

# Impact of an Educational Program for Mothers about Preventing Oral Medications Misuse for Children Under Five Years

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**Abstract** Oral drug misuses are occurring at an alarming rate; these misuses are both avoidable and expensive to the healthcare system. **Study aim:** The aim was to evaluate the impact of an educational program for mothers about preventing oral medications misuse for children under five years. **Design:** Quiz-experimental research design was used. **Setting:** The study was implemented at out-patient clinics in Assiut University Children Hospital. **Subjects:** A convenience sample of 50 mothers who had children under five years with acute common illnesses. **Tools:** The study used two tools: **Tool I** included two parts; part one; the socioeconomic scale and part two; mothers' age and main sources of information. **Tool II** was the structured interview questionnaire about mothers' knowledge regarding their practices during oral medications administration. **Results:** The majority of the mothers (88%) had a poor score of knowledge about practice before the program while 94% of them had a good score after the program. Also, the majority of them (96%, 88%, and 78%) compared to 82%, 8%, and 14% respectively in the pre and posttest gave antipyretics, cough & cold and antibiotics medications without a prescription. **Conclusion:** The educational program improved the mothers' knowledge about practice regarding oral medications administration for their young children and decreased oral drug misuse with a statistically significant difference between pre and posttest as regard their total score. **Recommendations:** Pediatric hospitals should offer the mothers with handouts, brochures, pamphlets, posters or videotapes about oral medication administration.

**Keywords:** educational program, drug misuse, medications errors, oral medications, children under five years

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## 1. Introduction

Medication errors are important worldwide affairs that can cause appreciable morbidity and mortality also, severe medical consequences for children [1,2]. Medication administration errors (MAEs) and misuse may be the result of faulty maternal practices i.e. when any of the medications administration rights gets wrong. Giving the child wrong dose in the form of overdose, underdose and missed a dose or giving the wrong drug is the possible most serious errors [3]. Also, "self-medication" or "over-the-counter (OTC)" are other forms of medication administration errors. It refers to medications that are taken by the patient but are not prescribed by the physician [4].

In Egypt a study done with [5] showed that; over-the-counter (OTC) drugs in the form of cold medications and cough suppressants were found to be the cause of poisoning in 19.1% of poisoned children. Also,

[6] study "the risk factors of acute poisoning among children at a poisoning unit of a university hospital in Egypt" indicated that analgesics and cough drugs were responsible for 2.7% and 1.4% of acute poisoning in children. Furthermore, in Jordan a study by [7] who found that total of 57% of parents treated children with incorrect doses of antipyretic drugs.

The administration of oral medications to children is frequently an aspect of nursing care that causes a concern for child, family, and nurse. Therefore, the mother's knowledge about child care influences the nature and quality of care that is given to the child especially medications and drug use [4]. Administering drugs safely to children requires the mothers first determine that they are giving the right drug to the right child, in the right dosage, by the right route, and at the right time. Also, the pediatric nurse needs to ensure that the parents or the child have the right information about the right medication [8].

Teaching the family about the prescribed medications is an essential part of the therapy. The nurse plays a vital role in the community as well as in pediatric hospitals and

clinics in teaching the mothers about how giving oral drugs to their children. The nurse should inform the mother that the prescribed drug is the best for the child. Also, tell her about dose and number of doses throughout the day in addition to the method of administering it to her child at home [9].

Moreover, the nurse should educate the mother about safe drug storage in the house where mothers should be instructed to carefully collect, count, and package each drug separately in its original container and out of children reach. The expected side effects should also be included in health education provided for mothers about oral medication administration. If the mothers learned how to give a drug correctly, they could treat their children properly with oral drugs at home [10].

### 1.1. Significance of the Study

Pediatric medication misuses are occurring at an alarming rate; these misuses are both avoidable and expensive to the health care system and often lead to severe and devastating consequences for children and their families. Pediatric medication misuses can cause disability, death, physical and psychological harm, and also, increase the cost of hospitalization [11]. Limited researches that exist indicate that misuses may be common and parents are often unaware of them [12,13]. Many types of research study the medications errors with nurses but no study done on the mothers to investigate the extent of drug misuse in children so, that the current study should be done.

## 2. Aim of the Study

The study aim was to evaluate the impact of an educational program for mothers about preventing oral medications misuse for children under five years.

## 3. Research Hypotheses

1. Mothers may have misuse during oral medications administration for children under five years.
2. The educational program improves the mothers' knowledge about practice regarding oral medications administration for children under five years and decreases oral drug misuse

## 4. Materials and Method

### 4.1. Research Design

A quasi-experimental research design was used in this study.

### 4.2. Setting

The study was carried out at General and Chest Pediatric Out-Patient Clinics in Assiut University Children Hospital. Assiut University Children Hospital

was opened in 2005. It was included inpatient and outpatient departments and served seven governorates in Upper Egypt from El-Minia to Aswan. There were twelve outpatient clinics as general clinic one & two, respiratory, blood, endocrine, nutrition, renal, gastrointestinal, neurology, fitness, EEG, and rheumatic clinic.

### 4.3. Subjects

A convenience sample of 50 mothers who had children under five years with acute common illnesses and were responsible for giving oral medications to their children. The sample was calculated by using power analysis according to the population flow at confidence interval 95% with precision levels 5% and  $p \leq 0.05$ . The possible sample was 39 child increased to 60 to compensate any dropout of the mothers. The researchers interviewed 60 mothers while 10 of them didn't complete the program. They were excluded from the study sample.

