

# KNOWLEDGE, ATTITUDE AND PERCEPTION OF PARENTS ON THE USE OF COUGH AND COLD MEDICATIONS IN CHILDREN

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**Abstract.** This study investigated the knowledge, attitude and perception of parents on the use of cough and cold medications in children. Questionnaires were distributed to parents of children aged  $\leq 6$  years in selected kindergartens. The overall knowledge of the parents ( $n=248$ ) was satisfactory with a mean score of  $5.87 \pm 1.70$  (from a total of 10) and the overall attitude was positive with a mean score of  $41.15 \pm 6.72$  (from a total of 50). Ten percent of parents admitted administering cough and cold medications in children aged  $< 2$  years. Age of the parents, education level and monthly income were found to significantly influence knowledge level ( $p < 0.05$ ). Spearman's rank-order correlation between knowledge and attitude scores showed a statistically significant positive linear relationship ( $r_s = 0.290$ ,  $p < 0.05$ ). The study provides some insights into the use of cough and cold medications in children from the parents' perspectives.

**Keywords:** attitude, cough and cold medications, knowledge, parents, perception

## INTRODUCTION

Cold is one of the common illnesses experienced by children with an average of three to ten times per year, which may last up to 14 days (Yust and Slattery, 2012). It is normally caused by self-limiting viral infection with symptoms of cough, nasal congestion, rhinorrhea and fever (Irwin *et al*, 2004).

A longitudinal study in the United States found that in any week, 1 out of 10 children is exposed to a cough and cold product, especially among children aged from 2 to 5 years (Vernacchio *et al*, 2008).

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However, there is little evidence to support the effectiveness of cough and cold medications in relieving the acute cough and common cold in children (Isbister *et al*, 2010). According to the American Academy of Pediatrics (1997), the dosing guidelines for cough and cold products are solely extrapolated from adult clinical data, without concern on the different pharmacokinetic profile in children.

Use and misuse of cough and cold medications in children have resulted in significant morbidity and mortality (Yust and Slattery, 2012). Ten unexpected infant deaths associated with the use of cough and cold medicines were identified in a one-year period in Arizona in the United States (Rimsza and Newberry, 2008). In 2005, 7,091 children were admitted to the emergency department due to adverse events from cough and cold medications

in the United States (Schaefer *et al*, 2008). Children are often given accidental overdose of the medications due to several reasons such as administration of multiple medicines by multiple caretakers, administration of similar ingredient in multiple products and dosing administration error (Yust and Slattery, 2012).

Insufficient evidence for the effectiveness of cough and cold products in children (Woo, 2008) and the reports of children's deaths associated with these medications have brought the attention of regulatory bodies to this issue (Srinivasan *et al*, 2007). In 2008, the US Food and Drug Administration (FDA) issued a public health advisory that cough and cold products should not be used in children less than 2 years (FDA, 2008b). In the following year, the Drug Control Authority (DCA) in Malaysia made it compulsory for safety warning statements to be clearly stated on the package of products. Cough and cold medications are prohibited to be used in children less than 2 years. However, children aged between 2 to 6 years may be prescribed with these products with caution and on doctor's and pharmacist's advice (Drug Control Authority, 2009).

The aim of this study was to investigate the knowledge, attitude and perception of parents on the use of cough and cold medications in children. It is suggested that parents should acquire good knowledge and positive attitude whenever they are treating their children with these products. This study also aimed at identifying the socio-demographic factors that may influence the parents on cough and cold medications usage in their children.

## MATERIALS AND METHODS

### Study design

This cross-sectional survey was

conducted at kindergartens across Kuala Lumpur. The kindergartens for children aged below seven were obtained from an online network source (Kindergarten Malaysian, n.d.). Questionnaires were distributed to the teachers in the kindergarten which were then handed over to the children's parents to be completed, with informed consent.

Parents with at least one child aged  $\leq 6$  years were eligible to be included in the study. Exclusion criteria for this study were incomplete questionnaires (*ie*, more than 80% of the questions were not answered) and parents who were not willing to participate in this study. The completed questionnaires were collected from the teachers in the following weeks. The study was approved by the local research ethics committee (UKM 1.5.3.5/244/NF-020-2013).

