

from family, media, community, past experience and other sources [7].

Previous studies that focused on self-medication of children indicated that 70% of illnesses among children were treated with self-medication in the U.S.A. [8]. However, in 2008, a survey conducted with a group of Japanese parents found that 60.5% didn't know the meaning of self-medication [9]. However, the use of self-medication for children was often inaccurate, with 71% of parents in a U.S. study failing to use self-medication in the appropriate way, and only 10.91% of parents saying that they read labels and drug information [10]. Parental attitudes about self-therapy for their children have been studied in an earlier study, which showed that parents with a good attitude towards self-medication are more ready to treat their own children [11, 12]. Many studies have reported on the percentage of parents that use self-medication on their children, for example, 53.8% of Saudi Arabia parent's and 95.7% of Sudanese parent's encourage self-medication [13, 14].

A similar study in India showed that 58.91% of mothers medicated their children with non-prescribed medication for common health problems [15]. Additionally, another study reported analgesic, anti-pyretic, and anti-cough medicines as the medications most commonly used in treat these children [16]. According to another study, the main reported reason for using self-medication on their children was that consultations with doctors were more expensive and time-consuming [17].

The issue of self-medication of children differs from other cases of self-medication because the parents are responsible for treating their children, rather than the children themselves. The relation between parents' attitudes and the medicines used to treat their children's common ailments, such as flu, cough, fever, diarrhoea, pain, and colic, has been a major focus of many earlier studies [18-22]. In general, the effect of parents' knowledge, perception, and practices of self-medication of their children on medicine use in children isn't well known [17, 19]. Therefore, the main aim of this study was to detect the current knowledge, attitudes, and practices (KAP) of parents towards self-medication for their children. This could supply baseline data for developing plans to increase people's awareness in the health field. The results of this study are a first trial to identify parents' KAP towards self-medication for their children in Palestine, which is essential to any efforts to upgrade the quality of health services in Palestine.

Methods

2.1 Study design

A descriptive, cross-sectional study was conducted in Palestine from October 2016 to February 2017.

2.2 Study area and population of the study

The population of the study included any parents who were more than 18 year old, and who had at least one child younger than 18, without chronic illness, such as

cardiovascular diseases, asthma, and diabetes mellitus. The study was carried out at healthcare centres for children, government clinic and private clinic in Nablus district.

2.3 Sample size

An online Raosoft sample size calculator (<http://www.raosoft.com/samplesize.html>) was applied to determine the sample size, which resulted in sample size of 500. This is after assuming confidence level of 95%, a margin of error of 5%, and a response distribution of 50%, and adding a non-response rate of 20% to increase the accuracy. The inclusion criteria were: 1) Parents with at least one child aged younger than 18, 2) who provided verbal agreement for participation, and 3) who do not work in the health field (doctors, pharmacist, and nurses).

2.4 Data collection instrument

Parents were interviewed face-to-face, using a questionnaire created based on other previous similar studies [4, 13, 17, 23-28] (see Additional File 1). We performed a literature review to develop a questionnaire that included appropriate measurements of parents' knowledge, attitudes, and experience of home medicine use. The questionnaire included 37 questions and was divided into seven sections. Each section generated responses in several forms, including closed-ended questions with multiple answers, "Yes", "No", and "Don't know", as well as open questions

First section: This section was composed of eleven items, with the focus on basic data about respondents (e.g. age, gender, place of residence, income, number of children, parental education level, job, and health status of children).

Second section: This section was designed to uncover the source of information about medication used by parents, and the reasons for engaging in self-medication.

Third section: This section consisted of six statements to assess parents' knowledge about self-medication. The respondents were requested to choose among three options provided, "yes", "no", and "don't know". The score for knowledge was measured by calculating the number of correct answers on three of these items, and the answers of "don't know" were added as incorrect answers (i.e., 1 point for correct, and 0 for incorrect).

Fourth section: this section contains questions to assess parents' attitude and beliefs regarding the efficacy and safety of self-therapy

Fifth section: This section consisted of questions to examine parents' behaviour regarding self-medication and the dosage form most preferred by parents.

Sixth section: This section consisted of questions to determine the medications used most frequently by parents on their children without consulting a doctor or pharmacist.

