An Najah National University

Faculty of medical and health sciences

Nursing and Midwifery Department

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Antibiotic misuse and non-prescription use among children less than six years in North of West Bank

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Essay title: Antibiotic misuse and non-prescription use among children less than six years in North of West Bank

A mixed quantitative-qualitative study.

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Abstract:

Background: The developing danger of antimicrobial and antibacterial resistance related to misuse of antibiotics and irrationalized use of non-prescription antibiotics particularly in children became a public major health problem. Children are particularly prone to high rates of antibiotic use. children are an important target group in our community, in need of appropriate treatment**.**

Objectives: The objective of the study is to investigate and explore the phenomena of misuse of antibiotics and non-prescription use of antibiotics in children less than six years in north of Palestine, and to know the prevalence and determinants of misuse of antibiotics in children less than six years in North of West Bank.

Settings: The pediatric wards and clinics of the four main northern cities governmental and private hospitals, Nablus, Jenin, Toulkarim and Qalqilia consequently.

Sample: A random sample of one-hundred and eighty child mother from Nablus, Jenin, Toulkarim and Qalqilia.

Methodological design: Using Quantitative Hospital-based cross-sectional survey for one-hundred and eighty child mother from Nablus, Jenin, Toulkarim and Qalqilia.

Results: 180 survey used, response rate was 100%, amoxicillin was the most used antibiotic, 73.3% agreed that antibiotic is useful in treatment of flu, economical and educational factors are part of misuse determinants.

Conclusion: The prevalence of non-prescribed antibiotic use and misuse of antibiotic for young children was high in North of West Bank. Mothers' knowledge and attitudes to illness and health care services played an important role in determining the nature of self-medication with antibiotic. Educational level, financial barriers and misconceptions were part of determinants of antibiotic misuse. Our findings have important implications for public education and the enforcement of regulations regarding the sale of antibiotics in Palestine.

Key words*: Misuse of antibiotic, Non-prescription use of antibiotic, Bacterial resistance, antibiotic, physician, prescription, knowledge, perception.*

Introduction

Bacterial strains resistant to antimicrobial agents presents an emergent growing concern worldwide.[1] antibiotic use and resistance development relationship is strong and supported by many studies.[2,3] Countries with the highest *per capita* antibiotic use have the highest prevalence of resistant pathogens. [4,5] Antibiotics are mostly used for the treatment of upper respiratory tract infections, like sore throat, common cold and rhinitis, even though if viruses are the cause of those illnesses.[6]

Antibiotics over use in upper respiratory tract infections (URTIs) in children is an important factor contributing to the development of antibiotic resistance and as a result the cautious use of antibiotics in pediatric clinical practice is vital.[7]

Some previous related studies have proposed that increased antibiotic prescription might increase self-medication with antibiotics.[8,9,10] In June 2005, a ministerial decree announced measures to stop over-the-counter sales of non-prescribed drugs, but in practice this still happens.[11] It is important to obtain a clear understanding of the factors that underlie this practice and to develop policies to prevent antibiotic resistance and promote rational use.

Hence antimicrobials have done more to improve public health in the last 50 years than any other measure, but on the other hand it is estimated that the volume of the antibiotic market worldwide is between 1 and 2 x 108 kg of products.[12] It is well known that the haphazard use of antibiotics has led to hospital, waterborne and food-borne infections by antibiotic-resistant bacteria, enteropathy (irritable bowel syndrome, antibiotic associated diarrhoea etc.), drug hypersensitivity, biosphere alteration, human and animal growth promotion, and destruction of fragile interspecific competition in microbial ecosystems.[13] The result is disastrous; infections caused by resistant microbes fail to respond to treatment, resulting in prolonged illness and a greater risk of death. Treatment failure also lead to longer periods of corruption, which increase the numbers of infected people moving in the community and also expose the general population to the risk of contracting a resistant strain of bacteria.[14] Drug policies that influence the accessibility of antibiotics are implemented differently in different countries and can play an important role in misconceptions about the use of antibiotics.[15]

An important feature in the development of antibiotic resistance is overuse of antibiotics.[16] However, a particular concern is over prescription of antibiotics for the treatment of viral upper respiratory infections and influenza-like symptoms.[17] The studies restricted to children confirmed even higher rates of antibiotic treatment in children diagnosed with viral infections.[18] Minimizing antibiotics use globally will reduce resistance rates. This goal might be achieved by better use of diagnostic tests and antiviral treatment and by improving physician and patient education.

Background and significance :

The developing danger of antimicrobial and antibacterial resistance related to misuse of antibiotics and irrationalized use of non-prescription antibiotics particularly in children became a public major health problem. WHO symbol and efforts in 2010 was directed toward the bacterial resistance resulting from misuse of antibiotics, it has announced that all researchers around the world must investigate exploring this phenomena to find out prevalence and solutions to this future health threatening issue.
Streptococcus pneumoniae infections are particular concern in pediatrics because pneumococci is the leading cause of bacterial meningitis, pneumonia, bacteraemia and otitis media in children.[19]
The global definition for Misuse of antibiotics is demanding antibiotics even when the physician thinks it is unnecessary, or buying antibiotics without a prescription or Not finishing the course of treatment because of stopping taking the antibiotics as soon as people feel better. Also the Non-prescription use of antibiotic is well defined as Buying or demanding antibiotic without physician prescription or order, throughout OTC (over the counter) drug centers.[20]

Recently it is estimated that half of the discovered antibiotics worldwide are used without medical guidance and prescription and purchased from pharmacies and street vendors.[21] Self-medication has also been noted in the United States of America and Europe, particularly for colds and upper respiratory tract symptoms, which are self-limiting and mostly caused by viruses.[22,23] Other studies from America, Asia and Europe indicate that between 22% and 70% of parents have misconceptions about the appropriate applications and efficacy of antibiotics.[24,25] And often use them without a prescription.[26,27] Other determinants of self-medication with antibiotics in low-income

countries include over-the-counter sales of antibiotics, the high cost of medical consultations and dissatisfaction with medical practitioners.[28]

Several studies suggested that increased antibiotics prescription also increase self medication with antibiotics.[21,22,29] Children are particularly prone to high rates of antibiotic use.[11] Many parents ask pediatricians for antibiotics for conditions such as viral upper respiratory tract infections, non-specific diarrhoea or sore throats. [30]

Therefore children are an important target group in our community, in need of appropriate treatment, and because the occurrence of antibiotic resistance must be limited, it is globally required to understand parents' administration of treatment to their children.

As there are no previous representative hospital-based studies conducted in Palestinian hospitals about misuse of antibiotics and self medication in children less than six years, such studies are important to determine the prevalence and determinants of non-prescription use of antibiotics, to recommend new strategies to limit that use and contribute to the global effects of breaking down the growing danger of bacterial and microbial resistance to antibiotics.

Theoretical Framework

Resistance determinants were present prior to the introduction of antibiotics, but were mostly found in natural antibiotic producing microorganisms.[31] Other neighboring species possibly had already acquired those genes or developed new mechanisms to protect themselves from the inhibitory effects of the antibiotics to which they were exposed. Consistent with this theory is the homology between resistance determinants (e.g. VanA and VanB4) found in antibiotic producing bacteria and in unrelated bacteria. Moreover, a collection of bacteria isolated prior to the therapeutic use of antibiotics showed little if any resistance[32], although many had conjugable plasmids without resistance determinants.[33] Bacterial resistance has evolved with the increased number, volume and diversity of antimicrobial applications. As new drugs were introduced clinically, resistant strains were identified relatively soon after. Many of these resistant bacteria are not obligate pathogens, being part of the indigenous micro flora. However given the right associations, such as immunocompromised patients and the use of antibiotics, these organisms have the

potential to cause life-threatening disease.[34] A direct relationship between the quantity of antibiotic used and the development of resistance has not been easy to determine. Data on total antibiotic utilization in particular areas are unfortunately limited, unreliable, or many times non-existent. An attempt to estimate worldwide antibiotic usage taking antibiotic availability as an indicator of human use has been reported. [31] Antibiotic availability varied considerably in different countries, but differences were also present within a country and throughout time. The authors state that while many countries do not have data on the antibiotic availability, those that have them use different systems of data collection, making comparisons difficult or impossible to establish. The situation gets even harder to analyze in many developing countries where antibiotics are available without prescription. Unfortunately, with the exception of a few attempts at quantification, [35] data in this area are still limited 13 years since this report. More importantly, data are presented for whole cities or countries, while resistance reflects local practices. [31,36] Therefore, what clearly matters is the antibiotic consumption in designated areas, whether home, hospital or community as these data will more closely reflect the incidence and patterns of resistance observed in those smaller environments. For example,(Ridley et al) [37] described that, although chloramphenicol was infrequently used in a hospital, it was routinely prescribed in a particular ward where more than half of the chloramphenicol-resistant hospital staphylococcal isolates originated.

In 1994 a ‘threshold 'hypothesis proposed that resistance could be curtailed if total antibiotic use in a particular environment stayed below a critical quantitative level.[38] The proposal was founded on the natural competition among bacteria and the potential for the return of susceptible flora after antibiotic treatment – a possibility that decreased as antibiotic consumption in a particular environment increased. Definition of the threshold values for different antibiotics would be important in controlling bacterial resistance. In a further elaboration of this idea, it was suggested that resistance followed a ‘selection density’. Here again, ecology was the basis of the suggestion, i.e. the more antibiotic used for individual persons, animals or plants in a particular geographic unit, the fewer susceptible bacteria would survive to repopulate.[36] Using population genetics theory, another group analyzed the relationship between the amount of antimicrobials used in the community and the frequency of resistance. They described a ‘sigmoidal rise in resistance over time in the presence of a constant rate of antibiotic consumption’ and a threshold level of

antibiotic usage needed to 'trigger the emergence of resistance to significant levels'.[39] Both the amount of antibiotics used and how they are used contribute to the development of resistance. The use of broad-spectrum antibiotics rather than narrow-spectrum drugs is known to favor the emergence of resistance by broadly eliminating competing susceptible flora. For example, the empiric use of amoxicillin-cefotaxime combination for suspected neonatal sepsis in a neonatal ICU was associated with the emergence of resistant gram-negative bacilli.[40] The risk of colonization with bacteria resistant to the empirical treatment was 18 times higher for the broad-spectrum therapy than for an alternative regimen of narrower-spectrum antibiotics. [40] Some antibiotics cause unpredictable ecological consequences because strains bear intrinsic resistance to them. For example, cephalosporins select for enterococci, and broad-spectrum antibiotics select for drug-resistant Acinetobacter and Xanthomonas. Antibiotics are frequently prescribed in the treatment of viral infections or at wrong doses for incorrect periods of time. (Guillemot et al) [41] described how antibiotic prescription practices can be more closely related to the emergence of resistance than the volume used. They demonstrated an association between the use of long-term, less than-recommended daily doses of oral β-lactams with increased risk for pharyngeal carriage of penicillin-resistant Streptococcus pneumoniae as compared to shorter courses with higher doses of the drug.

Other factors, difficult to quantify, impact the relationship between use and resistance (Fig. 1). Education, poverty, hygiene, and communal facilities (child care centers and nursing homes), affect the adequacy of treatment provided, the compliance of the patients, and the development and spread of resistance. A significant relationship between long-term, full-time day-care attendance of young children (<3 years) and the carriage of respiratory pathogens has been described.[42] The trade of foods and goods and the movement of people encourage the establishment and dissemination of resistant bacteria, making it difficult to determine direct correlations between the use of antibiotics locally and the emergence of resistance. Penicillin-resistant S.pneumoniae serotype 23F,originating in Spain, has been isolated in North and South America, Asia and Europe.[43]

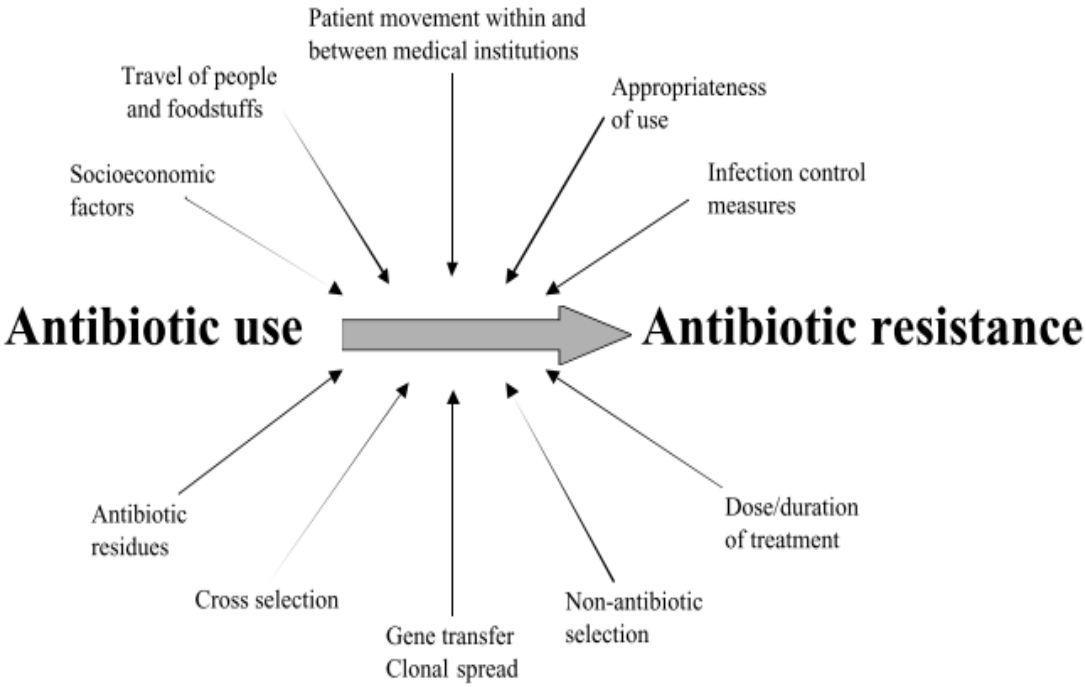


Fig.1 Relationship between antibiotic use and development of resistance. Antibiotic use is the main factor in the forward process, i.e. selection of resistance, but other factors can influence that relationship. Factors dependent on humans, and their management of antibiotics, are represented above the horizontal arrow, while factors related to the antibiotic itself and the genetic basis of resistance are represented below the horizontal arrow.

