

Assessment of Parents Perception concerning children's Antibiotic Use by PAPA Scale

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Abstract: Antibiotics overuse and misuse are major health issues worldwide. These misuse and overuse cause the development of bacterial resistance, increasing the burden of health issues, and rising the costs of health services. However, the PAPA scale can assist in discovering factors influencing antibiotic use and parental practice in terms of administering antibiotics to their children. This study aims to assess parents' knowledge, behaviors, adherence, information seeking, and antibiotic resistance awareness using the PAPA scale. A descriptive cross-sectional study was conducted involving 283 parents from July 2018 to January 2019. A self-administered questionnaire was distributed to parents who attended the out-patient pediatrics clinics at Benghazi Medical Center and the Children Hospital. Most of the parents had poor knowledge and beliefs, poor antibiotics use behaviors and poor awareness of antibiotic resistance. Only 16.6% of the parents knew that antibiotics could cure only bacterial infections; whereas the majority of them thought that antibiotic would treat all kinds of infections. However, most of the parents get their information about antibiotics use adherence from healthcare providers. This study concluded that there was a need for more parents' knowledge and awareness of antibiotics given to their children. Moreover, the parents need to increase awareness about the resistance of bacteria.

Keyword: PAPA scales, antibiotic resistance, parent perceptions, antibiotic usage for children.

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I. Introduction

In the pre-antibiotic era of the early 1900s, people had no medicines to the invading micro-organism and this resulted in a horrible public health dilemma with high morbidity and mortality. Antibiotics were one of the most important medical discoveries at that time. This discovery led to a decrease in morbidity and mortality. Thus, antibiotics became the most commonly and successfully used drugs; as time went on this success ended in a great trouble called antibiotic resistance [1-3].

Many studies reported a growing antimicrobial resistance; this led to antibiotics change from being the medical revolution to a major health problem [4-9]. The antibiotic resistance is due to many contributing factors; the overuse and misuse of antibiotics are the main causes of the increases in antibiotic resistance. In the pediatrics outpatient clinics, approximately 30% - 50% of antibiotic courses prescribed are not needed. Most of this unnecessary use is for the treatment of acute upper respiratory infections which mainly due to viral etiology [1,8,10].

Misuse and overuse of antibiotics in children are due to various influencing factors. The factors contributing to the misuse/overuse of antibiotics are (1) psychosocial factors, such as behaviors, beliefs, and attitudes (e.g., self-medication & over-the-counter medication), (2) parents pressure, often documented by doctors (3) demographic characteristics (e.g., socioeconomic status, education levels), (4) and lack of health education (5) patients' failure to follow doctors' advice on how to use antibiotics efficiently [4-6,11-12]. In addition to the presence of a great number of unnecessary prescriptions issued including incorrect antibiotic dosage and indication. This will lead to an increased exposure of antibiotics in cases of nonpathogenic microorganisms. Finally, this will result in the appearance of bacterial resistance [7,11,13].

However, it is well proved now that guiding the proper use of antibiotics is the ideal way of reducing drug resistance. Antibiotic use strategy should focus on antibiotics prescribing only when it is necessary for the proper time and dosage. By applying this strategy we will reach our goal to limit antibiotic resistance [1-2,13-14].

Many studies were conducted addressing the knowledge, attitude, beliefs, and practice of communities concerning antibiotics use in order to enhance the general awareness of their population. Thus reducing the undesirable effects of antibiotic misuse. These studies have provided the framework for the development of the Parental Perception on Antibiotics Scale 'The PAPA Scale' [3,5-6,11]. This scale aims to assess the factors influencing parents to use antibiotics for their children. This may help improve public knowledge of antibiotics use and hence, take a step toward controlling antibiotics resistance [3,5-6,11].

In the Middle Eastern and North African countries including Libya, obtaining antibiotics is easy and it is considered an over the counter drug. As there are no restrictions on using such medications and could be bought without a prescription [3-4,6,15]. The behaviors associated with the overuse of antibiotics may include antibiotics self-medication [6,9,12].

Furthermore, studies regarding public knowledge of antibiotics use and self-medication are rare in Libya. Where there are no reports on parents' behaviors regarding antibiotics use among Libyan children. As a result, it is important to measure this psychosocial issue in Libya. **The aim of this study** is to assess parents' knowledge, attitude and practice of antibiotics use by PAPA scale; and correlates it with the demographic characteristics.

II. Material and Methods

This descriptive study was carried out on parents who attended outpatient pediatrics clinic at a teaching hospital in Benghazi. A total of 283 parents subjects (both mothers and fathers) were for in this study.

