Journal of High Institute of Public Health 2019;49(2):97-105.

Original Article

Impact of a Mass Media Campaign on Adults' Knowledge and Attitudes towards Antibiotic Use

Nessrin A. El-Nimr [1 ¥], Hussien A. Elaswdi [2], Mohamed D. El-Borgy [3], Sunny A. Sallam [1]

1 Department of Epidemiology, High Institute of Public Health, Alexandria University, Egypt
2 Department of Epidemiology and Community Medicine, Faculty of Medicine, University of Misurata, Libya
3 Department of Health Administration and Behavioral Sciences, High Institute of Public Health, Alexandria University, Egypt

Abstract

Background & Objective(s): Self-medication with antibiotics is a worldwide problem and a major driver of the emergence of antimicrobial resistance. The objectives were to estimate the frequency, describe pattern and identify possible determinants of self-medication with antibiotics among adults in Misurata and to evaluate the impact of a mass media campaign on their knowledge and attitude regarding self-medication with antibiotics.

Methods: In the 1st phase, a cross sectional design was used and 277 adults accompanying patients attending the outpatient clinics of Misurata Central Hospital were interviewed using a predesigned structured questionnaire. Data about pattern of antibiotic use, knowledge and attitude was collected. In the 2nd phase, an intervention design (one group pretest post-test design) was used. A two months mass media campaign in the form of a radio program (one episode/week for eight weeks), a TV episode and written articles in Misurata University magazine about the correct use of antibiotics was launched and its effect was assessed after three months.

Results: Among adults using antibiotics, 39.5% used it as self-medication. Several defects in the pattern of antibiotic use was noticed including the duration of use, indication, and course completion. Almost two thirds had poor knowledge about antibiotics, while the majority had neutral or positive attitudes. The mean knowledge and attitude scores regarding antibiotics had significantly increased after the mass media campaign (from 9.03± 3.02 to 18.1± 4.21 and from 23.17± 5.11 to 25.81± 4.83, respectively).

Conclusion: The study highlighted the extent of inappropriate use of antibiotics and the potential effectiveness of using mass media campaigns in raising the public awareness about antibiotics.

Keywords: Antibiotics; attitude; awareness; mass media; self-medication.

Available on line at:
jhiphalexu.journals.ekb.eg

Print ISSN: 2357-0601
Online ISSN: 2357-061X

¥*Correspondence*:
Email: dr.elnimr@gmail.com

Suggested Citations: El-Nimr NA, Elaswdi HA, El-Borgy MD, Sallam SA. Impact of a mass media campaign on adults' knowledge and attitudes towards antibiotic use. JHIPH. 2019;49(2):97-105.

INTRODUCTION

The World Health Organization (WHO) has defined self-medication as: "The selection and use of medicines by individuals to treat self-recognized illnesses or symptoms". [(1)] Self-medication with antibiotics is widespread worldwide, and nearly 50% of the antibiotics used are purchased over-the-counter.[(2)] A systematic review of adult individuals in households of low- and middle-income countries indicated high prevalence (39%) of antimicrobial self-medication.[(3)] In Libya, the percentage of self-medication use was 24%. Nearly 50% of interviewed Libyans indicated they would take antibiotics for their own use without a prescription if they believed that they needed to.[(4)] Inappropriate use of antibiotics in humans, including in self-medication, and agriculture, is one of the drivers of the emergence of antimicrobial resistance.[(5)] In Libya, a study published in 2011 verified the existence of antibiotic resistance in hospitals and high resistance rates were observed among enteric bacteria against commonly used drugs.[(6)]

Studies have reflected the general public's lack of understanding regarding proper use of antibiotics.[(7, 8)] Local culture and traditions seem to play an important role in shaping people's beliefs about antibiotics.[(4)]

Mass media campaigns are used to expose high proportions of a population to health promotion messages, using the media as an educational tool.[(9)] The use of traditional mass media in health communication campaigns has the potential to transmit a behavior change message faster and farther than most other communication approaches.[(10)] Educational interventions focusing on the appropriate use of antibiotics by the public can be

successful especially when local context and barriers are adequately analyzed and addressed.[11]

The objectives of this study were to estimate the frequency and describe the pattern of self-medication with antibiotics among adults in Misurata city, to assess knowledge and attitude of adults regarding antibiotics, to identify factors associated with self-medication with antibiotics and to construct, implement and evaluate the impact of a mass media campaign on their knowledge and attitude regarding self-medication with antibiotics.

METHODS

The study was conducted in the Outpatient Department of Misurata Central Hospital which is the major hospital in Misurata city, Libya and receives patients from all levels of society and all city regions. The setting was selected because this was the culturally accepted way, since it is not culturally accepted to conduct a community based house hold survey, while conducting surveys in hospital settings is more acceptable. A cross-sectional design followed by an intervention approach (one group pre-test post-test design) were used. The target population comprised adults (18 years and above, both sexes, Libyan nationals and Misurata residents) accompanying patients attending the outpatient clinics. Those with medical education (physicians) or a related degree (pharmacists, dentists and nurses) and all support degrees were excluded.

