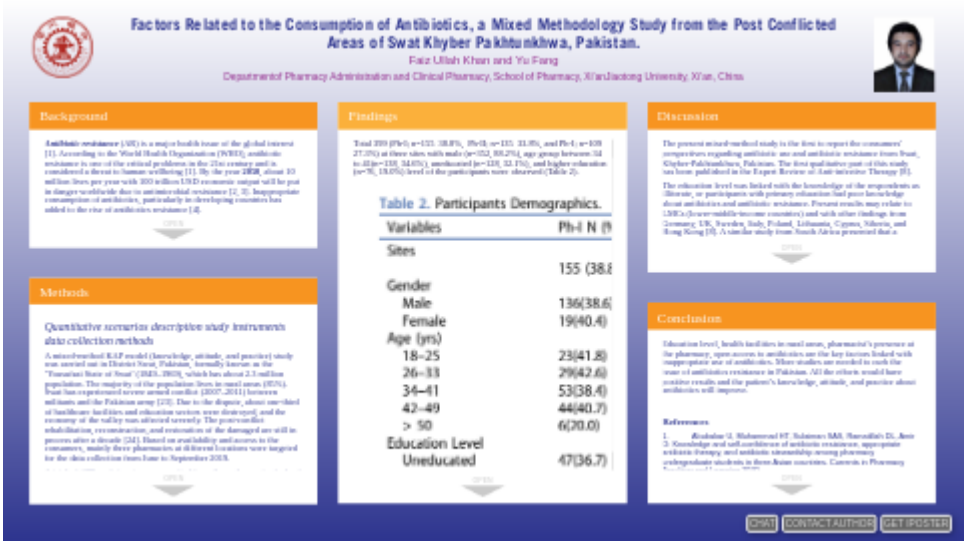
Factors Related to the Consumption of Antibiotics, a Mixed Methodology Study from the Post Conflicted Areas of Swat Khyber Pakhtunkhwa, Pakistan.



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BACKGROUND

Antibiotic resistance (AR) is a major health issue of the global interest [1]. According to the World Health Organization (WHO), antibiotic resistance is one of the critical problems in the 21st century and is considered a threat to human wellbeing [1]. By the year **2050**, about 10 million lives per year with 100 trillion USD economic output will be put in danger worldwide due to antimicrobial resistance [2, 3]. Inappropriate consumption of antibiotics, particularly in developing countries has added to the rise of antibiotics resistance [4].

The present mixed-methods study was aimed to assess the knowledge, attitude, and practices toward antibiotics and antibiotic resistance among consumers in post conflicted areas of Swat, Pakistan.

METHODS

Quantitative scenarios description study instruments data collection methods

A mixed-method KAP model (knowledge, attitude, and practice) study was carried out in District Swat, Pakistan, formally known as the 'Yousufzai State of Swat' (1849–1969), which has about 2.3 million population. The majority of the population lives in rural areas (85%). Swat has experienced severe armed conflict (2007–2011) between militants and the Pakistan army [23]. Due to the dispute, about one-third of healthcare facilities and education sectors were destroyed, and the economy of the valley was affected severely. The post-conflict rehabilitation, reconstruction, and restoration of the damaged are still in process after a decade [24]. Based on availability and access to the consumers, mainly three pharmacies at different locations were targeted for the data collection from June to September 2019.

A total of 399 participants were recruited from three pharmacies (a, b, c) at different locations. Those respondents who completed the first part (quantitative) of the study are invited to the second part (qualitative) of in-depth interviews until they gained a point of saturation. The quantitative part responses transferred to the predesign sheet and in-depth interviews were saved in the voice recorder.

Data Collection Procedures

A total of three scenarios were developed based on previously published literature [5]. The expected visits of the customer to each pharmacy, detailed scenarios with outcomes are presented (Table 1). A total of six community pharmacists were trained before the data collection. First, questions were asked and transferred to the data collection form. After the first part, the respondent invited the qualitative self-interview and the answers were recorded.

Table 1. Different scenarios for the participants.

