



EVALUATION OF ANTIBIOTIC USE BEHAVIOR IN COLD AND FLU AMONGST THE STUDENTS OF BAHAUDDIN ZAKARIYA UNIVERSITY MULTAN PAKISTAN

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ABSTRACT

Antibiotics are available without prescription in Pakistan and people are frequently using them in common cold and flu. This prospective six month study aims to explore the perception of educated young members of society about rationale for the use, storage and disposal of unused antibiotics. The one thousand students from several disciplines at Bahauddin Zakariya University were asked to give their responses in interview based on structured questionnaire. From 977 (59%) respondents had the conviction that the antibiotics are effective in the management of cold, flu. The majority of the participants (60%) lacked the appropriate knowledge regarding situations where antibiotics should be used. Seventy one percent of the respondents believed that the non microbial factors were responsible for cold and flu. The responders' beliefs reflected a poor understanding regarding general health. The role of antibiotics in pain management, strengthening of the immune system and healing of the illnesses is required to be educated to the general public. This has been a root cause of the injudicious use of antibiotics in nonbacterial infections and for symptomatic measures.

Keywords: Antibiotics usage, General public, Cold, Flu

INTRODUCTION

The discovery of antibiotics has played a revolutionary role in the eradication of bacterial infection during last few decades. Their convincing role has been initially benefited in therapeutics even without controlled clinical trials (Marlies *et al.*, 2010). However inefficient use of these 'magic drugs' over the years has resulted in emergence and prevalence of resistant strains of organisms that combat antibiotic more effectively, which is endangering their effectiveness (Wise *et al.*, 1998). According to World Health Organization report (WHO, 2000), antibiotic resistance is on the top three serious health issues. The primary factors contributing to bacterial resistance are over prescribing and suboptimal use of antibiotics including use in agriculture and veterinary. Furthermore, according to Arroll *et al.*, (2000) indiscriminate use of antibiotics in nonbacterial

infections particularly colds and flu is also contributing towards bacterial resistance. Multan, one of the five major cities of Pakistan has population of 4,500,000. The city is situated about 562 km southwest of the country capital Islamabad. The inhabitants experience various harsh weathers over the year ranging from cold season during December to February (0°C-20°C) to dry hot summer (30°C-54°C) which frequently accompanies dust aerosols and dust storms (Encyclopædia Britannica, 2010; Wikipedia, 2010). Majority of the population earns from agricultural resources particularly from wheat and cotton crops and fruit farming. Wheat harvesting during the month of April is associated with dust in the region which also adversely affect the climate. These climatic and environmental conditions predispose people to the respiratory problems like asthma and flu. A public Sector

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university, Bahauddin Zakariya University is located in the city which has student strength of about 15,000 (Wikipedia, 2010). Most of the University students belong to nearby cities and suburbs in the vicinity of about 200 km. The University has been provided with health centre but students are also reported to have self medication. Healthcare system of the country permits the availability of antibiotics without prescription. The University students and graduates occupy highest level in the education hierarchy and thus presumed to be the most equipped part of the community. Assessment of intellectual elite of the community for drug use patterns and subsequent intervention may assist to fabricate a model having more responsible individuals guaranteeing rational drug administration.

Public awareness and understanding influence the pattern of antibiotic use especially whether optimum doses are administered and / or whether full courses of therapy are taken (Arroll *et al.*, 1999; Norris *et al.*, 2001). Patient may not be able to understand the significance of doses of antibiotics or duration of therapy, the philosophy of resistance and consequences of such malpractices. According to Hart *et al* (1998), public awareness about antibiotic is of particular importance in developing countries like Pakistan where antibiotics are available without prescription. Over prescribing of antibiotics is a significant issue, research on people understanding about the antibiotic is crucial to rationalize the use and ameliorate resistance.

Limited studies regarding the use of antibiotics have been carried out in Pakistan. Thus, this study was aimed to explore the knowledge of university students about antibiotics, their tendencies towards antibiotic usage in cold and flu and antibiotic storage, expiry dates and disposal of unused medicine.

