

Original Article

Knowledge and perception of doctors regarding antibiotic stewardship in a tertiary care hospital of Southern Punjab.

Moazzam Ali Atif^{ID} & Sana Tufail^{ID}

Sheikh Zayed Medical College, Rahim Yar Khan-Pakistan.

Doi: 10.29052/IJEHSR.v10.i2.2022.179-187

Corresponding Author Email:

dr_sanatufail@yahoo.com

Received 03/01/2022

Accepted 30/03/2022

First Published 09/05/2022



© The Author(s). 2022 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>)



Abstract

Background: Pakistan has been working on Antimicrobial Resistance (AMR) for a decade; unfortunately, there is a lack of concept of antibiotic stewardship in most health setups, especially in the public sector. This study aims to analyze the knowledge and perception of junior physicians towards antibiotic stewardship programs. The need for this knowledge and impact of antimicrobial resistance on antibiotic stewardship ascertain barriers to stewardship acceptance.

Methodology: A cross-sectional study was conducted at different clinical departments of Sheikh Zayed Hospital, Rahim Yar Khan, including 50 junior physicians recruited via convenience sampling technique. The data was collected using a structured questionnaire comprising physician's hospital associated data and questions regarding the knowledge, perspectives, and practices concerning antibiotic stewardship programs (ASP) to reduce AMR. Statistical analysis was done using SPSS version 22.0, and data were presented using frequencies and percentages.

Results: Most of the enrolled physicians knew AMR and agreed that it is a serious global health issue. However, all the medical officers were completely unaware of the antibiotic stewardship program, while 42.9% of house officers and only 25.7% of PGs knew about the program.

Conclusion: Our study shows support from doctors for expanded stewardship implementation and provides an important understanding of the current attitudes of doctors regarding stewardship execution. A better understanding of perceptions and attitudes is dire for healthcare stakeholders to expand stewardship activities into healthcare settings.

Keywords

Antibiotic Stewardship Programs, Antimicrobial Resistance, Junior Physicians, Knowledge, Perception.



Check for updates

Introduction

Global antibiotics consumption has been increased to 65% from 2000 to 2015, the majority of consumption within low and middle-income countries^{1,2}. Furthermore, in high-income states, the consumption is increased by 6%, i.e., about 10.3 billion defined daily dose. In contrast, increased consumption is nearly 114% in lower and middle-income states, i.e., 24.5 billion defined daily dose³. Additionally, Pakistan, China, and India were the most considerable antibiotics consumed in 2015³. Disturbingly, Pakistan's antibiotic usage increased by 65 percent between 2000 and 2015³.

Pakistan, a South Asian country with a population of 216 M, is classified as a lower and middle-income state by the World Bank. However, Punjab is Pakistan's most developed province in terms of healthcare facilities, with more than 65 percent of the country's population^{1,4}. A fast-developing system of private healthcare institutes and heavily funded public healthcare institutes provide healthcare, meeting the majority of the population's demands¹. Antibiotic usage is disturbingly high, with Pakistan allegedly having the third-highest rate among lower and middle income⁵. Recent point prevalence surveys on antibiotic use in Punjab healthcare institutes also reveal a bleak picture of patients being given unneeded antibiotics^{3,6}. Furthermore, widespread infectious diseases initiated by multidrug-resistant and highly antibiotic-resistant bacteria have been observed in several studies¹. Widespread improper prescribing necessitates systematic initiatives to improve doctors' attitudes, and antibiotic stewardship programs can significantly optimize antibiotic usage in hospitals in this setting.

Various reasons can accelerate antibiotic resistance, but there is a significant link between the development of resistance and antibiotic misuse or overprescribing^{7,8}. The WHO's Global Action Plan to Combat Antibiotic Resistance⁹ prioritized implementing hospital-based antibiotic stewardship programs to optimize antibiotic use. "Coordinated interventions designed to improve and measure the appropriate use of antibiotic agents by supporting the selection of the optimal

antibiotic treatment regimen, including dose, length of therapy, and method of administration," as per antibiotic stewardship¹⁰. As a result, the WHO recommends that hospitals and other healthcare facilities (at all levels, including basic, secondary, and tertiary care) implement antibiotic stewardship programs based on local or international standards. As a result, numerous high-income states modified their public health policies to include antibiotic stewardship programs in hospitals and other settings. The Centers for Disease Control and Prevention (CDC) in the United States, for example, chartered the Core Elements of Hospital Antibiotic Stewardship Programs (CEHASP) in 2016, updated it in 2019, and ordered that it should be implemented in all hospitals across the country¹¹.