Patient Visit to Pharmacy	Additional Information Asked by Pharmacist.	Rationale	Expected outcomes
(1) With prescription contained Antibiotics.	a. Allergies (Penicillin) b. Previous use of Antibiotic Agents c. Pregnancy d. Previous history of Side effects e. No self-medication f. Patient knows antibiotics g. The patient knows antibiotics resistance	Self-medication with antibiotics among the public is common in Pakistan [30].	Patients with antibiotics demand should ask; (i) Duty Pharmacist or staff dispense antibiotics (ii) Idea about antibiotics (iii) An idea about antibiotics Resistance Patients should ask; (i) How to Use (ii) When to take (iii) With water or milk (iv) Dose regime (v) Use up to (vi) When to stop (vii) When to Refill (viii) Request for counseling (ix) Storage of antibiotics
(2) Without prescription demand for antibiotics	a. Ask for prescription b. Why you need antibiotics c. Who advised you antibiotics? d. Allergies (Penicillin) e. Previous use of Antibiotic Agents f. Physician visit g. Pregnancy h. Previous history of Side effects i. No-self-medication j. How dangerous antibiotics without prescription k. Antibiotics resistance	Nonprescription antibiotics dispensing is common in Pakistan [31].	(i) Duty Pharmacist or staff Shouldn't dispense antibiotics (ii) Idea about antibiotics (iii) An idea about antibiotics Resistance (iv) Referred to the concerned physician (v) Counseling session on antibiotics resistance. (vi) Contact the physician if the patient's condition is worse. (vii) Provide OTC for overnight relief (viii) Provide detailed information and satisfy the patient to stop antibiotics use without a prescription
(3) Request for a refill of antibiotics on used strips	a. Ask for prescription b. Why you need antibiotics c. Why you lost your prescription d. How long you are using antibiotics e. Allergies (Penicillin) f. Previous use of Antibiotic Agents g. Last Physician visit h. Pregnancy i. Previous history of Side effects j. No-self-medication	Storage of antibiotics at home is one of the problems leading to AR in the Asian region [32,33].	(i) Duty Pharmacist or staff Shouldn't dispense antibiotics without prescription (ii) Idea about antibiotics (iii) The idea about antibiotics Resistance (iv) Referred to the concerned physician (v) Counseling session on antibiotics resistance. (vi) Contact the physician if the patient's condition is worse. (vii) Provide OTC for overnight relief

Data Instruments

For the Quantitative (cross-sectional study), the questionnaire was adopted and developed from previously published literature [6, 7]. The modified questionnaire was tested on 50 participants to calculate the internal consistency through Cronbach alpha. The Cronbach alpha result was (overall = 0.93, each, $\alpha \geq 0.9$) shown a satisfactory and acceptable level which signifies the internal consistency of the questionnaire. The questionnaire was finalized and contained five parts with 45 items.

For the Qualitative part, an interview guide was developed based on qualitative and explorative study design. General population views about antibiotics resistance matter to know the literature gap. Semi structural interviews are useful tools, especially for exploratory studies. A pilot interview was undertaken for the trial to confirm the protocol's understandability and validity. Interview schema contained 12 questions with sub-sections. Face to face in-depth interview was conducted with the customers to determine their overall perceptions about the antibiotics. Interviews were conducted at the site of each pharmacy and place was reserved at the waiting area to ensure complete easiness for interviewers. Each interview lasts for about 20-30.

Ethical Approval

The health science center "Biomedical Ethics Committee" provided an ethical (No: 2019) approval for the given study.

Data Analysis

The collected data were entered through SPSS (Statistical Package for Social Sciences, Chicago, IL, U.S.A, Version 22) and descriptive analysis was performed. A binary regression test was used to present the general knowledge of the participants and its effect on the other variables. Value ($p<0.05$) less than 0.05 was considered as the significance level. Thematic analyses were applied to the qualitative phase of the study.