### 4.4. Tools of the Study

**Two tools were utilized for this study:**

**Tool I:** It was included two parts as the following:

**Part one: The Socioeconomic scale:** This tool was developed by Abd El-Twaab (1998) [14] and adapted by the researchers to assess the socioeconomic status. It included four items were the educational level of parents (8 items), family income (6 items), parents' occupation (2 items), and lifestyles (3 items). Each item had one score and the total score was classified into three classes as the following: high class from 85-100%, moderate class from 60 to less than 85%, and low class less than 60%. The item of family income was modified by the researchers according to the rate of inflation and the increase was conforming with recent income in 2017 through comparing difference of the value of the golden pound at 1998 (nearly 185 Egyptian pounds) to that at 2017 (nearly 5016 Egyptian pounds) and multiplying the rate of inflation (27.1) to the scale".

**Part two:** Mothers' age and the main sources of information about oral medication administration.

**Tool II: A structured interview questionnaire about mothers' knowledge regarding their practices during oral medications administration:** It was adapted after a thorough review of literature from previous researches by [10,13,15,16]. It included five main categories: right medication (5 items), right dose (8 items), right time (2 items), care before and after medications (12 items), common oral drugs; antibiotics (8 items), antipyretics (2 items), cough and cold medications (3 items) and Oral Rehydration Solutions (ORS) (6 items).

#### 4.4.1. Scoring System

- Each item from practices scores is graded as follows; one for correct response and zero for incorrect response. The mothers' practices were considered accurate according to the literature. The total score was 46.

According to [10] the mothers' knowledge about practice was scored as follow:

Poor = <50% (less than 23 score)

Fair = 50-65% (23 to less than 30 score)  
 Good =  $\geq 65\%$  (30 score and more).

phone. But the mothers who didn't complete the posttest were excluded from the study sample.

## 5. Method of Data Collection

1. An official permission was taken from the Dean of Faculty of Nursing to Assiut University Children Hospital's manager to collect the data after clarifying of the study purpose.
2. A structured interview questionnaire was developed by the researchers on the basis of the relevant literature.
3. The content validity of the structured interview questionnaire was assessed by a jury of five professors in the field of Pediatric and Community Health Nursing. The content validity index was 0.80. Also, reliability was assessed by using Cronbach  $\alpha$  test to measure the internal consistency. It was  $R = 0.82$ .
4. Ethical approval was attained from the Ethical Committee at the Faculty of Nursing - Assiut University. The purpose and nature of the study was explained to the mothers. Also, the mothers informed that they had the right to agree or disagree to participate in the study. Oral agreement was obtained to participate in the study from every mother and they were informed that the information obtained would be confidential and used only for the purpose of the study.
5. A pilot study was done on 10% (5) of the mothers to test the clarity and applicability of the tools and to estimate the time needed for filling the sheet. Based on the results of the pilot study no modifications were done in the tools. The mothers in the pilot were excluded from the total sample.
6. The data collection was starting from November 2016 to the end of February 2017. The researchers interviewed the mothers and their children at the Out-Patient Clinics in Assiut University Children Hospital. Data were collected before the application of the program and after one month from the program application. During the interview; the researchers introduced themselves to the mothers and explained the purpose and nature of the study. The researchers interviewed the mothers in the pretest throughout two sessions; in the first session the researchers filled the interview sheet. In the second session the researchers explained the program and gave the handout to the mothers.
7. The posttest was done after one month of the pretest. The researchers interviewed from three to five mothers one day/week. The average time for filing the pretest sheet was around 30-45 minutes depending on the response of the mothers. The program content was discussed in the booklet contained colored pictures, posters, and power point at students' teaching class. The average time to applied and filing the posttest sheet was around 20-30 minutes.
8. Some mothers didn't come after one month and the researchers talked with them through the mobile

## 6. Statistical Analysis

Data were coded and entered by using the Statistical Package for Social Science (SPSS) version 20. Data analysis was done in the form of univariate analysis: descriptive statistics (frequency & percent for qualitative data, mean  $\pm$  SD for quantitative data). Bivariate analysis: cross-tabulation. Chi-square test ( $X^2$ ) and t-test were used to test the difference between the proportions of qualitative data. The statistical significance level was considered when  $p\text{-value} \leq 0.05$  for all statistical tests.

## 7. Results

Table 1 shows the socio-demographic characteristics of studied mothers. It was found that 54% of the mothers their age were 30<40 years and 36% of them were illiterate. Concerning the mothers' occupation; 74% were housewives. Also, 82% of them have resided in the rural areas. Furthermore, 78% of them had less than five children. Finally, it was observed that 82% of the mothers had low social class while no one of them had high social class.

