

Assessment of Public Knowledge and Attitudes Regarding the Use of Antibiotics among the Pregnant Women in Tabuk City

Dalia Tageldin Abdoun Mohamed, Reem Ali AbdElkarim

OB/GYN Serves, King Salman Hospital, Tabuke City, Kingdom of Saudi Arabia.

ABSTRACT

Introduction: Antibiotic resistance is a global health problem that needs a serious intervention from all governmental sectors. There have been plenty of research studies about increasing resistance of bacteria to common antibiotics. The resistance to antibiotics is causing new infections which may make them difficult to treat. Moreover, this may lead to cause death by common infections and injuries that were treated before easily. Furthermore, this will put a serious economic burden on hospital and spread fatal infections among community. Unfortunately, 78% of pharmacies in Saudi Arabia are selling antibiotics without prescriptions which strongly participating in antibiotics abuse in this country.

Material and Methods: A cross-sectional study was conducted among 200 general population, randomly selected by simple random sampling technique from all population in Tabuk. A web based self-administrated, structured arabic questionnaire was used to test knowledge and attitude of general population about antibiotics using. The collected Data were entered and analyzed using (SPSS) statistical program version 19.

Results: In this study the sample with an age range of 19-30 years were used. The data of 500 questioners were analyzed using SPSS program. And its showed 39% of people in this study are taken antibiotics by doctors while 41% of people in this study are consumed antibiotics from pharmacists without prescriptions surprisingly. The small difference in the percentages between people who used antibiotic either by doctors or pharmacists prescription could indicate that pharmacy might be the responsible about antibiotic misuse. It sees that pharmacist in area of this study Tabuk sell the

antibiotics based on the information that he gets from customers without asking about the doctor's prescription. Therefore, strict legislation should be founded and applied on all pharmacies to avoid selling the antibiotics without prescriptions.

Conclusion: From this study it seems that the knowledge about using antibiotics in the small area like Tabuk is very primitive. Moreover, irresponsible attitude by both pharmacists and community is pointed also in this study. Antibiotic resistance can cause severe illness and is vital public health problem. It can be avoided by reducing unnecessary prescribing and overprescribing of antibiotics. Increase the knowledge about the proper use of prescribed antibiotics, good hygiene and infection control can reduce the risk of antibiotic resistance.

Keywords: Knowledge and Attitudes, Antibiotics, Pregnant Women.

*Correspondence to:

Dalia Tageldin Abdoun Mohamed,
OB/GYN Serves,
King Salman Hospital,
Tabuke City, Kingdom of Saudi Arabia.

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INTRODUCTION

Antibiotic resistance (ABR) threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria .It is an increasingly serious threat to global public health that requires action across all government sectors and society. ABR is present in all parts of the world. New resistance mechanisms emerge and spread globally. Patients with infections caused by drug-resistant bacteria are generally at increased risk of worse clinical outcomes and death and need more healthcare resources than patients infected with the same bacteria that are not resistant.¹ When infections become resistant to first-line drugs, therapies that are more expensive and have more side effects must be used. A longer duration of illness and treatment, often in

hospitals, increases health care costs as well as the economic burden on families and societies.¹

On 2014, WHO's report about global surveillance of antimicrobial resistance showed that antibiotic resistance consequences cannot be predictable in the future. The resistance is happening now among the whole world which is putting community and hospitals at risk the failure of control and treat common infections. So far, the world is heading toward a post-antibiotic era. Therefore, an urgent management and coordination between different governmental sectors should be taken place. Otherwise, common infections and minor injuries which have been treatable for years could cause death.¹

Resistance in bacteria is a complex issue caused by many interconnected factors. Therefore, single, isolated interventions have little impact. Coordinated action is essential to minimize occurrence and spread of ABR.¹