Problem statement of purpose:

The purpose of our study is to investigate and exploring the phenomena of misuse of antibiotics and non-prescription use of antibiotics in children less than six years in north of Palestine, to look for prevalence and determinants of misuse of antibiotics in children such as reasons to use, antibiotics used and signs and symptoms complained before use.

Research Questions:

1- What is the relative prevalence of the administration of non-prescription antibiotics by caregivers to children less than six years of age, and what are the factors associated with non-prescription use and what is the related knowledge, attitudes and behaviors about use of antibiotics and self medication?

2- Exploring the phenomena of Non-prescription use of antibiotic and misuse of antibiotic from caregivers and over prescription of antibiotics from related physicians

The selection of this research question because of the wide spread misuse of and non-prescript antibiotics in Palestinian areas among children less than six years by their caregivers and because of lack of caregivers knowledge about antibiotic use and relative consequences and because of the absence of relevant information about the prevalence and determinants of non-prescription use of antibiotics and bacterial resistance causes in children in Palestinian areas.

Research methodological design:

A quantitative approach was used A Hospital-based, cross-sectional survey was conducted in pediatric wards and clinics of governmental and private hospitals in Nablus, Jenin, Toulkarem, and Qalqilya, structured questionnaire was used to collect data from a random sample of One hundred and eighty caregiver of children with at least one child aged less than six years were chosen randomly by simple random sampling throughout counting randomly patients beds, Logistic regression was used to identify factors associated with antibiotic misuse.

Selection criteria:

Children less than six years with their caregivers are selected because they are under supervision of their parents, and more Susceptible to upper respiratory tract viral infections and symptoms. Caregivers with at least one child less than six years registered or inpatient of pediatric ward or clinic in the selected hospitals and have no chronic illness were eligible to be selected and participate. Children who have chronic illnesses and more than six years and not registered to these hospitals and clinics were excluded from participation.

Data Collection :-

The process of data collection started on October, 2011 and finished by November, 2011 starting by structured survey was prepared and revised by some experts and validated, pilot test was conducted by giving the survey to fifteen mothers in private clinics and the result was that questions and survey are valid and reliable, after determining the selection criteria of the study sample, one-hundred and eighty questionnaire were prepared to be distributed on the Northern cities governmental and private hospitals, the number of questionnaires per hospital was selected according to the geographical concentration of people in that city and the rate of inpatient cases per hospital and it was consequently as follow; Nablus city (Rafidia Governmental hospital and Al Itihad Private hospital) had 41% of geographical concentration related to the total number of people living in the four selected cities, and 40% of admission percentage of pediatric patient related to the total number of pediatric patients admitted to the four cities hospitals and according to that seventy-five questionnaire (total 180) were distributed in Nablus hospitals, Jenin (Jenin Governmental hospital and Al Razi private hospital) had 25% Geographical concentration and 25% admission percentage and hence forty-five questionnaire were distributed in Jenin hospitals.

In Toulkarim there were thirty-five questionnaire distributed in the city hospital according to 19% of geographical concentration and 17% of admission percentage, Qlaqilya hospitals also received twenty-five questionnaire according to 13% of

geographical concentration and 18% of admission percentage. Then hospital based cross sectional survey consist of two parts; demographical data (independent variables) including mother's age, mother's educational level, number of children in family, and family income. The dependent variables in the second part consist of thirty-five multiple question focusing on the study topic, the researchers chose morning shift in pediatric clinics and started collecting data through simple random sampling method, some mothers answered the survey by themselves and others asked the researchers to help them read the questionnaire and answer it according to their instructions. Data collected and coded and then sent to statistical analysis.

Procedure and analysis

- Independent variables:

1- Educational level: which has three levels (basic, secondary and university)

2- Number of the children in the family: which has two levels (one and more than one)

3-Mother age: with four levels (less than 25,26-35, 36-40 and more than forty years)

4. Family income : with five levels (very few, few, accepted, fair and excellent).

- Dependent variables:

The means for the responds of the study sample on its questions about the use of the antibiotic for children less than six years old.

Statistical processing:

After gathering the responds, they have been codified, entered to the computer and statically processed by using the statistical package for social science (SPSS)

The statistical procedures used in the study were; Frequencies, means, standard deviations and percentages.

Ethical considerations:

Protocol for human subjects research revised and a form of Institutional research board committee of An Najah National university filled out and sent and an acceptance was received, it included all issues about privacy, confidentiality, risks and benefits.

No personal information or sensitive information obtained or required , any names of pharmacists and pediatricians mentioned by mistake in the structured questionnaire and the meeting excluded and deleted .

A request of permission to enter hospitals and clinics submitted to the Palestinian ministry of health by end of October 2011.

Results:

(structured survey)

After a hospital based, cross sectional survey conducted in the pediatric wards and clinics of Nablus, Jenin, Toulkarim and Qalqilya governmental and private hospital. The mothers of one-hundred and eighty questionnaire were given the questionnaires and answered it, after gathering data and analyzing it the results were as follow; the first part of the questionnaire included demographic data (independent variables) and the statistics revealed the following results about demographic data:-

Table (1): The distribution of the study sample according to the variable of the mother educational level

Educational Level	No.	Percentage
Basic	46	25.6
Secondary	72	40.0
University Degree	62	34.4
Total	180	100%

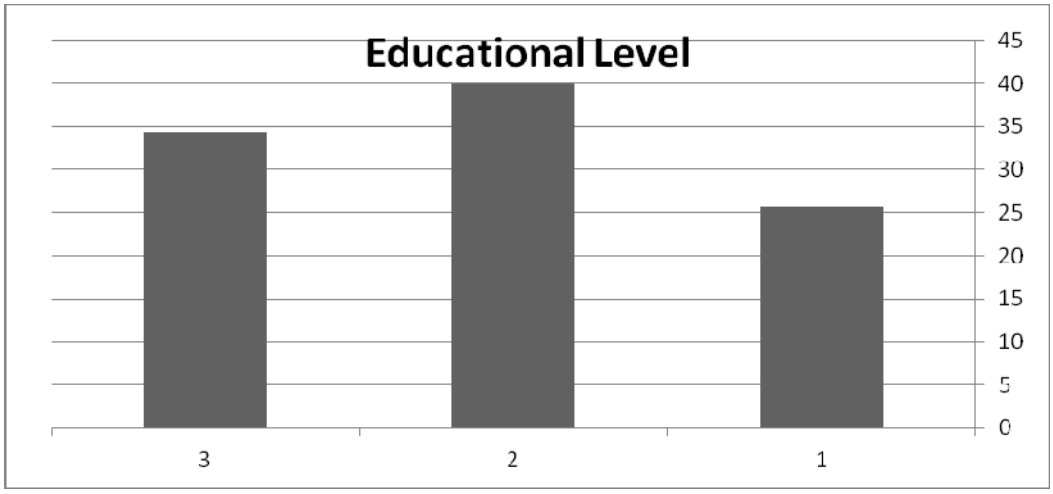


Table (2): The distribution of the study sample according to the variable of the number of the children in the family

Number of the children in the family	No.	Percentage
One	54	40.0
More than one	126	60.0
Total	180	100%

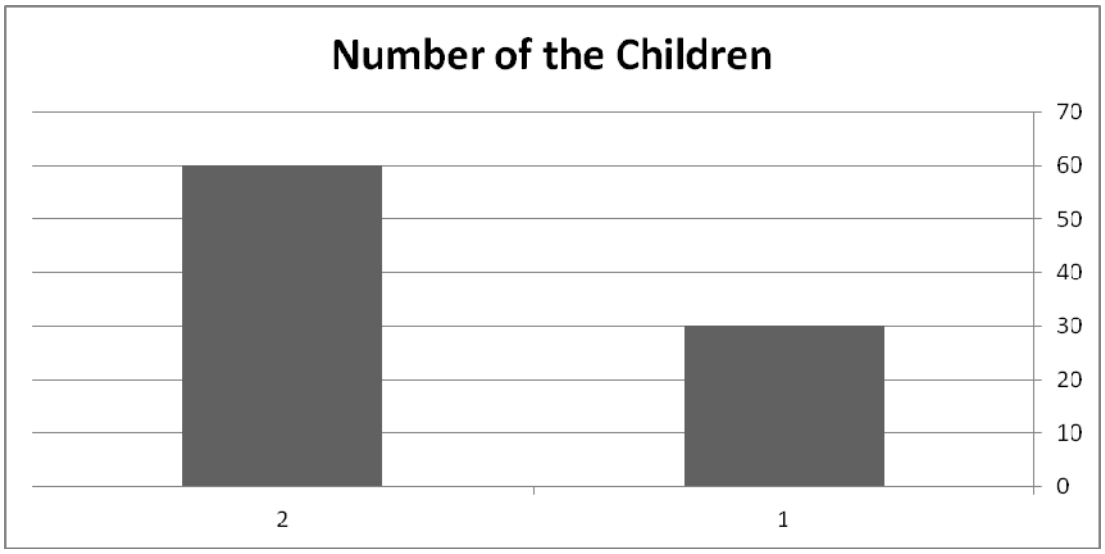


Table (3): The distribution of the study sample according to the variable of Mother age :

Mother age :	No.	Percentage
Less than 25 years	34	18.9
From 26-35 years	82	45.6
From 36- 40 years	59	32.8
More than 40 years	5	2.7
Total	180	100%

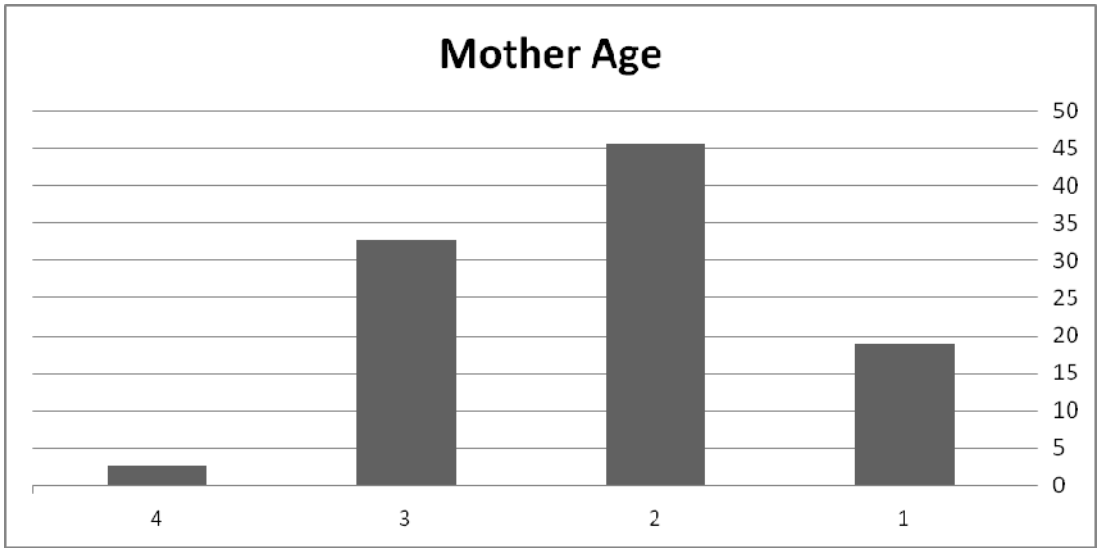
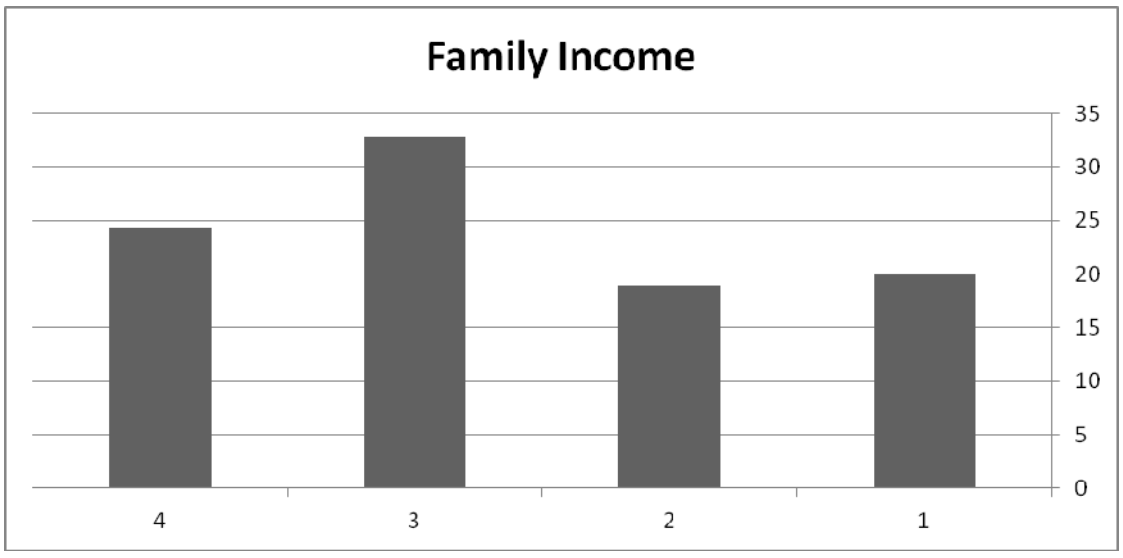


Table (4): The distribution of the study sample according to the variable of Family Income

Family Income	No.	Percentage
Very few	36	20.0
Few	34	18.9
Accepted	59	32.8
Good	44	24.4
Excellent	7	3.9
Total	180	100%