Seventh section: This section consisted of questions to evaluate parents' general knowledge regarding the safety and toxicity of the products used for self-medication. All

Table 2. Preferred type of therapy used by parents to their children

Therapy type	N (%)
Prescriptive medications	459 (91.8)
Over-the-counter medications (OTC)	136 (27.2)
Self-therapy	206 (41.2)
Alternative and Herbal medicine	179 (35.8)

children, most of them (54.6%) said they had sufficient experience to treat their children, and 49.2% claimed that they were able to ascertain the disease from symptoms. The other reasons given are presented in Table 3.

Table 3. Reasons for self-medication

Reason for self-medication	N (%)
- The cost of going to the doctor is high	106 (21.2)
- Waiting so long in the clinic	65 (13)
- Parents can ascertain the child's disease from the symptoms	246 (49.2)
- The workers in the medical field are not qualified	24 (4.8)
- Having experience of treating children	273 (54.6)
- The nearest clinic is too far from the parent's place of residence	37 (7.4)

Source of information about self-therapy

Most parents (82.8%) stated that the leaflet inside the drug was the main source of information about the medicine, followed by previous experience, which constituted 55.8%, followed by other sources, such as the internet, members of the community, the radio, TV, and others, as detailed in Figure 1.

Parents' knowledge regarding self-therapy

More than ninety percent of parents knew that completing the drug course is essential for full improvement. However, only 23% of parents knew that the number of active ingredients does not affect the activity of the medicine. More than two thirds (87%) of parents were aware that the required concentration of the active ingredient in the drug

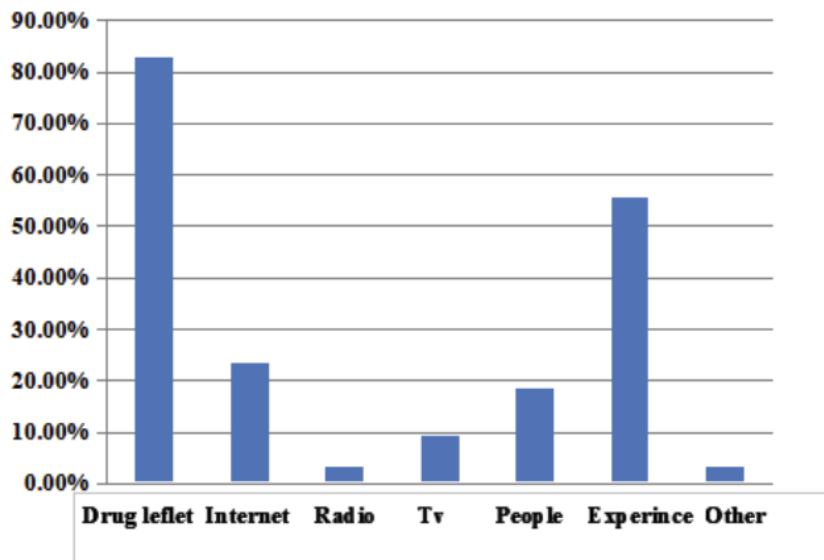


Figure 1. Sources of drug information in self-medication

depends on the child's age. Details are shown in Table 4. Knowledge scores ranged from 1 to 6, with a mean score of 4.38 ± 1.05 and median score 4 with interquartile range between 4 and 5. There were no significant differences found on the knowledge score and the socio-demographic factors.

Parents' preference of dosage forms

Figure 2 provides the parents' most preferable medicines dosage forms and shows that syrup is the most preferable (76.6%), followed by suppositories (52.4%), because they believe that these dosage forms can work better on their children.

Parents' attitude and beliefs regarding the efficacy and safety of self-therapy

As shown in Table 5, attitudes toward self-medication were evaluated using five questions. The first question measured positive attitude, while the last four questions measured negative attitude. Around two third of parents (77.2%) used dietary supplements for their children, and 22.8% wrongly believed that using dietary supplements is not important for their children. 213 parents believed that, for all pills, when split in half, they provide precisely half of the therapeutic dose.

Table 4. Parents’ Knowledge towards medications used for self-therapy

Items	Yes (%)	No (%)	I don't know (%)
Strict compliance to medication and completing the medication course is essential for full improvement	474 (94.8)	24 (4.8)	2 (0.4)
Medicine containing more than one active ingredient is more effective than medicine containing one active ingredient	181 (36.2)	115 (23)	204 (40.8)
The concentration of the active ingredient in the medication depends on the child's age	435 (87)	25 (5)	40 (8)
The greater the number of medicines used in treatment, the more successful and efficacious the treatment	95 (19)	381 (76.2)	24 (4.8)
Frequent use of a medication by a child for a long period may harm the child's health and cause side effects	443 (88.6)	47 (9.4)	10 (2)
Aspirin can normally be used as self-medication for children younger than 18	39 (7.8)	341 (68.2)	120 (24)