Antibiotic resistance is a critical concern in Pakistan's National Action Plan (2017), encouraging hospitals to formulate and develop antibiotic stewardship programs to combat the ongoing rise in resistant infections^{12,13}. However, it is unclear to what extent standardized antibiotic stewardship programs have been implemented in hospitals. Critical implementation data and facts are scarce, particularly in tertiary care settings. As a result, the goal of this study is to assess the present levels of CEHASP adherence in tertiary care facilities.

Methodology

This cross-sectional study was conducted at different clinical departments of Sheikh Zayed Hospital, Rahim Yar Khan (Medicine, surgery, Gynecology & Paediatrics). 50 junior physicians, including house officers, medical officers, and postgraduate trainees, were recruited via convenience sampling technique, and the data from 49 consenting physicians was included in the final analysis. The non-consenting physician was excluded.

The data was collected using a structured internally developed questionnaire comprising physician's hospital associated data and questions regarding the knowledge, perspectives, and practices of an antibiotic stewardship program to reduce antimicrobial resistance. Statistical analysis was

conducted using SPSS version 22.0; the data were presented using frequencies and percentages. Outcomes related to junior physicians' knowledge, perspectives, and practices regarding various aspects of the antibiotic stewardship program were stratified for the level of training of the junior physician.

Results

49 junior physicians were enrolled in the present study; out of the 40.8% were from the surgery department. 71.4% PGs, 14.3% medical officers, and house officers each. Most of the PGs were from 1st to 3rd year of training.

Table 1: Baseline characteristics of hospitals and physicians participating in the study.

Variables	N(%)	
Specialty / Department	Gyne	9(18.4)
	Medicine	11(22.4)
	Paeds	9(18.4)
	Surgery	20(40.8)
Designation	HO	7(14.3)
	MO	7(14.3)
	PG	35(71.4)
Year of training (for PGs only)	1 st Year	21(42.9)
	2 nd Year	11(22.4)
	3 rd Year	10(20.4)
	4 th Year	6(12.2)
	5 th Year	1(2.0)

It was observed that most of the enrolled physicians (medical, house officers, and PGs) were aware of Antimicrobial Resistance (AMR) and agreed that it is a serious global health issue. Table 2 shows the descriptive summary of junior physicians' knowledge, perspective, and practices regarding various aspects of the antibiotic stewardship program.

Table 2: Junior physicians' knowledge, perspectives, and practices regarding various aspects of the antibiotic stewardship program.

Variables		Level of training			Total (n=49)
		HO	MO	PG	
Knowledge regarding AMR	No	-	1(14.30)	-	1(2.0)
	Yes	7(100)	6(85.7)	35(100)	48(98)
AMR is a serious global health issue	Agree	7(100)	6(85.7)	35(100)	48(98)
	Neutral	-	1(14.30)	-	1(2.0)
Familiarity with Rational Prescribing Practice	No	2(28.60)	2(28.60)	8(22.90)	12(24.5)
	Yes	5(71.40)	5(71.40)	27(77.10)	37(75.5)
Antibiotics kill viruses	Agree	4(57.10)	-	1(2.90)	5(10.2)
	Disagree	2(28.60)	6(85.7)	30(85.70)	38(77.6)
	Neutral	1(14.30)	1(14.30)	4(11.40)	6(12.2)
Usage of broad-spectrum antibiotics promotes AMR	Agree	7(100)	7(100)	30(85.70)	44(89.8)
	Disagree	-	-	3(8.60)	3(6.1)
	Neutral	-	-	2(5.70)	2(4.1)