FINDINGS

Total 399 (Ph-I; n=155 38.8%, Ph-II; n=135 33.8%, and Ph-I; n=109 27.3%) at three sites with male (n=352, 88.2%), age group between 34 to 41(n=138, 34.6%), uneducated (n=128, 32.1%), and higher education (n=76, 19.0%) level of the participants were observed (Table 2).

Table 2. Participants Demographics.

Variables	Ph-I N (%)	Ph-II N (%)	Ph-III N (%)	Total (%)
Sites				
	155 (38.8)	135 (33.8)	109 (27.3)	399(100)
Gender				
Male	136(38.6)	122(34.6)	94(27.7)	352 (88.2)
Female	19(40.4)	13(27.6)	15(55.5)	47 (11.2)
Age (yrs)				
18–25	23(41.8)	22(40.0)	10(18.1)	55 (13.7)
26–33	29(42.6)	20(29.4)	19(27.9)	68 (17.0)
34–41	53(38.4)	48(34.7)	37(26.8)	138 (34.6)
42–49	44(40.7)	37(34.2)	27(25.0)	108 (27.1)
> 50	6(20.0)	8(26.6)	16(53.3)	30 (7.5)
Education Level				
Uneducated	47(36.7)	37(28.9)	44(34.3)	128 (32.1)
Primary Level	32(31.0)	56(54.3)	15(14.5)	103 (25.8)
Secondary Level	29(31.5)	21(22.8)	42(45.6)	92 (23.1)
Higher Education	47(61.8)	21(27.6)	08(10.5)	76 (19)
*Monthly Income				
VL (<10,000)	05(41.6)	04(33.3)	03(25.0)	12 (3.0)
L (>10,000 < 20,000)	18(36.7)	12(24.4)	19(38.7)	49 (12.3)
ML (>20,000 < 30,000)	50(37.8)	48(36.3)	34(25.7)	132 (33.1)
M (>30,000 < 40,000)	35(34.6)	41(40.5)	25(24.7)	101 (25.3)
MU (>40,000 < 50,000)	40(44.4)	26(28.8)	24(26.6)	90 (22.6)
Upper (>100,000)	07(46.6)	04(26.6)	04(26.6)	15 (3.8)
Residence				
Urban	66(38.1)	64(37.0)	43(24.8)	173(43.4)
Rural	89(39.3)	71(31.4)	66(29.2)	226(56.6)
Job Description				
Non-Employed	22(42.3)	18(34.6)	12(23.0)	52(13)
Employed	137(39.4)	117(33.7)	97(27.9)	347(87)
Antibiotics Consumption (Respondents)				
Antibiotics Purchase				
With Prescription	70(46.5)	56(27.9)	43(25.5)	169(42.3)
Without Prescription	55(20.3)	99(36.6)	76(28.1)	230(57.6)
AB consumption (yr)				
1–3 antibiotics	20(41.6)	14(29.1)	14(29.1)	48(12.0)
4–6 antibiotics	48(39.3)	44(36.0)	30(24.5)	122(30.5)
> 6 antibiotics	61(39.8)	44(28.7)	48(31.3)	153(38.3)
Don't Use	26(34.2)	33(43.4)	17(22.3)	76(19.0)

*In USD: VL = very low (>$62.35), L = low(>$62.35 < 124 USD), ML = middle (> $124 < 187.06 USD), M = middle(>$187.06 < 249.42 USD), and MU = middle upper(>$249.42 < 311.77 USD), and Upper = (>$623.54)

Poor to moderate knowledge were observed, participants were unaware of antibiotics resistance risk (Median=1, IQR=3) and misuse of antibiotics. A somehow positive attitude was noted but storage of antibiotics at home (Median=2, IQR=2) was preferred to use when needed (Table 3).