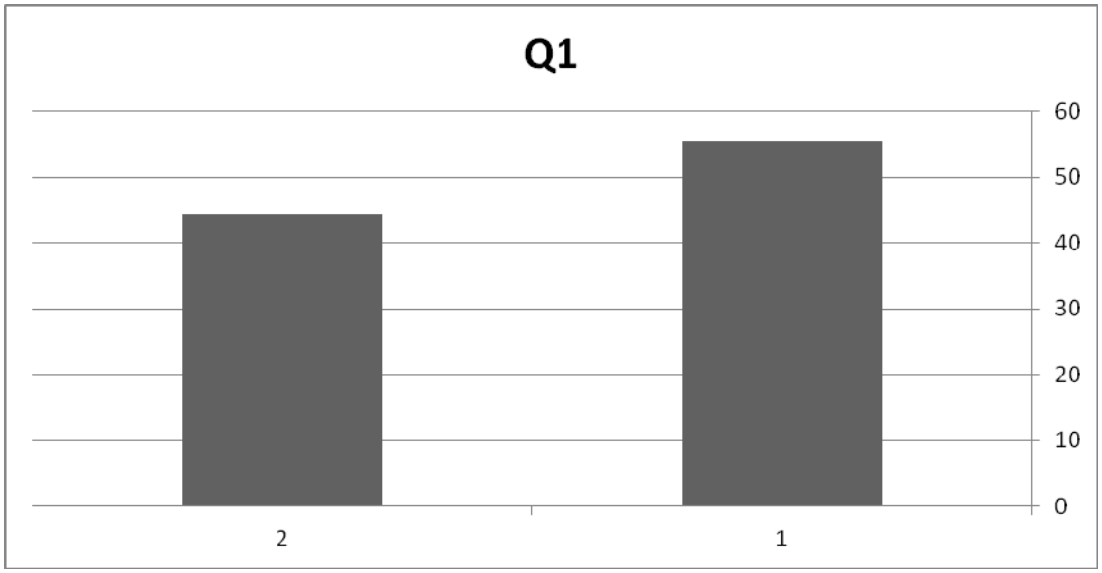


Following the demographic data, the dependent variables and the survey multiple questions analyzed and the reliability test revealed Cronbach's Alpha of 0.69 which is accepted, the questions and answers statistically were as follow:-

Question (1) : Sex

Table (5) : shows the child sex:

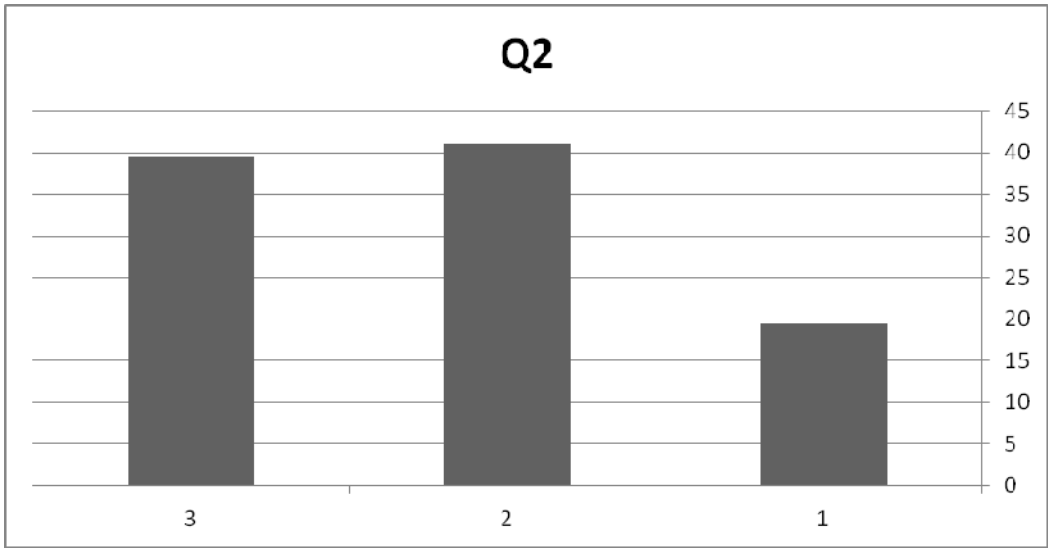
Sex	No.	Percentage
Male	100	55.6
Female	80	44.4
Total	180	100.0



Question (2) :How old is your child ?

Table (6) : shows the old of the child:

The old of the child	No.	Percentage
Less than one year	35	19.4
From 1-3 years	74	41.1
From 3-6 years	71	39.5
Total	180	100%



Question (3) : Does your child suffer from respiratory disease ?

Table (7) : shows if the child has respiratory disease

if the child has respiratory disease	No.	Percentage
Yes	31	17.2
No	149	82.8
Total	180	100%

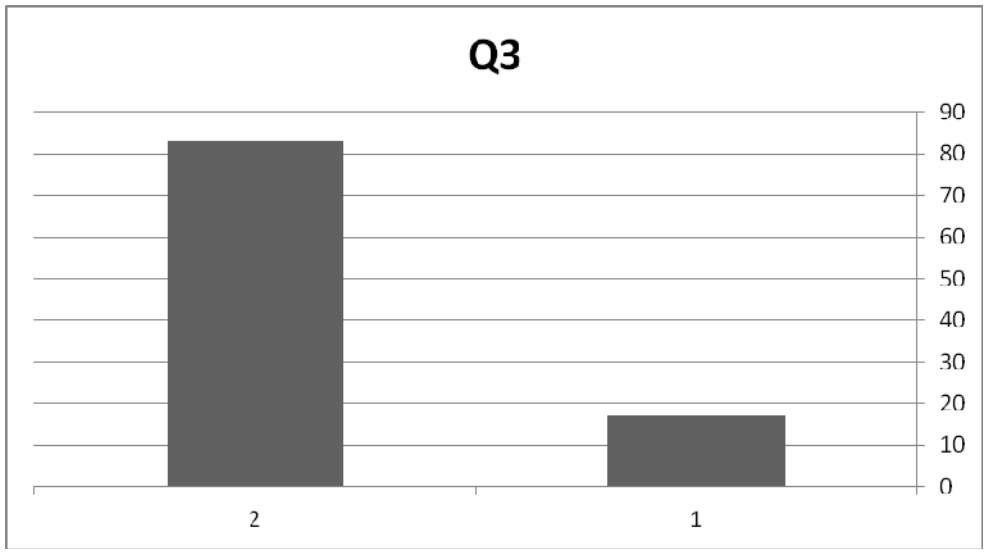
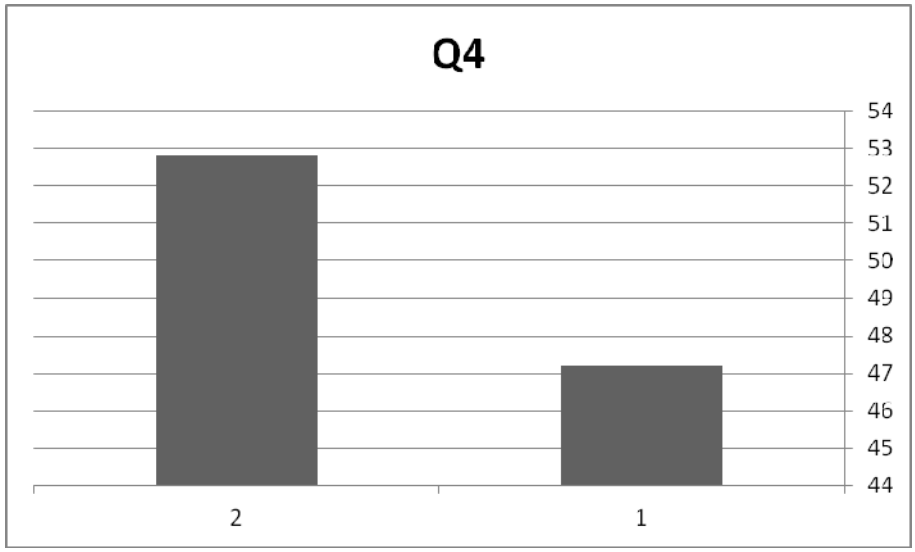


Table (8) : shows if the child go to a kindergarten or to the school?

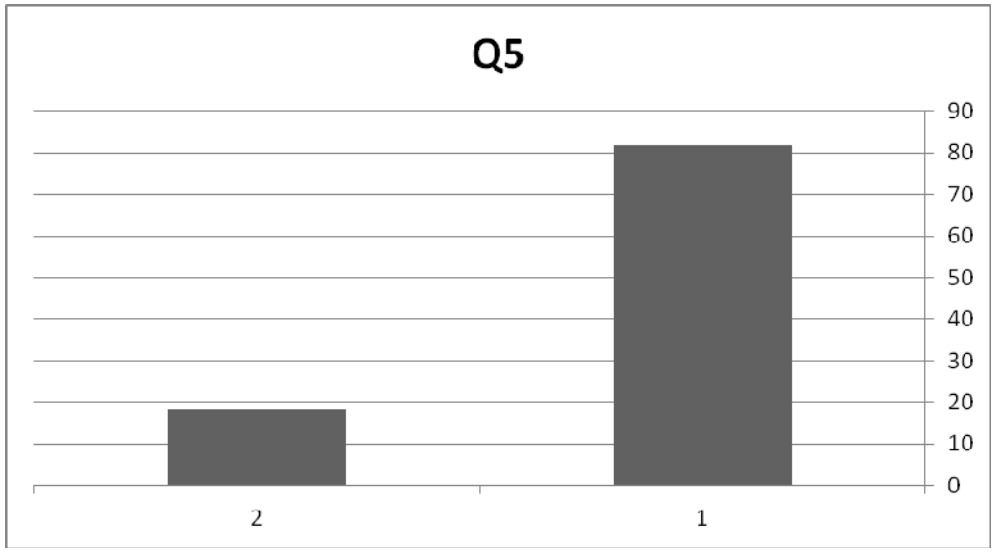
If the child go to a kindergarten or to the school?	No.	Percentage
Yes	85	47.2
No	95	52.8
Total	180	100%



Question (5) : Does your child take the antibiotic according to the physician description

Table (9) : shows if the child take the antibiotic medication according to the physician description

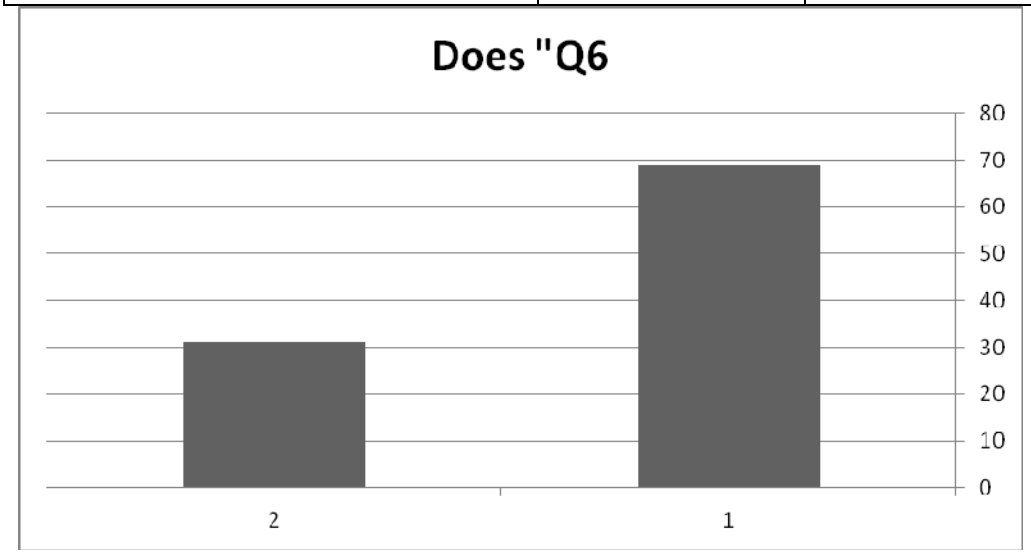
If the child take the antibiotic medication according to the physician description	No.	Percentage
Yes	147	81.7
No	33	18.3
Total	180	100%



Question (6) : Is the fever considered serious disease which needs an antibiotic

Table (10) : shows Is the fever considered serious disease which needs an antibiotic

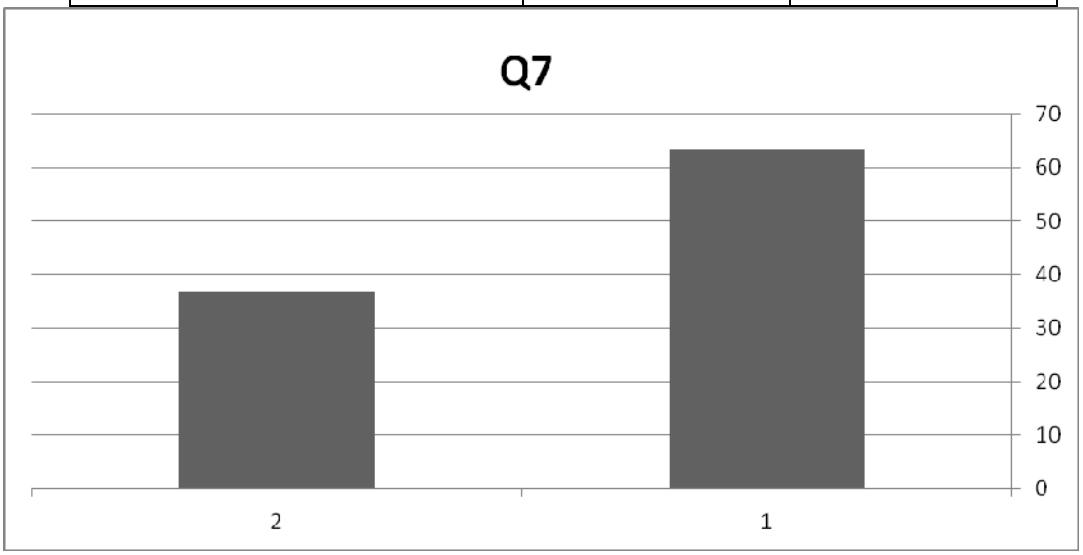
Is the fever considered serious disease which needs an antibiotic	No.	Percentage
Yes	124	68.9
No	56	31.1
Total	180	100%



Question (7) : Do you complete the antibiotic medication to the last dosage?