For the cross-sectional phase, the sample size was calculated using Epi- Info Software version 7. Based on a 24% prevalence of self-medication with antibiotics[4], and a confidence limit of 5%, the minimum required sample size at 95% confidence level was 280 adults. There are ten outpatient clinics in Misurata Central Hospital. The sample was distributed equally between the clinics (28 subjects from each clinic). Adults accompanying patients who attend the hospital clinics were consecutively recruited till the required sample size was completed.

For the intervention phase, all subjects who had poor knowledge scores in the pre-test were included (155 participants).

A pre-designed, structured interviewing questionnaire was used to collect data from the study participants (pre-test). The questionnaire consisted of four sections.

- Section I included socio-demographic data such as age, gender, level of education, occupation, address and phone number.
- Section II included questions about the pattern of self-medication with antibiotics such as type of antibiotic used, indication and duration of use, completion of antibiotic course, who recommended self-medication with antibiotics, reasons for self-medication with antibiotics and the main source of information the participants depended on.
- Section III consisted of twenty seven 'yes or no' questions about knowledge related to antibiotic use including questions about the role or action of antibiotics, identification of antibiotics, proper way for antibiotic use (whether prescribed or self-medicated), antibiotic resistance and antibiotics side effects. A special scoring system was constructed to assess knowledge. A score of 'zero' was given for each incorrect answer, while a score of '1' was given for each correct answer. The total knowledge score was calculated by summing scores of all questions yielding a total score ranging from 0-27 and was classified into poor (<50% or < 14 points), fair (50%-<70% or 14- <19 points) and good (≥70% or ≥19 points) levels of knowledge.
- Section IV consisted of nineteen questions about attitudes related to antibiotic use and 10 questions about parental attitude toward antibiotic use in children (only for participants who have children). This section was divided into 5 categories: a) Attitude towards using antibiotics without prescription as self-medication, b) Attitude towards physician visit for diagnosis and treatment, c) Attitude towards antibiotic administration, d) Attitude towards reusing antibiotics and e) Parental attitude towards antibiotic use for their children. A three point Likert scale was used and a scoring system was constructed to assess attitude. The answer of each attitude question was given a score of '2' for a positive attitude, a score of '1' for a neutral attitude and a score of '0' for a negative attitude. The total attitude score was calculated by summing the scores of all questions yielding a total score ranging from 0-38 and was classified into negative (< 50% or ≤18 points), neutral (50%- < 70% or 19-26 points) or positive (≥70% or ≥27 points) attitudes. The total attitude score for participants who have children ranged from 0-20 and was classified as negative (< 50% or ≤ 9 points), neutral (50%- < 70% or 10-13 points) or positive (≥70% or ≥14 points) attitudes.

The questionnaire was designed after extensive literature review on the subject. With respect to the local culture, statements concerning knowledge about and attitudes towards self-medication with antibiotics were developed. For content validity, the knowledge and attitude questionnaire has been revised by three experts in health education who modified the questions accordingly to its final form.

Field testing of the questionnaire was carried out among 20 individuals who were not included in the sample to get their feedback on the clarity of the questions, to estimate the time to fill the questionnaire and to detect any difficulties that may arise during data collection and how to deal with them. Accordingly, modification in the format of some questions and changing some concepts were done. Obtaining the phone number to inform the participants about the time of the radio program, and the date to return for the post-test was very difficult for females due to cultural unacceptance and it was overcome by taking the phone number of a male relative (father, brother, husband, etc.). The results of the pre-test of the study were used to

construct the health promotion program (a two months mass media campaign). It consisted of a radio program, a TV episode and written articles in Misurata University magazine. "Double edged" was the title of the radio program and the subject of this program was the correct use of antibiotics. The educational content was based on the questions posed in the questionnaire. The program included eight episodes (10 minutes each) broadcasted through a Misurata local radio station. It was broadcasted at 18:30, a time assumed to be the most appropriate for people to listen to the radio and a rerun two times per week. To ensure that the participants have listened to the program, a brochure was given to them after the pre-test in which the exact time of the program and the date to return for the post-test was mentioned. At the end of radio program episodes, one episode was recorded for a Misurata TV channel, which was broadcasted through the Health and People program. In addition, articles about self-medication with antibiotics were written in two issues of the Misurata University magazine and distributed in the city (3000 off prints free). All the program episodes were re-recorded on a CD. Almost 1000 CDs were distributed randomly around the city.

To assess the impact of the intervention, participants with poor knowledge score were contacted by phone and were invited for the post-test and their knowledge and attitudes regarding self-medication with antibiotics were reassessed three months after the end of the program using the same data collection tool (knowledge and attitude questionnaire).