Study design sample size

A cross-sectional descriptive study was performed in the outpatient pediatrics clinics at the Children Hospital and Benghazi Medical Centre, from July 2018 to January 2019.

Sample size: After taking into consideration the population size of the studied hospitals during the last 3 months (about 3600 patients who attended outpatient pediatrics clinic at both hospitals); the sample size was calculated by Epi-Info 7 at 5% margin of error, 95% and confidence level. The sample size was 345 which covered parents of all geographical areas of Benghazi. The participants should have at least one child aged less than 12 years, also they agreed to participate in the study.

Data collection and PAPA scale instrument

Primary data was collected by questionnaires. Delivery and collection of the self-administered questionnaires were used in this research. The first page of a questionnaire was a summary description of the aim of the study and included a consent form signed by parents. The questionnaire designed based on 'Parental Perception on Antibiotics (PAPA) scale' which has been developed and written by Arwa Alumra in 2014 [3,6]. We obtained permission to use the PAPA scale in our study from the developer, Arwa Alumra.

The questions in the questionnaire were divided into six sections. Section 1 was socio-demographic characteristics such as gender, age and level of education. Section 2 was parents' knowledge and beliefs which included 10 questions. Section 3 was parents' behaviors which included five questions. Section 4 was sources of information about antibiotics which included six questions. Section 5 was adherence which included six questions, and the last section was awareness about antibiotics resistance which included 4 questions. [3,11].

2.3 Measures

Knowledge/beliefs, behaviors, information sources, adherence, and awareness of antibiotic resistance were determined through the analysis of data obtained from the PAPA scale questions. Responses to questions are measured on a 5-point Likert scale (strongly disagree=1, disagree=2, I do not know=3, agree=4, strongly agree=5). Correct responses to PAPA scale's questions were (strongly disagree and disagree,) which means a good level (mean range from 1 to 2.4). While incorrect responses about PAPA scale's questions were (don't know, agree and strongly agree) which means a poor level (mean range from 2.5 to 5) [3,6,11].

2.4 Data analyses

Data analysis was executed using the Statistics Package Social Science (SPSS) program version 18. Mean, frequency, distribution table, and cross tabulation were used to describe and compare variables. The relationship between parents' information about antibiotics and variables such as education level and age investigated by using Chi-square test.

III. Result&Discussion

283 questionnaires out of 345 distributed were filled completely and collected which gives the response rate of 82%.Sixty-six percent of the respondents were mothers.Some demographic differences were clear between mothers and fathers in the sample. In respect to age, the average mothers' age was less than 31 years accounted for 51.1%. Approximately half of the responded fathers fall within the age range of 41-50 years. In addition, high diplomas and bachelor degree were more evident in mothers (62.4%), while most fathers in the study have high school or middle diploma.

In our study a high level of antibiotics yearly use among most of the children was observed; 84.5% of them used it at least once a year; as shown in Figure (1). Our result is in agreement with a Saudi Arabian study; it stated that more than half of the children had taken antibiotics at least once a year [6].

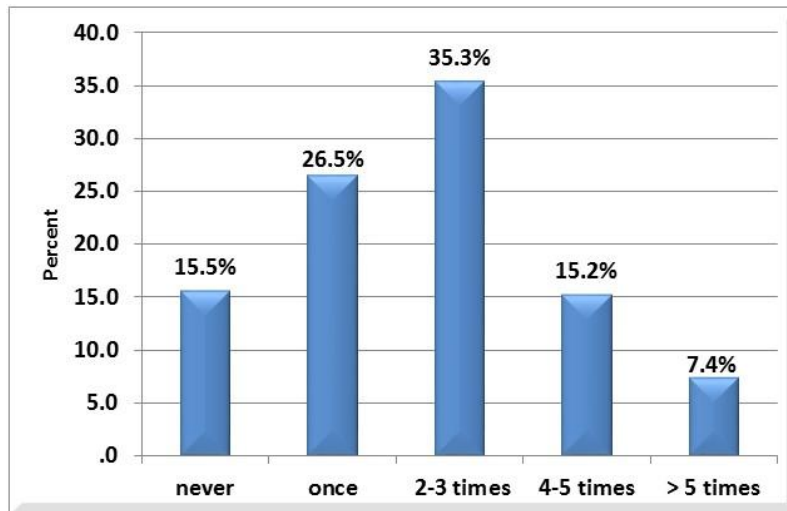


Figure (1): antibiotic usage per year among children according to their parents

Assess parental perceptions regarding antibiotics by PAPA scale.

