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### **Cough Syrup Misuse in Children**

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#### **ABSTRACT**

The aim of the present study was to determine the epidemiology of cough syrup misuse and assess cough and cold medications (CCM ) related adverse events (AEs) among children. 8162 electronic questionnaires were completed by parents of using cough syrup on their children in Hail. Data analysis with SPSS version 22. In the present study we found that there was misuse of cough medicine and our study showed that approximately 88.6% of the parents used cough medicines for their children , 11.4% were not sure about their use . Regarding to the uses of the last year 5 times or less was 57.4% , those who not sure how many times they used was 18.3% , those used it from 5 to 10 times was 18.1% and those used it more than 10 times were 6.1% . About the knowledge of the side effects of cough medicines 44.7% know and 55.3% do not know about the side effects of cough medicines. 38.9% had dizziness and sleep, 3.6% had difficulty in breathing and 1.7% had shiver . This study highlights the fact that using of cough syrups without a proper medical consultation is an important health related mistakes in our local community in Hail city.

**KEY WORDS:** Cough, Medicine, Children, Misuse, Cold

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## **INTRODUCTION**

The common cold or upper respiratory infection (URI) is a self-limiting viral illness that affects people of all ages, especially children.

The common cold brings with it many undesirable symptoms such as cough, nasal congestion, rhinorrhea, and sleep loss, which lead tired and frustrated parents to seek treatment. Pediatric health care professionals often recommend over-the-counter (OTC) cough and cold medications (CCMs) as first-line therapy.<sup>1</sup> (CCMs) includes expectorants, mucolytic, opium alkaloids (for cough), nasal sympathomimetics and anti-histamines.<sup>2</sup> There is an increase in the attention for CCMs use in children because of their potential side effects when<sup>3</sup>. Furthermore, there's limited evidence for efficacy particularly in children where US Food and Drug Administration (FDA) recommended against the use of CCM<sup>4</sup>.

### ***Objective:***

To determine the epidemiology of cough syrup misuse:

- i. To identify the socio-economic characteristics of those consuming cough syrup.
- ii. To identify those at risk of consuming cough syrup.
- iii. To identify the relation between misuse and other factors

## **Literature review**

A study has found that after withdrawal of cough and cold medications the visits of infants who are younger than two years due to adverse effects to emergency room was reduced<sup>5</sup>. The label language and graphics appear to influence misinterpretation of over-the-counter medication age indications<sup>6</sup>.

Poor parental education may increase the chance of misinterpretation of these medications<sup>7</sup>.

Additional findings have suggested that the effectiveness of over the counter cough medicines in acute cough has no good evidence whether for or against it<sup>8</sup>.

Actually a lot of reported adverse effects can be a result of the underlying upper respiratory tract infection<sup>9</sup>. Another study has shown that the patient education and sharing evidence-based information with both parents is important for safe care of their children who are infected with an upper respiratory infection and prevent harm<sup>10</sup>. Studies suggest There are four groups of factors related to cough medicine abuse by the survey, which are personal, peer, family, and community factors. Based on the present results, recommendations with consideration of cough medicine abuse prevention<sup>11</sup>. There is a significant

decrease of cough and cold medications use in children hospitalized with bronchiolitis who are less than two years old after withdrawal of infant cough and cold medications formulations and the 2008 FDA advisory<sup>12</sup>.