Statistical analysis

Statistical Analysis Software (SAS), Epi info, and Statistical Package for Social Sciences (SPSS) version 16 were used for data analysis. For quantitative variables, mean and standard deviation were calculated. A Chi-square (χ^2) test was used for analysis of categorical data. The 0.05 level was used as the cut off value for statistical significance. Multiple regression analysis was used to identify factors affecting self-medication with antibiotics, and factors affecting the adults' knowledge and attitudes regarding antibiotics use. A paired t test was used to compare the mean knowledge and attitude scores before and after the intervention.

Ethical considerations

The study was approved by the Institutional Review Board and the Ethics Committee of the High Institute of Public Health. The researcher complied with the International Ethical Guidelines for Epidemiological Studies. An informed verbal consent was obtained from all participants after explanation of the objectives and benefits of the research and confidentiality was ensured.

RESULTS

A total of 280 questionnaires were distributed, out of which 277 were completed (99%).The age of participants ranged between 18 and 73 years, with a mean of 32.62 ± 11.5 years and a median of 32 years and 175 participants (63.2%) were females. More than half of the participants were married (53.1%), 44.4% were single, 41.2% and 39.4% had secondary and university education, respectively. As for occupation, 25.6% and 24.5% were engaged in clerical work or were students, respectively.

The proportion of adults using antibiotics in Misurata during the previous 6 months was 58.5%. Among those who used antibiotics, 39.5% acquired/used antibiotics without prescription as self-medication. Reasons for practicing self-medication with antibiotics included minor illness that was considered not to be worthy of consulting a physician (37.5%), previous or prior experience (17.2%), confidence in the pharmacist (15.6%), friends' or relatives' advice (10.9%), unavailability of physicians (9.4%) and avoiding crowded waiting rooms of physicians (9.4% each). Sources of advices for self-medication with antibiotics were pharmacists (46.9%), self-decision (30.2%), the advice of relatives or friends (14.1%) and previous prescription (7.8%).

Table 1 shows that during the previous 6 months, for both prescribed and self-medicated antibiotics, the highest proportion of participants used antibiotics once (40.8% and 46.9%, respectively). The difference was not statistically significant. The proportion of participants who used the same antibiotic more than once during the previous six months was lower among participants with prescribed antibiotics (48%) than among those with self-medicated antibiotics (64.7%), with a statistically insignificant difference. The most commonly reported indications for prescribed antibiotics were toothache (23.5%), common cold (18.4%) and urinary tract infection (17.3%), while common cold (49.4%), toothache (20.3%), sore throat (17.2%) and tonsillitis (10.9%) were the most commonly reported indications for self-medicated antibiotics. The association between the indications for antibiotic use and the way of use (prescribed or self-medicated) was statistically significant (χ^2= 31.329, p= 0.002). The most common sources for obtaining prescribed antibiotics were private pharmacies (81.6%) and governmental pharmacies (18.4%), while self-medicated antibiotics were most commonly obtained from private pharmacies (76.6%) and private medicine cabinets (14.1%), with a statistically significant difference (χ^2= 21.155, p< 0.001).

The table also shows that the proportion of participants who completed the antibiotic course was higher (68.8%) among those with prescribed antibiotics compared to those with self-medicated antibiotics (31.2%). The difference was statistically significant [cOR = 2.27 (95% CI =1.19-4.33), χ^2= 6.33, p< 0.001]. The highest percent (54.6%) of those with prescribed antibiotics reported that they had been taking antibiotics for 4–7 days, while 59.4% of those with self-medicated antibiotics used the antibiotics for 1–3 days. This difference was statistically significant (χ^2= 25.48, p< 0.001). Amoxicillin and Amoxicillin-Clavulanate were the most commonly used antibiotics by

Table 1: Frequency, pattern and source of information about antibiotic use (prescribed and self-medication) among adults who used antibiotics during the previous 6 months (Misurata, Libya)