Figure (2) showed that parents have confidence in physicians, nurses, and pharmacist as they are the best sources to obtain information on antibiotics used. Similar results were found in studies conducted in Greece, China and USA [10-11,14]. Therefore, pediatric clinics should be a center of knowledge distribution to inform parents to the danger of misuse and side effects of the antibiotic; physicians, nurses and pharmacist should play a leading role in such setting to enhance the benefit of parents' trust.

In addition, more than half of the parents in our study agreed that antibiotics' information came from their previous experience. This emphasizes the importance of health care providers to offer quality information to correct any misuse and promote positive knowledgeable experiences.

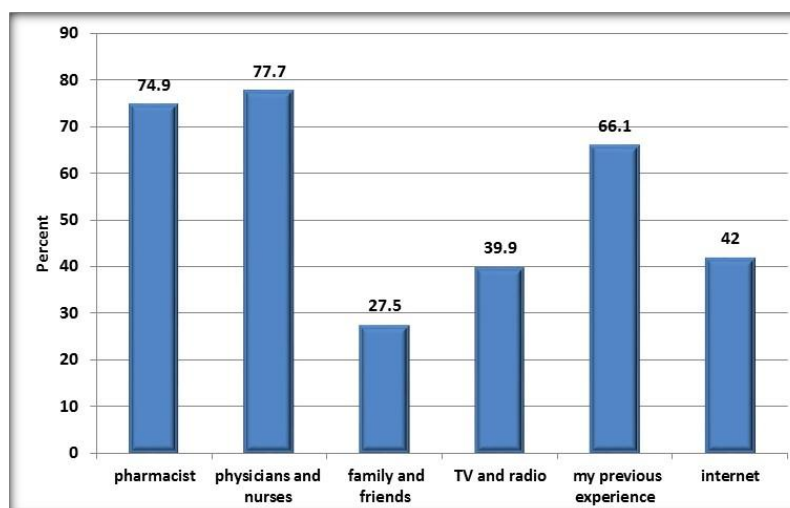


Figure (2): Sources of information about antibiotic

N.B: Some questions had multiple options for the respondents to select; therefore, the sum of the percentages is not always 100%.

Evaluating parental knowledge and beliefs

The results of our research assisted in evaluating parents' antibiotic knowledge. The level of knowledge and beliefs were poor among 83.4% of the parents with a mean of (3.2); this points toward poor knowledge about antibiotics. The result is similar to studies conducted in India and Malaysia which reported 72% and 69.1% respectively [1,5].

Table (1) shows the association between respondents' socio-demographic characteristics and knowledge & beliefs level. Differences in perception regarding antibiotic information were noted when responses were stratified by gender ($P < 0.05$) and educational level ($P < 0.05$). Poor knowledge level was detected in fathers as well as in parents with low educational level. About 67% of parents with master or PhD degree knew the right knowledge and beliefs of antibiotic use compared to 21.2% of parents who have high diplomas/bachelor, 4% of parents who have high school/middle diploma degree. Similar results have been documented in other studies [1,5,15].

In knowledge and beliefs section; 30% of parents responded correctly to the answers for the statement; "If my child has a cold or coughs it is best to get an antibiotic to get rid of it." Only 32% of parents did not believe that antibiotics have cured their child's cold symptoms. Moreover, 34% of parents responded correctly to the answers for the statement "antibiotics are helpful in treating common colds among children". These percentages were lower than the results percentage of recent research in the United States [11]. These findings suggest efforts increase awareness of parents' perceptions should be targeted to overcome the problem of misuse and overuse of antibiotics.

Table (1): Association of Socio-demographics and Knowledge and beliefs level Using PAPA scale (n=283)

| Socio- demographic characteristics | Knowledge and beliefs level | | *P value |
|---|-----------------------------|--------------|----------|
| | Good No. (%) | Poor No. (%) | |
| Age group in years | | | |
| Less than 31 | 17 (15.9%) | 90 (84.1%) | 0.1 |
| 31-40 | 19 (19.8%) | 77 (80.2%) | |
| 41-50 | 9 (12.2%) | 65 (87.8%) | |
| above 50 | 2 (33.3) | 4 (66.7%) | |
| Gender | | | |
| Fathers | 7 (7.2%) | 90 (92.8%) | 0.000 |
| Mothers | 40 (21.5%) | 146 (78.5%) | |
| Educational level | | | |
| Elementary school | 0 (0) | 19 (100%) | 0.000 |
| High school/middle diploma | 4 (4%) | 96 (96%) | |
| High diploma or bachelor | 31 (21.2%) | 115 (78.8%) | |
| Master or PhD | 12 (66.7) | 6 (33.3%) | |
| Trained in health/fields or one of their family work in it | | | |
| Yes | 25 (17.1%) | 121 (82.9%) | 0.7 |
| No | 22 (16%) | 115 (84%) | |

* A chi-square test was performed; level of significance is at $P < 0.05$.