**Table 1. Socio-demographic Characteristics of Studied Mothers (N=50)**

Characteristics	No	%
<b>Mother's age/years:</b>		
20-	19	38.0
30-	27	<b>54.0</b>
40 and more	4	8.0
<b>Mean <math>\pm</math> SD</b>	<b>30.8 <math>\pm</math> 6.5</b>	
<b>Mothers' Education:</b>		
Illiterate	18	<b>36.0</b>
Basic education	11	22.0
Secondary education	15	30.0
University education	6	12.0
<b>Mothers' Working Condition:</b>		
House wives	37	<b>74.0</b>
Working	13	26.0
<b>Residence:</b>		
Rural	41	<b>82.0</b>
Urban	9	18.0
<b>Number of children in the family:</b>		
Less than 5	39	<b>78.0</b>
5 and more	11	22.0
<b>Social class</b>		
Low	41	82.00
Middle	9	18.00
High	0	0.00

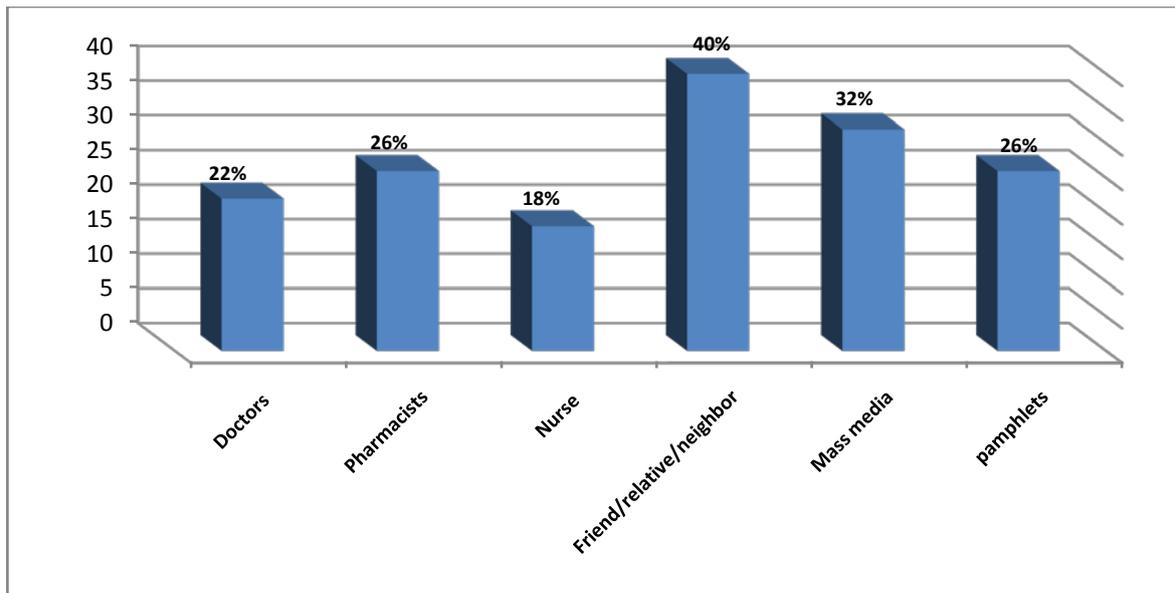


Figure 1. Main sources of information regarding oral medications administration among the studied mothers

Table 2. Percentage distribution of mothers' knowledge about their practice concerning right medication & right time in pre and posttest (N=50)

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
<b>Right medication:</b>						
<b>1. What is your first action in child illness:</b>						
• Try using herbs, warm fluids or any of traditional methods.	9	18.0	1	2.0	75.0	0.000
• Give previously prescribed medication	28	56.0	1	2.0		
• Buy medicines at pharmacy without a doctor's prescription.	10	20.0	2	4.0		
• Go to clinics or hospitals.	2	4.0	42	84.0		
• Consult the pediatrician immediately as the child gets ill.	1	2.0	4	8.0		
<b>2. Checking medication label every time before administration.</b>	18	36.0	49	98.0	6.38	0.000
<b>3. Notice the expiration date of medication.</b>	10	20.0	45	90.0	6.83	0.000
<b>4. Give medication to other siblings.</b>	44	88.0	16	32.0	5.51	0.000
<b>5. Having history of giving wrong medication to the child.</b>	14	28	0	0.0	3.75	0.000
<b>Right time:</b>						
<b>1. Complaining from giving the child's medications at accurate time.</b>	26	52.0	6	12.0	4.1	0.000
<b>2. Maternal practices in case of forgetting administration of child's medication on time</b>						
• Give medication as soon as they remember	28	56.0	3	6.0	81.5	0.000
• Provide next dose before its time	3	6.0	0	0.0		
• Give forgotten dose with next dose (double-dose/ over-dose)	5	10.0	0	0.0		
• Omit forgotten dose and provide next dose on its time	12	24.0	0	0.0		
• Consult pediatrician or pharmacist	2	4.0	47	94.0		

\*p ≤ 0.05.

Figure 1: Represents the main sources of information about oral medications administration of the studied mothers. It is clear from the figure that 40% of the mothers mentioned that friends, relatives, and neighbors were the main sources of information about oral medication administration followed by mass media (32%).

Table 2: Reveals the percentage distribution of mothers' knowledge about their practice concerning right medication & right time in pre and posttest. It was noticed that 56% and 20% of the mothers give previously prescribed medication and buy medicines at the pharmacy without a doctor's prescription as a first action when their children become ill in the pretest compared to 2% and 4%

of them respectively in the posttest.

In addition; 36% and 20% of the mothers check the medication label every time before administration and notice the expiration date of medication in the pretest increased to 98% and 90% respectively in the posttest. Furthermore, 88% and 28% of studied mothers give medication to other siblings and having a history of giving wrong medication to the child in the pretest compared to 32% and no one in the posttest. The results found that 56% and 10% of the mothers give medication as soon as they remember and give forgotten dose with next dose (double-dose/ over-dose) in the pretest compared to 6% and no one in the posttest.