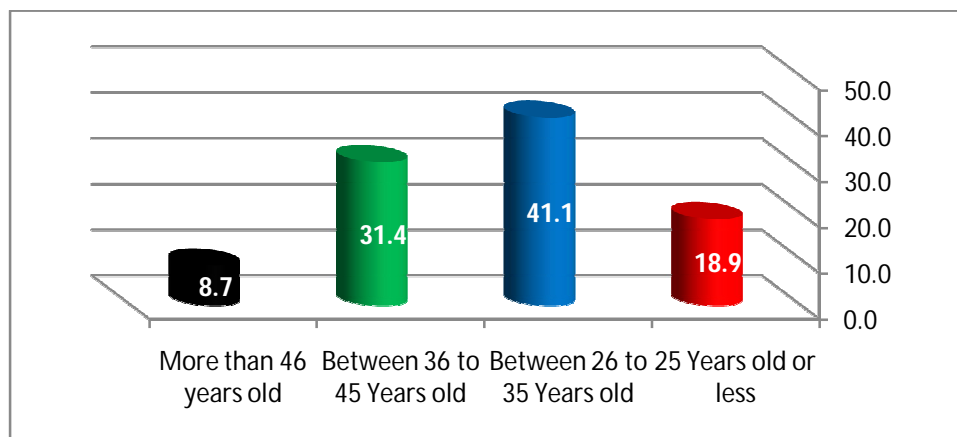
## MATERIAL AND METHODS

8162 electronic questionnaires were completed by parents of using cough syrup on their children in Hail, which is in the northwestern of Saudi Arabia and has population of around 600,000 inhabitants. Was undertaken during March 2017, with endorsement from the institutional ethics committee that completed and downloaded into a Data analysis with SPSS version 22 (descriptive statistics for frequency and percentage table and Chi-square test for qualitative variables for independency).

## RESULTS&DISCUSSIONS

### *Age of the participants that filled the questionnaires:*

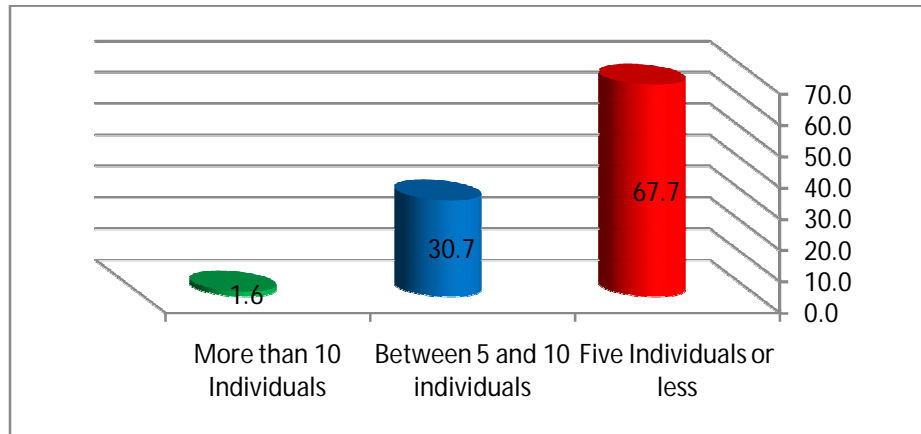
In this study the participants numbers were parents .Of those 8162 questionnaires distributed we found that the age most of them between 26-35 years old were 41.1%, between 36 to 45 was 31.4% ,less than 25 years was 18.9% and older than 45 years of age were 8.7 % as shown in figure no. 1 ( $P < 0.001$ ).



**Figure No.1: Percentage of the parents that participated in the study in comparison to their age  $P < 0.001$  highly significant difference from each group**

### *Numbers of person in the family:*

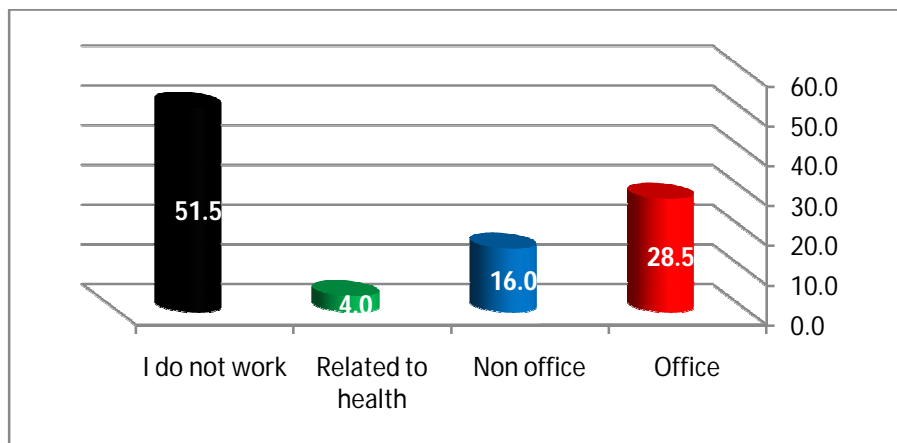
We found that the number of person in family of 5 or less was 67.7%, between 6 - 10 members was 30.7% and more than 10 members was 1.6% as shown in figure no.2 .