Table (11) : shows if you complete the antibiotic medication for the last dosage

Do you complete the antibiotic medication for the last dosage?	No.	Percentage
Yes	114	63.3
No	66	36.7
Total	180	100%



Question (8) : What is the antibiotic which your child takes usually ? (the answers and the names are trade names and just as participants said and written)

Table (12) : shows the antibiotic which the child takes normally

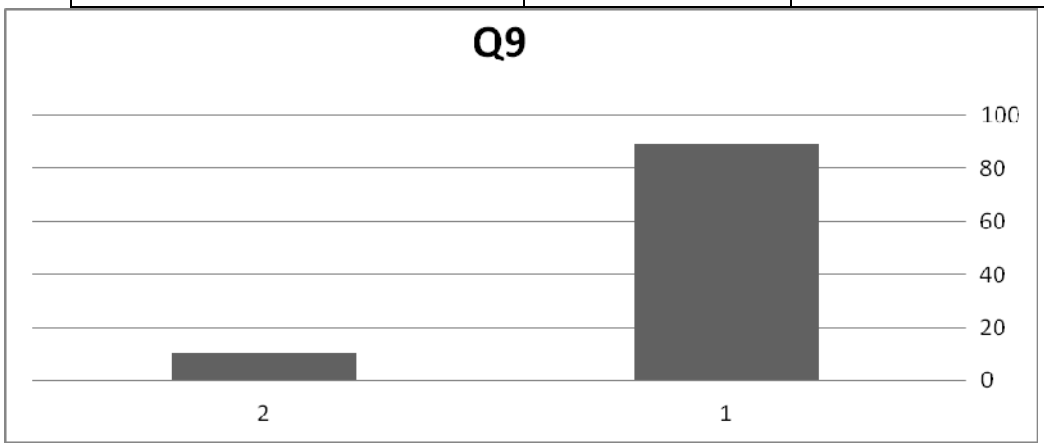
Shows the antibiotic which the child takes normally	No.	Percentage
Augmin	37	20.6
Amoxicare	10	5.6
Amoxitid	37	20.6
Amoxifarm	13	7.2
According to the physician	34	18.9
Amoxiclean	6	3.3
Amoxiplanon	2	1.1

Jeflex	16	8.9
Alfaniocare	2	1.1
Silbreem	4	2.2
Augmen	6	3.3
Megacare	3	1.7
Amoxapharm	3	1.7
Zeenat	5	2.8
Clamoxillin	1	0.6
Pencilline	1	0.6
Total	180	100%

Question (9) : Do you duplicate the dosage ?

Table (13) : shows if the mother duplicate the dosage?

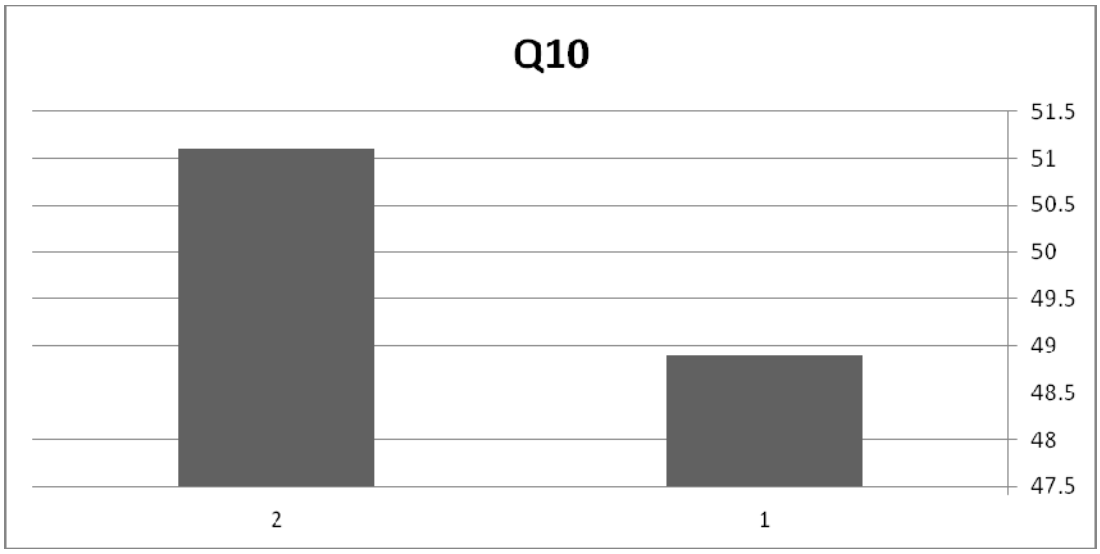
Do you duplicate the dosage ?	No.	Percentage
Yes	161	89.4
No	19	10.6
Total	180	100%



Question (10) : Do you ask your physician for special antibiotic ?

Table (13) : shows if you ask your physician for special antibiotic?

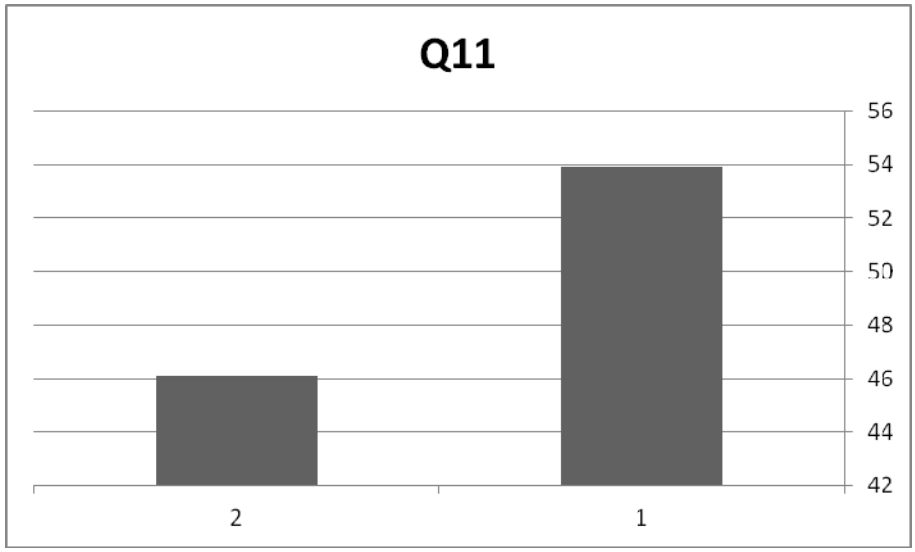
If you ask your physician for special antibiotic?	No.	Percentage
Yes	88	48.9
No	92	51.1
Total	180	100%



Question (11) : Do you think that your child needs antibiotic for cough and cold ?

Table (14) : shows if you think that your child needs antibiotic for cough and cold?

Do you think that your child needs antibiotic for cough and cold ?	No.	Percentage
Yes	97	53.9
No	83	46.1
Total	180	100%



Question (12) : Did you hear about the bacteria which resists the antibiotic ?

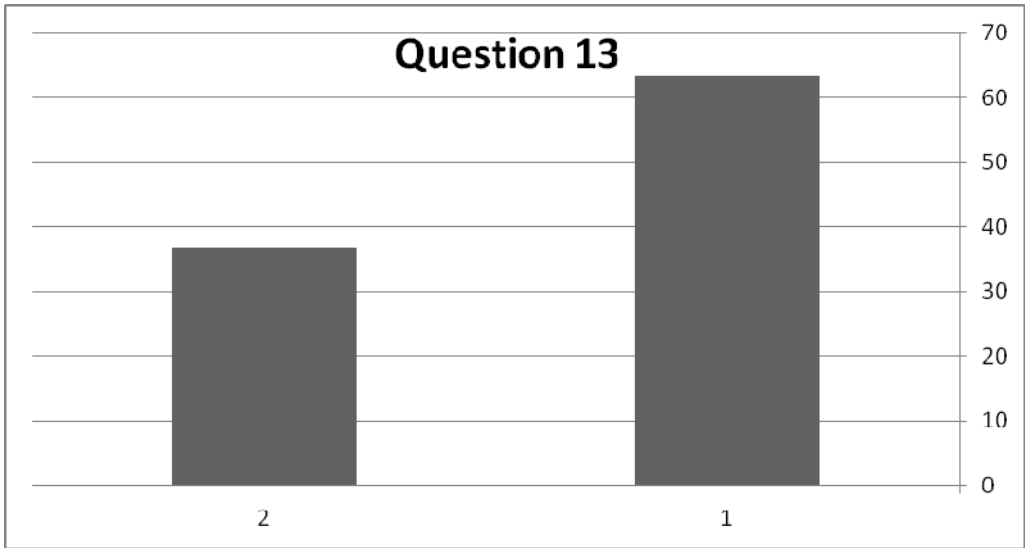
Table (16) : shows if you hear about the bacteria which resists the antibiotic ?

Did you hear about the bacteria which resists the antibiotic ?	No.	Percentage
Yes	86	47.8
No	94	52.2
Total	180	100%

Question (13) : Do you think that the bacteria which resists the antibiotic results from not completing the dosage?

Table (17) : shows if you think that the bacteria which resists the antibiotic results from not completing the dosage?

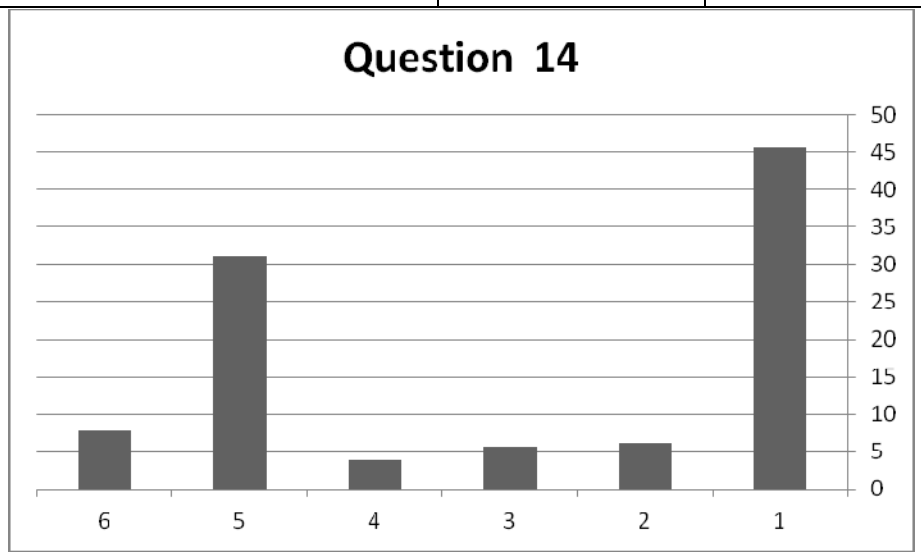
Do you think that the bacteria which resists the antibiotic results from not completing the dosage?	No.	Percentage
Yes	114	63.3
No	66	36.7
Total	180	100%



Question (14) : For what symptoms do you use the antibiotic?

Table (17) : shows what symptoms for use the antibiotic**?**

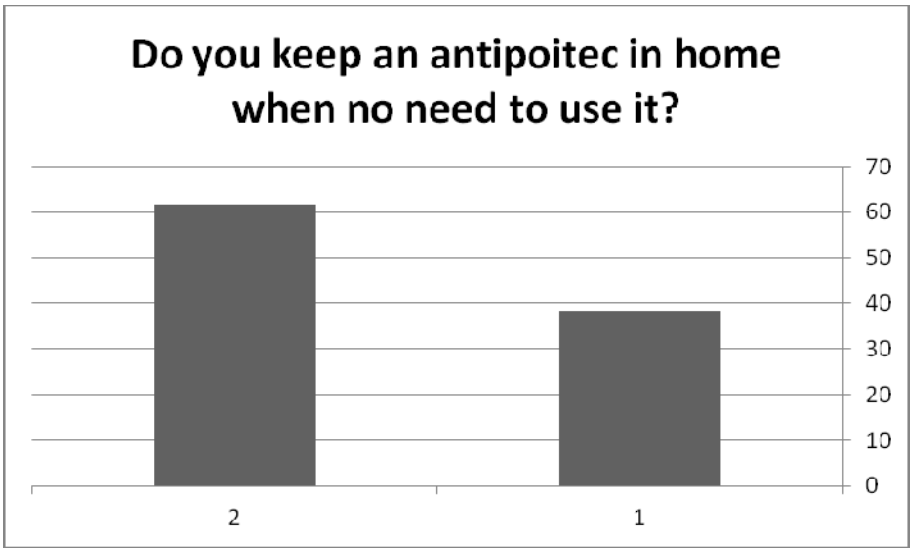
Symptoms for use the antibiotic	No.	Percentage
Fever	82	45.6
Running nose	11	6.1
Cold	10	5.6
Ear infection	7	3.9
Tonsillitis	56	31.1
Cough and Flu	14	7.8
Total	180	100%



Question (15) : Do you keep an antibiotic in your home when no need to use it ?

Table (17) : shows if you keep an antibiotic in your home when no need to use it ?

Do you keep an antibiotic in your home when no need to use it?	No.	Percentage
Yes	69	38.3
No	111	61.7
Total	180	100%



If yes, what kinds ?

Table (18) : shows kinds of antibiotic which are kept at home ?

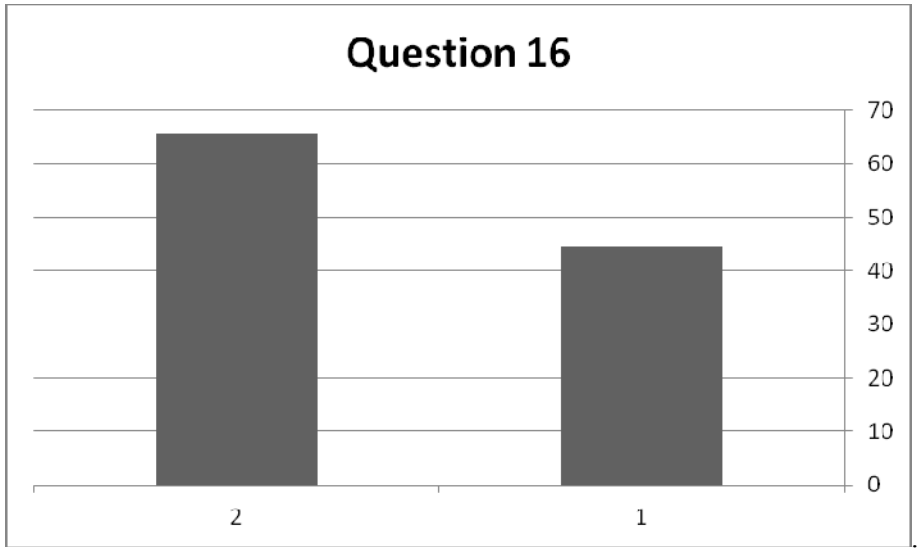
Do you keep an antibiotic atyour home ?	No.	Percentage
Mothers who do not keep	111	61.7
Augmen	21	11.7
Amoxipharm	10	5.6
Amoxiteen	13	7.2
Amoclan	4	2.2
Silbreem	5	2.8
Jeflex	2	1.1
Rofenal	3	1.7

Adol	4	2.2
Zeenat	3	1.7
Mexpen	3	1.7
Penecillin	1	0.6
Total	180	100%

Question (16) : Do you buy the antibiotic without the physician prescription ?

