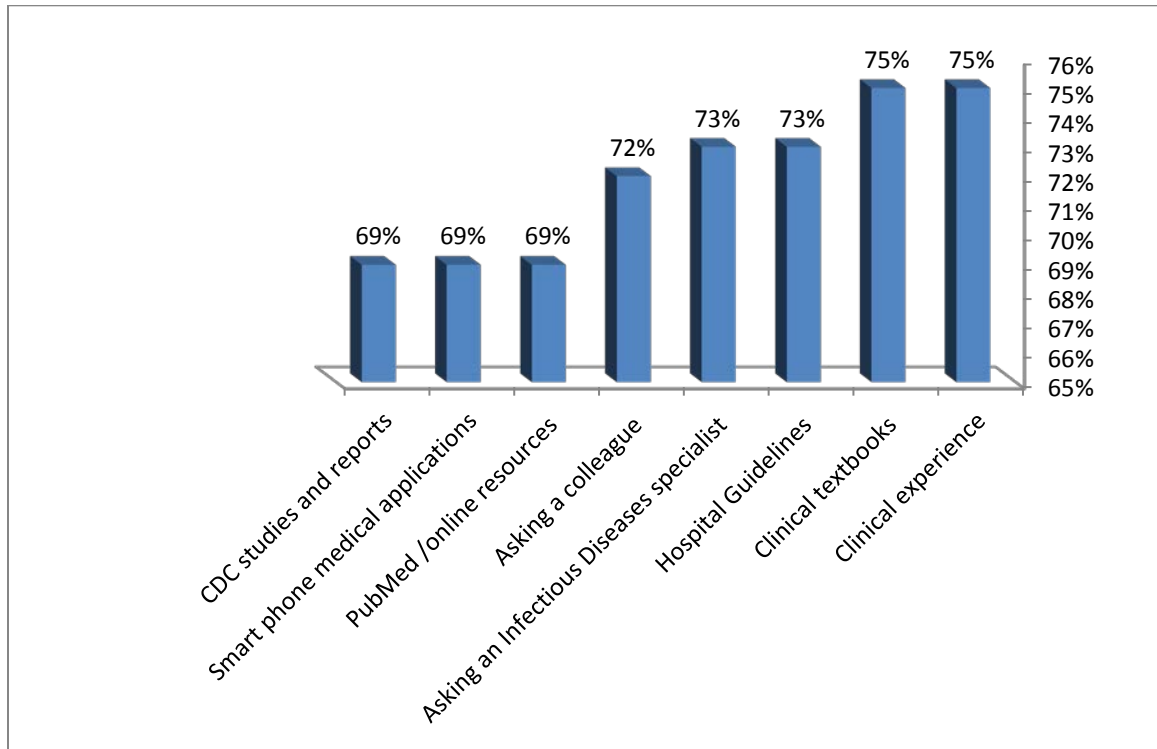


Figure 5.12: Source of information about treatment of infectious disease.

5.4 Practices:

Aims to record antibiotic prescribing and other practices

What you think about the following statements and whether you agree/disagree?

Table 5.9: Means and standard deviations of the antimicrobial prescribing and other practices items

n.	Item	Mean	Standard dev.	Percentage	Degree
3	Microbiology lab results must be provided to the treating physician.	4.10	0.75	82%	Agree
4	More cautious use of antibiotics would decrease antimicrobial resistance.	4.00	0.88	80%	Agree
2	This institution should provide adequate staff education regarding MDROs*.	3.97	0.85	79%	Agree
5	Patient rooms are cleaned according to hospital cleaning protocols which are evidence-based.	3.73	0.98	75%	Agree
7	If medically appropriate, IV antibiotics should be stepped down to an oral alternative if possible	3.70	0.86	74%	Agree
1	Broad spectrum antibiotics should be used in place of narrow spectrum antibiotics to reduce resistance.	3.56	1.14	71%	Agree
8	Does the laboratory use rapid methods to detect MDRO's like ESBL, MRSA, VRE or CRE?	3.47	0.93	69%	Agree
9	Does your institution build a yearly antibiogram?	3.32	0.87	66%	Neutral
6	I can give the patient ceftriaxone if the result culture is pseudomonas.	3.14	1.13	63%	Neutral
Total		3.67	0.55	73%	Agree

Table 5.9 shows that a great majority of HCPs (82%) agree that microbiology lab results must be provided to the treating physician with a mean of 4.10 and they also agree that a more cautious use of antibiotics would decrease antimicrobial resistance with a mean of 4.00 and 63% of HCP think that they can give the patient ceftriaxone if the culture result is pseudomonas with a mean of 3.14 (figure 5.13).

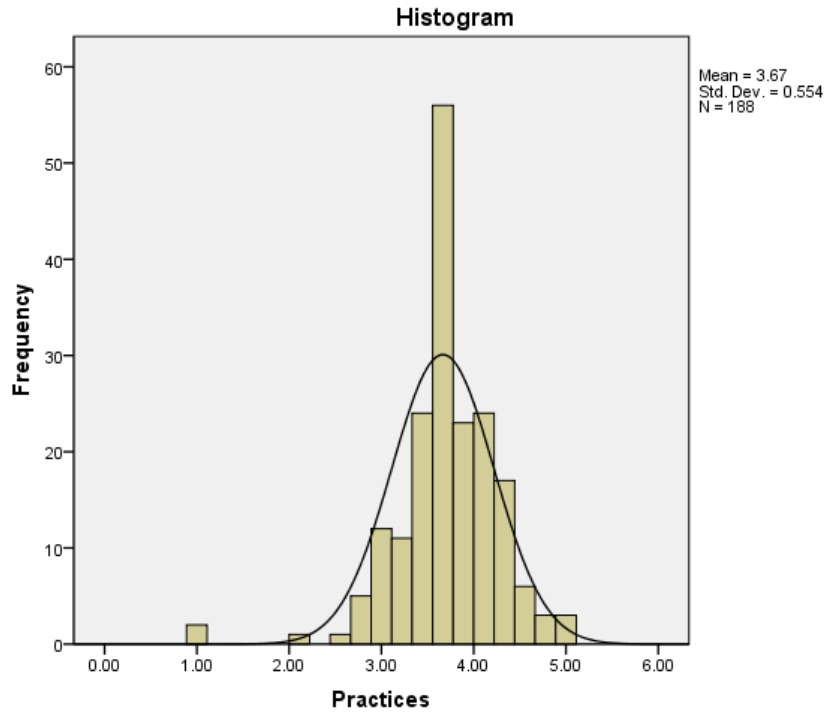


Figure 5.13: Antimicrobial prescribing and other practices.

Where do you think it is very important to enhance education?

Table 5.10: Means and standard deviations of the important to enhance education items.

N.	item	Mean	Standard dev.	Percentage	Degree
A	Appropriate use of antibiotics	4.32	0.82	86%	Strongly agree
B	Understanding basic mechanisms of antimicrobial resistance	4.17	0.78	83%	Strongly agree
C	Properly handling patients demanding unnecessary antibiotics	4.01	0.99	80%	Agree
E	Transitioning from intravenous to oral antibiotics	3.94	0.82	79%	Agree
D	Interpreting antibiograms	3.89	0.83	78%	Agree

Table 5.10 shows that 86% of HCPs agree that there has to be an appropriate use of antibiotics with a mean of 4.32 and 83% of them agree that it is important to understand the basic mechanisms of antimicrobial resistance with a mean of 4.17 and 78% of HCP think it is important to learn the proper interpretation of anti-biograms with a mean of 3.89 (Figure 5.14).

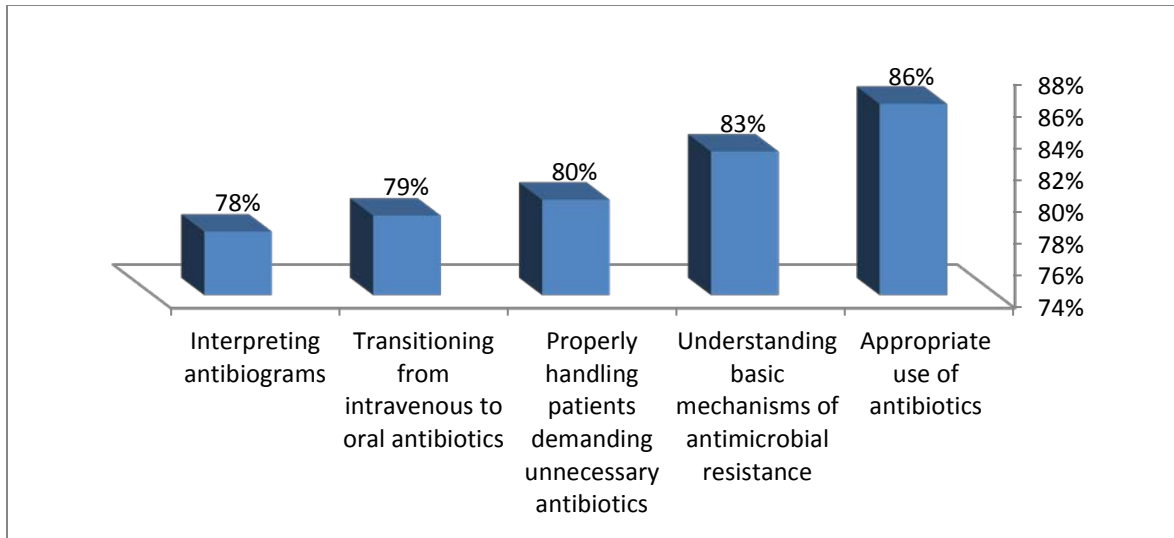


Figure 5.14: Important to enhance education.