### Questionnaire structure and interpretation

The questionnaire was designed with four parts: demographic, general knowledge about cough and cold and its medications, attitude towards the use of cough and cold medications, and perception on the use of cough and cold medications. The questionnaire was adapted from several references (FDA, 2008a,b; Drug Control Authority, 2009; Himmelstein *et al*, 2011).

There were eight questions in the demographic section (Part A) related to sex, age, ethnicity, highest educational level, occupation, monthly income, number of children and age of youngest child. Knowledge about cough and cold and its medications was assessed in Part B. Each question consisted of three optional answers of "yes", "no" and "not sure" in order to reduce the probability of respondents in selecting the correct answer by chance. Correct answer was given 1 mark while no mark was given for each ques-

tion that was wrongly answered or stated as “not sure”. The total score may range from 0 to 10 with higher scores reflecting better knowledge.

Part C assessed the respondents' attitude towards the use of cough and cold medications in children on 10 items. The items were rated on a 5-point Likert scale, that is, strongly disagree- 1, disagree- 2, neutral- 3, agree- 4 and strongly agree- 5. The 10 Likert scale items were summed together to give a total score ranging from 10 to 50, in which a higher score reflects a more positive attitude.

In Part D, 3 items were designed to collect parental perception on the use of cough and cold medications in children. Question 1 required the parents to indicate the degree to which they trusted the DCA's recommendation that cough and cold products should not be used in children under two years of age on a Likert scale ranging from 1 (highly doubt it) to 5 (highly trust it). Question 2 asked the parents to indicate how safe they considered the cough and cold medications on a Likert scale ranging from 1 (not safe at all) to 5 (very safe). Similarly, parents were required to indicate how effective the cough and cold medications in relieving their child's cough and cold on a Likert scale ranging from 1 (not effective at all) to 5 (very effective) in Question 3.

#### Statistical analyses

Microsoft® Excel 2007 (Microsoft Corp, Redmond, WA) was utilized for descriptive analysis of the data and SPSS® (Version 21; IBM, Armonk, NY) for other data analyses. Mann-Whitney test was used to test for the differences between the gender and age of youngest child, while the Kruskal-Wallis test was used to test the differences between age, ethnicity, highest educational level, occupation,

monthly income and number of children with the knowledge and attitude scores. In addition, the Kruskal-Wallis test was also used to compare the knowledge score for groups of respondents with different perception on safety and effectiveness of cough and cold medications and perception on the DCA's recommendation. The Mann-Whitney test was used for multiple comparisons, followed by the Bonferroni correction to determine which groups were significantly different. In this study, Spearman's rank order correlation ( $r_s$ ) was used for analyzing the relationship between knowledge and attitude scores. The level of statistical significant was defined as  $p$ -value <0.05.

## RESULTS

Forty-nine kindergartens were approached and only 17 of them were interested to participate in this study. A total of 651 questionnaires were distributed to children and 327 forms were successfully collected from the teachers at the end of data collection week (50.2%). Only a total of 248 forms could be used and the others were excluded due to incomplete data.

#### Demographic data

Majority of the respondents were female (71%), Malay (43.5%), within the age range of 30-39 years old (mean 35.63±5.25) and graduated from tertiary education (60.9%). The characteristics of the study population are summarized in Table 1.

#### Use of cough and cold medications in children

Majority of the parents (85.5%,  $n=212$ ) had used the cough and cold medicines on their youngest child with over half of them were able to identify the name of the products (58.5%,  $n=124$ ). Close to half of the parents (48.4%,  $n=120$ ) admitted that they had given the cough and

Table 1  
Demographic data

Demographic characteristics	Number of respondent (%)
Gender	
Male	72 (29.0)
Female	176 (71.0)
Age (years)	
21-29	23 (9.3)
30-39	175 (70.6)
40-49	45 (18.1)
≥50	5 (2.0)
Ethnicity	
Malay	108 (43.5)
Chinese	91 (36.7)
Indian	37 (14.9)
Others	12 (4.8)
Highest education level	
No formal education	0
Primary	2 (0.8)
Secondary	95 (38.3)
Tertiary	151 (60.9)
Occupation	
Unemployed	1 (0.4)
Student	4 (1.6)
Housewife	47 (19.0)
Self-employed	41 (16.5)
Salaried employed (non- health related)	141 (56.9)
Salaried employed (health- related)	14 (5.6)
Monthly income	
0	39 (15.7)
<RM 1,000	6 (2.4)
RM 1,000-RM 2,000	26 (10.5)
RM 2,000-RM 3,000	50 (20.2)
RM 3,000-RM 4,000	39 (15.7)
>RM 4,000	88 (35.5)
Number of children	
1	42 (16.9)
2	119 (48.0)
3	62 (25.0)
4	13 (5.2)
≥5	12 (4.8)
Age of youngest child	
<2 years old	57 (23.0)
≥ 2 years old	191 (77.0)