Casual/common use of antibiotics in Pakistan is appropriate	Agree	3(42.90)	1(14.30)	3(8.60)	7(14.3)
	Disagree	3(42.90)	6(85.70)	32(91.40)	41(83.7)
	Neutral	1(14.30)	-	-	1(2.0)
Correct antimicrobial use is essential for better patient care	Agree	7(100)	7(100)	34(97.10)	48(98)
	Disagree	-	-	1(2.90)	1(2.0)
Unnecessary use of broad spectrum antibiotics	Agree	6(85.70)	5(71.40)	34(97.10)	45(91.8)
	Neutral	1(14.30)	2(28.60)	1(2.90)	4(8.2)
Participation of hospital pharmacist for ASP	Agree	6(85.70)	6(85.70)	30(85.70)	42(85.7)
	Disagree	-	-	1(2.90)	1(2.0)
	Neutral	1(14.30)	1(14.30)	4(11.40)	6(12.2)
Irrational antimicrobials use plays an important role in the bacterial resistance emergence	Agree	7(100)	7(100)	34(97.10)	48(98)
	Neutral	-	-	1(2.90)	1(2.0)
Attendance of ASP related course/workshop during the last year	No	6(85.70)	7(100)	35(100)	48(98)
	Yes	1(14.30)	-	-	1(2.0)
Availability of drug interaction reference source in departmental library	Don't Know	4(57.10)	5(71.40)	13(37.10)	22(44.9)
	No	1(14.30)	2(28.60)	13(37.10)	16(32.7)
	Yes	2(28.60)	-	9(25.70)	11(22.4)
Knowledge regarding Infection Prevention & Control (IPC) policy in the hospital	No	1(14.30)	3(42.90)	11(31.40)	15(30.6)
	Yes	6(85.70)	4(57.10)	24(68.60)	34(69.4)
IPC has a role in ASP	Agree	5(71.40)	6(85.70)	27(77.10)	38(77.6)
	Neutral	2(28.60)	1(14.30)	8(22.90)	11(22.4)
Infection control measures at department & hospital are satisfactory.	Agree	3(42.90)	2(28.60)	7(20.0)	12(24.5)
	Disagree	3(42.9)	3(42.90)	19(54.30)	25(51)
	Neutral	1(14.30)	2(28.60)	9(25.70)	12(24.5)
Implementation of IPC guidelines in daily practice	Mostly	6(85.70)	3(42.90)	15(42.90)	24(49)
	Never	-	1(14.30)	-	1(2.0)
	Sometimes	1(14.30)	3(42.90)	20(57.10)	24(49)
Participation in any antimicrobial awareness campaign to promote the optimal antimicrobials use	No	4(57.10)	5(71.40)	19(54.30)	28(57.1)
	Yes	3(42.9)	2(28.60)	16(45.70)	21(42.9)
Information provided by Pharmaceutical Sales Representatives is reliable	Agree	2(28.60)	4(57.10)	7(20.0)	13(26.5)
	Disagree	1(14.30)	1(14.30)	13(37.1)	15(30.6)
	Neutral	4(57.10)	2(28.60)	15(42.90)	21(42.9)
Information provided by Pharmaceutical Sales Representatives is important for the medical staff	Agree	6(85.70)	5(71.40)	20(57.10)	31(63.3)
	Disagree	-	1(14.30)	5 (14.30)	6(12.2)
	Neutral	1(14.30)	1(14.30)	10(28.6)	12(24.5)
Most talks sponsored by drug companies are helpful, unbiased, and educational	Agree	2(28.60)	5(71.40)	11(31.40)	18(36.7)
	Disagree	1(14.30)	-	9(25.70)	10(20.4)
	Neutral	4(57.10)	2(28.60)	15(42.90)	21(42.9)
	Mostly	3(42.9)	3(42.90)	16(45.70)	22(44.9)