For many years, DNA gyrase was thought to be responsible both for unlinking replicated daughter chromosomes and for controlling negative superhelical tension in bacterial DNA. However, in 1990 a homolog of gyrase, topoisomerase that had a potent decatenating activity was discovered. It is now clear that topoisomerase IV, rather than gyrase, is responsible for decatenation of interlinked chromosomes. Moreover, topoisomerase IV is a target of the 4-quinolones, antibacterial agents that had previously been thought to target only gyrase. The key event in quinolone action is reversible trapping of gyrase-DNA and topoisomerase IV-DNA complexes. Complex formation with gyrase is followed by a rapid, reversible inhibition of DNA synthesis, cessation of growth, and induction of the SOS response. At higher drug concentrations, cell death occurs as double-strand DNA breaks are released from trapped gyrase and/or topoisomerase IV complexes. Repair of quinolone-induced DNA damage occurs largely via recombination pathways. In many gram-negative bacteria, resistance to moderate levels of quinolone arises from mutation of the gyrase A protein and resistance to high levels of quinolone arises from mutation of a second gyrase and/or topoisomerase IV site. For some gram-positive bacteria, the situation is reversed: primary resistance occurs through changes in topoisomerase IV while gyrase changes give additional resistance. Gyrase is also trapped on DNA by lethal gene products of certain large, low-copy-number plasmids. Thus, quinolone-topoisomerase biology is providing a model for understanding aspects of host-parasite interactions and providing ways to investigate manipulation of the bacterial chromosome by topoisomerases.²

Enterococci can develop resistance through mutations as well as acquisition of new genes on plasmids and transposons that can cross species and genera. Many of the acquired resistances likely emerged among enterococci colonizing humans or animals that were given antibiotics for other reasons.³

Enterococci have intrinsic low to moderate level of resistance to aminoglycosides, but gentamicin and streptomycin retain synergistic activity against enterococci when combined with a cell wall agent. When high-level resistance to one of these aminoglycosides is present (eg, through ribosomal mutations or acquisition of modifying enzymes), the synergistic effect of that agent is eliminated.^{4,5}

Although enterococci may be susceptible *in vitro* to trimethoprim-sulfamethoxazole, they seem to be resistant *in vivo* due to their capacity to utilize preformed folic acid.⁶

Resistance to vancomycin develops through alteration of its binding site, the D-alanyl-D-alanine terminus of cell wall precursors. Production of D-alanyl-D-lactate-ending peptidoglycans, for which vancomycin has significantly reduced affinity, confers high-level vancomycin resistance, primarily seen in *E. faecium*. The vancomycin resistance gene clusters that encode high-level resistance can disseminate to other bacterial species.⁷⁻¹²

Enterococcal resistance to linezolid is happened through mutation and possibly enzyme modification of the ribosomal RNA target. Although resistant enterococci have been isolated from patients

without previous exposure to the antibiotic, the appearance of resistance is generally linked to the heavy use of linezolid. The rise of linezolid resistance in enterococci through transferable plasmids carrying the (cfr) gene increases concern of spreading linezolid resistance to other strains and species.¹³⁻¹⁶

Resistance to daptomycin has been reported after long exposure to daptomycin. The mechanism of resistance involves mutations in genes associated with the regulation of the cell envelope response to antibiotics and cell membrane phospholipid metabolism. Clinical failure of daptomycin in endocarditis due to enterococci with apparent *in vitro* susceptibility to the drug has been reported.^{17,18}

E. faecalis are naturally resistant to quinupristin-dalfopristin due to the presence of the *Isa* gene, which encodes a putative ATP-binding efflux protein. Resistance to quinupristin-dalfopristin among *E. faecium* can happen by enzyme modification, hydrolysis, active transport, and target modification. Resistance to dalfopristin alone dramatically decreases the effectiveness of the combined antibiotic and decreases the bactericidal effect.^{19,20}

Certain special tests are recommended for evaluating resistances of enterococci that are difficult to detect with standard laboratory methods. Susceptibility testing at a high inoculum can better detect penicillin and ampicillin resistance.^{1,21}

The first review of antibiotic-resistant bacteria throughout the Gulf countries (Saudi Arabia, UAE, Kuwait, Qatar, Oman, and Bahrain) was carried out by a PhD candidate Hosam Mamoon Zowawi under supervision of Dr. David Paterson along with international researchers. The study showed that the incidence of carbapenem-resistant bacteria which kills about half of infected patients rose a terrifying 90% over the past twenty years. The study also found that rampant use of antibiotics was significantly contributed to the increase in superbugs in the region.