MATERIALS AND METHODS

A prospective study was conducted in Bahauddin Zakariya University over a period of 6 months from January 2010 to June 2010. This study primarily consisted of structured interviews (using questionnaire) of 1000 randomly selected University students from several disciplines. The respondents' views were recorded in an interview carried out by 5 trained pharmacists. All the interviews were carried out in English.

The questionnaire

A questionnaire was developed by the committee of professionals in periodic meetings using literature on antibiotic use. The questionnaire was tested in the university graduates, validated and tested for the reproducibility. The standardized questionnaire consisted

of 20 questions including 6 demographic questions. Questionnaire included close ended questions with a list of choices. Following demographic questions and the general questions about activity of the antibiotics and identification of the antibiotics from a list of drugs were listed. In addition basic questions addressing causes of cold and flu and usefulness of antibiotics in the stated conditions were given. The respondents were given the opportunity to select their preferred dosage form of antibiotics. Participants were also given the opportunity to record their behavior of consultation in the specified conditions, patterns of antibiotic administration, observation of expiry dates at the time of purchase, dealing with leftover antibiotics and experiences about the adverse effects.

Data analysis

The recorded responses of the participants in this study were analyzed using SPSS, version 13.0.

RESULTS

From 1000 students of several disciplines at Bahauddin Zakariya University, 977 students responded positively in this study. Twenty three students refused to respond. The demographic information and the responses to several questions on the questionnaire are given below under the respective headings.

Demographic Data

The majority of the participants (65.7%) were females (Table I). The students were from the diverse regions. Almost half of the respondents belonged to Multan region. Students from Sahiwal and Jhang regions (12% and 13%, respectively) were also appreciable (Table II). Rest of the students belonged to other southern Punjab regions. Students from a variety of disciplines participated in the interviews. Social sciences remained the most prominent (40%) amongst the participants, other than this discipline were from physical and natural sciences, 19% and 18%, respectively (Table III). Majority (40%) of respondents were from semester 3 and 4, followed by 31% from semester 1 and 2 (Table IV). About 75% respondents were from semester system as compared to the 25% from semester system (Table V). Age of the participants was also recorded (Table VI). The most significant age group was 21-23 years (57%).

Table I: Demographic data of Gender

Gender	Number of students	Percent of students
Male	335	34.3
Female	642	65.7
Total	977	100.0

Table II: Demographic data of different cities

Cities	Number of students	Percent of students
Multan	475	48.6
DG Khan	80	8.2
Jhang	128	13.1
Bahawalpur	66	6.8
Sahiwal	125	12.8
Others	103	10.5
Total	977	100.0

Table III: Demographic data of Departments of the University

Disciplines	Number of students	Percent of students
Physical Sciences	188	19.2
Health Sciences	67	6.9
Social Sciences	393	40.2
Natural Sciences	180	18.4
Management Sciences	68	7.0
Technology	81	8.3
Total	977	100.0

Table IV: Demographic data of semester/year of participants

Year	Number of students	Percent of students
1&2 semester	303	31.0
3&4 semester	391	40.0
5&6 semester	158	16.2
7&8 semester	91	9.3
Year	34	3.5
Total	977	100.0

Table V: Demographic data of Program of study of participants

Study program	Number of students	Percent of students
Annual	246	25.2
Semester	731	74.8
Total	977	100.0

Table VI: Demographic data of age groups of participants

Age (Year)	Number of students	Percent of students
18-20	209	21.4
21-23	556	56.9
24-26	196	20.1
27 and above	16	1.6
Total	977	100.0

Response of participants regarding action of antibiotics

Overall belief of the participants regarding antibiotics has been shown in Figure 1. Only 42.8% of the respondents commented appropriately on the activity of the antibiotics. Among the 57.2% participants with wrong perception, 18% believed that the antibiotics were useful in relieving pain, 14% had viewed that the antibiotics killed viruses, 13.9% thought antibiotics were effective in healing the illness and 11.1% advocated that antibiotics strengthen the immune system.