**Figure No. 2 : Percentage of number of person in family**

### ***Occupational Level:***

According to the work nature of the parents we found that numbers of person who do not had work was 51.5%, and who had work in offices was 28.5%, who doesn't had work in offices was 16% and who had work related to health was 4% as shown in figure no.3.



**Figure No. 3: Percentage of study participants related to work nature**

Similarly, there was study results suggest that four groups of factors are related to cough medicine abuse, including personal, peer, family, and community factors.

The lack of parental monitoring and sensitivity, poor relationship with the parents, and poor family climate are factors conducive to cough medicine abuse in young people. , easy accessibility, weak law



enforcement and the availability of a wide range of venues for consumption are community factors contributing to cough medicine abuse<sup>13</sup>.

### ***Have you used cough medicine for your child before:***

Regarding to uses of cough syrup for children we found that 88.6% of them used cough medicines for their children , 11.4% were not sure about their use and 0% did not use cough medicine . There is a positive relationship between uses of cough medicine for children before as shown in figure no.4 ( $P<0.001$ ).

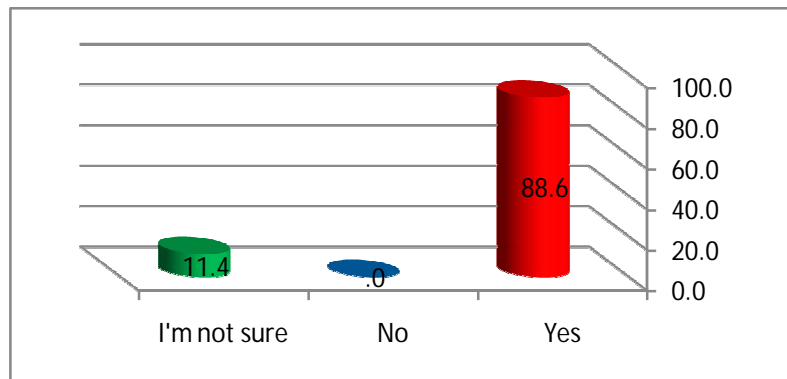


Figure No.4 : Percentage of using cough medicine for child before  $P<0.000$  highly significant from those said no

### ***Uses of cough syrup for the last year:***

Regarding to the uses of the last year 5 times or less was 57.4% , those who not sure how many times they used was 18.3% , those used it from 5 to 10 times was 18.1% and those used it more than 10 times were 6.1% as shown in figure no. 5.

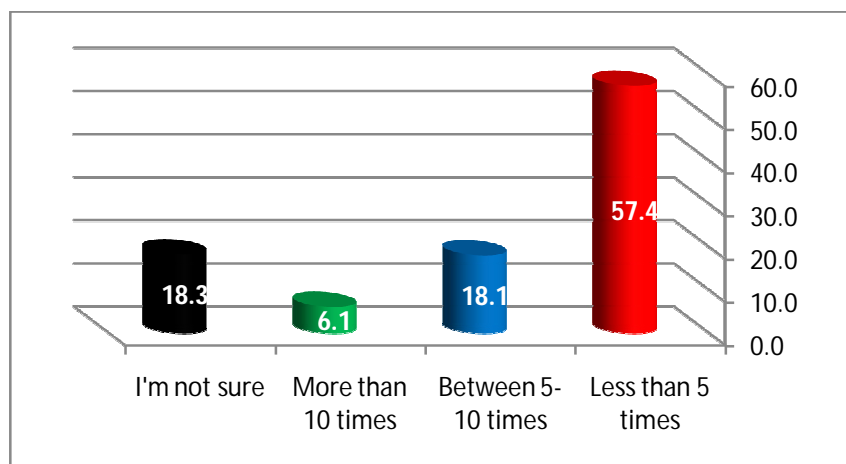
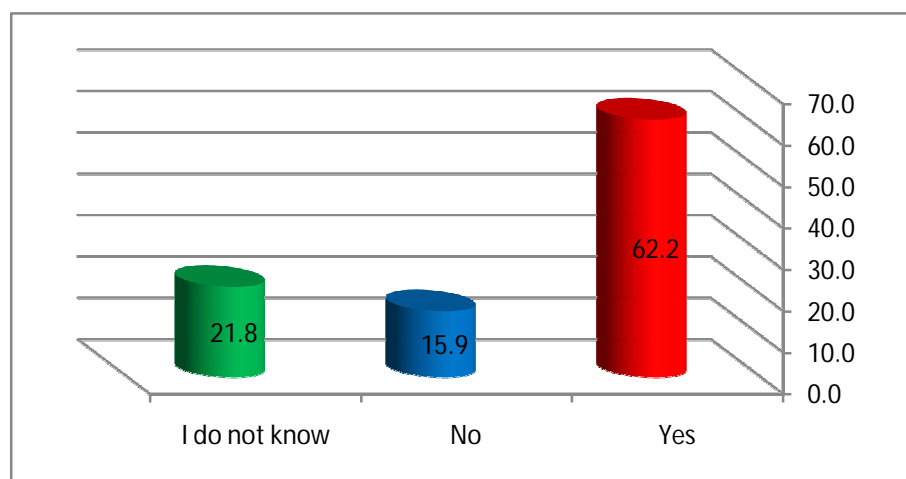