**Table 3. Percentage distribution of mothers' knowledge about their practice regarding right dose in pre and posttest (N=50):**

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
<b>1. Devices used in measuring and administering medication:#</b>						
• Medication bottle cap	18	36.0	0	0.0	20.0	0.000
• Graduated medication cup	12	24.0	17	34.0		
• Medicine dropper	0	0.0	0	0.0		
• Teaspoon	22	44.0	1	2.0		
• Syringe	22	44.0	42	84.0		
<b>Technique of using teaspoon (n=22):</b>						
• Place it on tip of the tongue	17	77.3	1	4.5	24.1	0.0001
• Place it at middle of the tongue	5	22.7	21	95.5		
<b>Technique of using syringe (n=22):</b>						
• Place it on tip of the tongue	12	54.5	0	0.0	30.4	0.0002
• Place it at middle of the tongue	8	36.4	2	9.1		
• Place it in the side and posterior of the mouth	2	9.1	20	90.9		
<b>Expelling excess air when using a syringe:</b>	19	86.4	21	95.4	0.20	0.8
<b>Method of measuring the medication using a graduated cup (n=12):</b>						
• Pour dose nearly	6	50.0	0	0.0	14.40	0.001
• Pour medication until it reaches the ordered amount	3	25.0	12	100.0		
• Measure prescribed dose at eye level	3	25.0	0	0.0		
<b>2. Maternal practices in case of child's vomiting or spitting out the administered dose:</b>						
• Give the same dose of medication again to the child	27	54.0	0	0.0	117.2	0.000
• Give another smaller dose to the child	11	22.0	1	2.0		
• Consult pediatrician or pharmacist	0	0.0	49	98.0		
• Increase amount of next dose	3	6.0	0	0.0		
• Didn't take any action	9	18.0	0	0.0		
<b>3. Previously administering an over-dose to the child:</b>	21	42.0	0	0.0		
<b>4. Actions taken in case of over-dose administration (n=21):</b>						
• Observe the child for any abnormal manifestation and then take an action	5	23.8	3	14.3	16.0	0.003
• Omit the following dose	4	19.0	1	4.8		
• Consult pharmacist	1	4.8	2	9.5		
• Consult pediatrician	4	19.1	15	71.4		
• Didn't take any action	7	33.3	0	0.0		

# More than one answer, \*p ≤ 0.05.

**Table 3:** Represents the percentage distribution of mothers' knowledge about their practice regarding right dose in pre and posttest. It was found as regard devices used in measuring and administering oral medication that 36% and 44% of the mothers respectively used medication bottle cap and teaspoon in the pretest compared to no one and 2% in the posttest.

It was clear from this table that 54% and 22% of the mothers give the same dose again and give another smaller dose of medication to the child when child vomit or spitting out it decreased to no one and 2% in the posttest. Finally, 33% of them didn't take any action in case of an overdose of medication in the pretest compared to zero in the posttest.

**Table 4:** Shows the percentage distribution of mothers' knowledge about their practice regarding care before and after oral medications administration in pre and posttest. It was revealed that 12% of the studied mothers checked the side effects of medication compared to 60% in the posttest.

As regards medication storage 96% compared to 92% of them in the pretest and posttest respectively stored the medication for later use. The majority of the mothers (96% and 96%) store antipyretics, cough, and cold medications in pretest compared to 94% and 82% of them respectively in the posttest.

**Table 5:** Indicates the percentage distribution of mothers' knowledge about their practice concerning antibiotic administration in pre and posttest. It was clear from the table that 80% compared to no one respectively of the mothers were stopping the course of antibiotic when the child improved in the pretest and posttest.

Concerning the mothers' practice in suspension preparation; 60% of the mothers add all the packet of sterile water to the medication particles regardless of the recommended amount in the pretest decreased to 2% in the posttest. Finally, 78 % compared to 14% of the mothers in the pretest and posttest give previously antibiotics used without a prescription.

**Table 4. Percentage distribution of mothers' knowledge about their practice regarding care before and after oral medications administration in pre and posttest (N=50)**