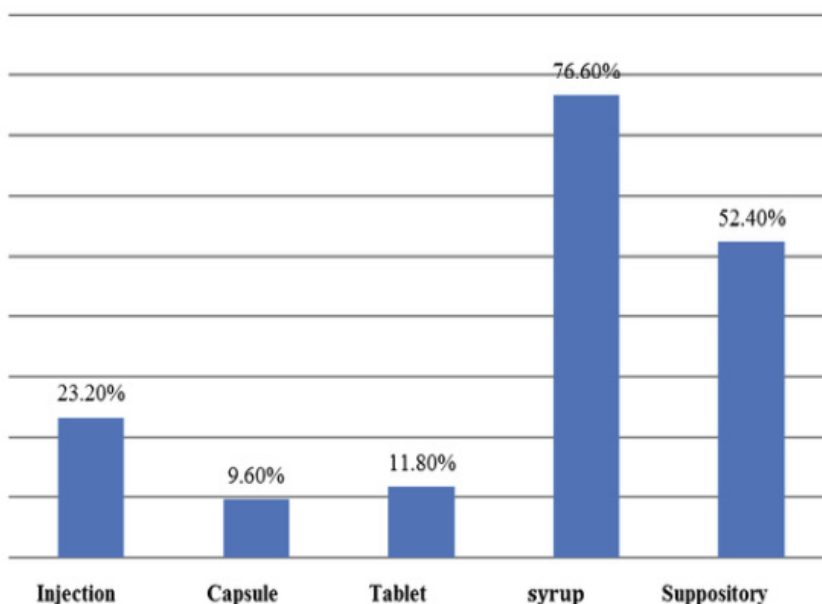


Figure 2. Dosage form preference

Table 5. Parents’ attitudes and beliefs regarding self-therapy efficacy and safety

Items	Appropriately	Agree (%)	Disagree (%)
Use of dietary supplements is important for children	Appropriate	386(77.2)	114(22.8)
Medicine chosen for a child without the advice of a doctor or pharmacist is effective and safe for the child	In appropriate	259(51.8)	241 (48.2)
More expensive medicine is more efficient and better than less expensive medicine	In appropriate	120(24)	380(76)
When a child has suffered from a disease in the past, it is correct to reuse the medicine if the same symptoms arise again without the advice of a doctor or pharmacist	In appropriate	149(29.8)	351(70.2)
Splitting a pill in half will give exactly half of the therapeutic dose	In appropriate	213(42.6)	287(57.4)

Parents’ practices regarding proper use of self-medication

Approximately all parents reported providing medication to children at home. As shown in Table 6, the most commonly used medications are antipyretics (95%), followed by skin

creams (46%) and anti-cough and anti-influenza medication (44.2%). Only 12.2% of parents used anti-emetic as self-medication to treat their children. More than half of parents (53.4%) said they often record the time when giving

Table 6. The most common medicine used by parents for their children as self-therapy

medicines to their children. Although more than two third of parents (86.8%) generally showed good practice, some showed bad adherence to the accurate number of doses and treatments time. Only seven parents (1.4%) do not consult the doctor or pharmacists when the symptoms of disease persist in their children. Most parents (93.8%) indicated that they used the measurement tool available in the medicine packet. Furthermore, most parents (95.8%) reported that

they kept the medication in specific place, out of reach of their children. When we asked parents what they do with the medicine remaining at the end of treatment periods, the majority said that they got rid of it, and only seven (1.4%) give it to someone else. Only around half of the parents (54.6%) know the exact quantity of the measuring tool teaspoonful as being five ml. Table 7 illustrates parents' practices regarding self-medication.

Table 7. Parents practice regarding proper use of self-medication

Items	N (%)
Record the time when giving the medicine for the child	267 (53.4)
Use the correct number of doses and treatment time when giving medicine for the child	434 (86.8)
Consult a doctor or pharmacist when the child's symptoms persist	493 (98.6)
Use the measurement tool available in the packet to measure the dose	469 (93.8)
Parents keep self- medications in an appropriate safe place	479 (95.8)
Parents practice towards leftover self-medication when having finished using them for their child	
keep it to use later	244 (44.8)
Get rid of it	419 (83.8)
Give it to someone else	7 (1.4)
The volume delivered by the measuring teaspoonful	
3 ml	217 (43.4)
5 ml	273 (54.6)
10 ml	10 (2)

Parents' beliefs regarding toxicity of self-medication

When parents were asked about their beliefs regarding “the side effects reported on the drug label or leaflet and how often they occurred”, 85% of them thought that they only happen in some people. More details about parents' beliefs regarding the toxicity of self-medication are presented in Table 8.