5.5 Question number one:

There is no correlation with the level of significance $\alpha \leq 0.05$ between the knowledge, attitudes and practices.

The Pearson correlation coefficient was calculated to test the relationship at the level of significance $\alpha \leq 0.05$ between the knowledge, attitudes and practice (Table 5.11).

Table 5.11: Correlation between knowledge, attitudes and practices.

Knowledge		
Domain	Pearson correlation coefficient	Sig.
Attitudes	0.644**	.000**
Practice	0.521**	.000**

There is a statistical positive relationship at the level of significance $\alpha \leq 0.05$ between the knowledge and attitudes and practices.

5.6 Question number two:

There is no relationship at the level of significance $\alpha \leq 0.05$ between the attitudes and practices.

The Pearson correlation coefficient was calculated to test whether there is a significant statistical relationship at the level of significance $\alpha \leq 0.05$ between the attitudes and practices (Table 5.12)

Table 5.12: Correlation between attitudes and practices.

Attitudes		
	Pearson correlation coefficient	Sig.
Practice	0.651**	.000**

There is positive relationship at the level of significant $\alpha \leq 0.05$ between the attitudes and practices.

5.7 Question number three:

There are no differences at the level of significant $\alpha \leq 0.05$ in the knowledge ,attitudes ,practices with respect to demographic variables.

The Chi-square test was used to compare numbers of knowledge, attitudes, and practices with respect to demographic variables.

Table 5.13: Compare numbers of knowledge with respect to demographic variables.

Sig	chi-square	Knowledge group					
		Poor knowledge		Good knowledge			
		Column N %	Count	Column N %	Count		
0.232	1.429	5%	6	95%	110	Male	Gender
		10%	7	90%	65	Female	
0.312	4.766	0%	0	100%	12	Less or equal than 25	Age
		0%	0	100%	12	46-55	
		11%	10	89%	83	26-35	
		0%	0	100%	2	More than 55	
0.564	2.04	4%	3	96%	66	36-45	Social
		2%	1	98%	42	Single	
		0%	0	100%	1	Divorced	
		8%	12	92%	131	Married	
0.116	5.905	0%	0	100%	1	Widowed	Profession
		3%	2	97%	65	Doctor	
		11%	10	89%	85	Nurse	
		17%	1	83%	5	Pharmacist	
0.998	0.032	0%	0	100%	20	Medical	Degrees
		7%	9	93%	120	BA	
		7%	2	93%	26	MA	
		7%	1	93%	13	PGD	
0.242	5.479	6%	1	94%	16	Phd	Years of experience
		2%	1	98%	46	1-5	
		4%	1	96%	22	16-20	
		11%	7	89%	59	6-10	
		0%	0	100%	16	More than 20 years	
		11%	4	89%	32	11-15	

There is no significant difference at the level of significance $\alpha \leq 0.05$ in the knowledge.

Table 5.14: Compare numbers of Attitude with respect to demographic variables.

Sig	chi-square	Attitude group					
		Negative attitude		Positive attitude			
		Column N %	Count	Column N %	Count		
0.186	1.752	39%	45	61%	71	Male	Gender
		49%	35	51%	37	Female	
0.235	5.533	58%	7	42%	5	Less than 25	Age
		25%	3	75%	9	46-55	
		43%	40	57%	53	26-35	
		100%	2	0%	0	more than 55	
		41%	28	59%	41	36-45	
0.676	1.528	42%	18	58%	25	Single	Marital
		0%	0	100%	1	Divorced	
		43%	62	57%	81	Married	
		0%	0	100%	1	Widowed	
0.384	3.050	46%	31	54%	36	Doctor	Profession
		43%	41	57%	54	Nurse	
		50%	3	50%	3	Pharmacist	
		25%	5	75%	15	Medical	
0.653	1.63	45%	58	55%	71	BA	Degrees
		39%	11	61%	17	MA	
		43%	6	57%	8	PGD	
		29%	5	71%	12	Phd	
0.69	2.251	49%	23	51%	24	1-5	Years of experience
		35%	8	65%	15	16-20	
		44%	29	56%	37	6-10	
		31%	5	69%	11	More than 20 years	
		42%	15	58%	21	11-15	

There is no statistical significant difference at the level of significance $\alpha \leq 0.05$ in the attitudes with respect to demographic variables.

Table 5.15: Compare numbers of practice with respect to demographic variables.

Sig	chi-square	Practice group					
		Poor practice		Good practice			
		Column N %	Count	Column N %	Count		
0.61	0.26	28%	33	72%	83	Male	Gender
		32%	23	68%	49	Female	
0.16	6.584	25%	3	75%	9	Less than 25	Age
		0%	0	100%	12	46-55	
		34%	32	66%	61	26-35	
		50%	1	50%	1	More than 55	
		29%	20	71%	49	36-45	
0.797	1.018	33%	14	67%	29	Single	Marital
		0%	0	100%	1	Divorced	
		29%	42	71%	101	Married	
		0%	0	100%	1	Widowed	
0.240	4.206	30%	20	70%	47	Doctor	Profession
		28%	27	72%	68	Nurse	
		67%	4	33%	2	Pharmacist	
		25%	5	75%	15	Medical	
0.028	9.115	25%	32	75%	97	BA	Degrees
		54%	15	46%	13	MA	
		29%	4	71%	10	PGD	
		29%	5	71%	12	Phd	
0.124	7.234	26%	12	74%	35	1-5	Years of experience
		22%	5	78%	18	16-20	
		32%	21	68%	45	6-10	
		13%	2	88%	14	More than 20 years	
		44%	16	56%	20	11-15	

There is no significant difference at the level of significance $\alpha \leq 0.05$ in practices with respect to practices.

Table 5.16: Overall level of KAP of healthcare providers towards antimicrobial stewardship.

		Category	Frequency (%)
1.	Knowledge	Good	175(92.5%)
		Poor	13(7.5%)
2.	Attitude	Positive	108(56%)
		Negative	80(44%)
3.	Practice	Good	132(70%)
		Poor	56(30%)

Chapter Six

Discussion

6.1 Introduction:

Determining the level of knowledge, attitude and practices (KAP) among HCPs towards Antimicrobial Stewardship (ASP) at Beit- Jala hospital and the factors that influencing the KAP is a necessary step for the implementation of ASP in the hospital for the purpose of improving patient outcome, reducing bacterial resistance, reducing healthcare costs, and reducing patients' length of stay.

This chapter discusses the study findings and conducts comparisons of these study findings and other studies done in the region as well as globally in terms of agreements and disagreements and discussion of study questions.

This study assessed the knowledge, attitudes and practices of healthcare providers at Beit- Jala hospital in the Palestinian Ministry of Health towards antimicrobial stewardship program, noting that there was no previous studies in Palestinian hospitals about antimicrobial stewardship except one study done by Khmour *et al.* (2017) about the clinical impact of antimicrobial stewardship program ASP interventions on hospitalized patients at the intensive care unit at Palestinian Medical Complex. The majority of HCPs in the study were males half of whome (50%) were nurses. Fifty percent (50%) of the male HCPs belonged to the age group 26-35 years of age. Seventy six percent (76%) of them are married. Thirty five percent (35%) of them have an experience of 6-10 years and sixty nine percent (69%) of them have a bachelor's degree. A good majority of the participants were aware of the global problems regarding antimicrobial resistance and the inappropriate use of antibiotics, but at the local hospital level, while inappropriate antibiotics use was considered a significant issue, antimicrobial resistance in general was not.