Table: 3

Variables	Knowledge Median (IQR)	P-Value	Attitude Median (IQR)	P-Value	Practice Median (IQR)	P-Value
Gender		< 0.05*		< 0.05*		< 0.05*
Male	1(0)		1(0)		1(0)	
Female	1(0)		1(0)		1(0)	
Age(yrs)		> 0.05***		> 0.05***		< 0.05***
18–25	3(2)		3(2)		3(2)	
26–33	3(2)		3(2)		3(2)	
34–41	3(2)		3(2)		3(2)	
42–49	3(2)		3(2)		3(2)	
> 50	3(2)		3(2)		3(2)	
Education Level		< 0.05***		< 0.05***		< 0.05***
Uneducated	2(2)		2(2)		2(2)	
Primary Level	2(2)		2(2)		2(2)	
Secondary Level	2(2)		2(2)		2(2)	
Higher Education	2(2)		2(2)		2(2)	
Monthly Income		> 0.05***		> 0.05***		< 0.05***
> 10,000	4(2)		4(2)		4(2)	
> 10,000- < 20,000	4(2)		4(2)		4(2)	
> 20,000- < 30,000	4(2)		4(2)		4(2)	
> 30,000- < 40,000	4(2)		4(2)		4(2)	
Residence		> 0.05**		> 0.05**		> 0.05**
Urban	2(1)		2(1)		2(1)	
Rural	2(1)		2(1)		2(1)	
Job Description		< 0.05**		< 0.05**		< 0.05**
Non-Employed	0(0)		0(0)		0(0)	
Employed	0(0)		0(0)		0(0)	
Antibiotics Purchase		< 0.05**		< 0.05**		< 0.05**
With Prescription	1(1)		1(1)		1(1)	
Without Prescription	1(1)		1(1)		1(1)	
Consumption (Average)		< 0.05***		< 0.05***		< 0.05***
1–3 antibiotics	2(1)		2(1)		2(1)	
4–6 antibiotics	2(1)		2(1)		2(1)	
> 6 antibiotics	2(1)		2(1)		2(1)	
Don't Use	2(1)		2(1)		2(1)	

*Kruskal-Wallis Test**Mann-Whitney Test ***Cha-square test

Most of the respondents didn't follow the actual dosage regimen prescribed (n=266, 66.7%, p<0.05). The thematic analysis included (themes=4, subthemes=6, and categories), 2 subthemes of knowledge with eight categories strongly suggested to educate the patient, and attitude with three categories were indicated the antibiotics work fast. Misuse of antibiotics comprised self-medication, nonprescription of antibiotics, without consultation with a doctor, sharing, and storage of antibiotics at home. Suggestions to healthcare professionals and government for rational use of antibiotics included 2 subthemes and 11 categories suggested immediate community-based awareness, and individual strict regulations for antibiotics.

A total of 17 interviews (in-depth) were conducted with a mean duration of 30 minutes. The majority of the participants (15 males, 2 females) were males aged between 20 to 55 years. Themes (4), sub-themes (6), and categories (30) established and athematic analysis were applied (Table 4). All themes include knowledge, attitude, practice, and rational use of antibiotics presented in detail. The majority of the participants have a lack of knowledge, negative attitude, and inappropriate use of antibiotics was observed in the second part of the qualitative study.

DISCUSSION

The present mixed-method study is the first to report the consumers' perspectives regarding antibiotic use and antibiotic resistance from Swat, Khyber-Pakhtunkhwa, Pakistan. The first part of this study has been published in the Expert Review of Anti-infective Therapy [8].

The education level was linked with the knowledge of the respondents as illiterate, or participants with primary education had poor knowledge about antibiotics and antibiotic resistance. Present results may relate to LMCs (lower-middle-income countries) and with other findings from Germany, UK, Sweden, Italy, Poland, Lithuania, Cyprus, Siberia, and Hong Kong [8]. A similar study from South Africa presented that a higher level of education will increases the awareness and appropriate practice of antibiotics. We have developed some scenarios (Table-1) for the assessment and educated the participants on the received antibiotics. General knowledge was assessed through common and easy questions.

CONCLUSION

Education level, health facilities in rural areas, pharmacist's presence at the pharmacy, open access to antibiotics are the key factors linked with inappropriate use of antibiotics. More studies are needed to curb the issue of antibiotics resistance in Pakistan. All the efforts would have positive results and the patient's knowledge, attitude, and practice about antibiotics will improve.

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