Educating patients routinely on antimicrobial use and resistance-related issues	Never	1(14.30)	-	2(5.70)	3(6.1)
	Sometimes	3(42.9)	4(57.10)	17 (48.6)	24(49)
Making efforts to prevent or reduce the transmission of infections within the community	No	-	-	4(11.40)	4(8.2)
	Yes	7(100)	7(100)	31(88.60)	45(91.8)
Communicating with senior physicians regarding the appropriateness of an antibiotic prescription.	No	-	1(14.30)	1(2.90)	2(4.1)
	Yes	7(100)	6(85.70)	34(97.10)	47(95.9)
Familiarity with Empirical Antibiotics Therapy	No	3(42.9)	1(14.30)	-	4(8.2)
	Yes	4(57.10)	6(85.70)	35(100)	45(91.8)
Use of empirical therapy in routine practice	No	3(42.9)	2(28.60)	4(11.40)	9(18.4)
	Yes	4(57.10)	5(71.40)	31(88.60)	40(81.6)
Culture & sensitivity (C&S) testing is routinely practiced in your ward	No	3(42.9)	5(71.40)	18 (51.4)	26(53.1)
	Yes	4(57.10)	2(28.60)	17 (48.6)	23(46.9)
Preference for C&S sample testing	Hospital Lab	5(71.40)	6(85.70)	23 (65.7)	34(69.4)
	Private Lab	2(28.60)	1(14.30)	12 (34.3)	15(30.6)

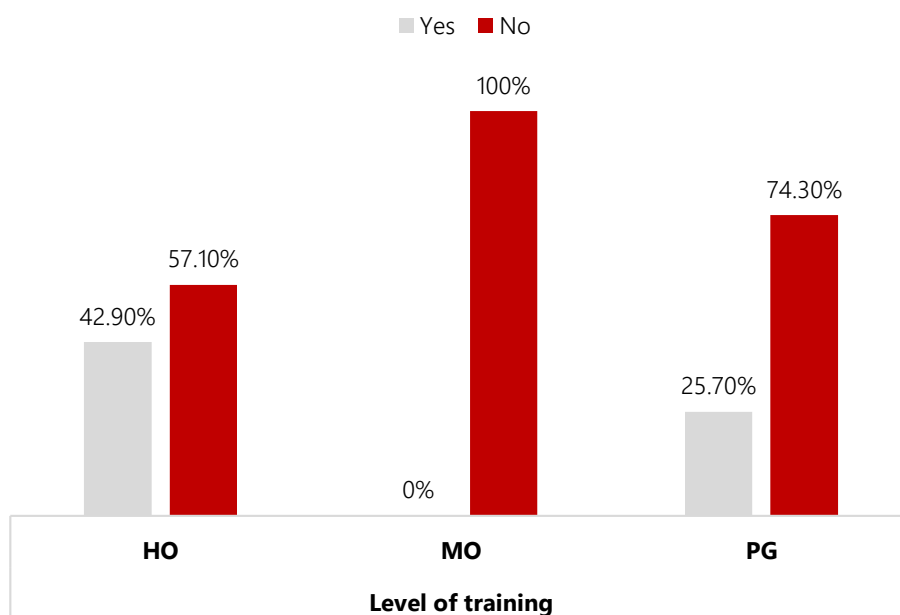


Figure 1: Awareness of junior physicians regarding various aspects of the antibiotic stewardship program.

The medical officers were completely unaware of the antibiotic stewardship program. While 42.9% house officers and only 25.7% PG's knew about the program.