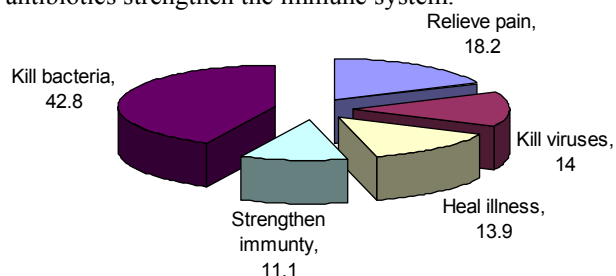


Figure 1: Perception participant on the action of antibiotics

Identification of antibiotics from a list of drugs

The participants were asked to pick antibiotics from a list of drugs. As shown in Figure 2, only 14.2% participants have selected the right option. About 53% correctly identified one of the two given antibiotics which was amoxicillin or augmentin (26% and 27.1%, respectively). About 33% of the respondents marked drugs other than antibiotics from the medicine list. Amongst which coldrex and paracetamol were the significant choices (12.1% and 17.03%, respectively) as antibiotics. Some (1.4%) of the participants believed that asthma inhalers contain antibiotic. A few respondents (0.9%) believed that allopurinol for gout is an antibiotic and another 0.9% thought metformin, an antidiabetic as an antibiotic. In addition respondents marked more than one medicine on the drug list (Figure 3). Among the participant who selected wrong medicines, 35.9% selected 1 irrelevant medicine 1.9% selected 2 and 0.3% and 0.1 persons selected 3 and 5, respectively irrelevant medicines. Nevertheless, 67% of the respondents did not select any irrelevant medicine. Figure 4 indicates that 14.2% participants had the awareness of antibiotics as compared to 53% with little awareness and 14% having no awareness at all.

Perception for the reasons of cold and flu

As shown in Figure 5, more than 70% of respondents regarded non microbial reason for flue, change in weather was the answer of 37.9% participants, getting cold was the reason chosen by 20.8% and dust was

selected by 12.3% as the possible cause of cold and flu. Only 29.1% have chosen microbes as possible cause of cold and flu.

Perception on usefulness of antibiotics in cold and flu

Only 24.2% of the respondents rightly perceived that the antibiotics are not useful in cold and flu. About 59.3% believed otherwise and 16.6% were unaware of this aspect (Figure 6). Among the respondents believing usefulness of antibiotics in cold and flu 40% perceived that antibiotics strengthen immunity, 15% believed they prevent other infections and according to other 15%, antibiotics prevent worsening of cold and flu. About 14% participant believed that the antibiotics symptomatic relieve cold and flu and 13.2% commented that antibiotics improve disease conditions (Figure 7).

Respondents' preferred dosage forms of antibiotics

This question was included to find the likings of the participants about the different dosage forms. Figure 8 indicated that a majority (64%) of respondents, preferred oral dosage form, amongst which 27.2% liked tablets, 18.7% selected syrup/suspension while 18.2% preferred capsules. About 36% of the participants believed that injectable were the preferred dosage form because of their prompt effectiveness and improved efficacy.

Consultation-based or self selection of antibiotics

The respondents were provided with the possible options for the consultation on antibiotic selection. More than 29% of the respondents used to purchase self-selected antibiotics, 28% by consultation with the pharmacy personnel and almost 40% used to consult registered medical practitioner for this purpose (Figure 9).

Duration for the usage of antibiotics

Antibiotic intake of the participants was explored by putting different time durations as the answers. As indicated in Figure 10, 42% respondents used to consume antibiotics till the symptoms disappeared, 32.3% take one pack per episode, about 13% taking the full course of therapy. They use to consume total amounts dispensed by the pharmacy.

Handling of the unused/leftover antibiotics

Behavior of the respondents regarding the handling of leftover antibiotics has been given in Figure 11. About 88% respondents used to retain unused antibiotics for their later use. About 7% reported donation of leftover antibiotics to their relative/friends. About 3 percent participant used to discard the leftover medicines after usage whereas 2% return the unused medicines to the pharmacy.