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
<b>Care before medication administration:</b>						
<b>1. Hand washing</b>	30	60.0	50	100.0	4.75	0.000
<b>2. Child's position</b>						
• Sitting position	18	36.0	16	32.0	11.2	0.003
• Lying position	9	18.0	0	0.0		
• Semi-sitting	23	46.0	34	68.0		
<b>3. Checking side effects of medication</b>	6	<b>12.0</b>	30	<b>60.0</b>	4.79	0.000
<b>4. Method of giving the child more than one medication at same time</b>						
• Administer all medications with the same device without rinsing	29	58.0	1	2.0	39.4	0.000
• Mix medications together	1	2.0	1	2.0		
• Rinse the device between administration of each medication	13	26.0	22	44.0		
• Administer each medication with a separate device	7	14.0	26	52.0		
<b>5. Methods of administering tablets to the child (n=27):</b>						
• Crush tablet and mix it with water or pleasant tasting liquid.	14	28.0	1	2.0	24.9	0.0004
• Dissolve tablets in water or pleasant tasting liquid.	7	14.0	25	50.0		
• Crush tablets and mix it with child's food.	6	12.0	1	2.0		
<b>6. Maternal practices in case of child's refusal to receive medications administration</b>						
• Refer to medication as a honey or candy	17	34.0	1	2.0	56.3	0.000
• Pinch child's nose to force the child to swallow medications.	10	20.0	0	0.0		
• Restraint and force the child to take medication	8	14.0	0	0.0		
• Punish the child physically	3	6.0	1	2.0		
• Ask a loved person to administer medications to the child	6	12.0	13	26.0		
• Reward and praise the child to take the medication	6	12.0	35	70.0		
• Threaten the child if he refuses the medication.	0	0.0	0	0.0		
<b>Care after medication administration:</b>						
<b>A. Medication storage:</b>						
<b>1. Storing the residual medication for later use</b>	48	<b>96.0</b>	46	<b>92.0</b>	0.42	0.7
<b>2. Store medications in their original packages</b>	44	88.0	50	100.0	2.11	0.03
<b>3. Place of storage of child's oral medications</b>						
• In locked cabinet	2	4.0	10	20.0	13.0	0.004
• On table (Within children reach)	6	12.0	0	0.0		
• On high shelf	5	10.0	9	18.0		
• In refrigerator	37	74.0	31	62.0		
<b>4. Types of residual medications that can be stored #</b>						
• Cough and cold medications	48	<b>96.0</b>	47	<b>94.0</b>	26.3	0.000
• Anti-diarrheal drugs	42	84.0	10	20.0		
• Antipyretics	48	<b>96.0</b>	41	<b>82.0</b>		
• Antibiotics	25	50.0	2	4.0		
<b>B. Method of cleaning medication device after administration:</b>						
• Rinsing it with water only	31	62.0	7	14.0	69.5	0.000
• Wash it with soap and warm water and allow it to dry	2	4.0	43	86.0		
• Didn't wash it	17	34.0	0	0.0		

# More than one answer, \*p ≤ 0.05.

**Table 5. Percentage distribution of mothers' knowledge about their practice concerning antibiotic administration in pre and posttest (N=50)**

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
1. Stopping course of antibiotic when the child improved	40	<b>80.0</b>	0	<b>00.0</b>	7.96	0.000
2. Developing time schedule for antibiotic administration	15	30.0	40	80.0	4.82	0.000
3. Compliance with scheduled time until finishing the prescribed course.	9	18.0	36	72.0	5.23	0.000
4. Prepare liquid antibiotics suspension	39	78.0	42	84.0	0.51	0.6
<b>5. Methods used by the mother in suspension preparation</b>						
• Add all the packet of sterile water to the medication particles regardless of the recommended amount	30	<b>60.0</b>	1	<b>2.0</b>	55.0	0.000
• Add the sterile water until it reaches the recommended amount	13	26.0	49	98.0		
• Add tape water to the medication particles	1	2.0	0	0.0		
• Add previously boiled water to the medication particles	6	12.0	0	0.0		
6. Shaking the antibiotic bottle each time before administration	45	90.0	50	100.0	1.84	0.1
<b>7. Measuring devices used to measure antibiotic doses:</b>						
• Syringe	27	54.0	34	68.0	66.6	0.000
• Graduated medication cup	1	2.0	7	14.0		
• Medication bottle cap	8	16.0	0	0.0		
• Tea spoon	14	28.0	0	0.0		
• Medicine dropper	0	0.0	0	0.0		
• Dosing spoon	0	0.0	9	18.0		
8. Storing suspended antibiotics in refrigerator in-between uses.	43	86.0	49	98.0	1.84	0.1
9. Giving previously prescribed antibiotics without prescription.	39	<b>78.0</b>	7	<b>14.0</b>	6.22	0.000

\*p ≤ 0.05.

**Table 6. Percentage distribution of mothers' knowledge about their practice concerning antipyretics, cough and cold medications administration in pre and posttest (N=50)**

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
<b>Practices concerning antipyretics administration</b>						
1. Giving feverish child antipyretics without prescription	48	<b>96.0</b>	41	<b>82.0</b>	1.92	0.05
<b>2. Maternal practices in case of severe and persistent fever</b>						
• Try another type of antipyretic	26	<b>52.0</b>	1	<b>2.0</b>	64.5	0.000
• Increase the dose of the same antipyretic	10	20.0	0	0.0		
• Increase the frequency of the same antipyretic	5	10.0	1	2.0		
• Consult the pediatrician	7	14.0	46	92.0		
• Administer antipyretic injection	2	4.0	2	4.0		
<b>Practices concerning cough and cold medications administration</b>						
1. Giving the child cough and cold medications without prescription	44	<b>88.0</b>	4	<b>8.0</b>	7.81	0.000
2. Administering more than one type of cough and cold medications (without prescription)	42	<b>84.0</b>	1	<b>2.0</b>	8.1	0.000
<b>3. Maternal practices in case of severe and persistent cough</b>						
• Asked pediatrician advice.	37	74.0	50	100.0	50.0	0.000
• Discontinue the current medication and try another one	10	20.0	0	0.0		
• Didn't take any action	0	0.0	0	0.0		

\*p ≤ 0.05.