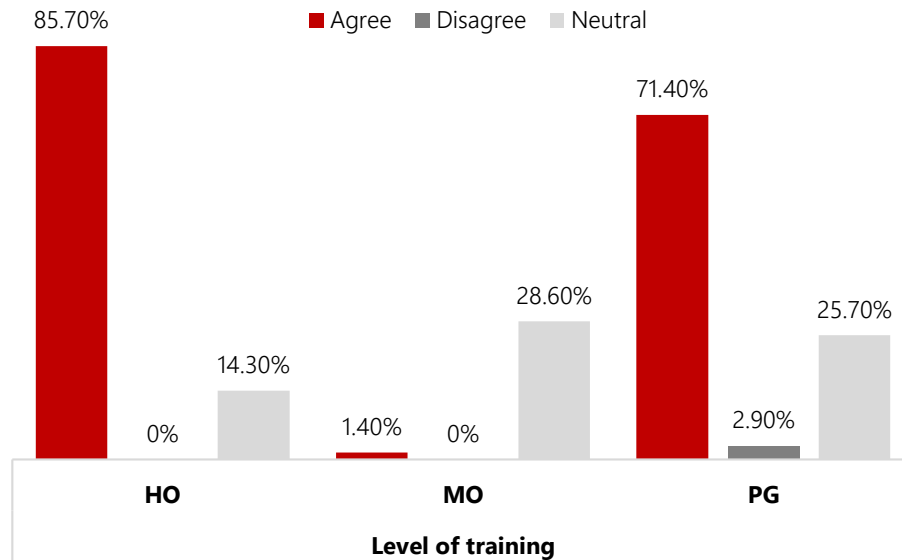


Figure 2: Physician's perspective related to ASP associated reduced antimicrobial resistance.

Regarding the junior physician's perspective concerning ASP associated reduced AMR, most house officers (85.7%) agreed to the statement, followed by PG's (71.4%). In comparison, only 1.4% of medical officers agreed that antibiotic stewardship program could reduce antimicrobial resistance.

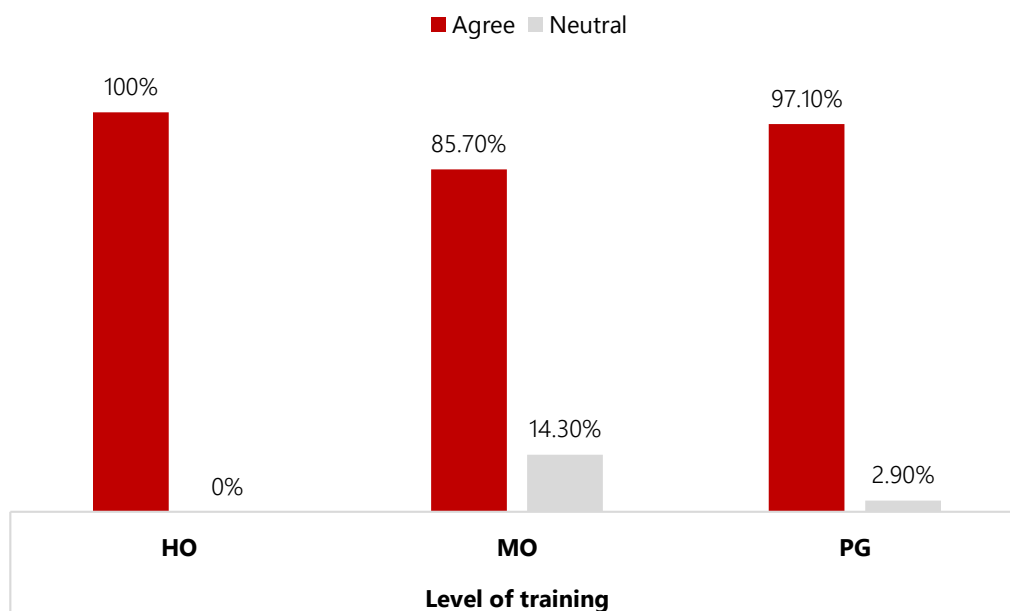


Figure 3: Physician's Practice related to the patient's cause/source of infection.

For the infection-related practices, all of the house officers, 97.1% PGs, and 85.7% medical officers, usually look for the cause/source of infection among the patients.

Discussion

Antimicrobial and multidrug resistance are serious public health issues. Physicians can play a critical role in avoiding the development of antibacterial and raising knowledge about the ethical usage of antibiotics, ensuring that medicines will be available for infection treatment for coming generations.

The majority of study participants had a basic knowledge of antibiotic prescribing difficulties and agreed on the importance of effective infection prevention with implementation of an antibiotic stewardship program. As it is a structured intervention promoting optimal antimicrobial usage and aids in the selection of the best antibiotics regimen¹¹. Efficient infection control practices also reduced the transmission of multidrug infections and slowed the transmission of antimicrobial resistance¹⁴. To prevent the potential of such transmission in society, all hospitals urgently need an antibiotic stewardship program and good infection prevention policies. The solution to combating this harmful issue is to educate and raise awareness among newly graduated medical students and senior professionals^{15,16}.