Monitoring of expiry dates of antibiotics

The quality consciousness of the individuals for the drug was assessed by observing their vigilance about the expiry date before purchase. As shown in Figure 12, 8% of the participants always used to check the expiry date of antibiotics before buying. Whereas 65% of the respondents never checked the expiry date and about 26% checking expiry dates occasionally.

Experiencing adverse drug reactions

The participants were explained about the adverse drug reactions (ADR). As shown in Figure 13, 13% participants reported occurrence of ADR, 53% did not experienced any ADR and 34% remained unaware of the ADR. Among the participants who reported occurrence of ADR, 87% experienced the system disturbances. About 5% experienced taste disturbances and the same percent, the GIT disturbances.

DISCUSSION

Antibacterial resistance is a serious hazard to the global health. It appreciably increases burden of disease posed to the community (File *et al.*, 2002; Blix *et al.*, 2003; Steinman *et al.*, 2003). Choa *et al.* (2004) reported that this alarming situation is due to the inappropriate use of antibiotics by the stakeholders of drug use process. Primary factors responsible for microbial resistance are knowledge and beliefs of the inhabitants, their vigilance levels as well as prescribing tendencies of the practitioners (File *et al.*, 2002; Choa *et al.*, 2004). In the present study we focused on the understandings of the participants about cold and cough, activity of antibiotics and their antibiotic utilization behaviors. The majority of participants lacked appropriate knowledge regarding activity of the antibiotics warranting the need for educating the general public regarding the above aspects of antibiotics usage. Wrong belief of public regarding the role of antibiotics, trends in self medications can be ascribed as a root cause of the injudicious use of antibiotics.

Availability of antibiotics to general public without prescription may lead to unnecessary use, inappropriate selection, suboptimal doses, compromised vigilance of such usage and complicated disease outcomes (Cohen, 1992; Neu, 1992; Sarkar and, Gould, 2006). Retaining the leftover antibiotics for future use or donation to friends/family members may also be disastrous on recycling (Clidna *et al.*, 2007) or promoting the inappropriate use of antibiotics. Storage during this period is obscure, at atmospheric temperature ranging from 0°C to 54°C which adversely affects the drug quality. In this study, pharmacies were observed to be helping patients

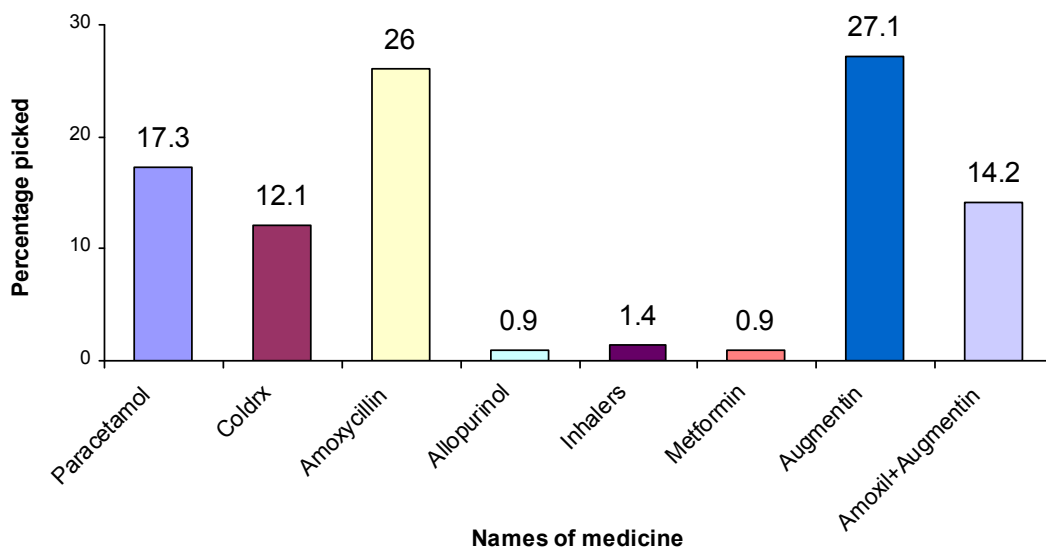


Figure 2: Response of the participant on the action of antibiotics?

