



Research article

Healthcare professionals' views and perceptions of analgesic and antipyretic use in paediatric patients in four major Saudi hospitals

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ABSTRACT

Background: Antipyretics and analgesics, including non-steroidal anti-inflammatory drugs, are medications commonly used in the Kingdom of Saudi Arabia (KSA) and elsewhere to manage fever and pain in the paediatric age group.

Research work investigating misuse of these medications in paediatric populations and pertinent healthcare professionals' (HCPs) perceptions as a major determinant of the severity of these errors is scarce.

Objectives: The aim of this study was to explore the perceptions of HCPs about analgesic and antipyretic use in paediatric patients at four major hospitals in Jeddah, KSA. The study also sought to explore factors believed by HCPs to be associated with occurrence of medication errors and adverse drug reactions (ADRs) due to analgesic and antipyretic use.

Methods: A cross-sectional survey employing a pre-piloted online questionnaire with an information sheet was delivered to HCPs in four hospitals in the western region of KSA. The questionnaire comprised a mix of a tick list and open and closed questions with Likert scales for attitudinal statements, and it also comprised items including demographics, healthcare professions and the respondents' work experience, HCPs' views and perceptions relating to occurrence of ADRs and medication errors in children who attended the hospital in the preceding three months and the severity and outcomes of the ADRs.

Results: Two-hundred seventy-four HCPs were approached, and 200 agreed to participate, yielding a response rate of 73%, including physicians (50%), nurses (24.5%), and pharmacists (16.5%).

The majority of HCPs reported that ADRs could be minimized with appropriate actions. They believed that their lack of experience may have contributed to ADRs. Most HCPs (81%) reported that parental knowledge was a key factor contributing to the decreased occurrence of ADRs in children. They also believed that other factors contributed to the occurrence of ADRs, such as lack of reconciliation (65%), parents' anxiety leading to over-medication (69%) and the easy availability of these medications at home (77%).

Twenty-nine respondents (n = 29, 14.5%) reported medication errors related to the use of analgesics or antipyretics. Specifically, they reported that possible contributing factors included poor communication of information (69.5%); interruptions (67.5%) and work pressure (66.0%).

Conclusion: HCPs reported that ADRs and medication errors related to using analgesics and antipyretics in paediatric patients are not uncommon. In their opinion, several factors were associated with occurrence of these events, including parental knowledge about medications and insufficient training of HCPs.

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1. Introduction

Antipyretics and analgesics, including non-steroidal anti-inflammatory drugs (NSAIDs), are medications commonly used in the Kingdom of Saudi Arabia (KSA) [1] and elsewhere to manage fever and pain in the paediatric age group [2]. Acetaminophen (paracetamol) and ibuprofen are the two major medications belonging to the analgesic and antipyretic family which can be dispensed without a prescription. Both medications have been repeatedly shown to be effective analgesics and antipyretics in the paediatric population in placebo-controlled clinical trials [2, 3, 4]. Management of paediatric patients with fever and pain is a common daily challenge in healthcare settings [5]. In this regard, analgesics' and antipyretics' ease of availability presents several advantages in managing fever and pain at home, representing significant worldwide pharmaceutical markets. However, multiple disadvantages are associated with their use, including misuse and medication errors which can lead to adverse drug reactions (ADRs) [3, 5].

According to a recent World Health Organization (WHO) report, children with fever account for approximately 20% of paediatric emergency department visits [6]. Several factors, such as parents' fear, anxiety, misconceptions about the potential harmful effects of fever on their children and the need for the quick relief of fever or pain, lead to the misuse of these medications, resulting in ADRs and practice errors [7, 8].

Despite the widespread use of analgesics and antipyretics and consequent ADRs, studies regarding their pattern of use in Saudi Arabia are limited [9, 10]. Alfreihi et al. reported that analgesics/antipyretics were the most common medications available over the counter (OTC) in Saudi Arabia. Alfreihi's study, conducted in the western region of KSA on an adult population, concluded that a high level of patient education plays an important role in the better understanding and heightened awareness of ADRs from analgesics [11].

The severity of the consequences of errors resulting from the misuse of analgesics and antipyretics was underscored in a study in the United Kingdom, spanning October 2010 to September 2011. While the study was not targeted to children only, it revealed that medication errors are the most common cause of patient safety issues during hospital stays, contributing 11% of all incidents and affecting 134,684 patients [12]. In Saudi Arabia, a study has shown that paracetamol accounted for 24.1% of drug overdoses which resulted in a prolonged hospital stay and the need for intensive care [13].

In a recent survey of members of the general public attending medication safety awareness campaigns in Jeddah, Saudi Arabia, analgesics ($n = 375$, 73.2%) and antipyretics ($n = 33$, 6.5%) were commonly cited as medicines obtained from sources other than a physician and were associated with issues of misuse with an array of consequences, both minor and serious [14].

However, research work investigating issues of misuse of these medications in paediatric populations as well as pertinent healthcare professionals' (HCPs') perceptions as a major determinant of the severity of these errors is scarce. Hence, additional research on the use and safety of analgesics/antipyretics in the Saudi Arabian population is warranted.

1.1. Aim of the study

The aim of this study was to explore the perceptions of HCPs about analgesic and antipyretic use in paediatric patients at four major hospitals in Jeddah, KSA. The study also sought to explore factors believed by HCPs to be associated with occurrence of medication errors and ADRs due to analgesic and antipyretic use.

2. Method

2.1. Research design

A cross-sectional survey employing a pre-piloted online questionnaire with an information sheet was delivered to HCPs in four hospitals in the western region of KSA.

2.2. Setting and recruitment process

This study was conducted on 10 March 2017 in paediatric outpatient clinics, paediatric emergency rooms, pharmacies, nursing stations and hospital waiting areas at four hospitals in Jeddah: the Maternity and Children's Hospital, the East Jeddah General Hospital, the King Abdul-Aziz Hospital and the Maternity and Children's Hospital Al-Aziziah, Jeddah, KSA.

Potential participants (HCPs who had active roles in patients' care and in monitoring and adjusting of treatment regimens, such as physicians, pharmacist nurses, assistant pharmacists and nurses) were approached opportunistically by a researcher and invited to participate. Other multidisciplinary professionals and staff were excluded. Each potential participant was provided an information leaflet (see Appendix 1) along with a consent form to be signed, and those who agreed to participate were given the questionnaire (see Appendix 2) by the researcher, who recorded the responses electronically. Participants received both Arabic and English versions of the questionnaire and had the choice of answering the questions either in Arabic or in English.

2.3. