Knowledge and attitude of school children in Amman/Jordan toward the appropriate use of medicines: A cross-sectional study

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Abstract  Objectives: The aim of this study is to examine the knowledge, practice, and attitude toward medications of different primary school children at age group (7–9) years.

Methods: This cross sectional study adopted the form of structured interviewing technique using a validated and pre-piloted questionnaire. The questionnaire consisted of a mixture of multiple choice and open-ended questions, 15 USP pictograms and six dosage form demos. A randomized stratified target sample of 200 students (n = 100 of each gender), of the first, second and third grades from the four Amman Education Directorates was recruited. School children were interviewed regarding their knowledge, attitude and the way they think medicines should be used.

Results: The mean score value achieved by children in all the knowledge questions was 23.26 ± 0.25 out of 32, which was considered as satisfactory knowledge by the research team. The most significant factors affecting children's knowledge (including: multiple choice questions, pictograms and dosage forms) were: age, school/area of residency, and the presence of a first-degree relative working in a medical job. The majority of participants (79%) stated that the taste of the medication was the main factor to prevent them from taking their medication.

Conclusion: In general, school children in our sample have satisfactory knowledge and a generally positive attitude toward medicines. However, school curricula in Jordan should include more education regarding the effective and safe use of medicines.

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1. Introduction

The prevalence of medicine use in children, both prescribed and over-the-counter (OTC) is reported to be high (Hämeen-Anttila et al., 2009). For example, one study in the USA found that 54% of children younger than three years old were given an OTC medicine during a period of 30 days (Kogan et al., 1994). Furthermore, an international survey from 28 countries revealed that children (11, 13 and 15 years) had taken medicines, especially for headache, and the prevalence varied...
between 21–50% among boys and 28–66% among girls (Hansen et al., 2003).

Previous research worldwide supported the use of direct, developmentally appropriate, child-centered health care education (Perrin et al., 1991; Tates and Meeuwesen, 2000; Sanz, 2003; Sleath et al., 2003). Other research has concluded that both medicine use and treatment adherence might be improved with direct child-appropriate education (Tieffenberg et al., 2000; Boorady, 2006).

A number of researches worldwide showed that children in general had a negative attitude toward medicines use or even fears of using medicines (Menacker et al., 1999; Häméen-Anttila et al., 2006). In other studies, teaching children about their medication regimen has correlated with improved knowledge and decreased anxiety, fear, and negativity toward medications (Knight et al., 1990).

It is increasingly acknowledged that education about the proper use of medicines should be a part of school health education (Bush et al., 1999; Pharmaceutical Federation, 2001). In Finland, health education, including the proper use of medicines, was recognized in the national policy on medicines in 2003. Furthermore, it became an obligatory subject in junior secondary schools and in primary schools, through a new curriculum. This new topic creates challenges for teachers, who usually have not had any formal education about medicines during their studies (Häméen-Anttila et al., 2009; Häméen-Anttila et al., 2006).

To date, there has been only one study in Jordan that explored knowledge and attitudes of children at age group (10–12) years toward appropriate use of medication (Barakat, 2009), which concluded that children had a good knowledge, yet negative attitudes about medicines and their use. This current study is the first one in Jordan that aims to study and explore knowledge, practice, and attitudes of children at a younger age group (7–9 years) regarding the appropriate, safe use and extent of correct information they have about medications.

2. Methods

2.1. Setting and participants

The study was conducted in eight public primary schools in Amman, the capital of Jordan, over 4 weeks between March and April of 2010, with a randomized stratified target sample of 200 students of the first, second and third grades (7–9 years old) of equal numbers of male and female (n = 100) from the four different Amman Education Directorates. School children then were selected by simple randomization (50 children for each Amman directorate). Lists of schools were obtained from the four Amman directorates. The schools were numbered, and then choice was made randomly by drawing lots manually by the researcher. This was also applied to the lists of children’s names within the target ages of the same classes from which children were selected.

Each participating school was provided with a formal letter from The University of Jordan (UJ) and the relevant Amman education directorate. Also, they were informed of the aim of the study and asked for permission to interview their students. Ethical approval to conduct the study was obtained from the Graduate Studies Committee at the Faculty of Pharmacy, and the Deanship of Graduate Studies at The University of Jordan.

2.2. Study design

A descriptive comparative study was conducted using a structured interviewing technique which looked at Knowledge, Attitude and Practice (KAP) of children toward medications.

The questionnaire was created in Arabic by the research team after reviewing previous similar studies and available questionnaires in the literature, then modifications were made to fit the Jordanian setting and the target age group.