The research noted, "Although non-prescription sales of antibiotics are illegal in the GCC states, 68% of pharmacies in Abu Dhabi, 78% in Riyadh, and 87 out of 88% pharmacies included in a study in Saudi Arabia had sold antibiotics to patients unnecessarily and/or without a prescription. Furthermore, 75% of patients who received antibiotic treatment in the intensive care unit of a Qatar hospital in 2004 did not have microbiologically-proven infection.

Zowawi said that intervention is needed to stop the disturbing of antibiotics, since poor hygiene and a high population of migrant workers contribute to the spread of dangerous diseases.²² In Saudi Arabia pharmaceuticals products sales are expected to surpass US\$ 7 Billion by 2018 as compare to US\$ 4 Billion in 2012.²³

MATERIALS AND METHODS

A cross-sectional study was conducted among 200 general population, randomly selected by simple random sampling technique from all population in Tabuk. A web based self-administrated, structured arabic questionnaire was used to test knowledge and attitude of general population about antibiotics using. The collected Data were entered and analyzed using (SPSS) statistical program version 19.

RESULTS

In this study the sample with an age range of 19-30 years were used. The data of 500 questioners were analyzed using SPSS program.

As shown in Figure 1, 39% of people in this study are taken antibiotics by doctors while 41% of people in this study are consumed antibiotics from pharmacists without prescriptions surprisingly. The small difference in the percentages between people who used antibiotic either by doctors or pharmacists prescription could indicate that pharmacy might be the responsible about antibiotic misuse. It sees that pharmacist in area of this study Tabuk sell the antibiotics based on the information that he gets from customers without asking about the doctor's prescription. Therefore, strict legislation should be founded and applied on all pharmacies to avoid selling the antibiotics without prescriptions.

On the other hand, the study shows that 7% of people in this study are taken antibiotics based on friends advices. Moreover, only 2% of people in this study assumed that they used antibiotics after searching their symptoms online while 10% are taken the antibiotics by them self-based on their previous experiences. These results supported that pharmacy is the main player in the issue of increasing the antibiotic resistance. The study suggested that around 60% of people in this study are taking antibiotic *via* pharmacy without prescription from their doctors. It appears that by controlling pharmacies in Saudi Arabia this may help in reducing the over distribution and using of antibiotics between people randomly.