Although the majority of the physicians in the survey were aware that antibiotic resistance was a serious problem, almost 50% were confident in their antibiotic usage, involving over-prescription of antimicrobial drugs, without any difference amongst new and experienced practitioners. This contradicts prior research, which found that senior clinicians were more assured of antibiotic usage than trainees^{17,18}, which is usually associated to the years of practice and observation related to multidrug-resistant infections.

We discovered that most physicians, regardless of experience, assumed that antibiotic misuse and resistance were more of a national problem than a problem at the institution, implying that practitioners might neglect or ignore antibiotic resistance at their healthcare institutions. These observations were consistent with prior research, which found that doctors physicians agree on the

severity of antibiotic resistance on a conceptual level but never on a practical level when examining their current practices^{18,19}.

According to our findings, many trainees believe that antibiotics have no detrimental effects even though the patients don't require them. Unpracticed clinicians are unaware that overuse of antibiotics might lead to resistance given the impact of antibiotics on healthy microbial communities within the human²⁰. This mentality might, in turn, lead to antibiotic overuse and antimicrobial resistance. Many survey participants were unaware of hospital policy and didn't believe that local antibiotics recommendations were much more effective than international guidelines. Physicians can rely on when determining the best possible treatment for their clients. National standards are more useful when a certain organism is shown to have greater resistance rates to antibiotics than in other locations where susceptibility seems to be less of a threat. It has been observed in urinary tract infection (UTI)-causing pathogens in some Latin American nations²¹.

On the other hand, doctors may favor international standards because they are more stable and well-researched than local ones. Many doctors do not advise their patients on utilizing antibiotics properly, and physicians can play an essential role in patient knowledge on the proper antibiotics usage through effective communication²².

This report recommends accelerating the introduction of antibiotic stewardship programs in hospitals to combat rising antibiotic resistance and maximize antibiotic therapy. A meaningful effect can be achieved if only the healthcare institutions in Pakistan follow standard stewardship programs. If stewardship treatments are not implemented soon, resistant diseases will have a terrible impact on Pakistan's healthcare system and the economy of the country.

Conclusion

It is concluded that the knowledge regarding antibiotic stewardship program varied among

doctors of different cadres. Medical officers were completely unaware of the antibiotic stewardship program and most of them didn't agree to the benefits of ASP for antimicrobial resistance. Huge gap and unaddressed knowledge pose the greatest challenge to doctors and their ability to partner in antibiotic stewardship efforts. Our study shows support from doctors for expanded stewardship implementation. A better understanding of perceptions and attitudes is dire for healthcare stakeholders to expand stewardship activities into health care settings.

Conflicts of Interest

The authors have declared that no competing interests exist.

Acknowledgement

The authors are thankful to Medical Affairs Department of Getz Pharma Pvt. Ltd. for the assistance in data analysis and publication.

Funding

The author(s) received no specific funding for this work.