Figure No. 5: Number of use of cough medicine for the past year

***Is the respiratory infection most common cause of coughing:***

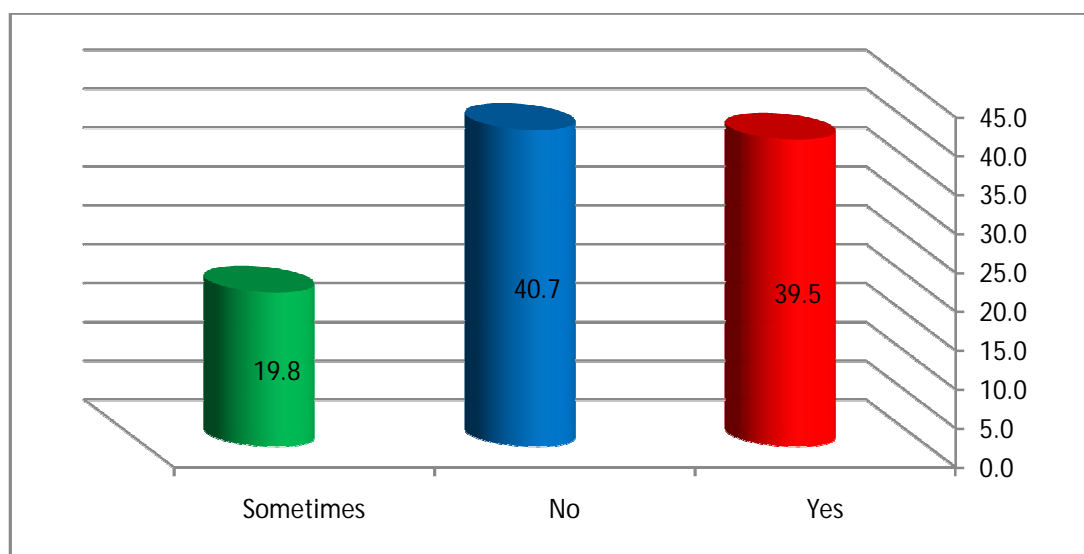
In the present study we found that most common causes of coughing due to respiratory tract infections was 62.2% , who had not sure about the cause was 21.8% and who said that respiratory infections did not the cause was 15.9% as shown in figure no. 6 .



**Figure No.6 : Percentage for parents that said most common cause of coughing Due to respiratory tract infection**

***Do you store cough medicine until needed in the future:***

According to the storage of cough medicine until needed in the future was 39.5% who said yes, while 40.7% said no and 19.8% said sometimes as shown in figure no.7( $P < 0.001$ ).