RM, Malaysian Ringgit (USD1=RM3.6).

cold medications to their ill children for sleepiness effect.

### Knowledge on cough and cold and its medications

The parents' general knowledge about cough and cold and its medications are shown in Table 2. Overall, the knowledge of the parents was satisfactory with a mean score of  $5.87 \pm 1.70$ . Half of the parents in this study answered that cough and cold can be treated using antibiotics, even though 66.1% answered correctly that cold is caused by viruses, not bacteria. There was a significant association between the total knowledge score and age, highest educational level and monthly income ( $p < 0.05$ ; Table 3). Other parameters including sex, ethnicity, occupation, number of children and age of the youngest child did not show any significant association with the total knowledge score. Mann-Whitney test with Bonferroni correction showed respondents who were in middle-aged range, graduated from high educational level and had high monthly income were significantly more likely to achieve high total knowledge score ( $p < 0.05$ ; Table 4).

### Attitude towards the use of cough and cold medications

The overall attitude of respondents towards the use of cough and cold medications in children was positive with a mean score of  $41.15 \pm 6.72$  (Table 5). A total of 13.7% and 16.1% of the parents strongly disagree and disagree, respectively to the statement "I will never decide how much of cough and cold medicines to be given by depending on how serious of my child illness".

There was a significant association between the highest educational level and the total attitude score ( $p < 0.05$ ), however, other parameters including gender, age,

Table 2  
Parental knowledge about cough and cold and its medications.

Questions	Number of respondent (%)		
	Yes	No	Not sure
Cough and cold usually will resolve without the use of any medication.	<sup>a</sup> 122 (49.2)	102 (41.1)	24 (9.7)
Cough and cold can be treated using antibiotics.	126 (50.8)	<sup>a</sup> 81 (32.7)	41 (16.5)
Majority of cold is caused by viruses, not bacteria.	<sup>a</sup> 164 (66.1)	25 (10.1)	59 (23.8)
The symptoms of cold include nasal congestion and sneezing.	<sup>a</sup> 233 (94.0)	6 (2.4)	9 (3.6)
It is not necessary to consult doctor when the cough persists for more than 4 weeks.	8 (3.2)	<sup>a</sup> 236 (95.2)	4 (1.6)
Cough and cold medications only help to relieve the symptoms and not treating the underlying condition.	<sup>a</sup> 138 (55.6)	61 (24.6)	49 (19.8)
There is sufficient evidence to support the effectiveness of cough and cold medications in treating the children.	106 (42.7)	<sup>a</sup> 41 (16.5)	101 (40.7)
In Malaysia, Drug Control Authority (DCA) discouraged the use of cough and cold medications in young children younger than 2 years.	<sup>a</sup> 145 (58.5)	22 (8.9)	81 (32.7)
The dosing guidelines for some of the pediatric cough and cold medicines are deduced from adult clinical data.	<sup>a</sup> 71 (28.6)	65 (26.2)	112 (45.2)
Oral syringe or measuring spoon is not necessary in administering cough and cold medications in children.	15 (6.0)	<sup>a</sup> 223 (89.9)	10 (4.0)

<sup>a</sup>Number of respondents answered the question correctly.

ethnicity, occupation, monthly income, number of children and age of youngest child did not show statistical significance (Table 6). Parents with tertiary education significantly scored higher compared to those who graduated from secondary education based on the multiple comparisons using Mann-Whitney test with Bonferroni correction.

#### Relationship between knowledge score and attitude score

Spearman's rank-order correlation indicated that there was a significant weak positive correlation between the knowledge score on cough and cold and its medications with the attitude score ( $p < 0.05$ ;  $r_s = 0.290$ ).