Frequency, pattern and source of information	Way of using antibiotics		Total (n=162) No. (%)	χ^2 (*p*)
	Prescribed (n=98) No. (%)	Self-medicated (n=64) No. (%)		
Frequency of a course of antibiotic use during the previous 6 months				
Once	40 (40.8)	30 (46.9)	70 (43.3)	
Twice	35 (35.7)	19 (29.7)	54 (33.3)	1.104
Three times	10 (10.2)	8 (12.5)	18 (11.1)	(*p*= 0.776)
> 3 times	13 (13.3)	7 (10.9)	20 (12.3)	
Used the same antibiotic (n=92)[a]				
Yes	28 (48.3)	22 (64.7)	50 (54.3)	2.332
No	30 (51.7)	12 (35.3)	42 (45.7)	(*p*= 0.127)
cOR (95% CI)	0.51 (0.21-1.22)			
Indications for antibiotic use [b]				
Common cold	18 (18.4)	31 (49.4)	49 (33.8)	
Toothache	23 (23.6)	13 (20.2)	36 (21.7)	
Sore throat	14 (14.3)	11 (17.2)	25 (15.4)	
Tonsillitis	12 (12.2)	7 (10.9)	19 (11.6)	
UTI	17 (17.3)	0 (0.0)	17 (8.4)	
Otitis media	4 (4.1)	1 (1.6)	5 (3.1)	31.329
URTI	3 (3.1)	1 (1.6)	4 (2.5)	(*p*= 0.002) *
Others[c]	7 (7.0)	0 (0.0)	7 (3.5)	
Sources of obtaining antibiotics				
Private pharmacy	80 (81.6)	49 (76.5)	129 (79.6)	
Governmental pharmacy	18 (18.4)	4 (6.3)	22 (13.6)	21.155
Medicine cabinet	0 (0.0)	9 (14.1)	9 (5.6)	(*p*< 0.001) *
Relatives or friends	0 (0.0)	2 (3.1)	2 (1.2)	
Completion of antibiotic course				
Yes	64 (68.8)	29 (31.2)	93 (57.4)	6.33
No	34 (49.3)	35 (50.7)	69 (42.6)	(*p*< 0.001) *
cOR (95% CI)	2.27* (1.19-4.33)			
Duration of antibiotic intake				
1-3 days	22 (22.4)	38 (59.4)	60 (37.0)	25.480
4-7 days	53 (54.1)	23 (35.9)	76 (46.9)	(*p*< 0.001) *
> 7 days	23 (23.5)	3 (4.7)	26 (16.1)	
Types of antibiotics used	n=53 [d]	n=31 [d]	n=84 [d]	
Amoxicillin and Clavulanate (Augmentin) [R]	14 (26.4)	17 (54.8)	31 (36.9)	
Amoxicillin (Amoxil) [R]	22 (41.5)	8 (25.8)	30 (35.7)	
Azithromycin (Zomax) [R]	5 (9.4)	3 (9.7)	8 (9.5)	
Ciprofloxacin	4 (7.5)	2 (6.5)	6 (7.1)	
Others[e]	8 (15.1)	1 (3.2)	9 (10.7)	
Source of information				
Physician	61 (62.2)	8 (12.6)	69 (42.6)	
Leaflet	21 (21.4)	18 (28.1)	39 (24.1)	61.839
Pharmacist	13 (13.3)	16 (24.0)	29 (17.8)	(*p*<0.001) *
Previous experience	0 (0.0)	13 (20.3)	13 (8.0)	
Relatives of friends	0 (0.0)	9 (14.1)	9 (5.6)	
Internet	3 (3.1)	0 (0.0)	3 (1.9)	

[a]% calculated among those who used antibiotics more than once
[b] Responses are not mutually exclusive
[c] Diarrhea, pelvic inflammatory diseases, postoperative, acne, peptic ulcer, foot infection
[d] % calculated among participants who recalled the name of the antibiotic
[e] Ceftriaxone injection (Rocephin)[R] ,Procaine penicillin, Furadantin, Co-trimoxazole, Erythromycin
cOR, Crude odds ratio; CI, Confidence interval
* Significant (*p*< 0.05)

both groups (41.5% and 26.4% among those who took prescribed antibiotics and 25.8% and 54.8% among those with self-medicated antibiotics, respectively). Finally, participants who took prescribed antibiotics mostly knew about antibiotics through physicians (62.2%) while self-medicating participants were least likely to know about antibiotics through physicians (12.5%). This difference was statistically significant (χ^2= 61.833, *p*< 0.001). The total knowledge score of adults regarding antibiotics ranged between 0 and 26 with a mean score of 12.47± 5.161 points. The highest percent (62.5%; 173 participants) had poor knowledge levels with a score between 0 – 13 points. The mean attitude score was 24.3 ±5.4 points and ranged from 10-36 points. Only 35.8% had a positive attitude (Figure1). Table 2 describes the logistic regression results of the factors affecting the adults' knowledge

(model a) and attitudes (model b) regarding antibiotics as the dependent variables. Three variables were significant in affecting participants' knowledge. The first was age. Adults with good and fair knowledge were 4.6 times more likely to be 30 years and above compared to those with poor level of knowledge (OR= 4.6, CI= 2.238-9.587). The second and third variables were the level of education and occupation. Adults with good and fair knowledge were almost three times more likely to have university education and to be unemployed compared to those with poor level of knowledge (OR= 2.939, CI= 1.552-5.564 and OR= 2.9, CI= 1.379-6.365, respectively). Two variables were found to significantly affect participants' attitudes: gender (OR= 0.415, CI= 0.186-0.923) and the total knowledge score (OR= 0.360, CI= 0.150-0.868).