References

- Atif M, Ihsan B, Malik I, Ahmad N, Saleem Z, Sehar A. Antibiotic stewardship program in Pakistan: a multicenter qualitative study exploring medical doctors' knowledge, perception and practices. *BMC Infect Dis.* 2021;21(1):1-1.
- Saleem Z, Hassali MA, Godman B, Versporten A, Hashmi FK, Saeed H, Saleem F, Salman M, Rehman IU, Khan TM. Point prevalence surveys of antimicrobial use: a systematic review and the implications. *ERATCK.* 2020;18(9):897-910.
- Klein EY, Van Boeckel TP, Martinez EM, Pant S, Gandra S, Levin SA, Goossens H, Laxminarayan R. Global increase and geographic convergence in antibiotic consumption between 2000 and 2015. *PNAS.* 2018;115(15):E3463-70.
- Bilal H, Khan MN, Rehman T, Hameed MF, Yang X. Antibiotic resistance in Pakistan: a systematic review of past decade. *BMC Infect Dis.* 2021;21(1):1-9.
- Hayat K, Rosenthal M, Gillani AH, Zhai P, Aziz MM, Ji W, Chang J, Hu H, Fang Y. Perspective of Pakistani physicians towards hospital antimicrobial stewardship programs: a multisite exploratory qualitative study. *Int J Environ Res.* 2019;16(9):1565.
- Mubarak N. A multicentre point prevalence survey of the antibiotic use in tertiary care hospitals in Punjab. *Antibiotics.* 2021;10:531.
- Saleem Z, Hassali MA, Versporten A, Godman B, Hashmi FK, Goossens H, Saleem F. A multicenter point prevalence survey of antibiotic use in Punjab, Pakistan: findings and implications. *ERATCK.* 2019;17(4):285-293.
- Aslam B, Wang W, Arshad MI, Khurshid M, Muzammil S, Rasool MH, Nisar MA, Alvi RF, Aslam MA, Qamar MU, Salamat MK. Antibiotic resistance: a rundown of a global crisis. *Infect Drug Resist.* 2018;11:1645.
- Blaskovich MA. The fight against antimicrobial resistance is confounded by a global increase in antibiotic usage. *ACS Infect Dis.* 2018;4(6):868-870.
- WHO. World health statistics 2015. World Health Organization. 2015. Available at: <https://apps.who.int/iris/handle/10665/170250>
- Fishman N, Society for Healthcare Epidemiology of America, Infectious Diseases Society of America. Policy statement on antimicrobial stewardship by the society for healthcare epidemiology of America (SHEA), the infectious diseases society of America (IDSA), and the pediatric infectious diseases society (PIDS). *Infect Control Hosp Epidemiol* 2012;33(4):322-327.
- CDC. Core Elements of Hospital Antibiotic Stewardship Programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. Available at <https://www.cdc.gov/antibiotic-use/core-elements/hospital.html>.
- Ministry of National Health Services Regulations & Coordination Government of Pakistan. Antimicrobial resistance national action plan Pakistan. *J Glob Antimicrob Resist.* 2017;6:1-74.
- Swaminathan S, Prasad J, Dhariwal AC, Guleria R, Misra MC, Malhotra R, Mathur P, Walia K, Gupta S, Sharma A, Ohri V. Strengthening infection prevention and control and systematic surveillance of healthcare associated infections in India. *bmj.* 2017;358.
- Srinivasan A, Song X, Richards A, Sinkowitz-Cochran R, Cardo D, Rand C. A survey of knowledge, attitudes, and beliefs of house staff physicians from various specialties concerning antimicrobial use and resistance. *Arch Intern Med.* 2004;164(13):1451-1456.
- Cassir N, Rolain JM, Brouqui P. A new strategy to fight antimicrobial resistance: the revival of old antibiotics. *Front Microbiol.* 2014;5:551.
- García C, Llamocca LP, García K, Jiménez A, Samalvides F, Gotuzzo E, Jacobs J. Knowledge, attitudes and practice survey about antimicrobial resistance and prescribing among physicians in a

- hospital setting in Lima, Peru. *BMC Clin Pharmacol.* 2011;11(1):1-8.
18. Giblin TB, Sinkowitz-Cochran RL, Harris PL, Jacobs S, Liberatore K, Palfreyman MA, Harrison EI, Cardo DM, CDC Campaign to Prevent Antimicrobial Resistance Team. Clinicians' perceptions of the problem of antimicrobial resistance in health care facilities. *Arch Intern Med.* 2004;164(15):1662-1668.
 19. Wester CW, Durairaj L, Evans AT, Schwartz DN, Husain S, Martinez E. Antibiotic resistance: a survey of physician perceptions. *Arch Intern Med.* 2002;162(19):2210-2216.
 20. Rafii F, Sutherland JB, Cerniglia CE. Effects of treatment with antimicrobial agents on the human colonic microflora. *Ther Clin Risk Manag.* 2008;4(6):1343.
 21. Andrade SS, Sader HS, Jones RN, Pereira AS, Pignatari AC, Gales AC. Increased resistance to first-line agents among bacterial pathogens isolated from urinary tract infections in Latin America: time for local guidelines?. *Mem Inst Oswaldo Cruz.* 2006;101(7):741-748.
 22. Cabral C, Ingram J, Lucas PJ, Redmond NM, Kai J, Hay AD, Horwood J. Influence of clinical communication on parents' antibiotic expectations for children with respiratory tract infections. *Ann Fam Med.* 2016;14(2):141-147.