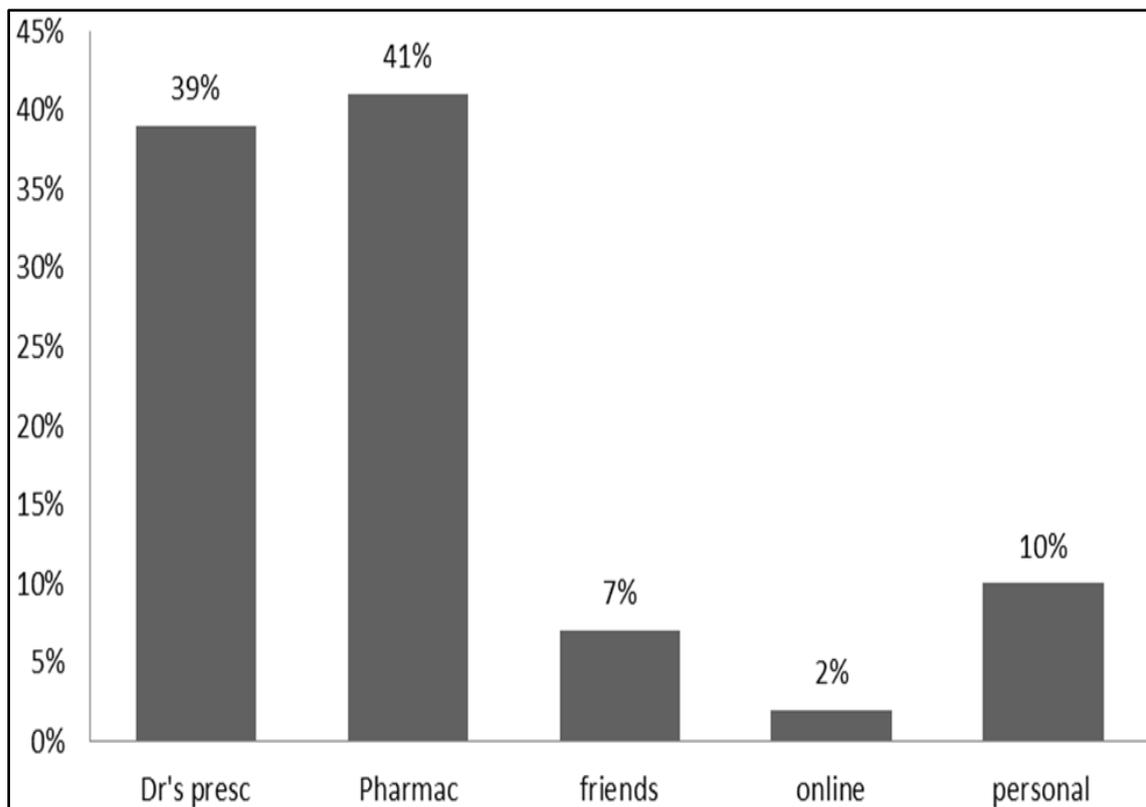


Figure 1: Percentage of antibiotics prescribed by different resources

Moreover, this study shows that 50% of people in this study are taken around 2 courses of antibiotics during the year. The multiple use of antibiotics could be an indication of antibiotic misuse. Moreover, the study found that only 39.2% of people who were contributed in this study were completed the full course of antibiotic treatment while 60.8% of people in this study were not. The misuse of antibiotics contributes strongly in raising the incidence of antibiotic resistance.

72.2% of people in this study were not adhered to taking medication on time schedule. On the other hand, 20.5% of people assumed that they change the type of antibiotics by them self if they did not see response without taking their doctor advice. Moreover, 27.1% of people in this study are taking same antibiotics to treat different diseases while 49.6% of people are using antibiotics that prescribed for other member of family. The study also shows that 33.7% of people in this study not dispose the medication after the end of its use.

DISCUSSION

Most important factor affecting bacteria resistance is the misuse of antibiotics. Research has shown that many of doctors prefer to prescribe broad-spectrum antibiotics for patients they assume cannot wait for a full diagnosis or are unlikely to return because of transportation cost or time²⁴ who found out that half of all adults (49%) believe that antibiotics are at least somewhat effective in treating colds and flu although 79% knows that colds and flu's are caused by viruses, not bacteria, and most people (61%) know that antibiotics are not effective in treating viruses. also found out that a third of people believe that antibiotics are effective for treating the common cold.²⁵ WHO concluded that the lack of effective monitoring and enforcement of controls on the sale and use of antibiotics is one of the main causes of growing resistance of the world's microbes to antimicrobial drugs.²⁶ The volumes of antibiotics prescribed are the major factor in increasing rates of bacterial resistance rather than compliance with antibiotic use.²⁷

RECOMMENDATIONS

- Making a Saudi Guide Line for antibiotics using.
- Increase the awareness of community about using antibiotics and their major complications.
- Increase the awareness of community about great differentiation between management of bacterial and viral infection.
- Antibiotics should be used only when they are prescribed by a certified health professional.
- Patient should complete the treatment course, even if they feel better.
- Never share of antibiotics with others or use the leftover medication.
- Establish strict regulations for selling antibiotics and put sanctions for those who violate these laws.

CONCLUSION

From this study it seems that the knowledge about using antibiotics in the small area like Tabuk is very primitive. Moreover, irresponsible attitude by both pharmacists and community is pointed also in this study. Antibiotic resistance can cause severe illness and is vital public health problem. It can be avoided by reducing unnecessary prescribing and overprescribing of antibiotics. Increase the knowledge about the proper use of prescribed antibiotics, good hygiene and infection control can reduce the risk of antibiotic resistance.

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