Table (19) : shows if you buy the antibiotic without the physician prescription?

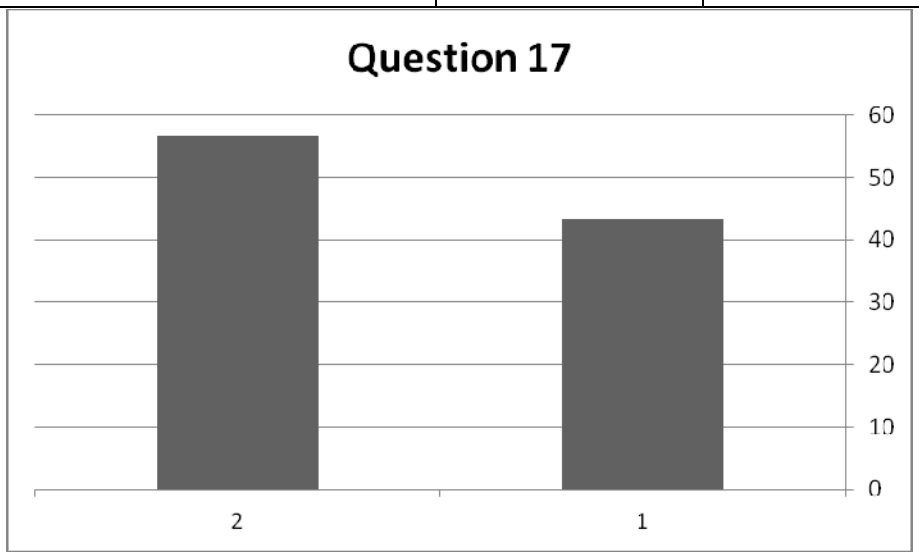
Do you buy the antibiotic without the physician prescription ?	No.	Percentage
Yes	80	44.4
No	100	65.6
Total	180	100%



Question (17) : Dose pharmacist give you antibiotic without the physician prescription ?

Table (20) : shows if the pharmacist give you antibiotic without the physician prescription ?

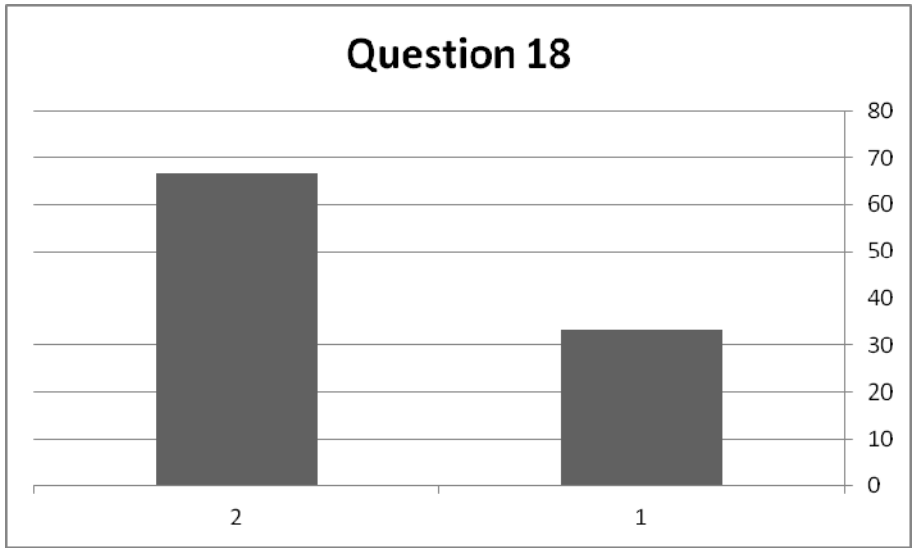
Dose pharmacist give you antibiotic without the physician prescription ?	No.	Percentage
Yes	78	43.3
No	102	56.6
Total	180	100%



Question (18) : Dose your child have cough or flu now ?

Table (21) : shows if your child has cough or flu now?

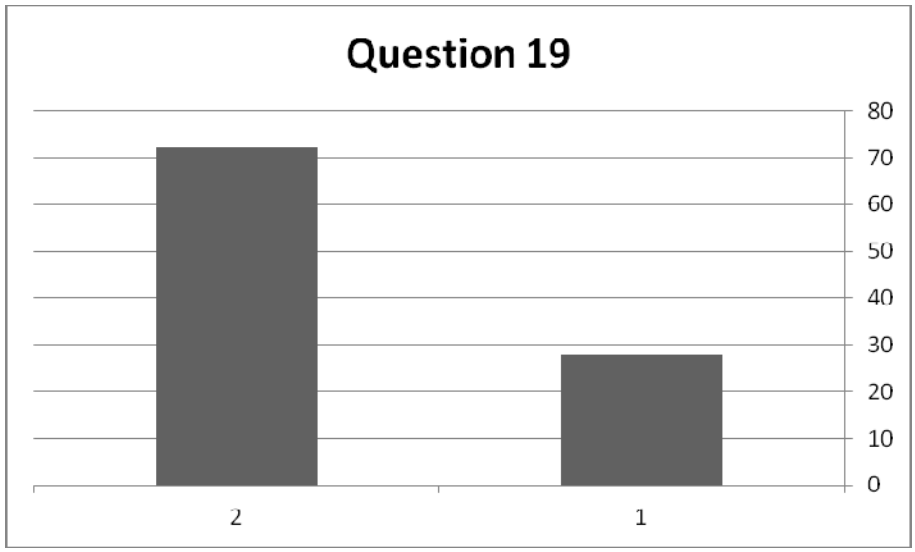
Does your child have cough or flu now?	No.	Percentage
Yes	60	33.3
No	120	66.7
Total	180	100%



Question (19) : Is your child weight less than the normal ?

Table (22) : shows if your child has less weight than the normal?

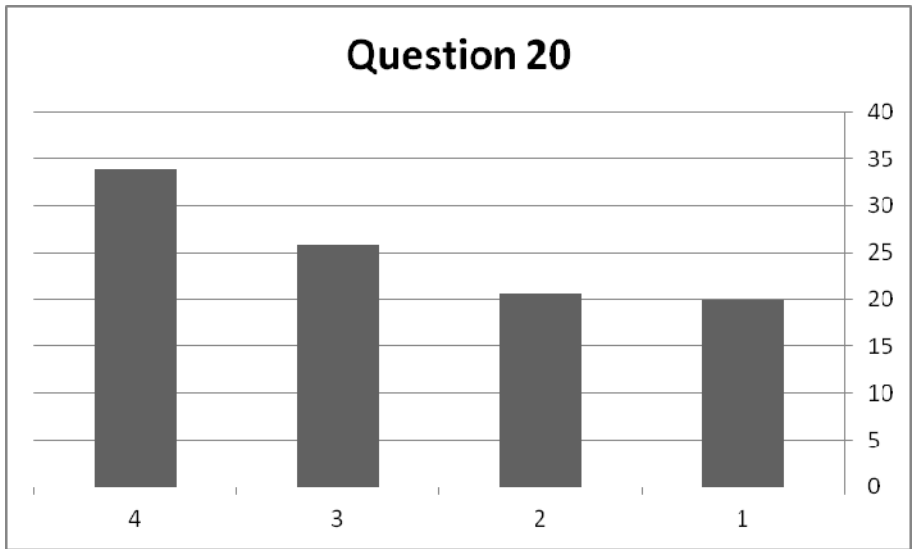
Is your child weight less than the normal?	No.	Percentage
Yes	50	27.8
No	130	72.2
Total	180	100%



Question (20) : Dose your child receive breast feeding?

Table (23) : shows if your child receive breast feeding?

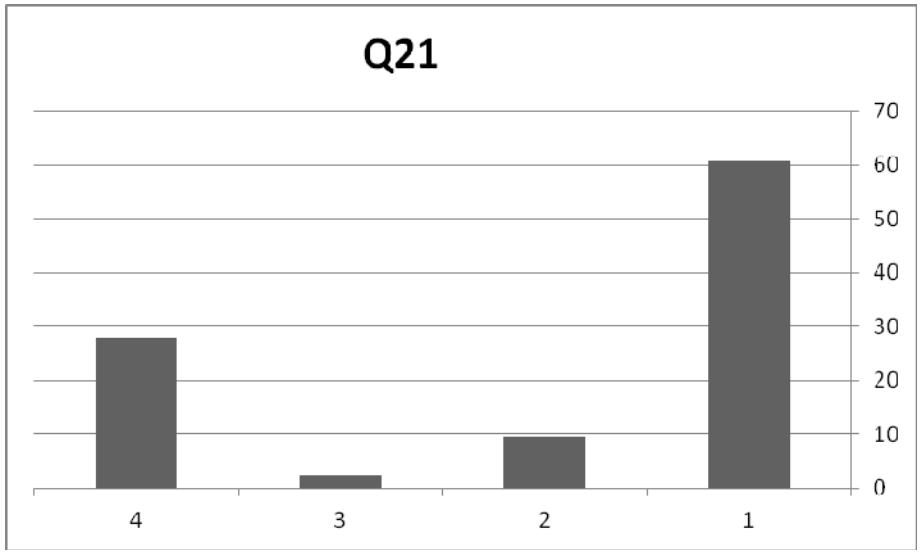
Dose your child receive breast feeding?	No.	Percentage
Yes	36	20.0
No	37	20.6
Combination of breast and artificial milk	46	25.8
Already finished	61	33.9
Total	180	100%



Question (21) : The antibiotic costs?

Table (24) : shows the cost of the antibiotic?

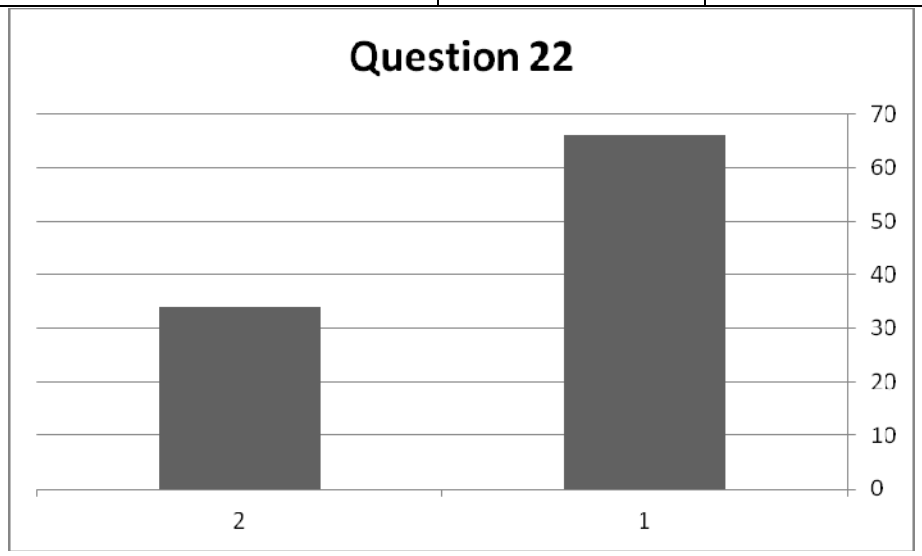
The cost of the antibiotic	No.	Percentage
50-100 NIS	109	60.6
100-200 NIS	17	9.4
More than 200 NIS	4	2.2
Another cost	50	27.8
Total	180	100%



Question (22) : Do you think that the antibiotic has side effects?

Table (25) : shows if the antibiotic has side effects ?

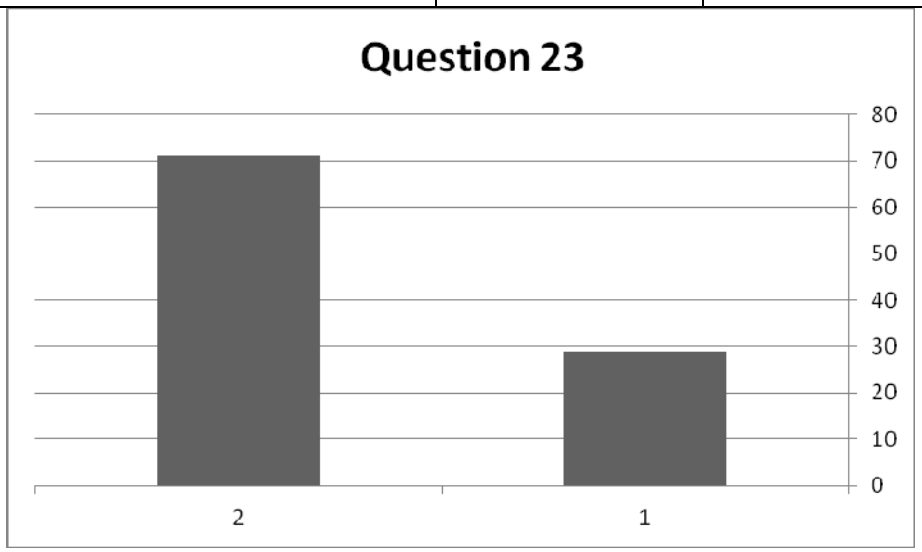
Do you think that the antibiotic has side effects ?	No.	Percentage
Yes	119	66.1
No	61	33.9
Total	180	100%



Question (23) : Do you change the physician if he doesn't prescribe an antibiotic for your child ?

Table (26) : shows if change the physician if he doesn't prescribe an antibiotic for your child ?