#### Perception towards the use of cough and cold medications

A total of 56.4% respondents trusted or highly trusted the DCA's recommendation. Only slightly over 5.0% of the respondent doubted or highly doubted the recommendation and 38.3% respondents were not sure whether to trust it. When asked about the safety of cough and cold medications, 4.0% parents considered them 'very safe' and over half of the parents (53.6%) responded 'safe'. Only 2.0% of the parents rated the medications as 'not safe at all'. Fifty six percent and 3.6% of the parents thought the medications were 'effective' and 'very effective', respectively. Some parents indicated the medications used were neither effective

Table 3  
Differences of knowledge score between different groups of respondents ( $n = 248$ ).

Variable	Mean $\pm$ SD knowledge score	<i>p</i> -value
Gender <sup>a</sup>		
Male	5.78 $\pm$ 1.63	
Female	5.90 $\pm$ 1.73	0.689
Age <sup>b</sup> (years)		
21-29	4.78 $\pm$ 1.54	
30-39	6.02 $\pm$ 1.71	
40-49	5.93 $\pm$ 1.56	
$\geq 50$	4.80 $\pm$ 1.64	0.003 **
Ethnicity <sup>b</sup>		
Malay	6.19 $\pm$ 1.73	
Chinese	5.52 $\pm$ 1.62	
Indian	5.84 $\pm$ 1.83	
Others	5.75 $\pm$ 1.22	0.052
Highest educational level <sup>b</sup>		
No formal education	0	
Primary	5.00 $\pm$ 0.00	
Secondary	5.25 $\pm$ 1.55	
Tertiary	6.26 $\pm$ 1.68	0.000 **
Occupation <sup>b</sup>		
Unemployed	3.00 $\pm$ 0.00	
Student	6.50 $\pm$ 1.29	
Housewife	5.57 $\pm$ 1.74	
Self- employed	5.39 $\pm$ 1.77	
Salaried- employed (non- health related)	6.04 $\pm$ 1.63	
Salaried- employed (health related)	6.50 $\pm$ 1.65	0.071
Monthly income <sup>b</sup>		
0	5.49 $\pm$ 1.76	
<RM 1,000	5.67 $\pm$ 1.63	
RM 1,000-RM 2,000	4.96 $\pm$ 1.95	
RM 2,000-RM 3,000	5.80 $\pm$ 1.49	
RM 3,000-RM 4,000	5.97 $\pm$ 1.63	
>RM 4,000	6.31 $\pm$ 1.64	0.019 *
Number of children <sup>b</sup>		
1	5.88 $\pm$ 1.60	
2	5.74 $\pm$ 1.71	
3	6.03 $\pm$ 1.77	
4	6.23 $\pm$ 1.36	
$\geq 5$	5.83 $\pm$ 1.99	0.705
Age of youngest child <sup>a</sup>		
<2years old	5.81 $\pm$ 1.64	
$\geq 2$ years old	5.88 $\pm$ 1.72	0.729
DCA recommendation <sup>b</sup>		
Doubt it	5.85 $\pm$ 1.95	
Not sure	5.00 $\pm$ 1.50	
Trust it	6.46 $\pm$ 1.55	0.000 **

Table 3 (Continued).

Variable	Mean $\pm$ SD knowledge score	p-value
Safety of cough and cold medications <sup>b</sup>		
Unsafe	6.39 $\pm$ 1.58	
Not sure	5.87 $\pm$ 1.99	
Safe	5.68 $\pm$ 1.59	0.041 *
Effectiveness of cough and cold medications <sup>b</sup>		
Ineffective	6.51 $\pm$ 1.73	
Not sure	5.53 $\pm$ 1.93	
Effective	5.72 $\pm$ 1.56	0.004 **

\* Indicates a significant difference at  $p < 0.05$ ; \*\* Indicates a significant difference at  $p < 0.01$

<sup>a</sup>Mann-Whitney test; <sup>b</sup>Kruskal-Wallis test.

nor ineffective (17.3%), slightly effective (22.6%) or not effective at all (0.4%).

There was a significant difference ( $p < 0.05$ ) in the total knowledge score with the perceptions on safety and effectiveness of cough and cold medications and perception on DCA's recommendation. It was found that parents who perceived that the cough and cold medications as safe and effective were more likely to attain a low knowledge score on cough and cold and its medications. Respondents who trusted the DCA's recommendation achieved a higher knowledge score than those who were not sure whether or not to trust the recommendation. The results are shown in Tables 3 and 4.