The interview consisted of three parts: (A) a questionnaire that consisted of a mixture of multiple choice and open-ended questions. (B) A selected collection of 15 pictograms shown to children on large display cards. The pictograms were adopted from the United States Pharmacopeia (USP) and selected because they were expected to be easy to understand by children within the age range 7–9 years old (Fig. 1; United States Pharmacopeia, 2006). (C) Six different dosage form demos presented to interviewees by the researcher (injection, capsule, tablet, suppository, cream, syrup) and scores were calculated for each.

2.3. Procedures

Before the start of the study, the researcher got training on how to conduct interviews with children and how to extract responses (e.g. avoid leading, paralleled or double negative questions). The questionnaire was filled by the researcher throughout the structured interview, where each question in the questionnaire being consistently asked by the researcher as an open ended question with repeating the question many times and rewarding the question in another way to make sure the child had understood, and then if children could not give an answer, multiple answers which were included in the pre-formed questionnaire were offered to the interviewee by the researcher for each question. Each interview was conducted on a one-to-one basis and took approximately 20–30 min to complete.

2.4. Data analysis

All data were coded and entered stepwise into SPSS® database for windows version 16, then SAS® database for statistical analysis. Both ANOVA and Chi-square tests were used to test for any significant differences among variables (P-value < 0.05). The questions were weighed according to their easiness and familiarity of participants with the answers was assumed by the research team.

3. Results

3.1. Children’s knowledge about medications

The most significant factors affecting children’s knowledge of medication (including multiple choice questions, pictograms and dosage forms) were: age (with increasing age of children, the knowledge about medications increases too), school/area of residency, and the presence of a first-degree relative working in a medical job (if having first-degree relative
In general, children’s knowledge about medication was considered by the research team as satisfactory (i.e. any knowledge score above 65%). For example, the majority of participating children answered correctly when they were asked about the meaning of a “medical prescription”, which is a “document written by a physician”, and most of the children answered that a vaccine is used to “improve immunity against certain diseases” (the correct answer; Table 1).

Children’s understanding of all pictograms was, in general, above average (Table 2). The average of correct answers ranged between 54% for the 12th picture (do not freeze) and 92.5% for the first picture (taken by mouth). Most children were able to recognize the correct meaning of most of the 15 pictograms, and it was found that with increasing the age of participants, the understanding of the pictograms also increased.

Regarding children’s knowledge of six dosage forms and their use, our study found that children were able to identify most of the selected dosage forms easily and were able to describe the appropriate method of using them (Table 3). The frequency of identifying both the name and the use of the dosage forms ranged between 92% and 100%.

3.2. Children’s attitudes and practice toward appropriate use of medication

The main factors that affected children’s attitude and practice about the appropriate use of medication were: age, family size, education directorate, and presence of first-degree relative working in a medical job (P < 0.05).

This study found that children had generally a positive attitude toward medications. For example, the majority of the answers (79.5%) were often and always that medicines have

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Scores of all question groups answered by children (n = 200).a</th>
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<tbody>
<tr>
<td></td>
<td>Minimum score</td>
</tr>
<tr>
<td>Multiple choice knowledge questions</td>
<td>4</td>
</tr>
<tr>
<td>Multiple choice knowledge questions-E SN</td>
<td>6.5</td>
</tr>
<tr>
<td>Pictograms</td>
<td>1</td>
</tr>
<tr>
<td>Dosage forms</td>
<td>4</td>
</tr>
<tr>
<td>All the knowledge questionsd</td>
<td>11</td>
</tr>
<tr>
<td>Multiple choice attitude and practice</td>
<td>2.5</td>
</tr>
<tr>
<td>All the questions</td>
<td>14</td>
</tr>
</tbody>
</table>