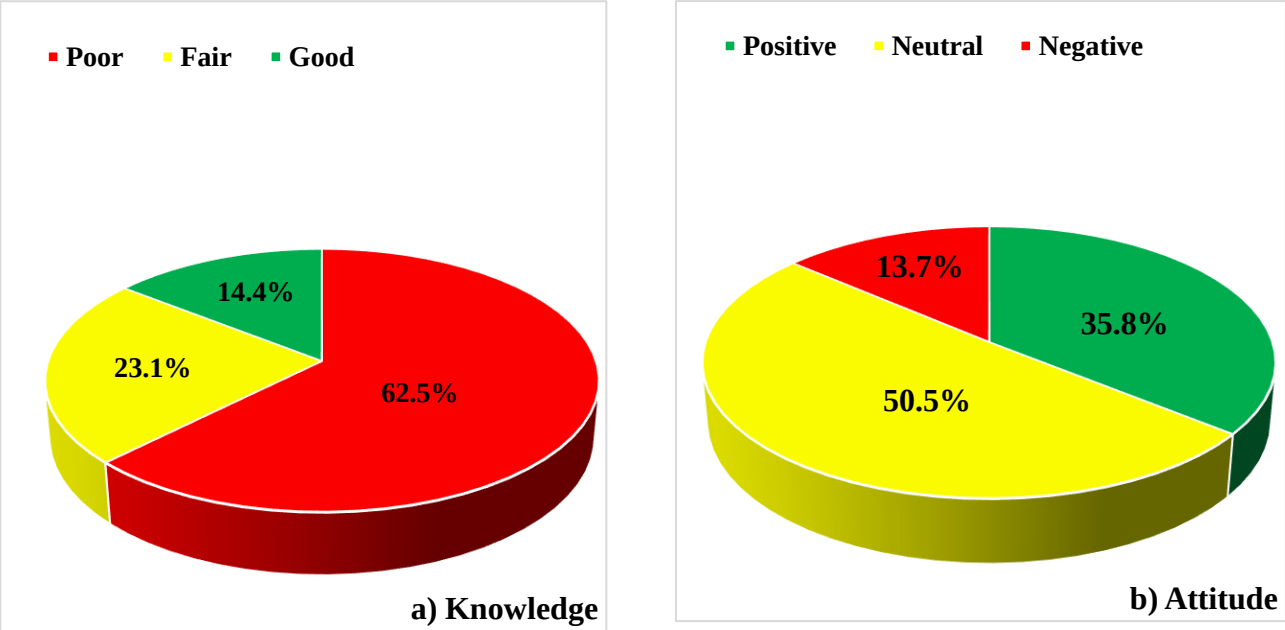

Figure 1: The total knowledge and attitude scores of adults regarding antibiotic use (Misurata, Libya)

Table 2: Logistic regression analysis results for the factors affecting the adults' knowledge (model a) and attitude (model b) regarding antibiotic use (Misurata, Libya)

Independent variables	Coefficient β	*p*	Odds ratio	95% confidence interval
Model a: Knowledge regarding antibiotics				
Age (30 years and above *vs* < 30 years)	1.533	<0.001*	4.632	2.238-9.587
Level of education (university and above *vs* below university)	1.078	0.001*	2.939	1.552-5.564
Occupation (unemployed *vs* employed)	1.092	0.005*	2.981	1.379-6.365
Constant	-6.033	<0.001		
Model b: Attitude towards antibiotic use				
Gender (females *vs* males)	-0.880*	0.031*	0.415	0.186-0.923
Knowledge score (poor *vs* fair and good)	-1.021*	0.023*	0.360	0.150-0.868
Constant	3.026	0.081		

* Significant (p<0.05)

It could be noticed from table 3 that starting from 20 years of age the proportion using antibiotics as self-medication increased by age. The difference was not statistically significant. The percentage of male participants using antibiotics as self-medication (51.5%) was higher than females (31.2%), with a statistically significant difference (χ^2= 6.721, *p*= 0.01). The highest proportion of self-medication with antibiotics was among widowers (75%), followed by single participants (43.1%). Among participants who had university and postgraduate education, 54.5% and 60% used prescribed antibiotics, while 45.5% and 40% practiced self-medication. It is obvious from the table that retired participants (100%) were the highest group using antibiotics without

prescription followed by academic staff (62.5%). The lowest proportion (22.2%) was among housewives. The association between all these factors and the way of using antibiotics (prescribed or self-medicated) was not statistically significant. It is clear from the table that the highest percentage of self-medication was found among participants with poor levels of knowledge (44.3%). The association between the level of knowledge and the way of using antibiotics was not statistically significant.