**Table 6:** Illustrates the percentage distribution of mothers' knowledge about their practice concerning antipyretics, cough, and cold medications administration in pre and posttest. It was revealed that 96% of the mothers in pretest compared to 82% in posttest give antipyretics to the child without a prescription. It was noticed that 52 % of them try another type of antipyretic when the child had a severe and persistent fever in the

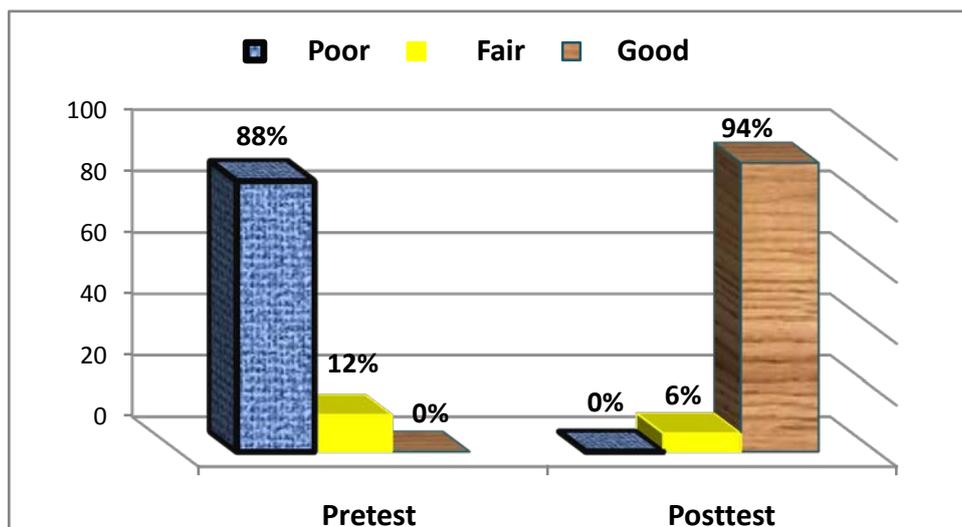
pretest while decreased to 2% in the posttest.

In addition; the majority (88%) of the mothers give their children a cough and cold medications without prescription before the program decreased to 8% after program application. Furthermore, 84% of them before program administering more than one type of a cough and cold medications (without a prescription) decreased to 2% after the program.

**Table 7. Percentage distribution of mothers' knowledge about their practice concerning ORS administration in pre and posttest (N=50):**

Items	Pretest		Posttest		X <sup>2</sup>	P
	No	%	No	%		
<b>1. Amount of water used for dissolving ORS packet:</b>						
• 200 ml of water	15	30.0	39	78.0	38.2	0.000
• Half cup of water	16	<b>32.0</b>	1	<b>2.0</b>		
• ORS special cup	4	8.0	9	18.0		
• Large size cup	6	12.0	0	0.0		
• Didn't know	9	18.0	1	2.0		
<b>2. Type of water used for dissolving ORS packet:</b>						
• Previously boiled water	20	40.0	48	94.0	36.1	0.000
• Tap water	24	<b>48.0</b>	2	<b>4.0</b>		
• Mineral water	6	12.0	0	0.0		
<b>3. Speed of administering ORS in case of child's thirst (drinking eagerly):</b>						
• Slowly	23	46.0	48.0	96.0	30.3	0.000
• Rapidly	27	54.0	2	4.0		
<b>4. Methods of ORS administration</b>						
• From the cup directly	12	24.0	2	4.0	40.0	0.000
• Cup and spoon	19	<b>38.0</b>	48	<b>96.0</b>		
• Using medicine dropper	6	12.0	0	0.0		
• Using syringe	0	0.0	0	0.0		
• Infant's bottle	13	26.0	0	0.0		
<b>5. Maternal practices in case of child's vomiting the administered ORS :</b>						
• Stop administration of ORS	31	<b>62.0</b>	0	<b>0.0</b>	60.5	0.000
• Continue administration of ORS but at a slower rate	11	22.0	49	98.0		
• Continue with the same rate	8	16.0	1	2.0		
<b>6. Perform faulty maternal practices in case of child's refusal of ORS.</b>	31	<b>62.0</b>	1	<b>2.0</b>	6.22	0.000
<b>Faulty maternal practices in case of child's refusal of ORS (n=31):</b>						
• Dissolve it in an amount of water less than the recommended	16	<b>51.6</b>	0	<b>0.0</b>	66.7	0.000
• Add sugar	13	<b>42.0</b>	0	<b>0.0</b>		
• Stop ORS and didn't any fluids replacement	2	6.4	0	0.0		

\*p ≤ 0.05.



\*P=0.000 - Mean ± SD (pretest =16.9 ± 4.6 and posttest =35.1 ± 2.7)

**Figure 2.** Percentage distribution of the total score of mothers' knowledge about their practice in pretest and posttest

**Table 7:** Shows the percentage distribution of mothers' knowledge about their practice concerning ORS administration in pre and posttest. It was noticed that 32% and 48% of the mothers respectively in the pretest dissolve ORS packet in half cup and in tap water compared to 2% and

4% of them in the posttest. Concerning the methods of ORS administration; 38% and 96% of the mothers in pre and posttest used cup and spoon. About two-thirds of the mothers (62%) stop ORS when the child vomit before the program compared to zero after the program application.