* The question groups were analyzed by ANOVA by using SAS® system.
  b S.E.: standard error of the mean.
  c Scored according to the level of easiness.
  d Including: multiple choice questions, pictograms and dosage forms.
<table>
<thead>
<tr>
<th>No.</th>
<th>Pictogram</th>
<th>Correct (%)</th>
<th>Wrong (%)</th>
<th>Answer is not related to pictogram (%)</th>
<th>Opposite (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Take by mouth</td>
<td>92.5</td>
<td>2.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Take 2 times a day</td>
<td>82.5</td>
<td>7</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>3</td>
<td>Place drops in nose</td>
<td>82</td>
<td>7</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>DO not store medicine where children can get it</td>
<td>81.5</td>
<td>5.5</td>
<td>1.5</td>
<td>11.5</td>
</tr>
<tr>
<td>5</td>
<td>Do not take with meal</td>
<td>66.5</td>
<td>5.5</td>
<td>9.5</td>
<td>18.5</td>
</tr>
<tr>
<td>6</td>
<td>Store in refrigerator</td>
<td>70.5</td>
<td>11</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>Take at bed time</td>
<td>61</td>
<td>4</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>This medicine may make you drowsy</td>
<td>59.5</td>
<td>5</td>
<td>16.5</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>Wash hands/place drops in ear/wash hands again</td>
<td>82.5</td>
<td>10.5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Shake well</td>
<td>80</td>
<td>9</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>Dilute with water</td>
<td>57.5</td>
<td>11</td>
<td>3.5</td>
<td>6</td>
</tr>
</tbody>
</table>
benefit, and of participants answered that medicines may sometimes (63.5%) or never (32%) cause harmful effects (Figs. 2 and 3).

When asked about the main factor that prevented them from taking their medication, the majority of school children (79%) stated that the taste of the medication was the main factor, while the time and the frequency of administration were the least factors to affect their compliance.

The most common source of medical information that children in our study and their parents were reported to depend on were the physician (92.5%) then the pharmacist (87.0%), while the least mentioned were the school (5.5%) and the internet (6.5%; Table 4). Finally, when children were asked about their possible action in case of finding a needle on the ground, more than half (50.5%) said that they would tell their parents (Table 5).

<table>
<thead>
<tr>
<th>Table 2 (continued)</th>
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<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
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<td>15</td>
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<table>
<thead>
<tr>
<th>Table 3</th>
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<tr>
<td>Children’s identification of the dosage forms and their use (n = 200).</td>
</tr>
<tr>
<td>Dosage form</td>
</tr>
<tr>
<td>Injection</td>
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<tr>
<td>Capsule</td>
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<td>Tablet</td>
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<tr>
<td>Suppositories</td>
</tr>
<tr>
<td>Cream</td>
</tr>
<tr>
<td>Syrup</td>
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</table>

![Figure 2](image.png)  
**Figure 2** Children’s opinion regarding medications benefit.
4. Discussion

4.1. Children’s knowledge about appropriate use of medications

In our study, children had in general a satisfactory knowledge about medicines and their use. These results are surprisingly good, bearing in mind the fact that school curricula do not formally include education about the rational use of medicines, which leaves the responsibility of teaching children about medicines to health care professionals and the parents in a scattered and non-organized manner.

The results of this study were similar to those reported by Barakat (2009), the previous study in Jordan which was conducted on a slightly older age group (10–12 years), and concluded that children’s knowledge was consistently satisfactory at that age group. Table 6 summarizes a comparison between the two studies.

In contrast to our results, research done by Hämeen-Anttila and colleagues (2006) in Finland on school children of age 5–12 years found that children’s knowledge of medicines was poor. They used medicine-related vocabulary uncertainly, implying that they did not fully comprehend all the information that they had gained. Also, FIP Statement of Principle (2001) showed that children in general had superficial knowledge about medicines and few opportunities to learn how to use them appropriately (Pharmaceutical Federation, 2001).

This study found that with the increasing age of children, their knowledge about medications increases too. Several studies also found that older children (6–12 years of age) had a better understanding of medicine use and its risks (Hämeen-Anttila et al., 2006; Bozoni et al., 2006). Using Piaget’s Theory of Cognitive Development (Sleath et al., 2003; Hämeen-Anttila and Bush, 2008; Byrnes, 2008), it is expected by children’s cognitive development stage (concrete operations stage), during which they are able to understand the link between the cause and the effect, to understand that...
disease is preventable, and their understanding of health and illness incorporates internal physiological characteristics.

Our study found also an association between children’s knowledge about medication and the presence of first degree relatives working as health care professionals. Children who had first-degree relatives working in health care professions achieved higher scores than those who did not. This is probably because such family members (father, mother, sister, or brother) would be more familiar with medicines and medical terms and discuss medication-related issues with their families. To the best of the researchers’ knowledge, no studies in the literature were found to discuss such issue.

The study found an association between children’s knowledge about medication and school/area of residency. There are many studies showing that there is a very strong link between schools meeting their educational goals and the health of their students (Nutbeam, 2000; St-Ledger and Nutbeam, 2000). It is for this reason that schools need to address health education as a part of teaching structure (Lee et al., 2007). Also, a study conducted by Smith and colleagues (2008) at the University of London, found that the school had a great role in life management of chronically ill young children, especially those taking care of their medications. In our study, the presence of chronic illness and its effect on knowledge was not investigated, due to the absence of children with chronic illness in the sample.