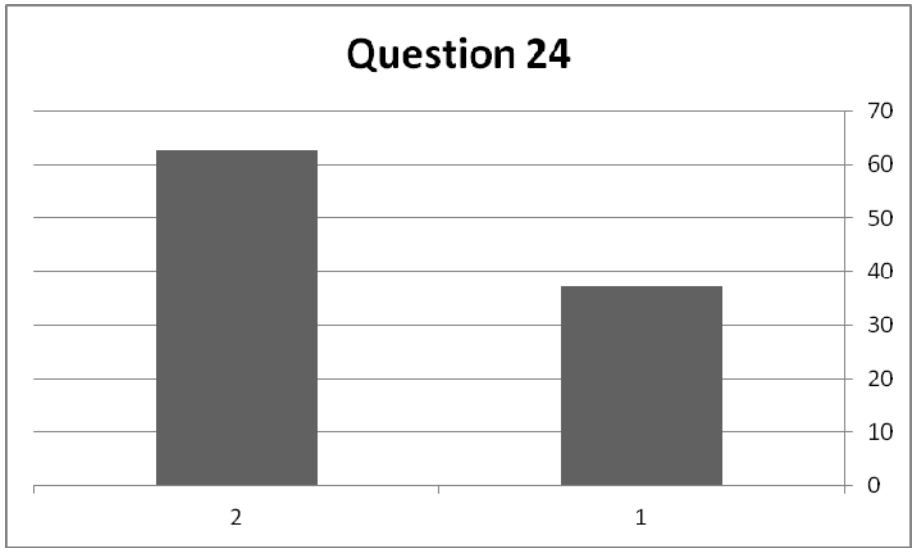
Do you change the physician if he doesn't prescribe an antibiotic for your child ?	No.	Percentage
Yes	52	28.9
No	128	71.1
Total	180	100%



Question (24) : Do you use the previous antibiotic prescribed for your other children ?

Table (27) : shows if you use the previous antibiotic prescribed for your other children?

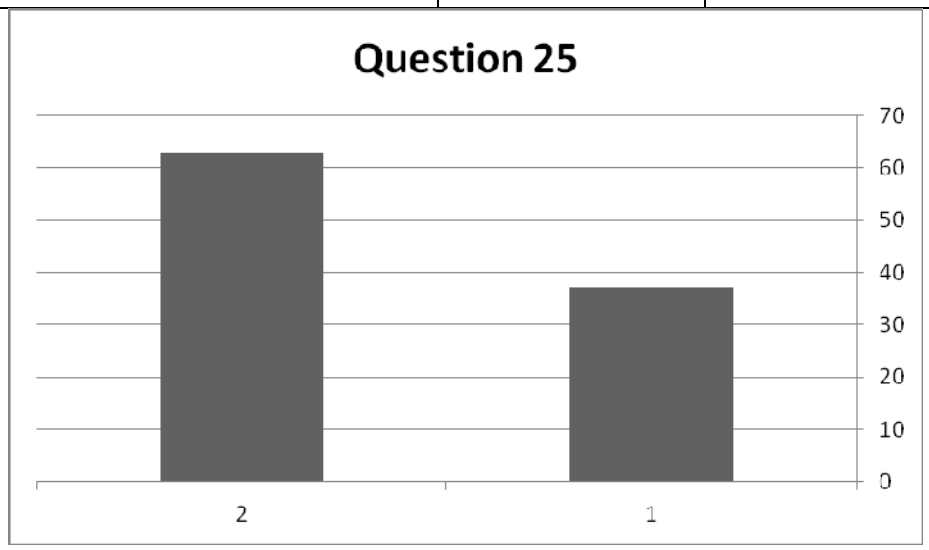
Do you use the previous antibiotic prescribed for your other children?	No.	Percentage
Yes	67	37.2
No	113	62.8
Total	180	100%



Question (25) : Do you use the previous antibiotic used by your neighbor for her children and was effective ?

Table (28) : shows if you use the previous antibiotic used by your neighbor for her children and was effective**?**

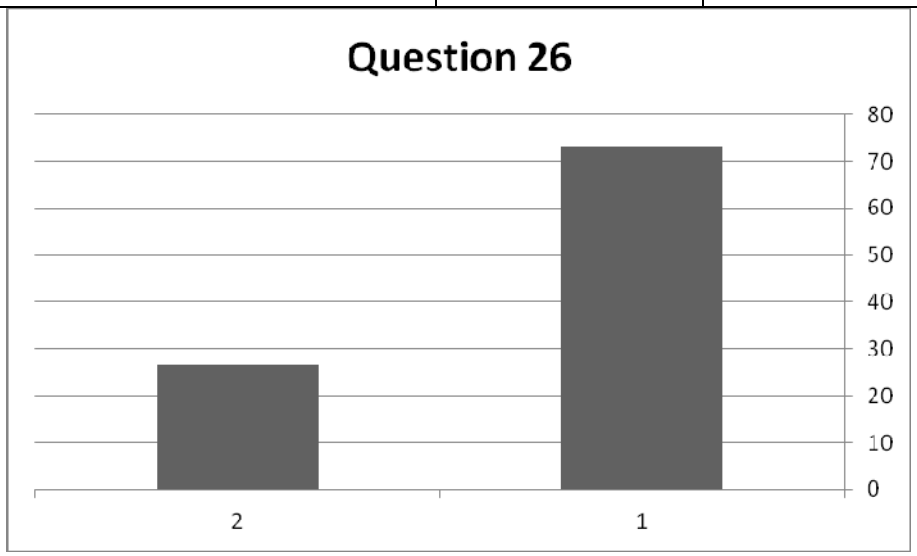
Do you use the previous antibiotic used by your neighbor for her children and was effective?	No.	Percentage
Yes	52	28.9
No	128	71.1
Total	180	100%



Question (26) : When your child take the medication for Flu, do you notice any progress ?

Table (29) : shows if you notice any progress **?**

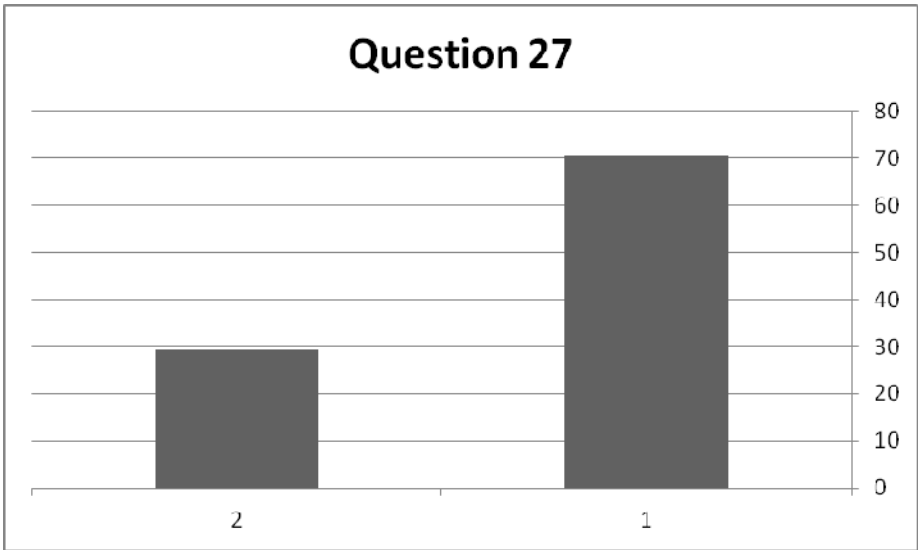
When your child take the medication, do you notice any progress ?	No.	Percentage
Yes	132	73.3
No	48	26.7
Total	180	100%



Question (27) : Do you think yourself concern too much about your children than the others do ?

Table (30) : shows if you think yourself concern too much about your children than the others do**?**

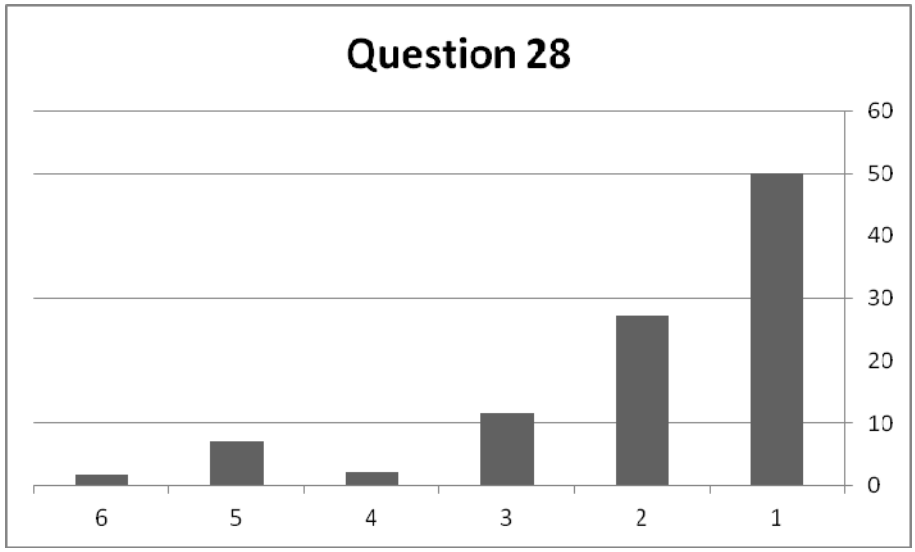
Do you think yourself concern too much about your children than the others do ?	No.	Percentage
Yes	127	70.6
No	53	29.4
Total	180	100%



Question (28) : How many days will pass when your child has fever and other symptoms until you visit the physician ?

Table (31) : shows How many days will pass when your child has fever and other symptoms until you visit the physician?

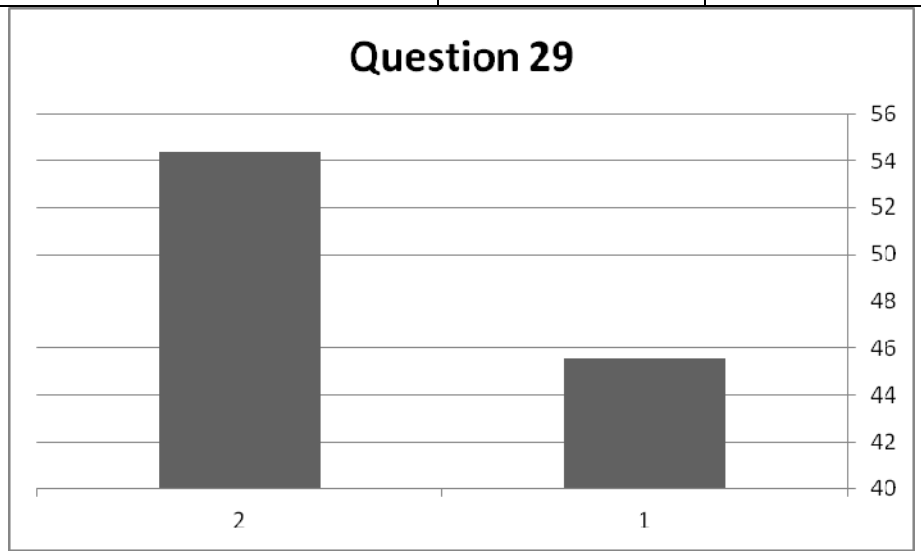
How many days will pass when your child has fever and other symptoms until you visit the physician	No.	Percentage
1 day	90	50.0
2 days	49	27.2
3 days	21	11.7
4 days	4	2.2
5 days	13	7.2
7 days	3	1.7
Total	180	100%



Question (29) : Do you give your child the antibiotic when you don't have time to visit the physician ?

Table (32) : shows the response on question no. 29?

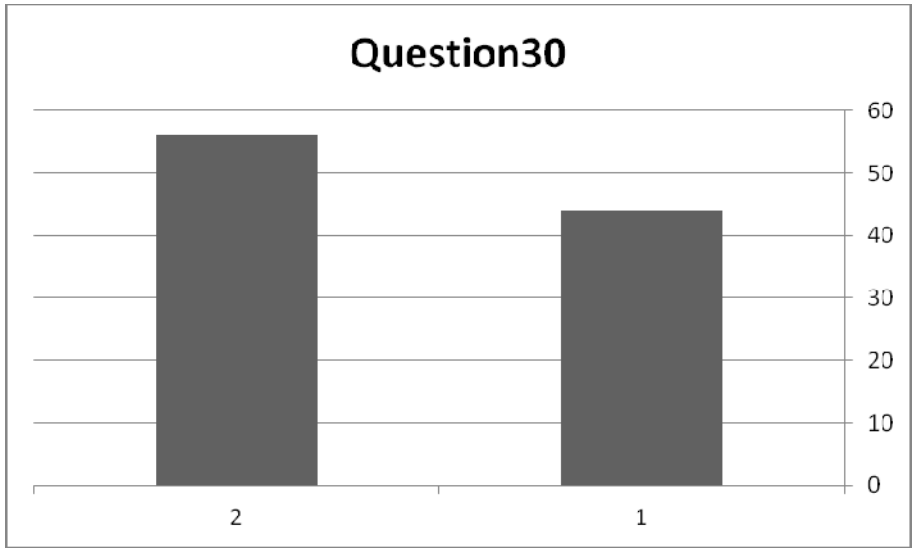
Do you give your child the antibiotic when you don't have time to visit the physician	No.	Percentage
Yes	82	45.6
No	98	54.4
Total	180	100%



Question (30) : Do you give your child the antibiotic when you don't have enough money to visit the physician ?

Table (33) : shows the response on question no. 30?

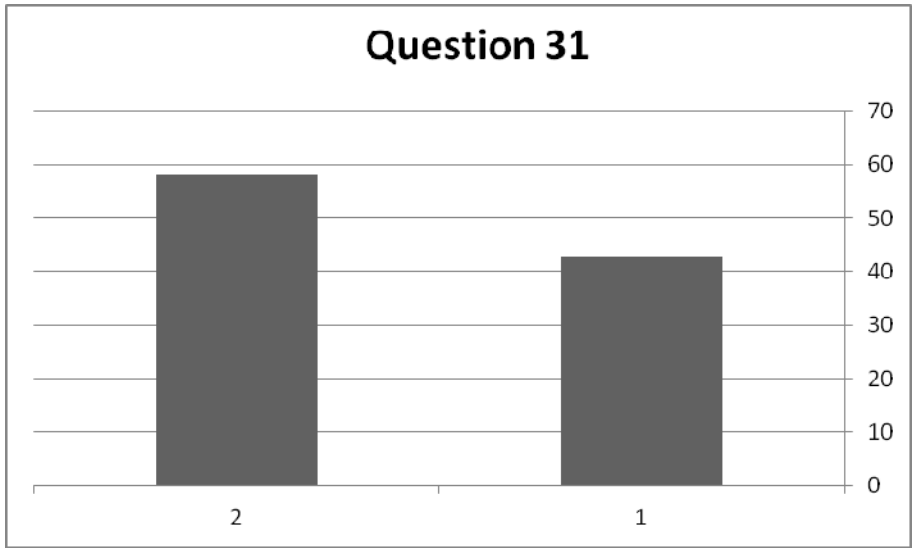
Do you give your child the antibiotic when you don't have enough money to visit the physician ?	No.	Percentage
Yes	79	43.9
No	101	56.1
Total	180	100%



Question (31) : Do you give your child the antibiotic because it has been prescribed previously by the physician ?