6.2 The level of knowledge of healthcare providers towards ASP and AMR:

According to the outcomes of the study, a decent majority of HCPs exhibited a knowledge level of 80% with regards to familiarity with terms, 81% of them had knowledge on the effectiveness and 81% of HCPs had a basic knowledge. In general, the overall knowledge of the sample participants in this study was 78% which indicates that HCPs had good knowledge. This result was higher when compared to a study in Fitch hospital by Tegan *et al.* (2017). The majority of HCPs are aware that inappropriate antibiotic use can lead to resistance, additional burden on the medical cost to the patient and healthcare system, increased adverse events and ineffective treatment. Findings in several studies showed the same results. The study of Baadani *et al.* (2015) assessed knowledge, perception, and attitude, towards AMS prescribing in Riyadh, Saudi Arabia showed that almost half (48.5%) of the participants believed that poor skills and knowledge were important causes of inappropriate use of antimicrobials. In this study, a significant percentage of HCPs had poor knowledge regarding the fact that urinary tract infections in pregnancy require broad spectrum antibiotics. This was also demonstrated by the study conducted by Alharthi *et al.* (2015). This may be due to the lack of knowledge and proper training concerning antimicrobial use. Seventy nine percent (79%) of HCPs agree that patients should be given narrow spectrum antibiotics if it is effective. The majority of HCPs (81%) feel that ASP is effective in improving patient outcome, (81%) in reducing resistance of bacteria, (80%) in improving patient safety, (79%) in reducing patient length of stay and in reducing healthcare costs without adversely impacting the quality of care (78%). These findings are in agreement with several studies done about KAP towards ASP. (Erku 2016, Khmour *et al.* 2017 Buckel *et al.* 2016, Tegan *et al.* 2017, Alharthi *et al.* 2015, Khan *et al.* 2016).

The familiarity of HCPs with antimicrobial resistance (77%) and DDD (64%) was appreciable. A significant number of HCPs were unfamiliar with the term ASP. This may be related to specialization in a sense that familiarity decreases with increasing specialization. The findings of this study were similar to the results of Buckel *et al.* (2016) and Tegan *et al.* (2017) who assessed KAP of healthcare professionals towards ASP. Furthermore, the study done by Cotta *et al.* (2014) which assessed attitudes towards ASP showed that (59%) of HCPs were unfamiliar with the term ASP.

6.3 The level of attitudes of HCPs towards AMR and AMs use:

The majority of HCPs (81%) agree that antimicrobials are a serious problem worldwide which is comparably similar with the study done by Garcia *et al.* (2011). Also there are numerous studies showing the same findings (Genga 2017, Srinivasan *et al.* 2004 Khmour *et al.* 2017 Rodrigues 2016). The attitudes of the study respondents towards antimicrobial use and resistance were found to be causal and significant. Seventy six percent (76%) of HCPs agree that antimicrobials are over use in their hospital. Seventy three percent (73%) feel that antimicrobial resistance is a great problem in their hospital. Seventy nine percent (79%) of HCPs think that restriction of antimicrobials use decreases AMR. Similar findings were displayed by Alothman *et al.* (2016) and Buckel *et al.* (2016). In contrast, the study by Tegan *et al.* (2017) revealed (31.8%) of HCPs agree on this statement.

Seventy six percent (76%) of HCPs agree that new antimicrobial development will keep up with our current resistance needs. Seventy three percent (73%) of HCPs had a negative attitude and less likely to contact infectious disease specialist (ID) before prescribing any antimicrobials. Similar results were found in the study of Buckel *et al.* (2016) and Tegan *et al.* (2017). In contrast, the study of Baadani *et al.* (2015) reported that most respondents felt that the ID is readily accessible and very helpful.

6.4 The source of information and continuing education about AMs:

When making the discussion related to antimicrobial prescribing, clinical experience and clinical textbooks were the most common sources of information (75%), followed by hospital guidelines and asking the infectious diseases specialist (73%). Seventy two percent (72%) of HCPs asked a colleague. Only (69%) of HCPs used PubMed online resources, smart phone medical applications and CDC studies reports. When assessing the source of information, there is a poor appreciation of and familiarity with the international medical source of information among the participants. This is in agreement with the study of Gracia *et al.* (2011).

6.5 The level of practices of HCPs towards AMs:

Eighty two percent (82%) of HCPs agreed that microbiology lab results must be provided to the treating physician. Seventy five percent (70%) agreed that patients' rooms are cleaned according to hospital cleaning protocols which are evidence-based. Eighty percent (80%) of the respondents agreed that a more cautious use of antibiotics would decrease AMR. This indicates good knowledge towards AMs. Seventy nine percent (79%) of HCPs agreed that the institution should provide adequate staff education regarding MDROs. This may be due to lack of continuous education in the institution. In contrast, the study by Tegan *et al.* (2017) revealed that staff generally have good education regarding MDROs. Seventy four percent (74%) of participants agreed that IV antibiotic should be stepped down to an oral alternative after 3 days, if possible. The findings of this study were similar to the results of Erku (2016) who assessed the perception and practices of community pharmacists in Ethiopia. There was a poor knowledge (69%) with regards to the methods of MDROs detection. In this study, sixty six percent (66%) of HCPs had knowledge about the implementation of antibiogram in the institution which reflects poor practices towards prescribing AMs. A significant percentage of HCPs had poor practices about giving the patient ceftriaxone if the result culture is pseudomonas. This practice is a critical indicator of a poor knowledge about MDROs and helping to increase its proportion in the hospital.

6.6 Priorities to enhance education:

Most HCPs believe that enhancing education must be in all aspects. Eighty six percent (86%) of participants strongly agree to enhance education with regards to the appropriate use of antibiotics, (83%) with regards to understanding basic mechanisms of AMR, (80%) in terms of properly handling patients demanding unnecessary antibiotics, (79%) in transitioning from intravenous to oral antibiotics, and (78%) with regards to interpreting anti-biograms. This is in agreement with the study of Baadani *et al.* (2015). Moreover, the study done by Buckel *et al.* (2016) showed somewhat parallel outcomes with an overall enhancement of education. In addition, Alothman *et al.* (2016) showed the same results.

6.7 The relationship between knowledge, attitudes and practice:

The results indicate that there is a statistical significant positive relationship at the level of significance $\alpha \leq 0.05$ between knowledge and attitudes, knowledge and practices, and attitude and practices. Most studies in the literature have shown similar results. In contrast the study by Tegan *et al.* (2017) revealed that there is no significant relationship between knowledge and attitude ($R=0.117$, $p=0.229$), knowledge with practice ($R=0.10$, $p=0.921$) and attitude with practice ($R=0.98$, $p=0.915$).

6.8 The overall level of KAP of healthcare providers towards antimicrobial stewardship:

The majority of participants had good knowledge (92.5%) of antimicrobial stewardship. Good practices were also observed among most (70%) participants. However, positive attitude towards antimicrobial stewardship was observed among (44%) of participants. This is consistent with the study of Tegan *et al.* (2017).

6.9 The differences in overall KAP with demographic character of the respondents:

The outcomes of this study indicated that there were no statistical significant differences between gender and KAP towards ASP. Our findings were parallel with Tegan *et al.* (2017) study results which indicated that demographic characteristics were unrelated to KAP. Moreover, our study is in agreement with the study conducted by Khan *et al.* (2016) who found that there is no statistical significant difference between gender and KAP level. Moreover, the study done by Srinivasan *et al.* (2004) reported that there are no differences between males and females in their level of KAP towards ASP.

This study shows that both male and female HCPs underwent similar circumstances and situations that led both male and female HCPs to express similar KAP levels towards ASP.

The results of this study show that there is no influence between the gender of HCPs and KAP levels on ASP.

The results indicated that there is no statistical significant difference between the age and KAP. Therefore, age has no influence on the level of KAP. This is in agreement with the study of Erku (2016) which was conducted to assess the perception and practices towards ASP among pharmacists. The findings suggest that none of the demographic variables showed any significant association with knowledge and practices towards ASP. Alharthi *et al.* (2015) found that there is

no statistical significant difference in KAP level among clinicians in relation to age and gender. Along the same line, the results in our study indicated that the age has no influence on the level of KAP.

The findings indicated that there is no statistical significant difference between the marital status and KAP. This is consistent with the study of Tegan *et al.* (2017) and Alharthi *et al.* (2015) whose findings suggest that none of the demographic variables showed any significant association between marital status of HCPs and KAP level towards ASP. The results of this study showed that there is no relationship between marital status of HCPs and KAP level towards ASP.

The outcomes of this study indicated that there is no statistical significant difference between the profession and the overall KAP. This is in agreement with Buckel *et al.* (2016) and Tegan *et al.* (2017) who stated that demographic variables such as the profession did not show any significant association between profession and KAP level. Similarly, Garcia *et al.* (2011); found no statistical significant relationships between profession and KAP level. In contrast, the study by Walia (2015) revealed profession has statistical significant difference on HCPs level of KAP.

Therefore, the results in our study indicated that the profession has no influence on the level of KAP.

This study showed that there is no statistical significant difference between the level of degrees and certificates with knowledge and attitudes. However, it revealed that there are statistical significant differences between the level of degrees and certificates and practices ($p=0.028$). This means that degrees and certificates play a role in the practice. The findings of this study were similar to the results of Khan *et al.* (2016), ($p=0.036$). In contrast, this result was inconsistent with Garcia *et al.* (2011), Srinivasan *et al.* (2004) and Alothman *et al.* (2016) who found that there is no statistical significant difference between the level of degrees and certificates with practices.