Children’s understanding of all pictograms was good, and it was found that with increasing the age of participants, the understanding of the pictograms also increased. Similar results were found in a study conducted in Finland which showed that children with higher age (10–13) were able to understand the medication taste and the problem with swallowing tablets. Medicines may be troublesome to children, primarily due to the medication taste and the problem with swallowing tablets (Steffensen et al., 1998; Hansen et al., 2008).

4.2. Children’s attitudes and practice toward appropriate use of medication

This study showed that children as young as 7 years have already constructed attitudes toward medicines. It was also found that children’s attitude toward the presence of benefit and side effects of medication differed with children’s ages (depending on P-value < 0.05). While the majority of the 7-year- and 8-year-old children said that medicines always have benefit, the majority of 9-year-old children thought that medicines often have a beneficial effect.

The previous study in Jordan by Barakat (2009) which was conducted on older children at age group (10–12) years found that children’s attitude toward the presence of benefit and side effects of medication differed with different ages. While half of the 12-year-old children said that medicines sometimes have benefit, half of those who are 10 years old said that medicines often have a beneficial effect, and the majority of all participants answered that medicine sometimes causes harmful effect (Barakat, 2009).

In fact, it has been argued that children’s health-related beliefs and behaviors are relatively stable by the time they are in the third and fourth grades (9–10 year; Hämeeen-Anttila and Bush, 2008). Furthermore, children’s attitudes in that study were generally negative, which is similar to that was concluded by Barakat (2009) at the same age group (Barakat, 2009). A similar pattern has been shown in other studies (Hämeeen-Anttila et al., 2006; Bush and Joshi et al., 2002). However, in some studies, children viewed medicines quite positively and linked them to their recovery (Bozoni et al., 2006; Aramburuzabala et al., 1996).

These findings imply that understanding of risks may be related to the age and cognitive development stage of children: the level of understanding of the risks of adverse reactions is most likely higher among older than among younger children (Menacker et al., 1999; Garcia et al., 1996). Our study found that the most common source of information about medicines for participating children were the physicians and pharmacist, while the least were schools and internet. Even though children in other parts of the world; the United States (5–14 y), Canada (12–15 y), Finland (11–17 y), and in Greece (6–11 y) said that their most common source of information about medicines was their parents, especially the mother (Menacker et al., 1999; Bozoni et al., 2006; Hämeeen-Anttila et al., 2005). This rhymes with our results since physicians or pharmacists will mostly deliver information to parents rather than directly to children.

This study found that the most common factor that prevented children from taking their medication was the taste of the medicine, while the least one is the time of administration of medicine. Some studies, based on reports from parents or health care personnel, indicated that the mere act of taking medicines may be troublesome to children, primarily due to the medication taste and the problem with swallowing tablets (Steffensen et al., 1998; Hansen et al., 2008).

4.3. Limitations of the study

- Generalization of the study results to all Jordanian children of similar age group is limited, because the study was conducted only in Amman. Thus, the authors believe that future studies in different areas in Jordan may reveal different results and be more representative.
- There is no socioeconomic classification for areas available in Jordan in order to compare this effect on children KAP.
- This study represents the KAP of the age range 7–9, which is not representative of other age groups to provide a more comprehensive picture of Jordanian children’s view of medicines.
- Although every effort has been made to ensure a representative sample of younger children in Jordan, the results of this study were obtained from public schools only which may not represent the whole younger school-children population.
- One of the major limitations of this study that may have biased the results was the “social desirability” effect. The answers of children may not reflect their real KAP. Moreover, children in most cases did not admit their lack of knowledge by using the choice “I don’t know”. This can be minimized in the future by repeating same questions in different ways to ensure more rigorous reliability of their answers.

4.4. Recommendations

- The medicine education material should contain a simple structure and ready-to-use materials in order to be used by teachers.
5. Conclusions

Several conclusions may be drawn from this study that can be taken into account and used when starting a medicine education program:

- In general, school children in public schools in Amman have satisfactory knowledge and a generally positive attitude toward medicines. However, their knowledge needs improvement regarding the rational medicines use. The positive attitude of children should be invested in a manner that would “promote proper use of necessary medication” rather than “promote use” of medication among children currently (i.e. compliance) and as future adults.

- School curricula in Jordan do not include education about the rational use of medicines, which leaves health care professionals and the parents mainly responsible for teaching children about medicines.

- Children are in need to be educated about the rational medicine use before they become independent medicine users. This can be done in collaboration with the health authorities and children media resources (e.g. TV, radio, magazines and internet).

References