## DISCUSSION

Majority of the parents (88.5%) in this study used cough and cold medications on their child for relieving symptoms of upper respiratory tract infections (URTIs). Although the DCA discourage the use of cough and cold medications for children aged  $< 2$  years, 11.3% of parents admitted to administering these medications. According to Garbutt *et al* (2010), the widespread use of 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 home (Varney *et al*, 2012). In addition, it was also believed that parents often use the medications for their children's comfort when they are sick despite the lack of efficacy and safety to support such use (Garbutt *et al*, 2010). Almost half of the parents in the present study admitted that drowsiness was a reason they administered the cough and cold medications to their sick child. According to Isbister *et al* (2010), sedation is a common side effect of antihistamine and it may be the desired effect for parents who believe that sleep can help their ill and sleepless children. However, there is no evidence to support this practice (Isbister *et al*, 2010).

In the present study, 50.8% of the parents indicated that cough and cold can be treated using antibiotics although 66.1% of the parents correctly answered that majority of the cold is caused by viruses, not bacteria. Garbutt *et al* (2010) reported that 1 in 5 parents would like to request an antibiotic for symptom relief in cough and cold conditions. This may be due to parents being unaware of the function of

Table 4  
Multiple comparisons for group which showed significant difference of knowledge score in Kruskal- Wallis test.

Variable	Mean $\pm$ SD knowledge score	Median	p-value
Age <sup>a</sup> (years)			
21 - 29	4.78 $\pm$ 1.54	5.0	
30 - 39	6.02 $\pm$ 1.71	6.0	0.006 **
21 - 29	4.78 $\pm$ 1.54	5.0	
40 - 49	5.93 $\pm$ 1.56	6.0	0.018 *
Highest educational level <sup>a</sup>			
Secondary	5.25 $\pm$ 1.55	5.0	
Tertiary	6.26 $\pm$ 1.68	6.0	0.000 **
Monthly income <sup>a</sup>			
RM 1,000 - RM 2,000	4.96 $\pm$ 1.95	5.0	
>RM 4,000	6.31 $\pm$ 1.64	6.0	0.030 *
DCA recommendation <sup>a</sup>			
Not sure	5.00 $\pm$ 1.50	5.0	
Trust it	6.46 $\pm$ 1.55	7.0	0.000 **
Safety of cough and cold Medication <sup>a</sup>			
Unsafe	6.39 $\pm$ 1.58	6.0	
Safe	5.68 $\pm$ 1.59	6.0	0.027 *
Effectiveness of cough and cold medications <sup>a</sup>			
Ineffective	6.51 $\pm$ 1.73	7.0	
Not sure	5.53 $\pm$ 1.93	6.0	0.030 *
Ineffective	6.51 $\pm$ 1.73	7.0	
Effective	5.72 $\pm$ 1.56	6.0	0.003 **

\* Indicates a significant difference at  $p < 0.05$ .

\*\*Indicates a significant difference at  $p < 0.01$ .

<sup>a</sup>Mann- Whitney test with Bonferroni correction.

antibiotics and the consequences of bacterial resistance. According to Torpy *et al* (2003) and Centers for Disease Control and Prevention (2013), common cold and the associated symptom of cough are usually caused by virus and thus antibiotics are not useful as they only kill bacteria, not viruses. The inappropriate use of antibiotics may increase the risk of resistant infections.

In the current work, parents with tertiary education obtained higher know-

ledge score than those with secondary education. This finding could be supported by earlier studies which found that parents with higher education would basically have a greater need for information. These parents were able to retrieve information and have better access to resources such as the internet and the library (Patistea and Babatsikou, 2003; Lu *et al*, 2005; Holappa *et al*, 2012).

Socioeconomic status often runs parallel with education level (Lu *et al*, 2005). A



Table 5  
Parental attitude towards the use of cough and cold medications.