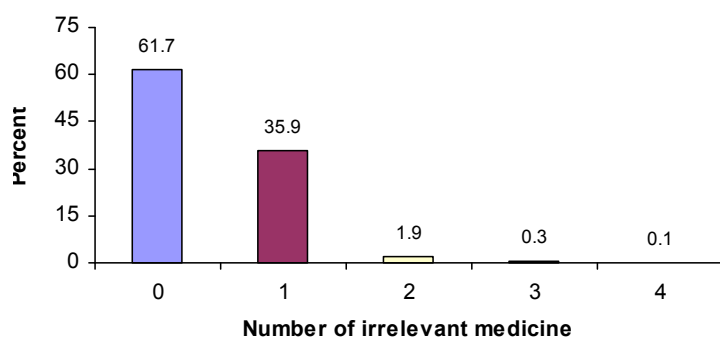


Figure 3: Response of the participant on the selection of irrelevant medicines from a list of drug

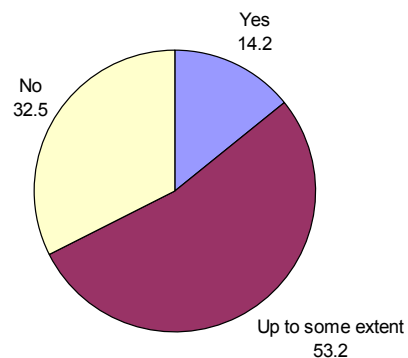


Figure 4: Response of the participant on awareness about antibiotics

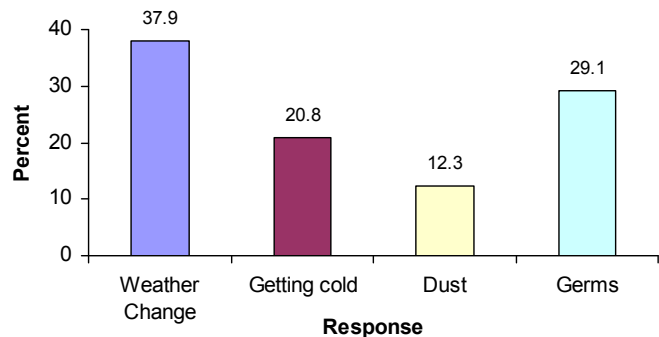


Figure 5: Response of the participant on the causes of cold and flu

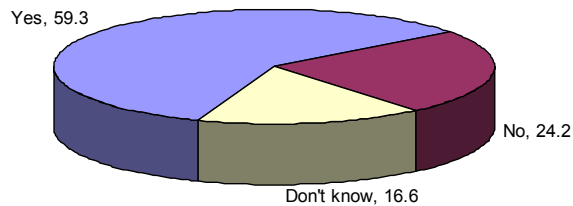


Figure 6: Response of the participant on the usefulness of antibiotics in for colds and flu?