The outcome of this study shows that degrees and certificates of the HCPs have an effect on their practices, and that this variable can be considered to evaluate HCPs towards ASP.

The results indicated that there is no statistical significant difference between years of experience and the overall KAP level. This is in agreement with the study of Genga *et al.* (2017) conducted to assessing knowledge, attitudes, and practice survey about antimicrobial resistance and prescribing among physicians. Also, these findings are consistent with the studies done by Baadani *et al.* (2015). The findings suggest that years of experience has no statistical significant difference on KAP level.

Accordingly, the results of this study showed that there is no relationship between years of experience and their KAP towards ASP. In contrast, the study by Garcia *et al.* (2011) revealed that years of experience have a statistical significant effect on the overall KAP level.

This study indicates that there is no statistical significant difference at $\alpha \leq 0.05$ between knowledge, attitude, and practice with the demographic character of the participants with the exception of the relationship between practice and degrees and certificates ($p=0.028$).

Chapter Seven

Conclusion and Recommendations

7.1 Conclusions:

This study was conducted to assess the knowledge, attitudes and practices of the healthcare providers at Beit Jala hospital in the Palestinian Ministry of Health towards antimicrobial stewardship program. AMR is considered a serious problem globally and nationally and, in this study, HCPs acknowledged this. The most significant factors that contribute to AMR is antimicrobial misuse either by over prescribing or by providing inappropriate drugs as well as the antimicrobial restriction. The findings of this study aim to help in improving the KAP among HCPs towards ASP and the threads of MDROs. In addition, the findings of this study can be used to improve the patient's outcome and safety, reduce the costs, and length of stay, and capture all AMs usage and containments of antimicrobial agents. The study explored the main domains of KAP of HCPs towards ASP. Moreover, the study explored the differences within the socio-demographic variables and other related factors to the KAP towards ASP. The response rate was 88%. As for the reliability coefficient of the study instrument, it was relatively high (0.877). In terms of the reported general level of knowledge (78%), good knowledge was (92.5%), positive attitude was (44%) and good practices were (70%). The majority of HCPs revealed good knowledge and practice towards ASP. Most of them showed negative attitude towards it. This may be due to the lack of consistency in prescription or because HCPs do not follow the national and global recommendations on antimicrobials use. The study revealed a positive relationship between knowledge, attitude and practice. Despite a clear concept of AMR, the study showed some gaps in practice and attitude towards AMs. This may be related to the lack of ASP implementation in our hospitals. Accordingly, the Ministry of Health should develop guidelines and policies to implement and monitor ASP in all governmental and private Palestinian hospitals. Doron et al. (2013) reported that hospitals with established ASP were more likely to agree with the use of antimicrobial restrictions compared to those without ASP.

7.2 Limitations

This is the first study that was conducted to assess KAP towards ASP among healthcare providers at Beit- Jala hospital. However, various limitations of this study were considered while interpreting the results. These limitations are associated with the use of a convenience sample that might not be representative of all hospitals. In addition, the study is descriptive and cross-sectional and it was conducted in one hospital, hence, the results cannot be generalized to other hospitals in Palestine. The high response rate of the study (88%) could be due to the extreme answers provided by some respondents compared to the others. The recall bias can occur especially when the self-administered questionnaire depends on the sincerity and honesty of the respondents. Despite the above mentioned limitations, the results showed the importance of implementing ASP in the hospitals and its positive impact on patients and public health.

7.3 Recommendations:

1. MOH decision makers and managers should develop guidelines and policies to implement ASP in our hospitals, the importance of team work and interdisciplinary involvement of different HCPs. The implementation of ASP helps in improving the patient's outcome and safety, reduce costs and length of stay, and capture all AMs usage and containments of antimicrobial agents.
2. Intervention to improve routine programs to HCPs overall antimicrobial use and opportunistic trainings to engage all stakeholders and share successes across the institution (Baadani et al, 2015).
3. MOH healthcare providers should be more committed towards antimicrobial use and hospital guidelines.
4. Development of customized interventions to improve KAP of HCPs towards antimicrobial use and ASP to all governmental and private hospitals.
5. The Ministry of Health should employ a specialist for infectious diseases and clinical pharmacist to improve and monitor the use of antimicrobials and follow-up prescription.
6. The Ministry of Health should periodically monitor the attitudes and practices of HCPs towards the prescription of antimicrobials in all governmental and private health institutions.

References:

- Abbo, L., Sinkowitz-Cochran, R., Smith, L., Ariza-Heredia, E., Gómez-Marín, O., Srinivasan, A., & Hooton, T. M. (2011). Faculty and resident physicians' attitudes, perceptions, and knowledge about antimicrobial use and resistance. *Infection Control & Hospital Epidemiology*, 32(7), 714-718.
- Al-Harhi, S. E., Khan, L. M., Osman, A. M. M., Alim, M. A., Saadah, O. I., Almohammadi, A. A., & Kamel, F. O. (2015). Perceptions and knowledge regarding antimicrobial stewardship among clinicians in Jeddah, Saudi Arabia. *Saudi medical journal*, 36(7), 813.
- Alothman, A., Algwizani, A., Alsulaiman, M., Alalwan, A., Binsalih, S., & Bosaeed, M. (2016). Knowledge and Attitude of Physicians Toward Prescribing Antibiotics and the Risk of Resistance in Two Reference Hospitals. *Infectious diseases*, 9, 33.
- Awad, A. I., & Aboud, E. A. (2015). Knowledge, attitude and practice towards antibiotic use among the public in Kuwait. *PloS one*, 10(2), e0117910.
- Baadani, A. M., Baig, K., Alfahad, W. A., Aldalbahi, S., & Omrani, A. S. (2015). Physicians' knowledge, perceptions, and attitudes toward antimicrobial prescribing in Riyadh, Saudi Arabia. *Saudi medical journal*, 36(5), 613.
- Baym, M., Stone, L. K., & Kishony, R. (2016). Multidrug evolutionary strategies to reverse antibiotic resistance. *Science*, 351(6268), aad3292.
- Bronzwaer, S. L., Cars, O., Buchholz, U., Mölstad, S., Goettsch, W., Veldhuijzen, I. K., & Degener, J. E. (2002). The relationship between antimicrobial use and antimicrobial resistance in Europe. *Emerging infectious diseases*, 8(3), 278.
- Buckel, W. R., Hersh, A. L., Pavia, A. T., Jones, P. S., Owen-Smith, A. A., & Stenehjem, E. (2016). Antimicrobial Stewardship Knowledge, Attitudes, and Practices among Health Care Professionals at Small Community Hospitals. *Hospital Pharmacy*, 51(2), 149-157.
- Cabana, M. D., Rand, C. S., Powe, N. R., Wu, A. W., Wilson, M. H., Abboud, P. A. C., & Rubin, H. R. (1999). Why don't physicians follow clinical practice guidelines?: A framework for improvement. *Jama*, 282(15), 1458-1465.
- Centers for Disease Control and Prevention, *Antibiotic Resistance Threats in the United States*, 2013.

- Centers for Disease Control and Prevention. Antibiotic Use in Nursing Homes. Nov 5, 2013. Accessed May 27, 2016. <http://www.cdc.gov/getsmart/healthcare/learn-from-others/factsheets/nursing-homes.html>
- Centers for Disease Control and Prevention. Core Elements of Hospital Antibiotic Stewardship Programs. Accessed May 27, 2016. <http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>.
- Cooke, F. J., Dean Franklin, B., Lawson, W., Jacklin, A., & Holmes, A. (2004). Multidisciplinary hospital antibiotic stewardship: a West London model. *Clinical Governance: An International Journal*, 9(4), 237-243., F. J., Dean Franklin, B., Lawson, W., Jacklin, A., & Holmes, A. (2004). Multidisciplinary hospital antibiotic stewardship: a West London model. *Clinical Governance: An International Journal*, 9(4), 237-243.
- Cotta, M. O., Robertson, M. S., Tacey, M., Marshall, C., Thursky, K. A., Liew, D., & Buising, K. L. (2014). Attitudes towards antimicrobial stewardship: results from a large private hospital in Australia. *Healthcare infection*, 19(3), 89-94.
- Cramer, Duncan and Dennis Howitt. The SAGE Dictionary of Statistics. London: SAGE, 2004; Penslar, Robin Levin and Joan P. Porter. *Institutional Review Board Guidebook: Introduction*. Washington, DC: United States Department of Health and Human Services, 2010; "What are Dependent and Independent Variables?" Graphic Tutorial.
- De Kraker, M. E., Davey, P. G., Grundmann, H., & BURDEN Study Group. (2011). Mortality and hospital stay associated with resistant *Staphylococcus aureus* and *Escherichia coli* bacteremia: estimating the burden of antibiotic resistance in Europe. *PLoS medicine*, 8(10), e1001104.
- De Zwart, B. C. H., Frings-Dresen, M. H. W., & Van Duivenbooden, J. C. (2002). Test-retest reliability of the Work Ability Index questionnaire. *Occupational medicine*, 52(4), 177-181.
- Dellit, T. H., Owens, R. C., McGowan, J. E., Gerding, D. N., Weinstein, R. A., Burke, J. P., & Brennan, P. J. (2007). Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clinical infectious diseases*, 44(2), 159-177.
- DiDiodato, G., & McArthur, L. (2016). Evaluating the effectiveness of an antimicrobial stewardship program on reducing the incidence rate of healthcare-associated *Clostridium*

difficile infection: a non-randomized, stepped wedge, single-site, observational study. *PloS one*, 11(6), e0157671.