Of the self-medications believed to be potentially lethal in overdose, many were unrecognised by the parents: Paracetamol (67.4%), ibuprofen (44.6%), multivitamins

(70%), antihistamine (29.2%), anti-cough (44.4%), and antibiotics (39.6%); (See Table 8).

Discussion

This study aimed to investigate parents' awareness about self-therapy for their children, as well as their method of using self-therapy on their children. The majority of studies on self-therapy in children have investigated the use of medicine by children themselves [17, 25, 29]. However, few surveys have measured parental knowledge,

Table 8 Parents beliefs towards toxicity of self-medication

Items	Yes (%)
The occurrence of side effects of medicines used for children	
Occurs in all persons	37 (7.4)
Occurs in some persons	425 (85)
Only occurs in high doses	60(12)
Overdose of these drugs is considered fatal for a child	
Paracetamol	163 (32.6)
Ibuprofen	277 (55.4)
Multi vitamins	150 (30)
Anti-histamine	354 (70.8)
Anti-cough	278 (55.6)
Antibiotic	302 (60.4)

perception, and practices regarding their own self-medication of their children [13, 15].

As shown in our study, parents of children with acute simple health problems, such as respiratory illnesses, cough, fever, diarrhoea, colic, and pain are likely to use self-medication for their child's treatment. We also found that the use of self-medication by parents on their children was more common if the parents had a positive attitude toward self-medication, compared with parents that had a negative attitude.

The main reasons for parents' self-medication of their children, according to our results, is that parents have experience in treating their children and are able to ascertain the nature of the disease from the child's symptoms.

In other studies, the reasons were partly different. For example, in a Vietnamese study, the reason for self-medication was the ease of obtaining self-therapy, with no need for a doctor's prescription [17, 19]. Other Sudanese and Saudi studies have shown that people engage in self-medication as using medical services is too expensive and time consuming [13, 14].

In earlier studies, experience made up a large percentage of people's sources of information about medicine [30, 31]. Similarly, we also found that the major information sources in our population were the label inside the medicine and parents previous experience. A point of interest in our result is that parents have high awareness about the importance of completing a course of treatment. However, in other studies, awareness about the importance of completing treatment for full improvement was poor [17]. This is a very important issue, especially in the case of antibiotics, because not completing the course of therapy will lead to development of medicine resistance [17].

On the question of whether "aspirin can be used as self-medication for children younger than 18", this study found that around two thirds of parents have good knowledge regarding this statement, and about one third of parents were unaware in relation to this point. For example, Reye syndrome can occur as a dangerous adverse effect of aspirin in children younger than 12 [32].

Most parents thought that syrup and suppositories are better dosage forms for children. This is because syrup can be easily swallowed by a child. In addition, suppositories can result in faster temperature reductions; moreover, they are an excellent alternative for oral dosage, especially when children do not accept oral medicines. On the other hand, a previous study in Malaysia indicated that the most preferred dosage forms were injection and syrup [24].

In our study, we found that approximately two thirds of parents preferred to give their children multivitamins. A Malaysian study conducted among parents reported that 75.6% of them also give their children multivitamins [24]. Furthermore, in our study, most parents (72.6%) tend to

think that cost does not affect efficacy of treatment. This outcome is in contrast to that of Malaysian study, which found that parents tend to think that the more expensive medicines are more efficient and better than the cheapest ones [24].

Around one third of parents in our study indicated reusing kept prescription medication on their children, for cases of with the same symptoms, without the advice of a doctor or pharmacist. This finding corroborates other studies, for example, where 26.3% of Korean parents reported the same practice [27]. 46% of parents in an Indian study believed it to be correct to reuse the same medicine for the same symptoms [17]. In addition, a Yemeni study has reported similar findings [33]. In light of this data, we can infer that this practice is not correct, since similar symptoms on a second occasion may not necessarily be the result of the same disease as the first occasion.

It is an issue of great concern that around half of respondents thought that any tablet could be divided into two parts if you have to use half a tablet. Moreover, in similar study, the vast majority of respondents (84%) have the same thought [17]. Splitting enteric coated, extended release, controlled release or other specialised dosage forms of tablets, which do not disintegrate in stomach, will lead to overdose of medicine and, in some cases, may lead to toxic effects. In addition, some medication, when broken, can irritate the stomach [34, 35].