Table 3: Distribution of adults using antibiotics according to their sociodemographic characteristics, their knowledge and attitude scores and the way of using antibiotics (Misurata, Libya)

Sociodemographic characteristics	Way of using antibiotics		Total	χ^2
	Prescribed (n=98) No. (%)	Self-medicated (n=64) No. (%)		
Age (in years)				
< 20	5 (41.7)	7 (58.3)	12	6.781 (p= 0.237)
20-	38 (69.1)	17 (30.9)	55	
30-	38 (63.3)	22 (36.7)	60	
40-	14 (50.0)	14 (50.0)	28	
50-	3 (50.0)	3 (50.0)	6	
60+	0 (0.0)	1 (100.0)	1	
Gender				
Male	32 (48.5)	34 (51.5)	66	6.721 (p= 0.01*)
Female	66 (68.8)	30 (31.2)	96	
Level of education				
Illiterate	1 (100.0)	0 (0.0)	1	4.436 (p= 0.62)
Read and write	1 (100.0)	0 (0.0)	1	
Primary	4 (80.0)	1 (20.0)	5	
Preparatory	5 (83.3)	1 (16.7)	6	
Secondary	42 (61.8)	26 (38.2)	68	
University	36 (54.5)	30 (45.5)	66	
Postgraduate	9 (60.0)	6 (40.0)	15	
Occupation				
Clerk	26 (55.3)	21 (44.7)	47	7.005 (p= 0.428)
Student	23 (63.9)	13 (36.1)	36	
Teacher	22 (59.5)	15 (40.5)	37	
House-wife	14 (77.8)	4 (22.2)	18	
Engineer	6 (75.0)	2 (25.0)	8	
Academic staff	3 (37.5)	5 (62.5)	8	
Merchant	4 (57.1)	3 (42.9)	7	
Retired	0 (0.0)	1 (100.0)	1	
Total knowledge score				
Poor	58 (55.7)	46 (44.3)	104	2.730 (p= 0.255)
Fair	23 (69.7)	10 (30.3)	33	
Good	17 (68.0)	8 (32.0)	25	
Total attitude score				
Negative	10 (37.1)	17 (62.9)	27	26.406 (p< 0.001*)
Neutral	40 (50.0)	40 (50.0)	80	
Positive	48 (87.3)	7 (12.7)	55	

*Significant (p<0.05)

The highest percentage of self-medication was found among participants with negative attitude scores (62.9%). It was noted that the proportion using prescribed antibiotics increases with the attitude score. This association was statistically significant (χ^2 = 26.406, p< 0.001). Of the 173 pre-intervention participants who had poor level of knowledge, 155 (89.6%) completed the posttest questionnaire. The dropout/attrition rate was 10.4%. Table 4 shows that the high knowledge score increased by 35.3% and the poor/low knowledge scores decreased by 47% after the intervention. The mean knowledge score increased from 9.03± 3.02 before the intervention to 18.1 ± 4.21 after the intervention. This increase was statistically significant (paired t-test= 30.07, p< 0.001). The percent of positive attitude increased by 39.8% and the percent of negative attitude decreased by 2.2% after the intervention. The mean attitude score increased from 23.17 ± 5.11 before the intervention to 25.81 ± 4.83 after the intervention. This increase was statistically significant (paired t-test = 20.33, p< 0.001).

Table 4: Distribution of adults by their knowledge and attitude scores regarding antibiotic use before and after the intervention program (Misurata, Libya)

Knowledge and attitude scores	Before (n=277)	After (n=155)	% change
Knowledge score			
Poor	173 (62.5)	24 (15.5)	- 47.0
Fair	64 (23.1)	54 (34.8)	11.7
Good	40 (14.4)	77 (49.7)	35.3
Mean ± SD [a]	9.03±3.02	18.1±4.21	
Paired t test [a]	30.07 (p<0.001*)		
Attitude score			
Negative	38 (13.7)	16 (11.5)	-2.2
Neutral	140 (50.5)	18 (12.9)	-37.6
Positive	99 (35.8)	105 (75.6)	39.8
Mean ± SD [a]	23.17±5.11	25.81±4.86	
Paired t test [a]	20.33 (p<0.001*)		

* Significant (p<0.05); SD, standard deviation
[a] Values calculated for participants in the intervention group only (n=155)

DISCUSSION

Antibiotic resistance is rising to dangerously high levels worldwide. The emergence and spread of resistance is made worse where antibiotics can be bought for human or animal use without a prescription. In contrast with developed countries, where antibiotics are largely restricted to prescription-only use, antibiotics are often over-prescribed by health workers and over-used by the public in countries without standard treatment guidelines.(12) Mass media interventions can produce positive health changes on a large scale by enforcing positive health behaviors among individuals. (9)

Despite the Libyan antimicrobial policy that restricts the dispensing of antibiotics without prescription, the study revealed that the percentage of antibiotic usage during the previous 6 months of the study was 58.5%, and the rate of self-medication was 39.5%. The rate of self-medication was less than that reported in Alexandria, Egypt, 2015 (53.9%). (13)

On the other hand, the rate was higher than that reported in Cairo, Egypt, 2013 (29.8%)(14) and Kuwait, 2015 (27.5%).(15) This substantiates the fact that there is wide variation in self-medication prevalence. The variation between and within countries is due to the use of different definitions of self-medication, differences in the health seeking behavior of people, socio- cultural factors, relative prevalence and the seasonal variation of illnesses.(16) The prevalence found in the present study was higher than that reported in the Euro-Mediterranean region study between 2004 and 2005 including Libya (24%).(4) This finding indicates a potential increase in self-medication with antibiotics among Libyans.