Evaluating parental behaviors

Fifty-nine percent of parents showed poor behavior toward antibiotic usage with a mean of 2.6 which was close to good behavior (mean from 1 to 2.4 is good). However, some behaviors still need to be corrected. For instance, the majority of the parents preferred that "they should store antibiotics at home for when they are needed." Most of the parents stated that "they get their child's antibiotics from the pharmacy without a prescription." This result is in agreement with a study performed in China, it found 75% of parents had stored antibiotics at home to use as needed, and 62% of parents provided their children antibiotics without a prescription [14].

Furthermore, Table (2) shows the significant association was noted between the behaviors with parents' socio-demographic characteristics ($P < 0.05$). High educated young mothers have a significant association with the behaviors of parents regarding antibiotics use in children. This result is in agreement with a study performed in Kuala Lumpur, Malaysia, pointing to how the mother's education level impacted the behavior of the mother management of antibiotics use [1]. It was not uncommon that most mothers brought their children to seek medical treatment in a primary health clinic. Therefore, mothers who are highly educated understand the doctor's explanation better and do not administer antibiotics to their children unnecessarily.

Table (2): Association of Socio-demographics and behaviors using PAPA scale (n=283)

| Socio- demographic characteristics | Behaviors about antibiotic | | *P value |
|---|----------------------------|-----------------|----------|
| | Good No. (%) | Poor No. (%) | |
| Age group in years | | | |
| Less than 31 | 48 (44.9%) | 59 (55.1%) | 0.001 |
| 31-40 | 42 (43.8%) | 54 (56.3%) | |
| 41-50 | 21 (28.4%) | 53 (71.6%) | |
| above 50 | 6 (100%) | 0 (0) | |
| Gender | | | |
| Fathers | 24 (24.7%) | 73 (75.3%) | 0.000 |
| Mothers | 93 (50%) | 93(50%) | |
| Educational level | | | |
| Elementary school | 2 (10.5%) | 17 (89.5%) | 0.002 |
| High school/middle diploma | 36 (36%) | 64 (64%) | |
| High diploma or bachelor | 68 (46.6%) | 78 (53.4%) | |
| Master or PhD | 11 (61.1%) | 7 (38.9%) | |
| Trained in health/fields or one of their family work in it | | | |
| Yes | 46 (31.5%) | 100 (68.5%) | 0.001 |
| No | 71 (51.8%) | 66 (48.2%) | |

*: A chi-square test was performed; level of significance is at $P < 0.05$.

Evaluating parents' antibiotic adherence

Evidence from different studies has shown that parents who obtained guidance more frequently from physicians had a stronger adherence to physicians' advice. Our study showed that 57.2% of parents had good adherence regarding antibiotic usage with a mean of 2.2. However, more adherence still needs to be corrected. For instance, approximately half of the parents preferred a reduction of antibiotics dosage when their child gets better. Moreover, 41% of the parents incorrectly responded to the statement "In the past, I have stopped giving my child antibiotics because he/she felt better". These results were similar to a study performed in Saudi Arabia[3].

Moreover, the study also identified which socio-demographic predictors of parents' evaluation of the adherence to antibiotics; as shown in Table (3). Differences in perception regarding adherence to antibiotics were noted when responses were stratified by gender and educational level ($P < 0.05$). Those parents who are mothers and high education level have more adherence to antibiotics compared to fathers with low education level. These results were similar to a study performed in Saudi Arabia [15].