Table (34) : shows the response on question no. 31?

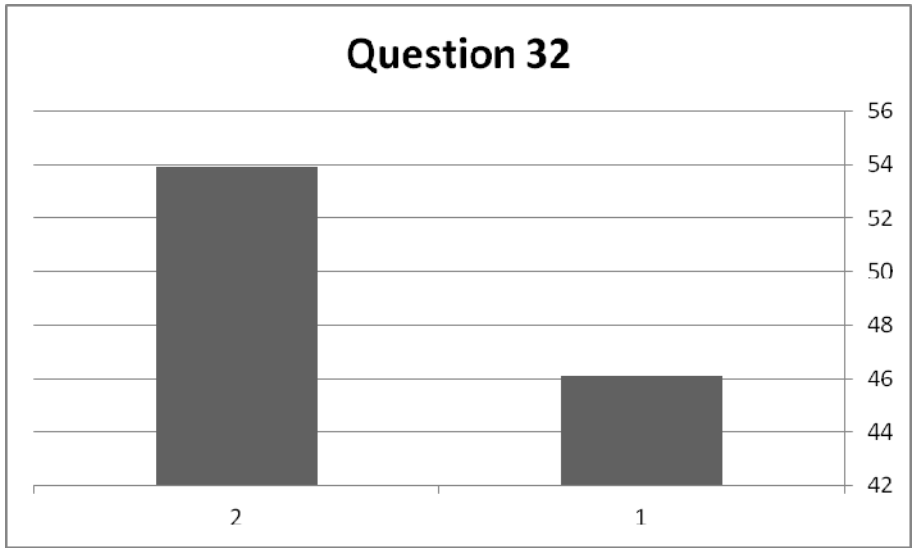
Do you give your child the antibiotic because it has been prescribed previously by the physician	No.	Percentage
Yes	77	42.8
No	103	57.9
Total	180	100%



Question (32) : Do you give your child the antibiotic because it has been prescribed by the pharmacist ?

Table (35) : shows the response on question no. 32?

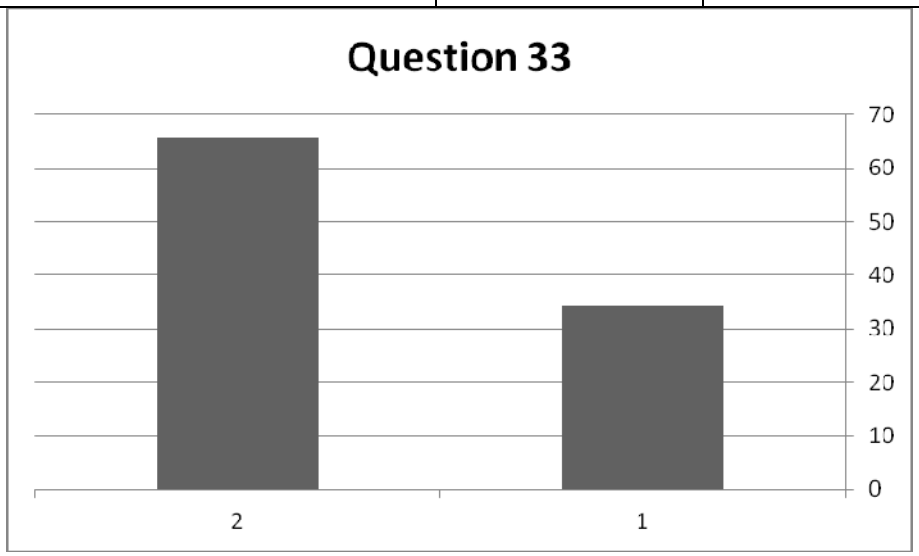
Do you give your child the antibiotic because it has been prescribed by the pharmacist ?	No.	Percentage
Yes	83	46.1
No	97	53.9
Total	180	100%



Question (33) : Do you give your child the antibiotic because it has been advised by a relative or a family member for another same cases ?

Table (36) : shows the response on question no. 33?

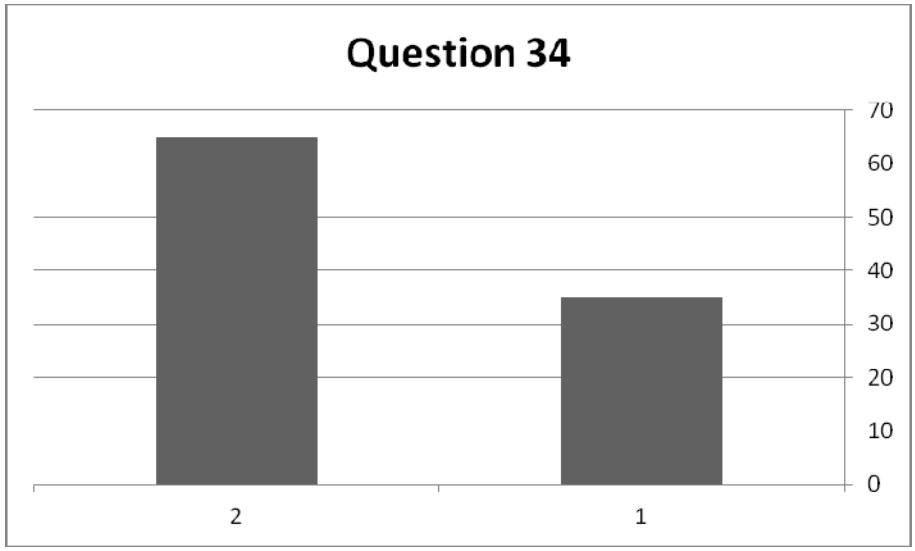
Do you give your child the antibiotic because it has been advised by a relative or a family member for another same cases?	No.	Percentage
Yes	62	34.4
No	118	65.6
Total	180	100%



Question (34) : Do you give your child the antibiotic because it has been remained at the house after curing another child with the same symptoms ?

Table (37) : shows the response on question no. 34?

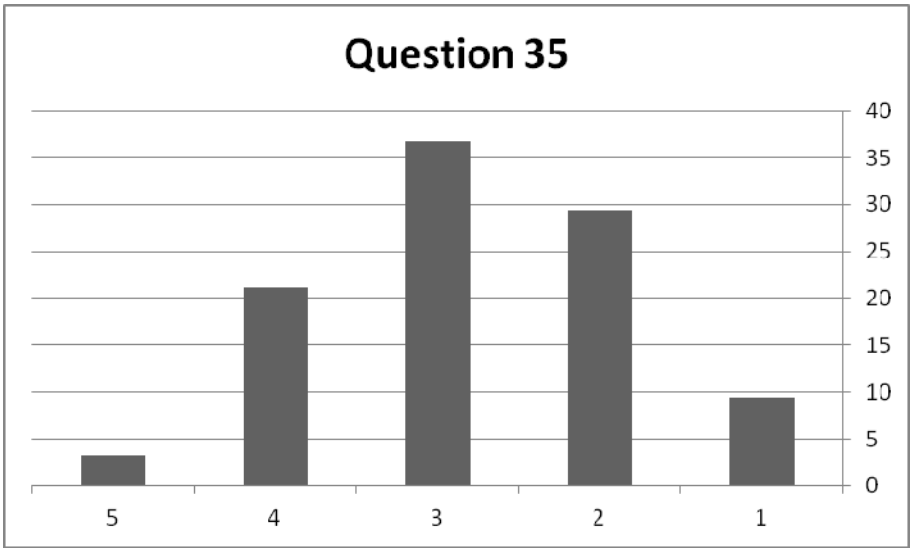
Do you give your child the antibiotic because it has been remained at the house after curing another child with the same symptoms ??	No.	Percentage
Yes	63	35.0
No	117	65.0
Total	180	100%



Question (35) : The antibiotics which you use for your children compared by others given to another children ?

Table (37) : shows the response on question no. 35?

The antibiotics which you use for your children compared by others given to another children?	No.	Percentage
Very much	17	9.4
A lot	53	29.4
Few	66	36.7
Very few	38	21.1
I don't use	6	3.3
Total	180	100%



Methodological Discussion

The study conducted using hospital based cross sectional survey, One hundred and eighty participant from the different four cities were chosen randomly using simple random sampling method to fill out and answer the structured questionnaire, a hospital based cross sectional approach was chosen because of the availability of participants in the hospital from different areas rural and city citizens, also the differentiation and chose of governmental and private hospitals ensures coverage of different socioeconomically described community levels. Time shortage and efficiency of cross sectional approach ensures quick data collection without losing reliability and also the number of participants chosen proportionally to the number of cases admitted to those hospitals is representative. The choosing of hospitals and pediatric wards also ensures participants familiarity with the topic because at most mothers who admitted their children to a hospital the have previously exposed to at least one antibiotic course treatment and they are surely had a good background.

Results discussion

This study is the first hospital-based survey of non-prescription use of antibiotics for children less than six years in North of West Bank. In both developed and developing countries, self-medication with antibiotics is common for illnesses presumed to be caused by a virus.[44,45,46,47]

The physicians in north of west bank had an excellent knowledge about bacterial resistance, but their attitudes toward antibiotic prescription still affected by parents perceptions and requests about prescribing antibiotics, other study in Greece showed that pediatric physicians have an excellent scientific background about bacterial resistance to antibiotics resulting from antibiotic misuse but they never contributed in their attitudes to that misuse.[48]

Pediatricians in North of West Bank said that families mostly trust the physician who prescribe antibiotic for their children which highly contribute in an indirect way to bacterial resistance to antibiotics, Mongolian researchers investigated families beliefs and also revealed that families trust physicians who prescribe antibiotics for their children.[49] Pediatricians in North of West Bank ensured that Amoxicillin is the most used antibiotic for children treatment of respiratory diseases in first place and followed by gastric dysfunction and abdominal restlessness, few studies in USA suggested that Amoxicillin is frequently used for the treatment of respiratory symptoms and abdominal restlessness in children less than five years.[50]Pediatricians in North of West Bank agreed that giving instructions about completing the full course of antibiotic to children is the first priority in their treatment, researchers in Switzerland concluded that pediatricians also prioritize giving instructions about completion of antibiotic course in their treatment.[51] Palestinian pediatricians agreed with their American colleagues about warning parents about non-prescription use of antibiotic.[52] Pediatricians in North of West Bank disagree about prescribing an antibiotic because parents asked for that, mostly they refuse that and still there are a proportion doing that, other researchers in Sweden propose that all of the pediatricians refuse prescribing any antibiotic when there is no indication for that.[53] The absence of sensitivity test of antibiotic is noted in the treatment of children less than six years in North of West Bank which minimizes the effectiveness of the treatment and increase bacterial resistance chances, Canadian pediatricians agreed that sensitivity tests should be performed prior to major illness treatment and hospitalization and also if the private pediatrician thought it is important to do that.[54]

The pharmacists in North of West Bank agreed that Amoxicillin is the most prescribed antibiotic for children less than six years and also the most antibiotic requested by parents without medical prescription, researchers in USA also agreed that pharmacists in their countries declared that Amoxicillin is the most prescribed antibiotic for children less than six years.[55] Selling antibiotic without medical

prescription is commonly appear in pharmacies in North of West Bank as pharmacist declared in spite of some pharmacists refusing to declare that, in USA policies and protocols are strictly monitoring over the counter drug centers and also registered pharmacies and there is a slight variation in the commitment to those protocols in which 80% of pharmacists refuse to sell any antibiotic without medical prescription and the rest considered as over the counter drug centres.[56]

Pharmacists in North of West Bank said that the signs and symptoms which mostly complained when parents come to buy an antibiotic without medical prescription are influenza like symptoms including cough, running nose, fever and sore throat at the highest level followed by pharyngeal congestion and tonsillitis and fewer than that symptoms of unexplained diarrhea and vomiting, their colleagues in Vietnam declared that symptoms include respiratory symptoms including cough and running nose, followed by gastric dysfunction and unexplained recurrent vomiting.[57]

In the hospital-based survey the response rate was 100% which is highly accepted and represent the population of children caregivers in the four selected cities, other study in Cyprus showed a response rate of 88% in a community-based survey which is also accepted and representative.[58] The mothers educational level participated in our study represented 40% of secondary education and 34.4% of high education and the rest of basic education which indicates an accepted level of education and also proposed good knowledge about basic health issues, in USA the educational level of 850 mothers participated in similar study presented 60% of high education and 25% of secondary education which also supported our point of view about having accepted level of education.[59] Mothers participated in our study are mostly have more than one child in a percentage of 60% which indicates a good knowledge and background about children care and illness, in UK mothers mostly have one child and have no previous background about children care and illness, this difference refers to cultural and socioeconomical differences between our community and British community.[60]
The majority of our study sample are mothers above 26 years of age and less than 40 years, other study in USA showed age variable between 30 and 45 years of age.[61]
When we have investigated family income it has been shown that 71.7% of families incomes ranged between very few and fairly accepted which makes economical factor one of the most important factors contributing to non-prescription use of antibiotic,

other study in Vietnam showed that families incomes highly ranged between very few and few in percentage of 70% of 5560 selected sample and also support that the economical factor is highly considered when investigating non-prescription use of antibiotic.[62] In both males and females 60.5% of our study sample children age are less than three years which also suggest that younger ages more susceptible to illness in relation with feeding method and nutrition, in Island the age group were less than seven years and 70% of them were less than three years.[63] In our study 47.2% are in kindergarten or school or nursery which indicates that there are an accepted relation between exposing to communicable diseases from other children and misuse of antibiotic and self medication guided by parents, in Sweden researchers showed that children who are in schools or kindergarten are highly exposed to communicable diseases and symptoms which increase the rate of antibiotic use and non-prescription use.[64] Parents in North of West Bank mostly consider fever as a serious complication that require antibiotic treatment in percentage of 68.9% of study sample, in Mongolia the researchers suggested that 59% of parents consider that fever require antibiotic treatment, which in both sides indicate parents misconception and knowledge deficit about antibiotic use indication and about fever as serious condition.[65] Parents mostly complete the dosage of antibiotics but 36.7% of our study sample didn't complete the dosage till the last dosage and represent an important feature of antibiotic misuse in North of West Bank, in Norway parents showed that 90% of them complete the course of antibiotic in community-based survey consisting of 6850 participants.[66] Amoxicillin was the most taken and prescribed antibiotic through our sample in which 57.3% of children receives Amoxicillin usually by their caregivers, in Mongolia 63.6% of children receiving Amoxicillin by their care givers with or without medical prescription which increasingly necessitate global intervention to put an end of antibiotic misuse and find an immediate alternative for resistances in the particularly use antibiotics.[67] The mothers in North of West Bank tended to duplicate the dosage of antibiotic thinking that could help in faster recovery and also asked their private pediatricians for antibiotic prescription which highly mark false beliefs and attitudes regard antibiotic use and contribute mainly in global disaster of antibiotic misuse, in Canada parents tended to ask pediatricians for prescribing antibiotic but never duplicate the dosage of antibiotic for their children.[68] In North of West Bank the majority of our sample had misconception about antibiotic indications and 47.8

considered cough and cold necessitate antibiotic use, in accordance to British researchers 39% of parents thought that cough is one of antibiotic indications.[69]