In the present study, about half of self-medicating participants would take antibiotics for a common cold, which demonstrates the public perspective regarding the effectiveness of antibiotics in treating such conditions, making the misuse of antibiotics a repeated behavior which is detrimental in an era of antibiotic resistance. The proportion of people reporting using antibiotics for common cold was in agreement with a study in Iran, 2013 (48%).(17) Physicians continue to prescribe antibiotics in avoidable cases.(18) They would thus contribute in a way to antibiotic abuse. In the present study, there was even abuse in the prescribed medications, which points to the need for revising the educational programs for general practitioners.
In the present study, the majority of respondents who self-medicated identified private pharmacies as the main source of medicine and information. Generally, pharmacy staff do not inquire about patient's allergies, do not explain potential side effects, and dispense parenteral antibiotics for home use, which increases the potential for adverse events. Furthermore, financial concerns often guide selection of low-cost antibiotics and in short durations of treatment. This finding was consistent with the results of other studies.(19,20) In addition, increased availability of over the counter antibiotics at the pharmacy despite the fact that this is against the law, is an important component contributing to self- medication with antibiotics. This gray area of pharmacy practice deserves further investigations to know the relative importance of over-the-counter sales.
The current study showed that Amoxicillin-Clavulanate tablets followed by Amoxicillin were the most common antibiotics used in self-medication and could be explained by the fact that they are cheap, easily accessible, have a good safety profile, with broad spectrum antimicrobial activity and a high rate of prescription by physicians led people to recognize these agents. This finding was in agreement with other studies.(17, 21, 22)
Many studies reported that age and level of education were among the factors associated with self-medication with antibiotics.(23) In the present study, age and level of education were not associated with self-medication with antibiotics. The current results showed that self-medication with antibiotics was significantly higher in males than female respondents, which was in agreement with the

results reported by other studies.[24, 25] However, a number of researchers found no differences between males and females.[26, 27]

The current findings demonstrated that the general public lacks knowledge and harbors some key misunderstandings about antibiotics, as almost two thirds of the respondents had poor knowledge about antibiotics. In terms of attitude toward antibiotic use, the majority of participants had neutral or positive attitudes.

The present finding revealed a significant increase in the mean knowledge and attitude scores of participants regarding antibiotics after the mass media campaign. These results were in agreement with the findings of Mainous et al.,[28] This finding demonstrates the importance of public education campaigns as a successful tool for raising public awareness about antibiotics.

Limitations of the study

As the study was conducted in a local hospital setting, the findings may not be generalized to the whole country or other sectors of health care. First, only Misurata residents were surveyed. Second, more females were included in the study than males, which was not intentional; the plan was not to recruit higher numbers of either gender. The high female-to-male ratio found in this study is not truly representative of the actual gender distribution in the population. It is probable that females accompany patients to the hospital visits at a higher rate than males. Third, the intervention was relatively short-lived to see a substantial change in attitude. Future interventions may benefit from longer periods.

CONCLUSION & RECOMMENDATIONS

The study highlighted the extent of inappropriate use of antibiotics especially their use for treating viral infections and for disease prevention, with inadequate antibiotic knowledge and neutral attitude. Predictors of adults' knowledge were age, level of education and employment status while gender and level of knowledge were found to be the predictors affecting the adults' attitudes. Significant changes in knowledge and attitude occurred during 3 month period following the health promotion mass media program.

Improving communication about antibiotic appropriateness between healthcare professionals and patients in addition to policies for auditing antibiotic prescriptions in the healthcare facilities and monitoring sources of obtaining antibiotics through enforcing strict regulations are needed. Consistent and multifaceted intervention strategies concerning appropriate antibiotic use and the problems of antibiotic resistance are required in order to correct widespread misconceptions on antibiotic use.

FUNDING

Al-Hekma Hospital sponsored the mass media campaign.

Conflict of Interest: None to declare.