- Doron S, Nadkarni L, Lyn Price L, et al. (2013). A nationwide survey of antimicrobial stewardship practices. *Clin Ther*, 35:758-765.
- Doron, S., & Davidson, L. E. (2011, November). Antimicrobial stewardship. In *Mayo Clinic Proceedings* (Vol. 86, No. 11, pp. 1113-1123). Elsevier.
- El Astal, Z. (2005). Increasing ciprofloxacin resistance among prevalent urinary tract bacterial isolates in Gaza Strip, Palestine. *BioMed Research International*, 2005(3), 238-241.
- Erku, D. A. (2016). Antimicrobial stewardship: a cross-sectional survey assessing the perceptions and practices of community pharmacists in Ethiopia. *Interdisciplinary perspectives on infectious diseases*, 2016.
- García, C., Llamocca, L. P., García, K., Jiménez, A., Samalvides, F., Gotuzzo, E., & Jacobs, J. (2011). Knowledge, attitudes and practice survey about antimicrobial resistance and prescribing among physicians in a hospital setting in Lima, Peru. *BMC clinical pharmacology*, 11(1), 18.
- Genga, E. K., Achieng, L., Njiri, F., & Ezzi, M. S. (2017). Knowledge, attitudes, and practice survey about antimicrobial resistance and prescribing among physicians in a hospital setting in Nairobi, Kenya. Knowledge, attitudes, and practice survey about antimicrobial resistance and prescribing among physicians in a hospital setting in Nairobi, Kenya Risk factors for pulmonary tuberculosis treatment failure in rural settings in Benin, West Africa: A cohort study, 3.
- Goldstein, E. J. (2011). Beyond the target pathogen: ecological effects of the hospital formulary. *Current opinion in infectious diseases*, 24, S21-S31.
- Golub, MD., Rebert M. (2012). Antibiotic resistance. *Journal of the American association Jama*, November 14, 2012—Vol 308, No. 18.
- Harris, D. J. (2013). Initiatives to improve appropriate antibiotic prescribing in primary care. *Journal of Antimicrobial Chemotherapy*, 68(11), 2424-2427.
- Hughes, J., Huo, X., Falk, L., Hurford, A., Lan, K., Coburn, B., & Wu, J. (2017). Benefits and unintended consequences of antimicrobial de-escalation: Implications for stewardship programs. *PloS one*, 12(2), e0171218. in the United States, 2013.

- Huttner, B., Harbarth, S., & Nathwani, D. (2014). Success stories of implementation of antimicrobial stewardship: a narrative review. *Clinical Microbiology and Infection*, 20(10), 954-962.
- Kadavanu, T., & Mathai, D. (2012). Antimicrobial stewardship program (ASP). *medicine*, 22.
- Kaliyaperumal, K. I. E. C. (2004). Guideline for conducting a knowledge, attitude and practice (KAP) study. *AECS illumination*, 4(1), 7-9.
- Kapil, A. (2013). India needs an implementable antibiotic policy. *Indian journal of medical microbiology*, 31(2), 111.
- Kardas, P., Devine, S., Golembesky, A., & Roberts, C. (2005). A systematic review and meta-analysis of misuse of antibiotic therapies in the community. *International journal of antimicrobial agents*, 26(2), 106-113.
- Khan, M. U., Hassali, M. A. A., Ahmad, A., Elkalmi, R. M., Zaidi, S. T. R., & Dhingra, S. (2016). Perceptions and practices of community pharmacists towards antimicrobial stewardship in the state of Selangor, Malaysia. *PloS one*, 11(2), e0149623.
- Khmour, M. R., Hallak, H. O., Al-Deyab, M., Nasif, M. A., Khalili, A. M., Dallashi, A. A., & Scott, M. G. (2017). Impact of Antimicrobial Stewardship program on Hospitalized Patients at the Intensive Care Unit: A prospective Audit and feedback Study. *British journal of clinical pharmacology*.
- Laura Udakis. (2011). Antimicrobial resistance. *Microbiology society journal*. See <http://WWW.who.int/world-health-day/2011>.
- Laxminarayan, R., Duse, A., Watal, C., Zaidi, A. K., Wertheim, H. F., Sumpradit, N. & Greko, C. (2013). Antibiotic resistance—the need for global solutions. *The Lancet infectious diseases*, 13(12), 1057-1098.
- Lee, C. R., Cho, I. H., Jeong, B. C., & Lee, S. H. (2013). Strategies to minimize antibiotic resistance. *International journal of environmental research and public health*, 10(9), 4274-4305.
- Levy, S. B. (2002). Factors impacting on the problem of antibiotic resistance. *Journal of Antimicrobial Chemotherapy*, 49(1), 25-30.

- Lucet, J. C., Nicolas-Chanoine, M. H., Roy, C., Riveros-Palacios, O., Diamantis, S., Le Grand, J. & Ravaud, P. (2011). Antibiotic use: knowledge and perceptions in two university hospitals. *Journal of antimicrobial chemotherapy*, 66(4), 936-940.
- MacDougall, C., & Polk, R. E. (2005). Antimicrobial stewardship programs in health care systems. *Clinical microbiology reviews*, 18(4), 638-656.
- May AK, Melton, S. M., McGwin, G., Cross, J. M., Moser, S. A., & Rue, L. W. (2000). Reduction of vancomycin-resistant enterococcal infections by limitation of broad-spectrum cephalosporin use in a trauma and burn intensive care unit. *Shock (Augusta, Ga.)*, 14(3), 259-264.
- Melander E, Mölsted, S, Alsterlund, R., Ekdahl, K., & Jönsson, G. (2000). Macrolides and broad-spectrum antibiotics are risk-factors for spread of pneumococci with reduced sensitivity to penicillin. *Pediatr Infect Dis J*, 19, 1172-7.
- Memish, Z. A., Shibl, A. M., Kambal, A. M., Ohaly, Y. A., Ishaq, A., & Livermore, D. M. (2012). Antimicrobial resistance among non-fermenting Gram-negative bacteria in Saudi Arabia. *Journal of antimicrobial chemotherapy*, 67(7), 1701-1705.
- Meyer, E., Schwab, F., Schroeren-Boersch, B., & Gastmeier, P. (2010). Dramatic increase of third-generation cephalosporin-resistant E. coli in German intensive care units: secular trends in antibiotic drug use and bacterial resistance, 2001 to 2008. *Critical care*, 14(3), R113.
- Micek, S. T., Lloyd, A. E., Ritchie, D. J., Reichley, R. M., Fraser, V. J., & Kollef, M. H. (2005). Pseudomonas aeruginosa bloodstream infection: importance of appropriate initial antimicrobial treatment. *Antimicrobial agents and chemotherapy*, 49(4), 1306-1311.
- Murthy, R. (2001). Implementation of strategies to control antimicrobial resistance. *Chest*, 119(2), 405S-411S.
- Okeke, I. N. (2010). Poverty and root causes of resistance in developing countries. In *Antimicrobial resistance in developing countries* (pp. 27-35). Springer, New York, NY.
- P. Howard, Ashiru-Oredope, D., & Gilchrist, M. (2018). Time for pharmacy to unite in the fight against antimicrobial resistance. *Stroke*, 13, 57.