**Table 8. Relationship between socio-demographic characteristics of the studied mothers and their total score of knowledge about practice of oral medication administration in pre and posttest**

Characteristics	Pretest			Posttest			X <sup>2</sup>	P
	Poor	Fair	Good	Poor	Fair	Good		
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)		
<b>Mother's age/years:</b>								
• 20-30 (n=19)	16 (84.2)	3 (15.8)	0 (0.0)	0 (0.0)	0 (0.0)	19 (100.0)	61.1	0.000
• 30-40 (n=27)	24 (88.9)	3 (11.0)	0 (0.0)	0 (0.0)	2 (7.4)	25 (92.6)		
• 40 and more (n=4)	4 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	3 (75.0)		
<b>Mothers' Education:</b>								
• Illiterate (n=18)	14 (77.8)	4 (22.2)	0 (0.0)	0 (0.0)	1 (5.6)	17 (94.4)	66.7	0.000
• Basic education (n=11)	11 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (9.1)	10 (90.9)		
• Secondary education (n=15)	13 (86.7)	2 (13.3)	0 (0.0)	0 (0.0)	2 (13.3)	13 (86.7)		
• University education (n=6)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100.0)		
<b>Mothers' Working Condition:</b>								
• House wives (n=37)	31 (83.9)	6 (16.1)	0 (0.0)	0 (0.0)	2 (5.4)	35 (94.6)	58.3	0.000
• Working (n=13)	13 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	12 (92.3)		
<b>Residence:</b>								
• Rural (n=41)	35 (85.4)	6 (14.6)	0 (0.0)	0 (0.0)	2 (4.9)	39 (95.1)	58.3	0.000
• Urban (n=9)	9 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (11.1)	8 (88.9)		
<b>Number of children in the family:</b>								
• Less than 5 (n=39)	34 (87.2)	5 (12.8)	0 (0.0)	0 (0.0)	2 (5.1)	37 (94.9)	58.3	0.000
• 5 and more (n=11)	10 (90.9)	1 (9.1)	0 (0.0)	0 (0.0)	1 (9.1)	10 (90.9)		
<b>Social class:</b>								
• Low (n=41)	35 (85.4)	6 (14.6)	0 (0.0)	0 (0.0)	2 (4.0)	39 (78.0)	72.2	0.000
• Middle (n=9)	9 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (11.1)	8 (88.9)		
• High (n=0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		

\*p ≤ 0.05.

Moreover, 62% of the mothers perform faulty practices when the child refused ORS in pretest decreased to 2% in the posttest such as 51.6% and 42% of them respectively dissolve it in less amount of water and add sugar to ORS in the pretest compared to zero in the posttest.

**Figure 2:** Reveals the percentage distribution of the total score of mothers' knowledge about their practice in pretest and posttest. It was clear from this figure that the majority of the mothers (88%) had poor score before the program while 94% of them had a good score after the program application with a statistically significant difference between pre and posttest.

**Table 8:** Shows the relationship between socio-demographic characteristics of the studied mothers and their total score of knowledge about the practice of oral medication administration in pre and posttest. It was found that statistically significant differences between socio-demographic characteristics of the studied mothers' and their total score of knowledge about practice in pre and posttest p=0.000 for all items.

## 8. Discussion

Child safety is the highest priority for healthcare professionals and caregivers. Errors in medication usage

rank among the most common threats to child safety. In addition to the burden of medical costs, medication errors cause appreciable morbidity and mortality in children [1] and [17]. The misuses of oral medications are a significant global concern in the pediatric population because young children, who usually have their medication administered by their parents [2].

The present study found that there were some medication misuses during the administration of oral medications from mothers for children under five years with common illnesses as respiratory tract infections, common cold, and gastroenteritis who taking daily medications. The study highlight the complexity of the oral medication use process and numerous ways things can go wrong, including right medication, right time, right dose, common oral drugs used, care before, and after taking oral medications while the mothers didn't aware by these misuses.

Concerning the total score of the mothers' knowledge about practice; it was found that the majority of the mothers had poor score before program while the majority of them had a good score after program application with a statistically significant difference between pre and posttest as indicated in **Figure 2**. These findings were in agreement with [10]. Also, [18] explained that educational intervention leads to improving knowledge and practices of the mothers. Moreover, the finding was supported by [19]

who found that there was an improvement in the total score of mothers' knowledge after giving the instructions.

The lack of mothers' knowledge in the pretest can be attributed to several factors as the mothers' education, lack of information sources and clear instructions from doctors and nurses, failure of communication between mothers and health care providers that leads to gaps in the continuity of medication administration process at homes.

The present study found that the main sources of information for the mothers about medication administration were friends, relatives, and neighbors followed by mass media as presented in Figure 1. While the finding of [16] indicated that the main sources of mothers' information on medication were from the pamphlet, doctors, and pharmacists. These results may be due to the good relation between mothers and friends, relative and neighbor also, accessibility of the mass media as television.

The study results found that more than half of studied mothers gave previously prescribed medication to their children as the first action in child illness regarding right medication in the pretest which decreased in the posttest as shown in Table 2. Moreover, most of them gave previously prescribed antibiotics, antipyretics, cough and cold medications to their children without prescription as illustrated in Table 5, Table 6. The results were in the same line with [16,20,21,22,23,24] they indicated that there was a high prevalence of non-prescribed medications among children.

According to [25] "it is estimated that more than half percent of antibiotics worldwide are purchased privately without prescription". Other studies by [26,27,8] they reported that there was a considerable parental use of antibiotics without consulting pediatricians, particularly for colds, upper respiratory tract symptoms and sore-throat. Furthermore, fever, cough, and cold were the commonest symptoms for which parents self-medicated their children as indicated by [29,30].