Questions	Number of respondent (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I believe that my child will usually recover from cough and cold by rest and sufficient fluid intake.	16 (6.5)	47 (19.0)	60 (24.2)	76 (30.6)	49 (19.8)
I will always check the active ingredients on the label before giving the medicines to my child.	12 (4.8)	16 (6.5)	56 (22.6)	81 (32.7)	83 (33.5)
I will take caution when administering more than one cough and cold products.	8 (3.2)	12 (4.8)	20 (8.1)	87 (35.1)	121 (48.8)
I will always read the instruction and dosing information written on the label.	8 (3.2)	5 (2.0)	8 (3.2)	68 (27.4)	159 (64.1)
I will always use the oral syringe or measuring spoon when giving cough and cold medications to my children.	8 (3.2)	7 (2.8)	5 (2.0)	62 (25.0)	166 (66.9)
I will never decide how much of cough and cold medicines to be given by depending on how serious of my child illness.	34 (13.7)	40 (16.1)	42 (16.9)	50 (20.2)	82 (33.1)
I will never give the cough and cold product which intended for adults to my child.	14 (5.6)	9 (3.6)	6 (2.4)	46 (18.5)	173 (69.8)
I will choose the cough and cold products with child resistant closure.	12 (4.8)	14 (5.6)	57 (23.0)	69 (27.8)	96 (38.7)
I will refer to the doctors or pharmacists with any questions regarding cough and cold medications.	5 (2.0)	6 (2.4)	10 (4.0)	74 (29.8)	153 (61.7)
I will stop treating my child younger than 2 years with cough and cold medications when the health warning is given out.	7 (2.8)	7 (2.8)	19 (7.7)	73 (29.4)	142 (57.3)

Table 6  
Differences of attitude score between respondents with different demographic characteristics ( $n = 248$ ).

Variable	Mean $\pm$ SD attitude score	<i>p</i> -value
Gender <sup>a</sup>		
Male	42.13 $\pm$ 4.76	
Female	40.88 $\pm$ 7.36	0.409
Age <sup>b</sup> (years)		
21 - 29	38.22 $\pm$ 6.84	
30 - 39	41.65 $\pm$ 6.64	
40 - 49	40.82 $\pm$ 6.97	
$\geq$ 50	40.60 $\pm$ 3.36	0.06
Ethnicity b		
Malay	41.25 $\pm$ 7.81	
Chinese	40.78 $\pm$ 4.91	
Indian	41.76 $\pm$ 7.81	
Others	41.17 $\pm$ 4.78	0.079
Highest educational level <sup>b</sup>		
No formal education	0	
Primary	36.50 $\pm$ 13.44	
Secondary	39.53 $\pm$ 6.96	
Tertiary	42.23 $\pm$ 6.30	0.001 **
Occupation <sup>b</sup>		
Unemployed	42.00 $\pm$ 0.00	
Student	42.50 $\pm$ 3.00	
Housewife	40.06 $\pm$ 5.67	
Self- employed	41.59 $\pm$ 5.76	
Salaried- employed (non- health related)	41.43 $\pm$ 7.04	
Salaried- employed (health related)	40.29 $\pm$ 9.96	0.451
Monthly income <sup>b</sup>		
0	40.36 $\pm$ 5.09	
<RM 1,000	41.50 $\pm$ 5.24	
RM 1,000 - RM 2,000	36.96 $\pm$ 11.25	
RM 2,000 - RM 3,000	42.28 $\pm$ 4.41	
RM 3,000 - RM 4,000	41.05 $\pm$ 6.77	
>RM 4,000	41.89 $\pm$ 6.70	0.203
Number of children <sup>b</sup>		
1	41.12 $\pm$ 7.65	
2	41.20 $\pm$ 6.54	
3	40.47 $\pm$ 7.22	
4	42.54 $\pm$ 4.22	
$\geq$ 5	42.75 $\pm$ 4.69	0.581
Age of youngest child <sup>a</sup>		
<2years old	41.60 $\pm$ 5.40	
$\geq$ 2 years old	41.02 $\pm$ 7.08	0.925

\*\* Indicates a significant difference at  $p < 0.01$ .

<sup>a</sup>Mann-Whitney test; <sup>b</sup>Kruskal-Wallis test.

higher education level and socioeconomic status has been found to be associated with greater knowledge (Neni *et al*, 2010). In this study, parents with high monthly income achieved better knowledge score than those with low monthly income. According to Lu *et al* (2005), parents with high monthly income might be financially more capable to purchase recommended resources, such as medical literature and have better access to the information.