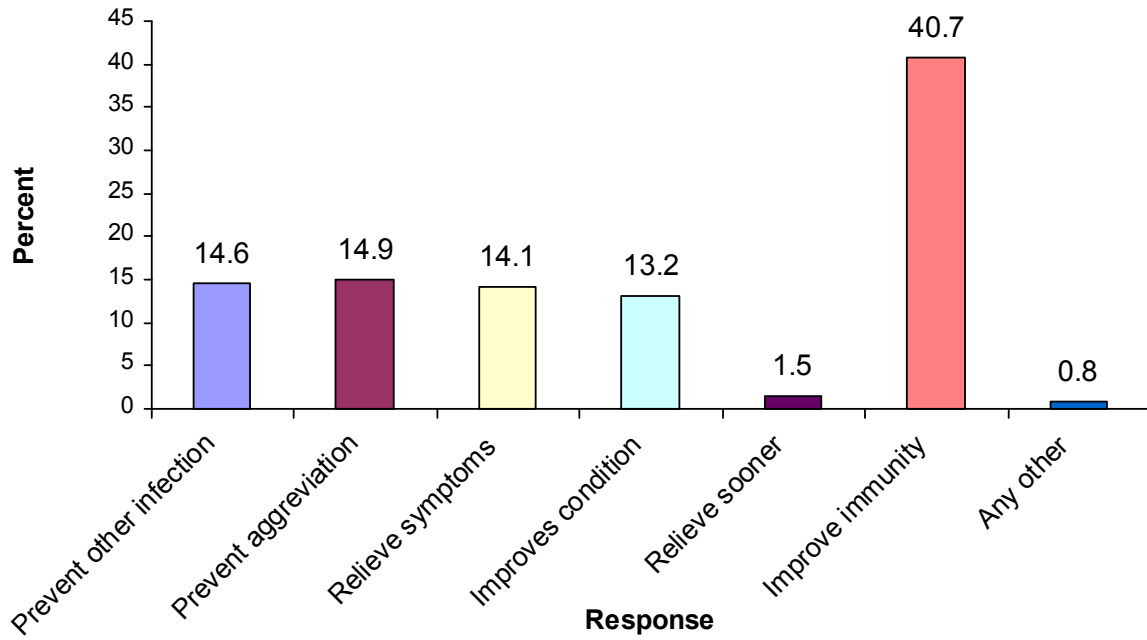


Figure 7: Response of the participant on the specific use of antibiotics in cold and flue

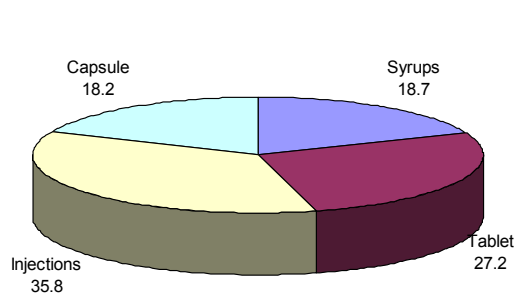


Figure 8: Response of the participant on the dosage forms they preferred

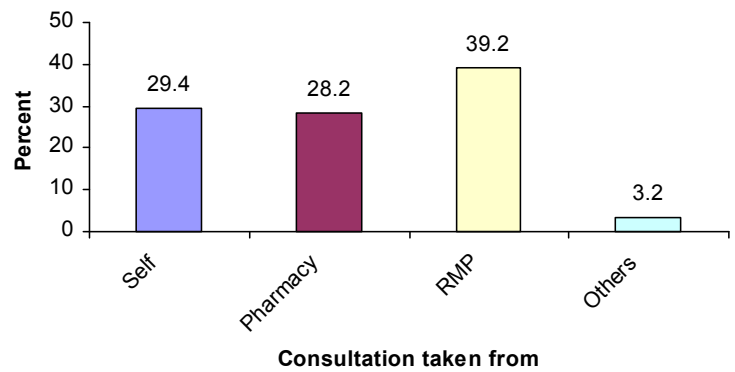


Figure 9: Response of the participant on the self-selection or consultation-based selection for antibiotics

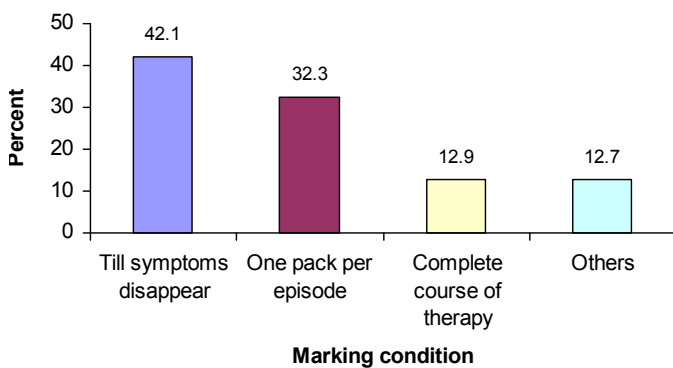


Figure 10: Response of the participant on the handling of unused/leftover antibiotics