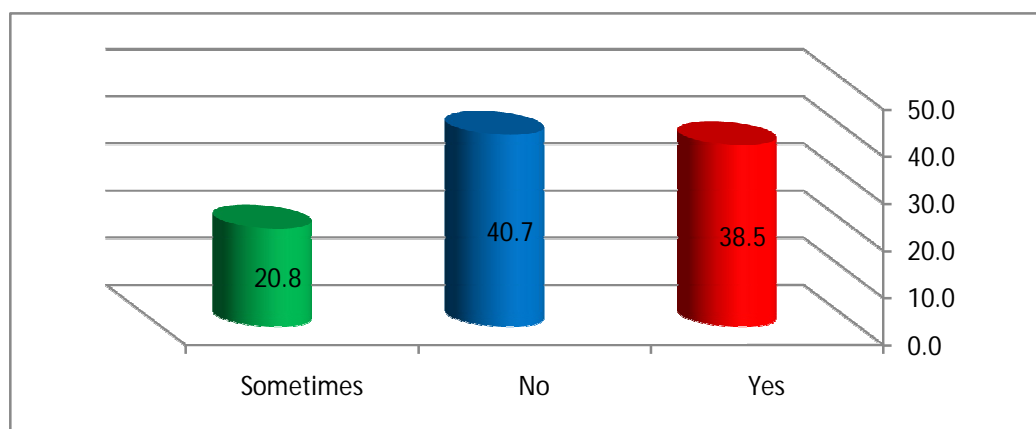


**Figure No.7 : Percentages of parents that stored cough medicine until needed in the future**

**$P < 0.001$  highly significant from each group**

***Do you buy cough medicines for your child in case you don't get it from your doctor:***

Regarding to buy cough medicine for the child without prescription from the doctor was 38.5%, those said no was 40.7% and said sometimes was 20.8% as shown in figure no.8 .



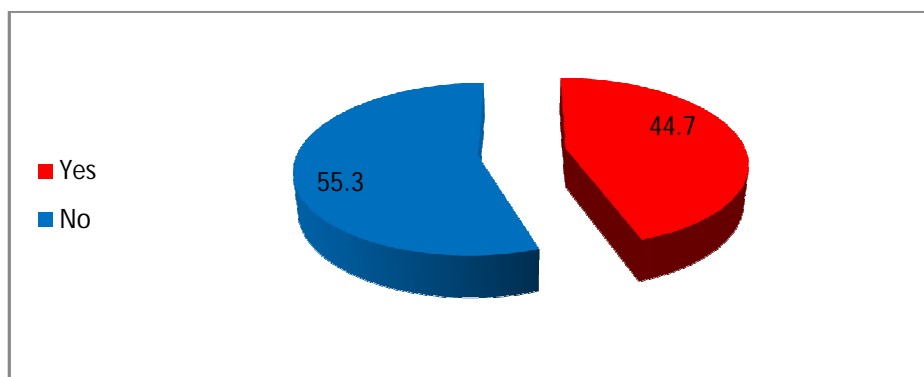
**Figure No. 8 : Percentage of parents that buy cough medicines for child in case they don't get it from the doctor**

To relief the uncomfortable symptoms in pediatric patients they used cough and cold medications with or without prescriptions . Similar to several other studies should be controlled in children due to concerns on both effectiveness and protection, and that other safer remedies such as saline water, fluid intake, humidified air (vaporizer),honey should as an alternative be used<sup>14</sup>.

***Knowledge about the side effects of cough medicines:***

About the knowledge of the side effects of cough medicines 44.7% said yes and 55.3% said no as shown in figure no.9( $P < 0.001$ ).

Cough medications may affect the children to serious adverse effects, especially those less than six years of age. The regulatory authority in America in January 2008 , about cough medications remove some of the OTC and controlled their use in children, especially those under the age of 2 years due to severe adverse effects .The arrangement of the American Academy of Pediatrics , that the syrups do not effort in children less than 6 years, and that their misuse could cause severe adverse effects<sup>14</sup>.



FigureNo. 9 : knowledge about the side effects of cough medicines among parents

$P < 0.001$  highly significant from each group.

***If your child does not respond to the dose and improve, do you increase the dose:***

In the present study we found that who do not change the dose if the first dose is not effective was 83.8%, sometimes increase the dose was 10.8% and who increase the dose if the first dose is not effective was 5.5% as shown in figure no.10.