- Palmer, H. R., Weston, J., Gentry, L., Salazar, M., Putney, K., Frost, C., & Garey, K. W. (2011). Improving patient care through implementation of an antimicrobial stewardship program. *American Journal of Health-System Pharmacy*, 68(22), 2170-2174.
- Panesar, P., Jones, A., Aldous, A., Kranzer, K., Halpin, E., Fifer, H., & Pollara, G. (2016). Attitudes and behaviours to antimicrobial prescribing following introduction of a smartphone app. *PloS one*, 11(4), e0154202.
- Perez, K. K., Olsen, R. J., Musick, W. L., Cernoch, P. L., Davis, J. R., Land, G. A., & Musser, J. M. (2012). Integrating rapid pathogen identification and antimicrobial stewardship significantly decreases hospital costs. *Archives of Pathology and Laboratory Medicine*, 137(9), 1247-1254.
- Pollack, L. A., & Srinivasan, A. (2014). Core elements of hospital antibiotic stewardship programs from the Centers for Disease Control and Prevention. *Clinical Infectious Diseases*, 59(suppl_3), S97-S100.
- Postma, M., Stärk, K. D., Sjölund, M., Backhans, A., Beilage, E. G., Lösken, S., & Nielsen, E. O. (2015). Alternatives to the use of antimicrobial agents in pig production: A multi-country expert-ranking of perceived effectiveness, feasibility and return on investment. *Preventive veterinary medicine*, 118(4), 457-466.
- Punnoose, A. R., Lynn, C., & Golub, R. M. (2012). ANTibiotic resistance. *Jama*, 308(18), 1934-1934.
- Ridhorkar, R., & Nagdeo, N. V. (2018). Knowledge and Beliefs on Antimicrobial Resistance among Clinicians: Step towards Antibiotic Stewardship. *Journal of Health Science*, 8(1), 4-11.
- Rodrigues, A. T., Ferreira, M., Roque, F., Falcão, A., Ramalheira, E., Figueiras, A., & Herdeiro, M. T. (2016). Physicians' attitudes and knowledge concerning antibiotic prescription and resistance: questionnaire development and reliability. *BMC infectious diseases*, 16(1), 7.
- Sa'ed, H. Z., Taha, A. A., Araj, K. F., Abahri, I. A., Sawalha, A. F., Sweileh, W. M., & Al-Jabi, S. W. (2015). Parental knowledge, attitudes and practices regarding antibiotic use for acute upper respiratory tract infections in children: a cross-sectional study in Palestine. *BMC pediatrics*, 15(1), 176.
- Saga, T., & Yamaguchi, K. (2009). History of antimicrobial agents and resistant bacteria.

- Shah RC, & Shah, P. (2008). Antimicrobial stewardship in institutions and office practices. *The Indian Journal of Pediatrics*, 75(8), 815-820.
- Shales DM, Gerding, D. N., John, J. F., Craig, W. A., Bornstein, D. L., Duncan, R. A., & Levy, S. (1997). Society for Healthcare Epidemiology of America and Infectious Diseases Society of America Joint Committee on the Prevention of Antimicrobial Resistance guidelines for the prevention of antimicrobial resistance in hospitals. *Infection Control & Hospital Epidemiology*, 18(4), 275-291.
- Shibl, A. M., Memish, Z. A., Kambal, A. M., Ohaly, Y. A., Ishaq, A., Senok, A. C., & Livermore, D. M. (2014). National surveillance of antimicrobial resistance among Gram-positive bacteria in Saudi Arabia. *Journal of Chemotherapy*, 26(1), 13-18.
- Simões, A. S., Gregório, J., Póvoa, P., & Lapão, L. V. (2015). Practical guide for the implementation of Antibiotic Stewardship Programs. Lisboa: Instituto de Higiene e Medicina Tropical.
- Solomon, D. H., Van Houten, L., Glynn, R. J., Baden, L., Curtis, K., Schrag, H., & Avorn, J. (2001). Academic detailing to improve use of broad-spectrum antibiotics at an academic medical center. *Archives of internal medicine*, 161(15), 1897-1902.
- Spellberg, B., Guidos, R., Gilbert, D., Bradley, J., Boucher, H. W., Scheld, W. M., & Infectious Diseases Society of America. (2008). The epidemic of antibiotic-resistant infections: a call to action for the medical community from the Infectious Diseases Society of America. *Clinical Infectious Diseases*, 46(2), 155-164.
- Srinivasan, A., Song, X., Richards, A., Sinkowitz-Cochran, R., Cardo, D., & Rand, C. (2004). A survey of knowledge, attitudes, and beliefs of house staff physicians from various specialties concerning antimicrobial use and resistance. *Archives of internal medicine*, 164(13), 1451-1456.
- Suaifan, G. A., Shehadeh, M., Darwish, D. A., Al-Ije, H., Yousef, A. M. M., & Darwish, R. M. (2012). A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. *African Journal of Pharmacy and Pharmacology*, 6(10), 763-770.
- Tacconelli E, Cataldo, M. A., Dancer, S. J., Angelis, G., Falcone, M., Frank, U., & Singh, N. (2014). ESCMID guidelines for the management of the infection control measures to

reduce transmission of multidrug-resistant Gram-negative bacteria in hospitalized patients. *Clinical Microbiology and Infection*, 20(s1), 1-55.

- Tegagn, G. T., Yadesa, T. M., & Ahmed, Y. (2017). Knowledge, Attitudes and Practices of Healthcare Professionals towards Antimicrobial Stewardship and Their Predictors in Fitch Hospital. *J Bioanal Biomed*, 9, 091-097.
- Walia, K., Ohri, V. C., & Mathai, D. (2015). Antimicrobial stewardship programme (AMSP) practices in India. *The Indian journal of medical research*, 142(2), 130.
- World Health Organization. Antimicrobial Resistance. (Updated: Apr2015.) Accessed May 27, 2016. <http://www.who.int/mediacentre/factsheets/fs194/en/#>
- Yu, K., Rho, J., Morcos, M., Nomura, J., Kaplan, D., Sakamoto, K., & Jones, J. (2014). Evaluation of dedicated infectious diseases pharmacists on antimicrobial stewardship teams. *American Journal of Health-System Pharmacy*, 71(12).

Appendix A

أ- الصفات الديموغرافية

الجنس	
<input type="checkbox"/> ذكر	<input type="checkbox"/> أنثى
العمر	
<input type="checkbox"/> 26-35 سنة	<input type="checkbox"/> أقل من او يساوي 25 سنة
<input type="checkbox"/> 46-55 سنة	<input type="checkbox"/> 36-45 سنة
	<input type="checkbox"/> أكثر من 55 سنة
الحالة الاجتماعية	
<input type="checkbox"/> أعزب / عزباء	<input type="checkbox"/> مطلق/ة
<input type="checkbox"/> متزوج/ة	<input type="checkbox"/> أرمل/ة
التخصص	
<input type="checkbox"/> طبيب/ة	<input type="checkbox"/> ممرضة
<input type="checkbox"/> صيدلي / صيدلانية	<input type="checkbox"/> فني /ة مختبرات طبيه
المؤهل العلمي	
<input type="checkbox"/> دبلوم	<input type="checkbox"/> خبير / فني
<input type="checkbox"/> بكالوريوس	<input type="checkbox"/> مؤهل آخر
<input type="checkbox"/> ماجستير	
الخبرة العملية	
<input type="checkbox"/> أقل من سنة واحدة	<input type="checkbox"/> 9-12 سنة
<input type="checkbox"/> 1-4 سنوات	<input type="checkbox"/> أكثر من 12 سنة
<input type="checkbox"/> 5-8 سنوات	

ب - المعرفة

يهدف هذا القسم إلى تحديد معرفتك ببعض المصطلحات والمفاهيم الطبية الهامة

الرجاء وضع علامة ✓ في الفراغ الذي يوافق مدى معرفتك بالمصطلحات أو المفاهيم التالية.					
العبارة	لدي معرفة جيدة	لدي معرفة قليلة	لا رأي	لا معرفة لدي	لا معرفة لدي على الإطلاق
1					
2					
3					
4					

أ- لدي خبرة عملية ب ASP .

ب - سمعت بهذا المصطلح لكن معرفتي به بسيطة.

ج-لا رأي لي.

د- سمعت بهذا المصطلح لكنني لا أعرف ما هو .

هـ- لا معرفة لي على الإطلاق بهذا المصطلح.

الرجاء وضع علامة ✓ في الفراغ الذي يلائم مدى موافقتك على كل من العبارات التالية.					
العبارة	أوافق بشدة	أوافق	لا رأي	لا أوافق	لا أوافق مطلقاً
1					
2					
3					
4					
5					
6					
7					
8					

9- فوائد وفاعلية برنامج الاشراف على المضادات الحيوية					
غير فعالة على الإطلاق	غير فعالة	لا أعرف	فعالة	فعالة جداً	العبارة
					a تحسين مخرجات المريض المريض.
					b تحسن سلامة المريض وتقلل النتائج غير المتوخاة من مضادات الجراثيم.
					c تخفض تكاليف الرعاية الصحية دون التأثير على جودة الرعاية.
					d تخفض المقاومة.
					e تقلل فترة مكوث المريض في المستشفى.

ج- المواقف / السلوك
يحدد هذا القسم موقفك من استخدام مضادات الجراثيم ومقاومتها.