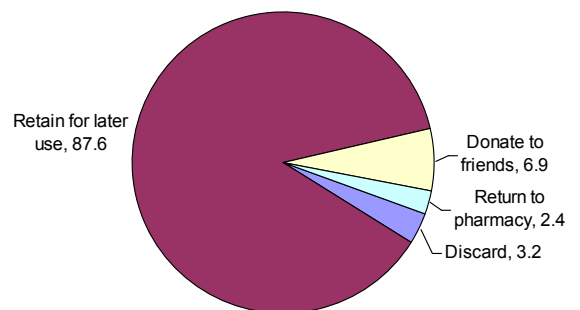


Figure 11: Response of the participant on the duration of antibiotics usage

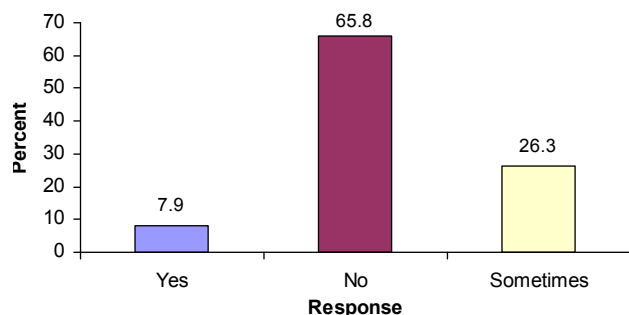


Figure 12: Response of the participant on monitoring of the expiry date before purchase of antibiotics

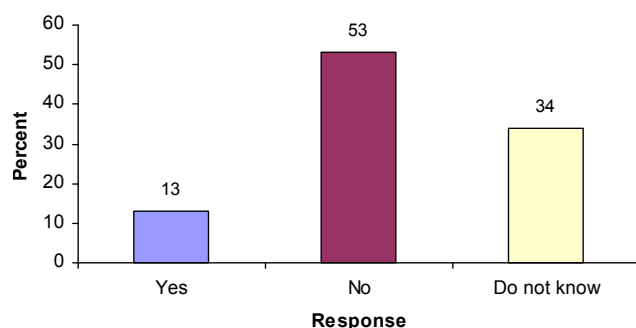


Figure 13: Response of the participant on experiencing adverse drug reactions

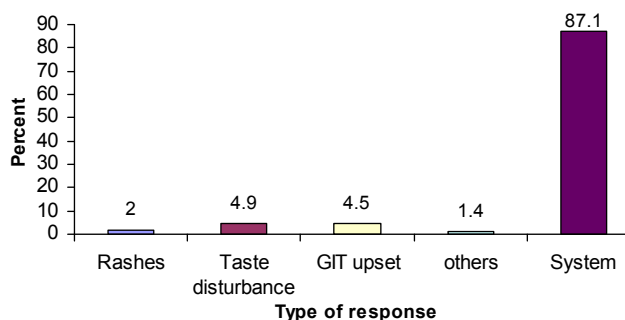


Figure 14: Response of the participant on specific adverse drug reactions

unethically in antibiotics selection. Underlying financial benefits may be the driving force for such practices. Apart from this, they were ignorant of their pivotal role in the health education (Barret, 2010). Community empowerment can effectively be achieved by improving the health education which must also be included in the curricula of mandatory education. Consequences of irrational use, if communicated may help to improve the responsibility level of the individuals.

There were some limitations to the study. Participants might not possess comparable experiences in antibiotic selections. Population part included in the study was highly educated compared to general public therefore an elaborated study may be performed to know the public beliefs regarding use of antibiotics. Respondents of the present study were bachelors, below 30 years of age having strong body defenses and thus, might have effectively tolerated any noxious responses to their therapies, hence might have reported the 'safe outcomes' of antibiotic usage. Quantitative records of antibiotic consumptions and leftovers were not enquired from the participants.

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