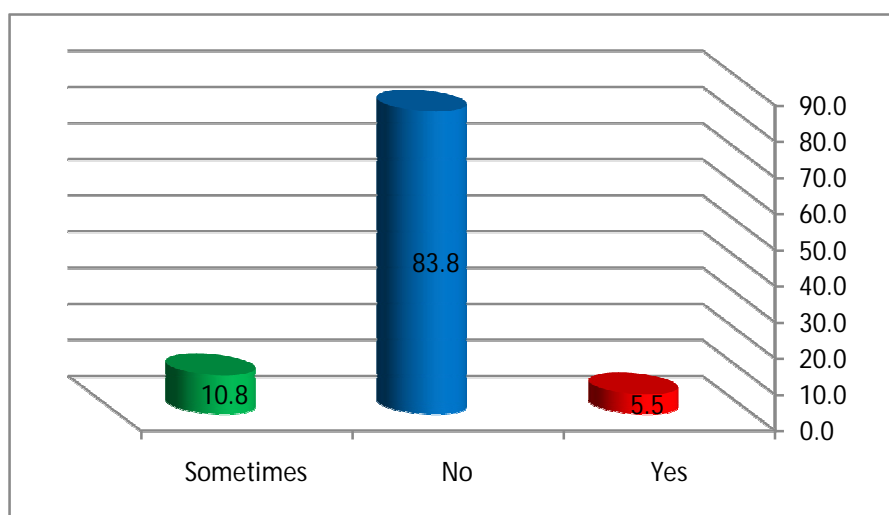
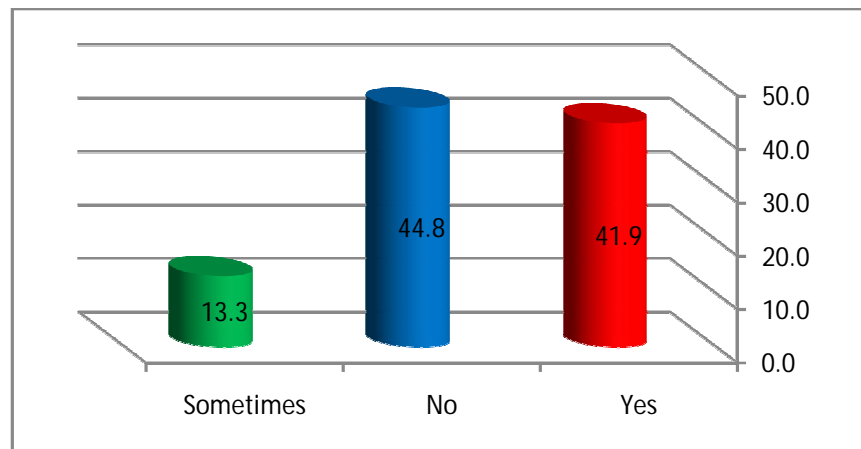


Figure No.10 : Percentage of parent that increase the dose if there is no improvement

This One of the causes in over dose and toxicity of OTC cough syrups parents who do not understanding including poor teaching , poor relationship with the parents and poor family environment were factors conducive to cough medications abuse in children<sup>14</sup>.

***When using cough medicine and you did not find any result, Do you replace it with another type of cough medicine***

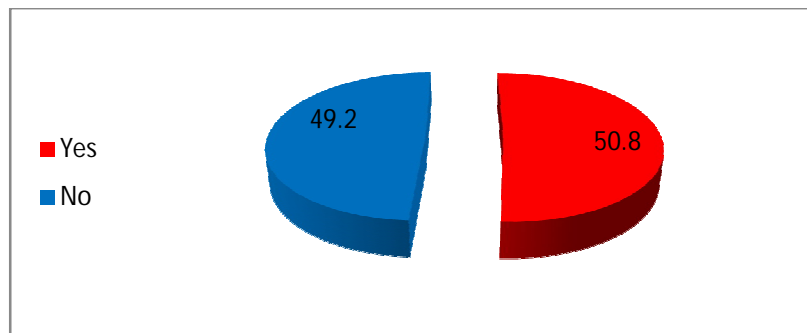
According to replacement to another cough medicine if there was no result 41.9% said yes 44.8% said no and 13.3% said sometimes as shown figure no.11 .