In the present research, one third of parents indicated that they will decide on how much of the cough and cold medications to be given depending on the seriousness of their child's illness. In other words, parents may give their children higher than the recommended doses. According to Kearns *et al* (2000), parents often increase the dose of medicines whenever an appropriate dose administered did not give the desired outcome. The misconception that a higher amount of medicine helps in alleviating the symptoms and more rapid recovery can expose the child to severe toxicity. Inappropriate dosing especially in combination products that contain paracetamol, as an example, may lead to acute liver failure in children (Squires *et al*, 2006).

Parents with higher education demonstrated significantly better attitudes than those with lower education levels as found in the present study. This finding is further supported by other studies which reported that better educated individuals often display a more positive attitude (Ab and Ab, 2005; Neni *et al*, 2010). According to Lu *et al* (2005), parents with low level of education may result in physicians giving less information as they may perceive that the parents are less able and less willing to access large amount of information.

The result showed that there was a weak, positive but significant relationship

between knowledge score and attitude score. As the knowledge score increases, attitude score also increases and vice versa. This finding was supported by other studies which stated that the attitude is influenced by the degree of knowledge of the condition in various areas of research (Parmar *et al*, 2001; El Sharkawy *et al*, 2006; Sell Salazar, 2009).

In this study, knowledge was found to be associated with the attitude, which suggests that parents who possess lower attitude may be improved through the input of greater knowledge. There were parents who admitted administering the cough and cold medications at higher than recommended doses to children. Therefore, widespread parent education on reading medications labels and administering appropriate doses is necessary (Yaghmai *et al*, 2010). Absence of data supporting the safety and efficacy of cough and cold medications in the pediatric population highlights the importance in educating parents about the safe use of these products so as to lessen the inappropriate exposure and risks to children (Vernacchio *et al*, 2008).

Regarding perception towards the use of cough and cold medications, the results showed that over half of the parents trusted the DCA's recommendation about the prohibited use of cough and cold medications in children aged below two. It was believed that parents who trusted the recommendation were aware and knew about the recommendation. However, a small percentage of parents doubted or were unsure whether or not to trust the recommendation by the DCA. It has been suggested that message should be communicated directly by the health care providers to parents in order to gain public trust in the recommendation (Himmelstein *et al*, 2011). The public often

relied on the health care providers to give information based on the recommendations by the FDA or MHRA (Brown and Calnan, 2012).

In general, parents who participated in this study were found to consider the cough and cold medications as safe and effective, which may be due to the perception that there was sufficient evidence to support the effectiveness of these medications. This is consistent with the findings by Hanoch *et al* (2010), Himmelstein *et al* (2011) and Varney *et al* (2012), which showed that parents viewed the medications used for their children as safe and effective. According to Sharftein *et al* (2007), it is believed that direct-to-consumer advertisement which claimed the products to be safe and effective may account for such findings. Furthermore, parents who often maintained confidence in the drug they used based on repeated positive experience with those products may make them to rate the medications as safe and effective (Brown and Calnan, 2012).

The study conducted was only confined to certain areas in Kuala Lumpur, through convenience sampling, which may not necessarily represent the general population in Kuala Lumpur and Malaysia. The respondents were allowed to complete the questionnaires at home, which may also be biased as respondents have the liberty to search for the correct answers, therefore not reflecting their true knowledge. To that end, future studies may include the investigation of parental beliefs towards the use of cough and cold medications as well as the practice of parents when using these products in children. A nationwide study could also be conducted to evaluate the knowledge, attitude and perception of parents on the use of cough and cold medications in children.

In conclusion, this study provides an insight into the knowledge, attitude and perception of parents on the use of cough and cold medications in children. Overall, the parents in Kuala Lumpur had a satisfactory level of knowledge on cough and cold and its medications. Parents within the middle-age range, high education and high monthly income possessed better knowledge of cough and cold and its medications. Parents had an overall positive attitude towards the use of these medications. Educational level had a significant impact on the parental attitude in using these medications. Efforts aimed at educating the parents may be needed in order to improve their knowledge and attitude towards the use of pediatric cough and cold medications. This eventually may help promote the appropriate and safe use of cough and cold products in children.

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