Analgesics and antipyretics were the forms of medication most commonly used as self-medication for children, by 475 (95%) parents. These results match those observed in earlier studies [13, 17, 26, 36, 37]. Furthermore, we found a high rate of antibiotics use for children among parents in our population (39.6%). These results are consistent with data obtained in a Sudanese study, where 36.6% of parents use antibiotics for their children as self-therapy. These results are in agreement with those obtained by a Saudi study, which found 16.8% of parents using antibiotics for their children [13]. This is considered to be a significant problem, as the excessive use of antibiotics without control could lead to bacterial antibiotic resistance [38]. Addressing this problem requires suitable rules and regulations to limit the use of antibiotics.

Since parents are their children's major caregivers, they should be very careful in dealing with the right amount of medicine and the correct time to take it. In our study, the majority of parents were correct regarding the number of doses and treatment time when giving medicine for their children. Similar results were found in another study [24].

Half of the parents have good knowledge about the quantity in one teaspoonful. In contrast, an earlier study indicated that only 30% of respondents know the exact quantity in one teaspoonful [17].

The side effects of medication are problems that occur in addition to the desired therapeutic effect, and these effects

do not occur in all people. The possible side effects and toxicities of self-medication vary with their composition. The majority of participants (85%) have a good knowledge about the occurrence of side effects in patients.

Parents think that self-medication is safe and suitable for their children, even when giving higher amounts than recommended doses [39]. However, unfortunately, children are more vulnerable to adverse drug events than adults. For example, in our study 67.4% of respondents believed that paracetamol is safe, even in very high doses, and this misconception is very dangerous because high doses of paracetamol can lead to hepatotoxicity [40]. The same is the case with Ibuprofen and multivitamins, where a large proportion of respondents thought that a high dose of these medicines is safe for their children. Ibuprofen overdose is a serious problem because it affects the gastrointestinal tract and causes metabolic acidosis, furthermore, ibuprofen toxicity doesn't have a specific antidote [41]. As such, parents should be warned about the dangers of excessive medication consumption.

Strengths and limitations

The main strength of this study is the use of a large and evenly selected sample from private and government clinics. Furthermore, this study focuses on parental unawareness about several medicine-use practices in children, which hasn't been discussed in earlier studies in Palestine, suggesting a serious need for interventions to raise awareness among parents. One of the limitations of our study was that the answers reported by the parents cannot be confirmed, and recall bias is probable. In addition, this study is not a representative sample because most of the participants were mothers, so these findings display the knowledge and attitude of mothers, not fathers. Another limitation is that our data was collected from only two places.

Conclusion

Self-medication use has been common among parents for their children in Palestine. The aim of this study is to form future plans to increase awareness about, and thereby decrease hazards related to, self-therapy. There has been a high tendency for parents to use self-medication on their children, especially antipyretics. Furthermore, antibiotics have been used without prescriptions by a large proportion of parents. These should be further regulated and require a parent-focused education programme in Palestine. As such, specific guidelines for appropriate self-therapy should be established. In addition, we hope that this study will be used in future to improve parents' knowledge about self-therapy, to ensure that children receive the best treatment. We must encourage the role of pharmacists in educating parents on how to use self-medicating medicine in proper doses and at the correct time, as well as regarding when doses reach toxic levels.

List of abbreviations

KAP, knowledge, attitudes, and practices;
SPSS, Statistical Package for the Social Sciences;
NIS, New Israeli Shekel;
IRB, Institutional Review Boards

Declarations

Ethics approval and consent to participate

All aspects of the study protocol were approved by IRB at An-Najah National University. Permission to interview parents was granted by the Palestinian Ministry of Health or a head of a private clinic. Data was collected from parents only upon obtaining verbal informed consent in line with the requirements of the IRB. Furthermore, the parents were notified that their answers would be kept totally confidential and would only be used for scientific research purposes. Informed verbal consent was obtained by all the parents and approved by the IRB committee because the study imposes minimal risk on study participants, and no personal data would be noticed in any publication arising from the study.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

RS, DH, SS, HK, and RZ conducted the data collection, performed the analyses and literature search, and drafted the manuscript. SZ conceived the research idea, designed the study, led the data analysis and interpreted the data, monitored the whole research process, and participated in drafting the manuscript. AO, WS, RA, and SA participated in the design of the study, and revised the article for important intellectual content. All authors read, and approved the final manuscript.

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