الرجاء وضع علامة √ في الفراغ الذي يلائم مدى موافقتك على كل من العبارات التالية.					
لا أوافق مطلقاً	لا أوافق	لا رأي	أوافق	أوافق بشدة	العبارة
					1 هل يوفر المشفى الذي تعمل فيه تعليمات عامة لتشخيص وإدارة المرضى الذين يعانون من مشاكل معدية.
					2 أود الحصول على معلومات إضافية حول الاستخدام الفعال لمضادات الجراثيم.
					3 تطوير مضادات جديدة للجراثيم سيوافق الحاجات الحالية للمقاومة.
					4 هل تتبع توصيات المستشفى الذي تعمل فيه بشأن مضادات الجراثيم؟
					5 هناك استخدام مفرط للمضادات الحيوية في المستشفى التي اعمل بها.
					6 مقاومة المضادات الحيوية تعتبر مشكله كبيره في المستشفى التي اعمل بها.
					7 يمكن إستبدال المضاد الحيوي في اليوم التالي/الثالث إذا لم يظهر على المريض أي تحسن.
					8 تقييد الاستخدام المضاد الحيوي طريقه معقوله وفعاله للسيطره على الاستخدام المفرط للمضادات الحيوية.
					9 مقاومة المضادات الحيوية تعتبر قضيه صحيه خطيره تواجه العالم.
					1 أشجع عقد المؤتمرات الطبية المتعلقة بالمضادات الحيوية والمشاركة فيها.
					0 أفضل استشارة متخصص في الأمراض المعدية السارية عند

1	وصف مضاد حيوي معين لأي مريض.				
1	هل موظفي المختبر يستخدمون القواعد الارشادية من معهد				
2	المعايير السريري والمخبرية CLSI من اجل تفسير فحص الحساسيه المضاده للميكروب.				

معهد المعايير السريري والمخبرية CLSI

13- الرجاء وضع علامة √ في الفراغ الذي يلائم مدى اعتمادك على مصادر المعلومات التالية حول الأمراض المعدية.					
العبارة	إلى حد كبير	إلى حد ما	نادراً	أبداً	
a					الخطوط العامة للمستشفى.
b					أستشير أحد الزملاء.
c					أستشير متخصصاً في الأمراض المعدية.
d					المصادر الالكترونية سبيل المثال PubMed.
e					التطبيقات الطبية على الهاتف الذكي.
f					الكتب التدريسيه السريرية.
g					الخبرات السريريه الذاتيه.
h					التقارير والأبحاث الصادرة عن مركز السيطرة على الأمراض والوقايه منها في امريكا.

CDC مركز السيطرة على الامراض والوقايه منها في امريكا.

د - الممارسات الطبية
يهدف هذا القسم إلى دراسة ممارسة وصف مضادات الجراثيم وممارسات أخرى

الرجاء وضع علامة √ في الفراغ الذي يلائم مدى موافقتك على كل من العبارات التالية.					
العبارة	أوافق بشدة	أوافق	لا رأي	لا أوافق	لا أوافق مطلقاً
1					يجب استخدام المضادات الحيوية الواسعة الطيف بدلاً عن المضادات الحيوية المحدودة الطيف لخفض المقاومة.
2					على هذه المؤسسة أن تقدم لموظفيها معلومات وافية حول البكتيريا المقاومه للعديد من المضادات الحيوية MDROs.
3					يجب على مختبر الاحياء الدقيقة تزويد الطبيب المعالج بالنتيجه مباشره.
4					الاستخدام الحذر للمضادات الحيوية يقلل من مقاومة المضادات بالحيويه.
5					يجب تنظيف غرفة المريض بناءا على بروتوكولات النظافه بالمستشفى .
6					ممكن اعطاء المريض Ceftriaxone اذا كانت نتيجة الزراعه Pseudomonas.
7					اذا كان مناسباً من الناحية الطبيه، يجب استبدال المضادات الحيويه الوريديه بمضادات عن طريق الفم بعد ثلاثة ايام.
8					هل مختبر المستشفى يقوم بعمل الطرق السريعه للكشف

					عن انواع البكتيريا المقاومة للعديد من المضادات الحيوية.
					9 هل المستشفى تقوم بعمل التقرير السنوي يوضح حساسية البكتيريا للمضادات Anti-biogram

MDROs تعني البكتيريا المقاومة للعديد من المضادات الحيوية.

9- من وجهة نظرك، في أي المجالات التالية يحتاج الكادر الطبي في المستشفى إلى مزيد من المعرفة؟					
لا أوافق مطلقاً	لا أوافق	لا رأي	أوافق	أوافق بشدة	العبارة
					a الاستخدام الصحيح للمضادات الحيوية.
					b الآليات الأساسية لمقاومة مضادات الجراثيم.
					c التعامل مع المرضى الذين يطلبون المضادات الحيوية دون الحاجة إليها.
					D تفسير ال Anti-biograms (تقرير سنوي يوضح حساسية البكتيريا للمضادات).
					E الانتقال من إعطاء المضادات الحيوية بالوريد إلى اعطائها عن طريق الفم.

شكراً لتعاونكم

This questionnaire starts from section "A" page 2 to section "D" page 6" ended with page" 8".

A. Demographic Characteristics

Please put the sign (x) in the appropriate answer.

Gender			
Male		Female	
Age			
Less than or equal 25 years old		46-55 years old	
26-35 years old		More than 55 years old	
36-45 years old			
Marital Status			
Single		Divorced	
Married		Widowed	
Profession			
Doctor		Nurse	
Pharmacist/Clinical Pharmacist		Medical/Lab Technologist	
Degrees & Certificates			
Bachelor's degree		Master's degree	
Post graduate diploma (PGD).		PhD	
Other			
Years of Experience			
1-5 years		16-20 years	
6-10 years		More than 20 years	
11-15 years			

B. Knowledge

This section will examine your familiarity with terms

Please indicate what you think about the following statements and whether you're familiar with them:

		Very familiar	Familiar	Neutral	Not familiar	Not at all familiar
1.	Are you familiar with the term “antimicrobial stewardship”?					
2.	Are you familiar with the term “antibiogram”?					
3.	Are you familiar with DDD “Define daily doses”?					
4.	Are you familiar with the term antimicrobial resistance?					

- a. Very familiar (I am engaged in the practice of antimicrobial stewardship (ASP))
- b. Familiar (I have heard the term and have some familiarity)
- c. Neutral (No opinion).
- d. Not familiar (I've heard the term but I'm not sure what it is)
- e. Not at all familiar (I've never heard of it)

Please indicate what you think about the following statements and whether you agree/disagree with them:

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Inappropriate antibiotics use can lead to resistance.					
2	Inappropriate antibiotics use can lead to increased adverse events.					
3	Inappropriate antibiotics use results in an additional burden on the medical cost to the patient and health care system.					
4	Antimicrobial stewardship helps to select an appropriate antibiotic before and after culture results.					
5	The patient should not be given a broad-spectrum antibiotic if the narrow-spectrum antibiotic is effective.					
6	There is a misuse of antibiotics in our country.					
7	Urinary tract infections in pregnancy require broad-spectrum antibiotics.					
8	Antibiotics should only be used when necessary.					

9. Antimicrobial stewardship program effectiveness interim of :

		Very Effective	Effective	Don't Know	ineffective	Very ineffective
a.	Improving patient outcome.					
b.	Improving Patient Safety (Minimizing unintended consequences of antimicrobials)					
c.	Reducing healthcare costs (without adversely impacting quality of care).					
d.	Reducing resistance of bacteria.					
e.	Reducing patient length of stay.					

C. Attitude

This section is a reflection of your attitudes about antimicrobial use and resistance

Please indicate what you think about the following statements and whether you agree/disagree with them:

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Does your hospital provide guidelines for the diagnosis and management of patients with infective problems?					
2	I would like more education on the appropriate use of antimicrobials.					
3	New antimicrobial development will keep up with our current resistance needs.					
4	Do you follow the recommendations of your hospital's antimicrobial guidelines?					
5	Antimicrobials are overused in my hospital.					
6	Antimicrobial resistance is a great problem in my hospital.					
7	The antibiotic can be replaced after two or three days if the patient health does not improve.					
8	Restriction on antimicrobial use is a reasonable method for controlling antibiotic use.					
9	Antibiotic resistance is an important and serious public health issue worldwide.					
10	Encouraging medical conferences about antibiotics and participating in them is essential.					
11	I consult an infectious disease specialist before prescribing any antibiotic.					
12	Does the laboratory personnel at your institution use CLSI guidelines to perform and interpret antimicrobial sensitivity testing (AST)?					

AST: Antimicrobial Sensitivity Testing

CLSI: Clinical and laboratory standards institute.