**Figure No.11 : Replacement to another cough medicine if there was no result**

***Do you advise others to use cough medicine:***

About the advice others to use cough medicine was 50.8% said yes and 49.2% said no as shown in figure no.12  $P (< 0.001)$ .



**Figure No. 12: Advise others to use cough medicine  $P < 0.001$  highly significant difference from each group**

There was study compared the use of cough and cold medications in two multicenter studies of young children hospitalized with bronchiolitis before and after the 2008 Food and Drug Administration cough and cold medications advisory. Although cough and cold medications use decreased after the advisory, nearly 20% of children age 12–23.9 months with severe bronchiolitis received cough and cold medications<sup>15</sup>.

Similarly study suggested that honey enhanced symptoms and reduced cough frequency compared with no treatment. In addition, it should encourage a rethinking of the management of common childhood illness and the role parents participated. The current view based on recently conducted studies in several other centres is that the use of cough syrups should be restricted in children owing to concerns on both efficacy and safety, and that other safer remedies such as honey should be used instead<sup>16</sup>.

This is in harmony with conducted a systematic review to identify studies relating to the use of products to treat symptoms of the common cold, influenza or allergic rhinitis, and relating to poisoning or toxicity from unintentional ingestion or overdose in children (<12 years). Seventy two relevant studies or clinical reports were identified. The common use of these agents does not appear to be responsible for increased deaths in young children. Many cases of toxicity from cough and cold medications in young children are a result of therapeutic error. Particular medications, including diphenhydramine and codeine, appear to be associated with a high frequency of severe adverse effects and toxicity so restriction of cough and cold medicines in children is supported by currently available evidence<sup>17</sup>.

Also there was study concluded that honey significantly reduced the total mean symptom score by day three ( $p < 0.001$ ) and was most effective in symptomatic relief of symptoms associated with the common cold whilst salbutamol or placebo offered no benefit. The study investigated on Children between ages one to twelve years presenting with a common cold between December 2010 and February 2012 were enrolled, One hundred and forty five children were enrolled in the study (45- placebo, 57 –honey, 43 –salbutamol). Of the 145 children 51% were male<sup>18</sup>.

In addition to that a descriptive cross-sectional study was used to investigate suitability of cough syrups sold within Eldoret municipality for use in children less than two years of age based on their formulations and available literature. A total of 260 mothers and 55 pharmacy attendants were interviewed. They found that there was widespread use of the syrups in children, including infants, with 192 (74%) of the respondents having used identified syrups and over 90% of these on children less than 2 years including those less than three months. 146 (76%) mothers had administered the syrup at double the recommended dose<sup>19</sup>.

Cough and cold medications including those with efficacy harmful components are still used in children, including those aged below 2 years in many parts of the world. Similarly the present study concluded that they were not only still in use in children under six years, but also there were multiple combinations

of risk such as sex , age , marital status ,educational level , number of person in family , distribution of living space , work nature and Income .

There are many cough medicines listed not recommended in the OTC syrups for children less than six years of age include antitussives (dextromethorphan and pholcodine), expectorants (guaifenesin and ipecacuanha), nasal decongestants (ephedrine, oxymetazoline,phenylephrine, pseudoephedrine and xylometazoline), and antihistamines (brompheniramine,chlorpheniramine, diphenhydramine, doxylamine, promethazine and tripolidine)<sup>20</sup>.

This study included a sufficient sample size. However, to generalize our findings to the whole community of Saudi Arabia we should include participants from other regions in our kingdom. We conducted our questionnaire in Arabic language only because it is the first language in our community. Probably if we include other languages we might figure out the non-Arabic speaker practices. The MOH and SFDA should put strict policy on selling cough syrup from public pharmacies. Physicians must not prescribe cough syrups unless indicated. Health awareness campaign should be done to educate community about when and how to use cough syrups and it's side effects.

## **CONCLUSION**

This paper highlight the fact that using of cough syrups without a proper medical consultation is an important health related mistakes in our local community in Hail city. Ministry of Health and The Saudi Food & Drug Authority (SFDA) must take an action to stop this misuse of the cough syrups that might dramatically affect our child's health. Physicians, nurses, pharmacists and other health care provider should increase the awareness of the parents especially the mothers about the serious side effects of cough syrups on their kids especially under 6 years.

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