REFERENCES

1. WHO. Guidelines for the regulatory assessment of medicinal products for use in self-medication. Geneva: WHO; 2000. 31p.
2. Högberg LD, Muller A, Zorzet A, Monnet DL, Cars O. Antibiotic use worldwide. Lancet Infect Dis. 2014;14:1179–80.
3. Ocan M, Obuku EA, Bwanga F, Akena D, Richard S, Ogwal-Okeng J, et al. Household antimicrobial self-medication: a systematic review and metaanalysis of the burden, risk factors and outcomes in developing countries. BMC Public Health. 2015;15(1):742.
4. Scicluna EA, Borga MA, Gu¨rb D, Rasslan O, Taher I, Redjeb S. Self medication with antibiotics in the ambulatory care settings within the Euro-Mediterranean region; results from the ARMed project. J Infect Public Health. 2009;2:189-97.
5. Tangcharoensathien V, Chanvatik S, Sommanustweechai A. Complex determinants of inappropriate use of antibiotics. Bull World Health Organ. 2018;96:141–4.
6. Ghenghesh KS, Rahouma A, Tawil K, Zorgani A, Franka E. Antimicrobial resistance in Libya: 1970-2011. Libyan J Med. 2013;8:1-8.
7. Ling Oh A, Hassali MA, Al-Haddad MS, Syed Sulaiman SA, Shafie AA, Awaisu A. Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang. Malaysia. J Infect Dev Ctries. 2011; 5 (5): 338-47.
8. Barah F, and Goncalves V. Antibiotic use and knowledge in the community in Kalamoon, Syrian Arab Republic: a cross-sectional study. East Mediterr Health J. 2010;16(5):516-21.
9. Wakefield MA, Laken B, Hornik RC. Use of mass media campaigns to change health behavior. The Lancet. 2010;376: 1261-71.
10. Carson KV, Ameer F, Sayehmiri K, Hnin K, van Agteren JE, Sayehmiri F, et al. Mass media interventions for preventing smoking in young people. Cochrane Database Syst Rev .2017; 6.
11. Huttner H, Goossens T, Verheij, Harbarth S. Characteristics and outcomes of public campaigns aimed at improving the use of antibiotics in outpatients in high-income countries. The Lancet Infectious Diseases. 2010;10(1):17–31.
12. WHO. Antibiotic resistance. Geneva: WHO; 2018. Fact sheet.
13. El-Nimr NA. Wahdan IM, Wahdan AM, Kotb RE. Self-medication with drugs and complementary and alternative medicines in Alexandria, Egypt: Prevalence, patterns and determinants. East Mediterr Health J. 2015;21(4):256-65.
14. Elmasry A, Baker A, Kolkailah D, Khaskia M. Pattern of antibiotic abuse - a population based study in Cairo. Egypt J Chest Dis Tuberc. 2013;62:189-95.
15. Awad A, and Aboud E. Knowledge, attitude and practice towards antibiotic use among the public in Kuwait. PLOS ONE. 2015; 2:1-15.
16. Saengcharoen W, Lerkiatbundit S, Kaewmang, K. Knowledge, attitudes, and behaviors regarding antibiotic use for upper respiratory tract infections: a survey of Thai students. Southeast Asian J Trop Med Public Health. 2012;43(5):1233-44.
17. Heidarifar R, Koohbor M, Kazemian Mansourabad M, Mikaili P, Sarahroodi S. Self-medication with Antibiotics among Iranian Population in Qom State. Journal of Scientific and Innovative Research. 2013;2(4):785-9 .
18. Imanpour S, Nwaiwu O, McMaughan DK, DeSalvo B, Bashir A. Factors associated with antibiotic prescriptions for the viral origin diseases in office-based practices, 2006–2012. JRSM Open. 2017;8(8).
19. Shah S, Hamna A, Rehan A, Najeeb S. Self-medication with antibiotics among non-medical university students of Karachi: a cross-sectional study. BMC Pharmacology and Toxicology. 2014;15:74.
20. Shehadeh M, Suaifan G, Darwish RM, Wazaify M, Zaru L, Alja'fari S. Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. Saudi Pharmaceut J. 2012;20(2):125–33.

21. Eystathios S, Panagiotis M, Athanasia P, Aristofanis G, George Matzouranis, Christos P. Self-medication with antibiotics in rural population in Greece: a cross-sectional multicenter study. BMC Family Practice. 2010;11:58.
22. Khaled Al, Abdulkarim A, Noohu K, Sirajudeen A. Misuse of antibiotics and awareness of antibiotic hazard among the public medical professionals in Thamar Province, in Republic of Yemen. International Journal of Comprehensive Pharmacy. 2013; 1: 39
23. Afolabi AO. Factors influencing the pattern of self-medication in an adult Nigerian population. Ann Afr Med. 2008; 7(3): 120–7.
24. Widayati A, Suryawati S, de Crespigny C, Hiller JE. Self-medication with antibiotics in Yogyakarta City, Indonesia: a cross-sectional population based survey. BMC Res Notes. 2011; 4: 491-9.
25. Ramalhinho, I, Cordeiro C, Cavaco A, Cabrita J, Assessing determinants of self-medication with antibiotics among Portuguese people in the Algarve Region. Int J Clin Pharm. 2014; 36: 1039–7.
26. Jose J, Jimmy B, Alsabahi AG, Al Sabei GA. A study assessing public knowledge, belief and behavior of antibiotic use in an Omani population. Oman Med J. 2013; 28: 324–30 .
27. Ivanovska V, Zdravkovska M, Bosevska G, Angelovska B. Antibiotics for upper respiratory infections: Public knowledge, beliefs and self-medication in the Republic of Macedonia. Prilozi. 2013; 34: 59-70 .
28. Mainous A, Diaz V, Carnemolla M. A community intervention to decrease antibiotics used for self-Medication among Latino adults. Ann Fam Med. 2009;7(6):520–6.