The signs and symptoms which mostly complained by children in North of West Bank and indicated antibiotic use included fever 45.6%, tonsillitis 31.1%, cough and flu 7.8, running nose 6.1% and cold symptoms 5.6%, signs and symptoms mostly complained in Mongolia were influenza like symptoms 52%, cough and cold 22.3%, and abdominal restlessness 11.6%.26 In our study it has been shown that 28.2 of mothers keep an antibiotic at home when no need for it and Amoxicillin was the most antibiotic kept, while in Turkey it has been shown that 32.6% of mothers keep an antibiotic when no need to use it, and Amoxicillin was the most kept.[70]

The mothers declared that most of the pharmacists accept giving them antibiotics without medical prescription in North of West Bank and 43.3% of our sample agreed that, in Mongolia it has been shown that most of the pharmacists accept selling antibiotics without medical prescription.[71] There is a significance relation between breastfeeding and illness susceptibility while in North of West Bank 45.6% of the study sample give their children breastfeeding or a mix of breast feeding and artificial milk while 20.6% didn't feed their children by breast feeding and depend only on artificial milk and they have noticed recurrent episodes of illness and weight loss for their children and noticed that their children were less than normal weight, in Canada researchers showed that 58% of mothers didn't fed their children by breast and depended on artificial milk which highly contributed to gastric dysfunction and indicated self medication with antibiotics.[72] Mothers used to repeat the usage of an antibiotic previously used to treat her other child who complained from similar symptoms as 37.2% of our study sample answered yes when they were asked about that attitude, also there was 28.9%of the study sample said that they use an antibiotic where given to them from a neighbor as it was effective in the treatment of their children, where 73.3% of the study sample said that their children got better when they have received an antibiotic due to having influenza like symptoms in which the misconception and knowledge deficit about antibiotic indication is clear and irresponsible unhealthy practices and attitudes play the main role in contribution of antibiotic misuse in the North of West Bank, in Cyprus mothers also used to repeat usage of previously used antibiotic to treat similar symptoms of their children, where the majority also used an antibiotic course to treat influenza like symptoms.[73] Time shortage and poverty also appeared as factors of non-prescription use of

antibiotic where 45.6% of the study sample buy antibiotics because they don't have time to visit the pediatrician and 43.9% buy an antibiotic because they don't have the enough money to visit the pediatrician, in Vietnam the poverty appeared highly as a factor of non-prescription use of antibiotic but varied about time shortage where it presented lesser percentage than in our study.[74] The mothers in North of West Bank used to consult the pharmacist about an appropriate antibiotic to their children instead of visiting the pediatrician where 46.1% of the study sample are respondents of saying yes about this attitude, in Canada researchers showed similar percentage and attitude.[75]

Conclusion

The prevalence of non-prescription use of antibiotics in children less than six years in North of West Bank is high and Some determinants of this practice were the child's age, caregivers 'misconceptions about the efficacy of antibiotics for upper respiratory tract infections, caregivers' own experience with self-medication, and the availability of antibiotics at home. Other determinants include economical issues of the caregivers and time shortage of parents who care of their children.

The most used Antibiotic for the treatment of upper respiratory tract infections, gastric dysfunction and unexplained vomiting and diarrhea was Amoxicillin, and the most kept antibiotic at homes also was amoxicillin, drug sellers didn't commit to policies and protocols of antibiotic selling, and pediatricians attitudes of antibiotic prescribing due to parents pressure also was one of the determinants.

The signs and symptoms which mostly complained when antibiotic used or prescribed were fever, tonsillitis, cough and cold, running nose, and other influenza like symptoms.

Interventions aimed at preventing the unsanctioned use of antibiotics should be directed primarily at reducing the availability of no prescribed antibiotics and educating the general public to dispel misconceptions about the use of antibiotics.

Recommendation

Prior completion of this study we have concluded the following recommendations:-

1- Drawing out national policies and protocols to limit and stop non-prescription selling of antibiotics.

2- Educational and health lectures to aware and warn physicians who respond to parents pressure regard prescribing an antibiotic when there are no need for it.

3- Governmental and non-governmental programs to teach pharmacists and physicians about bacterial resistance and its developing danger globally.

4- National campaign to teach parents young children about the danger of non-prescription use of antibiotic and community based programs including primary health clinics, maternal clinics and hospitals.

5- Addition of health promotion education into schools coursed and university coursed warning people about the danger of such topics like non-prescription use of antibiotics and misuse of antibiotics.

6- Put the protocols that necessitate sensitivity test prior to antibiotic prescription for young children to limit bacterial resistance to particularly used antibiotics.

7- Warn parents and caregivers about proper use of antibiotic like completion of the course, side effects predicted and disposal of antibiotic when finishing course.

8- Increase research efforts about bacterial resistance and misuse if antibiotics as multidisciplinary efforts to build out global policy to fight the practices, attitudes and beliefs regard antibiotic misuse and prescription.

Study Limitations

Time shortage was the major study limitation while in two months the study procedures were done, other limitation was financial support as we hoped that we have included sensitivity tests for the children were included in the study, otherwise n

Acknowledgment

We are highly appreciate the efforts of Dr Aidah Al Kaissi in teaching us the science of Nursing research, and our pleasant to MISS Shorouq Qadous and Mr Jehad Bani Oudeh in their supervision and scientific support of this study.

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Appendix one

Study Questionnaire

***هذا الاستبيان حول استخدام المضادات الحيوية لعلاج الاطفال دون ست سنوات**

* عزيزتي الام نرجو منكي الاجابة عن كامل الاسئلة التالية حسب التعليمات الموردة ادناه , هذا الاستبيان لهدف بحثي تعليمي يضمن الخصوصية والسرية لكل مشترك بالدراسة , لن يتم سؤالك عن اية معلومات شخصية , بمجرد اجابتكي على الاسئلة فانتي توافقين على المشاركة بالدراسة من خلال اجابتك على الاسئلة .

ما هو المستوى التعليمي لدى ام الطفل : ( ) اساسي ( ) ثانوي ( ) جامعي

كم عدد الاطفال في العائلة ؟ ( ) طفل واحد فقط ( ) اكثر من طفل

العمر (أم الطفل) : .....

ضع اشارة (√) :-

* السؤال الاول: الجنس(الطفل)؟
( ) ذكر ( ) أنثى

* السؤال الثاني : كم يبلغ عمر طفلك ؟
( ) اقل من عام ( ) من عام الى ثلاثة اعوام ( ) من ثلاثة اعوام الى ستة اعوام

* السؤال الثالث : هل يعاني طفلك من مرض تنفسي مزمن مثل الازمة او غيرها ؟
( ) نعم ( ) لا

* السؤال الرابع : هل يذهب طفلك الى روضة او مدرسة ؟
( ) نعم ( ) لا

* السؤال الخامس : هل يتناول طفلك المضاد الحيوي بمشورة طبيب ؟
( ) نعم ( ) لا

* السؤال السادس: هل يعتبر "الحمى" ارتفاع درجة الحرارة لدى طفلك دافعا قويا لاستخدام المضاد الحيوي ؟
( ) نعم ( ) لا

* السؤال السابع: هل تكملين عادة علاج المضاد الحيوي لطفلك حتى اخر جرعة ؟
( ) نعم ( ) لا

* السؤال الثامن: ما هو المضاد الحيوي الذي يتناوله طفلك غالبا؟

.....

.....

* السؤال التاسع : عادة ما تعطي الطفل المضاد الحيوي بالجرعة الموصوفة العادية ام تقومين بمضاعفتها ؟
( ) الجرعة الموصوفة ( ) مضاعفة الجرعة

* السؤال العاشر : هل تطلبين من طبيبك أن يصف لطفلك المضاد الحيوي لأمر ما ؟

( ) نعم ( ) لا

* السؤال الحادي عشر : هل تتوقعين انه من الضروري اعطاء المضادات الحيوية لطفلك, إذا كان المرض الذي يسببه فيروس ، مثل البرد" الرشح "؟

( ) نعم ( ) لا

* السؤال الثاني عشر: هل سمعت من قبل عن البكتيريا المقاومة للمضادات الحيوية ؟

( ) نعم ( ) لا

* السؤال الثالث عشر: هل تعتقد إن البكتيريا المقاومة للمضادات الحيوية تظهر في حالة عدم إكمال علاج المضاد الحيوي ؟

( ) نعم ( ) لا

* السؤال الرابع عشر: لأي من الإعراض تستخدمين المضاد الحيوي لطفلك ؟

.....

.....

* السؤال الخامس عشر: هل يوجد مضاد حيوي في صيدلية منزلك عندما لا يكون هناك سبب لاستخدامه ؟

( ) نعم ( ) لا

(إذا كانت الإجابة نعم ما هي .....)

* السؤال السادس عشر : هل تتوجهين للصيدلية لشراء مضادات حيوية لطفلك دون وصف الطبيب ؟

( ) نعم ( ) لا

* السؤال السابع عشر : هل يقوم الصيدلاني بإعطائك أدوية من غير وصفة طبية ؟

( ) نعم ( ) لا

* السؤال الثامن عشر : هل يعاني طفلك من الرشح او الزكام الان ؟

( ) نعم ( ) لا

* السؤال التاسع عشر : هل تلاحظين ان طفلك وزنه اقل من الطبيعي ؟

( ) نعم ( ) لا

* السؤال العشرون : هل يتلقى طفلك رضاعة طبيعية ؟

( ) نعم ( ) لا ( ) مزيج بين الطبيعية والصناعية ( ) أنهى فترة الرضاعة

* السؤال الحادي والعشرون : الدخل المالي للعائلة ؟

( ) قليل جدا ( ) قليل ( ) مقبول ( ) جيد ( ) ممتاز

* السؤال الثاني والعشرون : عادة ما تتراوح تكلفة المضاد الحيوي بين :

( ) 50- 100 شيقل جديد ( ) 100 – 200 شيقل جديد

( ) اكثر من 200 شيقل جديد ( ) غير ذلك

* السؤال الثالث والعشرون :هل تعتقدين ان للمضاد الحيوي أعراض جانبية ؟

( ) نعم ( ) لا

* السؤال الرابع والعشرون :هل تغيرين طبيب الاطفال اذا لم يقوم بوصف مضاد حيوي لعلاج طفلك ؟

( ) نعم ( ) لا

* السؤال الخامس والعشرون :هل تقومين باستخدام ما تبقى من المضاد الحيوي لأطفالك الآخرين إذا اصيبو بأعراض مثل الحمى , الكحة و الرشح ؟

( ) نعم ( ) لا

* السؤال السادس والعشرون : هل تقومين بالاستعانة بمضادات حيوية قد استخدمتها جارتك من قبل لاطفالها وقد اثبتت نجاعتها وقوتها ؟

( ) نعم ( ) لا

* السؤال السابع والعشرون : عندما يتناول الطفل الذي يشكو من اعراض الرشح المضاد الحيوي يتماثل للشفاء بشكل اسرع ؟

( ) نعم ( ) لا

* السؤال الثامن والعشرون : هل تعتبرين نفسك أكثر قلقا على ابنك من قلق الآخرين على أبنائهم ؟
( ) نعم ( ) لا
* السؤال التاسع والعشرون : كم يوم يمضي حتى تزورين الطبيب عندما تلاحظين ان طفلكي يشكو من اعراض مثل جريان الانف والكحة والاستفراغ والحرارة ؟
( ) يوم
* السؤال الثلاثون:هل تعطين المضاد الحيوي لطفلك عندما لا تملكين وقتا كافيا لزيارة الطبيب ؟
( ) نعم ( ) لا

* السؤال الحادي والثلاثون : هل تعطين المضاد الحيوي لطفلك عندما لا تملكين مالا كافيا لزيارة الطبيب ؟
( ) نعم ( ) لا
* السؤال الثاني والثلاثون :هل تعطين المضاد الحيوي لطفلك لان الطبيب قد وصفه سابقا لعلاج نفس الاعرض ؟
( ) نعم ( ) لا
* السؤال الثالث والثلاثون :هل تعطين المضاد الحيوي لطفلك لأن الصيدلاني قد نصح بذلك ؟
( ) نعم ( ) لا
* السؤال الرابع والثلاثون : هل تعطين المضاد الحيوي لطفلك لأن احد اقاربك او افراد العائلة قد نصح بنجاحه بعلاج اعراض مشابهة لاعراض مرض طفلك ؟
( ) نعم ( ) لا
* السؤال الخامس والثلاثون :هل تعيدين استخدام المضاد الحيوي المتبقي في المنزل سابقا لعلاج طفلك المصاب بنفس الاعراض السابقة ؟
( ) نعم ( ) لا
* السؤال السادس والثلاثون : المضادات الحيوية التي تستخدمينها لعلاج طفلك مقارنة بالاطفال الاخرين هي :_
( ) كثيرة جدا ( ) كثيرة ( ) ليست كثيرة ( ) قليلة ( ) لا استخدم

شكرا لتعاونكم , الشفاء العاجل لطفلكم