This may be contributed to the low social class of the mothers which prevented them from buying medicines. Also, the waiting hours in the clinics which were too lengthy, difficulty in transportation and far distance. These factors considered obstacles for mothers from consulting the pediatricians. Furthermore, the widespread use of a cough and cold medications might be due to the parental belief that the medications are effective and safe to be used in treating the symptoms, together with the continued availability of medications in the home. Also, the availability of antibiotics products due to inadequate regulations of the distribution and sale of medications could increase the rate of self-medication with antibiotics.

The current study found that most of the mothers gave the medication to other siblings as revealed in Table 2. The results were in agreement with [16] who found that one-quarter of the participants reusing the saved prescribed medications for their children and reported that administering these medications to other siblings without a prescription.

The present study found that more than one-quarter of the mothers had a history of giving wrong medication to the child as shown in Table 2. The results were in agreement [10]. The current results explained that nearly two-thirds of the mothers were educated and had the ability to read the pamphlets.

Measuring oral medications requires the use of measuring devices to ensure that the correct dose is drawn up for administration [31]. The findings of the current study represent that some mothers still use the medications bottle cap and teaspoon in measuring the oral medication as indicated in Table 3, Table 5. The results were similar to the findings of [16] and [10] who found that the highest percentages of mothers were using non-standardized administration devices like medication bottle caps and teaspoons.

From the researchers' viewpoints; this may be attributed to the availability and convenience of using a teaspoon and medication cap bottle. Besides lack of maternal awareness of pediatric drug dosages that must be accurate to reduce the risk of adverse effects and prevent overdosage.

The findings of the current study represent that more than half of the mothers gave another dose of oral medications to the child when the child vomited or spat it, in addition; less than half of them previously administered an overdose of medication to the child in the pretest as shown in Table 3. The results in agreement with [1] and [16] who stated that extra doses may be administered to children in the case of spilling, spitting, or vomiting. In addition; [32] indicated that approximately most dosing errors were involving overdosing. These might be attributed to the maternal belief that increasing the drug dose or increasing frequency of administration would speed the rate of child's improvement/ recovery.

The current study found that most of the mothers were storing the residual medications for later use such as the antipyretics, cough, cold and anti-diarrheal medications while half of them were storing the antibiotics medications as presented in Table 4. These results were in the same line with [10] and [33] they stated that the majority of mothers were storing the residual medications for later use.

The results could be attributed to that there were no clear guidelines from health care team about storing residual medications, side effects from storing it and for how long the mothers could store it. Besides; the financial causes due to the higher cost of medications. Also, it was accessible for them and ready for use at any time.

The study results found that more than three-quarters of the mothers were stopping the course of antibiotic when the child improved as illustrated in Table 5. The results were in same line with [34] and [16]. The results could be attributed to that there were no communications between healthcare providers and parents and there were no written instructions and other support materials that might increase the adherence to prescribed medication regimens.

The current study results found that more than half of mothers tried another type of antipyretic in case of severe and persistent fever. Furthermore; one-fifth and a minority of the mother increased the dose and frequency of the same antipyretic as presented in Table 6. These findings were in agreement with [34] and [10] who found that analgesics and antipyretics were the commonest self-medicated drugs.

Also, the majority of mothers were administering more than one type of a cough and cold medications without prescription as indicated in Table 5. This was in accordance with [35,36] and studies conducted by [29] and [30] reported that "fever, cough, and cold were the

commonest symptoms for using medications without consulting a doctor".

From the researchers' point of view frequent coughing especially during child's sleep was irritating to the child and upsetting for the mother. Mother's sympathy made her gave any type of the available cough medications in order to relieve her child's suffering. Also, this might be due to the misconception that a higher amount of medicine helped in alleviating the symptoms and more rapid recovery.

The current study found that some mothers performed faulty practice related to ORS administration such as dissolved, administered, using infant's bottle, stooped ORS administration in case of child vomiting and modified its taste by adding sugar as shown in Table 6. These results were in the same line with Morisky et al. cited in [37]. This explained by mothers' thoughts that decreasing amount of water in dissolving ORS and giving it rapidly would increase its effect. Also, they persuaded that adding sugar would improve the taste of ORS and made it acceptable to the child.

The results of the current study indicated that there were statistically significant differences found between socio-demographic characteristics of the studied mothers' and their total score of knowledge about practice in pre and posttest for all item as shown in Table 8. These findings were similar to a study carried out by [21], [38], [39] and [12].

This could be attributed to the highly educated mothers had the ability to read pamphlets and understand the instruction from the health team regarding oral drugs administration. Moreover, younger age women and had less than five children were interested in oral drug administration because they planned to have other children in the future. Also, they were new mothers concentrate more than old mothers and they less occupied with problems and life stressors.

## 9. Conclusion

The educational program improved the mothers' knowledge about practice regarding oral medications administration for their young children and decreased oral drug misuse with a statistically significant difference between pre and posttest as regard their total score.

## 10. Recommendations

1. Pediatric hospitals should offer the mothers with handouts, brochures, pamphlets, posters or videotapes about oral medication administration.
2. Continued educational programs should be conducted for the mothers in pediatric outpatient clinics about medication administration.
3. Teaching the mothers about the appropriate measuring devices to measure the dose of oral medications for their young children.
4. The Ministry of Health should set regulations to restrict non-prescribed drugs sales from pharmacies especially antibiotics in order to limit self-medication practices.

5. The mass media should be used to disseminate the correct information regarding the administration of oral medication and increasing the mothers' awareness about the harmful effects of their misuse on the child health.

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