Table (3): Association of Socio-demographics and adherence using PAPA scale(n=283)

| Socio- demographic characteristics | Antibiotic adherence | | *P value |
|---|----------------------|-----------------|----------|
| | Good No. (%) | Poor No. (%) | |
| Age group in years | | | |
| Less than 31 | 58 (54.2%) | 49 (45.8%) | 0.068 |
| 31-40 | 55 (57.3%) | 41 (42.7%) | |
| 41-50 | 43 (58.1%) | 31 (41.9%) | |
| above 50 | 6 (100%) | 0 (0) | |
| Gender | | | |
| Fathers | 48 (49.5%) | 49 (50.5%) | 0.038 |
| Mothers | 114 (61.3%) | 72(38.7%) | |
| Educational level | | | |
| Elementary school | 6 (31.6%) | 13 (68.4%) | 0.007 |
| High school/middle diploma | 69 (69%) | 31 (31%) | |
| High diploma or bachelor | 77 (52.7%) | 69 (47.3%) | |
| Master or PhD | 10 (55.6%) | 8 (44.4%) | |
| Trained in health/fields or one of their family work in it | | | |
| Yes | 82 (56.2%) | 64 (43.8%) | 0.7 |
| No | 80 (58.4%) | 57 (41.6%) | |

*:A chi-square test was performed; level of significance is at $P < 0.05$.

Evaluating parents' awareness of antibiotics resistance

In the past many years, overuse and misuse of antibiotics led to antibiotics resistance which impacts children's health [4]. In our study, 58% of parents have a poor level of awareness of antibiotics resistance with a mean of 2.7. A significant association was noted between the awareness of antibiotics resistance and parents' educational level ($P < 0.05$); as shown in Table (4). Forty-five per cent of parents who have high

diplomas/bachelor degree; and 44% of parents who have high school/middle diploma have shown the right awareness of antibiotic resistance. These results were in disagreement with other studies; they found most of the parents showed good awareness of antibiotic resistance [3,10].

Only 33% of parents answered correctly the statement "Antibiotics are generally safe" and 38% of parents answered correctly the statement "Antibiotics can be harmful to one's health." This shows a more different perception when it comes to risks associated with the use of antibiotics and suggests an important topic to review. The results disagree with a study performed in Nebraska, USA; the researchers found that most respondents answered correctly both statements [11].

Table (4): Association of Socio-demographics and awareness about antibiotics resistance Using PAPA scale (n=283)

| Socio- demographic characteristics | awareness about antibiotics resistance | | *P value |
|---|--|--------------|----------|
| | Good No. (%) | Poor No. (%) | |
| Age group in years | | | |
| Less than 31 | 47 (43.9%) | 60 (56.1%) | 0.08 |
| 31-40 | 41 (42.7%) | 55 (57.3%) | |
| 41-50 | 31 (41.9%) | 43 (58.1%) | |
| above 50 | 0 (0) | 6 (100%) | |
| Gender | | | |
| Fathers | 37 (38.1%) | 60 (61.9%) | 0.33 |
| Mothers | 82 (44.1%) | 104(55.9%) | |
| Educational level | | | |
| Elementary school | 7 (36.8%) | 12 (63.2%) | 0.025 |
| High school/middle diploma | 44 (44%) | 56 (56%) | |
| High diploma or bachelor | 66 (45.2%) | 80 (54.8%) | |
| Master or PhD | 2 (11.1%) | 16 (88.9%) | |
| Trained in health/fields or one of their family work in it | | | |
| Yes | 56 (38.4%) | 90 (61.6%) | 0.23 |
| No | 63 (46%) | 74 (54%) | |

* A chi-square test was performed; level of significance is at P < 0.05.

IV. Conclusion

Overuse and misuse of antibiotics continue to be global problems affecting the population in its entirety. The PAPA scale showed that poor level of knowledge and beliefs regarding antibiotic use, poor antibiotic use behaviors and poor level of antibiotics resistance awareness. However, despite this poor knowledge, most of the parents have an overall good antibiotic use adherence. Therefore, health education and interventions for parents should be conducted through physicians, nurses, and pharmacists, as they are the main source of information for the parents.

Poor knowledge and belief level was detected in the fathers in general as well as in the parents with low educational level. While poor antibiotic use behaviors were detected in the fathers of (41-50) age group as well as in parents with low educational level. And poor antibiotic use adherence was detected in the fathers in general as well as in the parents with low educational level. Moreover, poor antibiotics resistance awareness was detected in the parents with a low educational level.

Most of the parents incorrectly identified antibiotics as being effective either against viral or mixed (bacterial and viral) infections. Most of the parents in our study pressured healthcare providers to get antibiotics for their children.

V. Recommendations

There is a need to improve parents' antibiotics knowledge and promote healthier attitudes and practices which should include the appropriate indications, administration, and the potential hazards of medicating children with antibiotics. Moreover, interaction between parents and health professionals can help improve parents' views regarding antibiotics use and the importance of course completion. Strict laws should be enforced by the government to prohibit the availability of antibiotics as an over the counter drug.

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