13. To what extent do you rely on the following sources of information about the treatment of infectious diseases:

		To a great extent	Somewhat	Neutral	Very little	Not at all
a.	Hospital Guidelines					
b.	Asking a colleague					
c.	Asking an Infectious Diseases specialist					
d.	PubMed /online resources					
e.	Smart phone medical applications					
f.	Clinical textbooks					
g.	Clinical experience					
h.	CDC studies and reports					

CDC Centers for Disease Control and Prevention (USA)

D. Practices

This section aims to record antibiotic prescribing and other practices

Please indicate what you think about the following statements and whether you agree/disagree with them:

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Broad spectrum antibiotics should be used in place of narrow spectrum antibiotics to reduce resistance.					
2	This institution should provide adequate staff education regarding MDROs* .					
3	Microbiology lab results must be provided to the treating physician.					
4	More cautious use of antibiotics would decrease antimicrobial resistance.					
5	Patient rooms are cleaned according to hospital cleaning protocols which are evidence-based.					
6	I can give the patient ceftriaxone if the result culture is pseudomonas.					
7	If medically appropriate, IV antibiotics should be stepped down to an oral alternative if possible					
8	Does the laboratory use rapid methods to detect MDRO's like ESBL, MRSA, VRE or CRE?					
9	Does your institution build a yearly antibiogram ?					

MDROs: Multi-Drug Resistant Organisms.

ESBL: Extended Spectrum Beta-Lactamase.

MRSA: Methicillin – Resistant Staphylococcus aureus.

VRE: Vancomycin – Resistant Enterococci.

CRE: Carbapenem- Resistant Enterobacteriaceae.

5. Where do you think it is very important to enhance education

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a	Appropriate use of antibiotics					
b	Understanding basic mechanisms of antimicrobial resistance					
c	Properly handling patients demanding unnecessary antibiotics					
d	Interpreting antibiograms					
e	Transitioning from intravenous to oral antibiotics					

Thank you

Appendix B

Consent form

Al-Quds University
Jerusalem
School of Public Health



جامعة القدس
القدس
كلية الصحة العامة

التاريخ: 2018/2/7

حضرة الدكتورة أمل أبو عوض المحترمة
مدير عام التعليم الصحي/ وزارة الصحة الفلسطينية

الموضوع: تسهيل مهمة اطالب خليل أبو سبيتان

تحية طيبة وبعد،،

يقوم الطالب خليل أبو سبيتان برنامج ماجستير السياسات والإدارة الصحية/ كلية الصحة العامة/ جامعة القدس بإجراء بحث الرسالة بعنوان:

“Knowledge, Attitudes and Practices towards Antimicrobial Stewardship among Healthcare Providers at Beit Jala Hospital”

وتهدف الدراسة إلى تقييم مدى المعرفة والسلوك والممارسات حول موضوع برامج إدارة المضادات الحيوية وترشيد استخدامها. وسيقوم الطالب بتوزيع استبانة الدراسة على الأطباء والمرضى والعاملين بالمختبرات والصيدليات في مستشفى بيت جالا. نرجو من حضرتكم السماح للطالب بتوزيع الاستبانة على عينة الدراسة المطلوبة. علماً بأن الدراسة ستكون لأغراض البحث العلمي فقط.

وتفضلوا بقبول فائق الاحترام،،



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البريد الإلكتروني: sphealth@admin.alquds.edu



Ref:
Date:.....

الرقم: ٢٠١٨/١١١/١٦٤
التاريخ: ٢٠١٨/١٢/١١

الأخ مدير عام الإدارة العامة للمستشفيات المحترم،،،
تعبية واحترام،،،

الموضوع: تسهيل مهمة طلاب

يرجى تسهيل مهمة الطالب: خليل ابو سبيتان - ماجستير السياسات والإدارة الصحية - جامعة القدس،
في عمل مشروع بحثي بعنوان: " Knowledge, Attitude and Practices towards
Antimicrobial Stewardship among Health Care Providers at Beit Jala
Hospital"، لذا يرجى تسهيل مهمته في الحصول على معلومات من خلال تعبئة استبانة من الاطباء
والممرضين والعاملين في المختبرات والصيدليات، وذلك في:

- مستشفى بيت جالا

في الفترة ما بين 2018/2/11 - 2018/3/11، علماً بأنه سيتم الالتزام بمعايير البحث العلمي والحفاظ
على سرية المعلومات. كما يرجى العلم ان مشرف البحث: د. معتصم حمدان.



مع الاحترام،،،

نسخة: عميد كلية الصحة العامة المحترم/ جامعة القدس

تقييم مستوى المعرفة والسلوك والممارسه تجاه برنامج ادارة المضادات الحيويه بين مقدمي الرعاية

الصحيه في مستشفى بيت جالا

أعداد: خليل ابراهيم خليل ابو سبيتان

اشراف: د. ماهر خضور

الملخص

المقدمه

اجريت العديد من الدراسات حول موضوع مقاومة مضادات الميكروبات على انها تمثل تهديد جاد على سلامة المريض والصحة العامه والتي تحتاج الى تدخل ضروري. يعتبر الاستخدام المناسب والحكيم لمضادات الميكروبات احد اهم العوامل لكبح هذه المشكله. تطبيق برنامج ادارة مضادات الميكروبات والاشراف عليها هي الطريقه الناجعه في تقليل الاستخدام غير المناسب وتغيير انماط وصف مضادات الميكروبات في المستشفيات. اظهرت الدراسه على ان مقدمي الرعاية الصحيه يدركون اهمية مقاومة مضادات الميكروبات، ويعتقدون بان الاستخدام المناسب لمضادات الميكروبات سوف يقلل من هذه المشكله، ويوافقون بان تطبيق برنامج ادارة مضادات الميكروبات امر ضروري. وعلى الرغم من هذا المفهوم الواضح الا ان بعض مقدمي الرعاية الصحيه يفتقدون الاتساق في الممارسه والسلوك تجاه استخدام مضادات الميكروبات. دراستنا تدعم تطبيق برنامج ادارة المضادات الحيويه عن طريق مؤسسات الرعاية الصحيه من اجل تقليل الاستخدام غير المناسب لمضادات الميكروبات، تقليل العواقب السلبيه لمضادات الميكروبات، تحسين المخرجات للمريض وسلامته، تقليل التكلفة، تقليل مدة مكوث المريض في المستشفى، السيطرة على الاستخدام الشامل لمضادات الميكروبات واحتوائها.

هدف الدراسة:

هدف الدراسة هو تقييم مستوى المعرفة والسلوك والممارسات تجاه برنامج ادارة مضادات الميكروبات بين مقدمي الرعاية الصحية في مستشفى بيت جالا.

طريقة البحث:

صممت هذه الدراسة كدراسة وصفية مقطعية نفذت عن طريق استبيان ذاتي التعبئه اعطي لمقدمي الرعاية الصحية لتعبئته في مستشفى بيت جالا، مدينة بيت لحم في فلسطين خلال الفتره الواقعه بين 15 شباط لغاية 15 ايار من عام 2018. تم تصميم الاستبيان معتمدين على استبيانات من دراسات سابقه مع بعض التعديلات التي اجريت على الاستبيان لتلائم مع اهداف الدراسة. شملت الدراسة جميع مقدمي الرعاية الصحية الاطباء، الممرضين، الصيادلة وفنيي المختبرات الذين يرغبون بالمشاركه في هذه الدراسة وتم استبعاد فنيي الاشعه من الدراسة. ولقد قمنا بتحليل النتائج من خلال برنامج SPSS النسخه 20.

النتائج ومناقشتها :

مئة وثمانية وثمانون 188 من أصل مئتان وأربعة عشر 214 استبيان تم تعبئتها بنجاح . أكثر من النصف 116 (62%) منهم كانوا ذكورا اثنان وتسعون (92%) من المشاركين كان لديهم معرفة جيدة ، (44%) كان لديهم سلوك إيجابي تجاه برنامج إدارة مضادات الميكروبات و (70%) من مقدمي الرعاية الصحية كان لديهم ممارسات جيدة تجاه برنامج إدارة مضادات الميكروبات.

الصفات الديمغرافية ليست مؤشرا هاما لمعرفة وسلوك ممارسات مقدمي الرعاية تجاه برنامج إدارة مضادات الميكروبات بالمقابل كان هناك مؤشرا هاما بين ممارسة مقدمين الرعاية الصحية ومستوى التعليم

(P=0.028). كانت هناك علاقة إيجابية بين المعرفة مع السلوك وبين المعرفة مع الممارسة وبين السلوك مع الممارسة.

الاستنتاج:

على الرغم من أن برنامج إدارة مضادات الميكروبات غير مطبق في مستشفياتنا إلا أن معظم مقدمي الرعاية الصحية كان لديهم معرفة وممارسة جيدة . ومع ذلك أظهر معظمهم سلوك سلبي تجاه هذا البرنامج . وزارة الصحة يجب أن تعمل على تطوير قواعد إرشادية وسياسات لتطبيق ومراقبة برنامج إدارة مضادات الميكروبات في جميع المستشفيات الحكومية الخاصة.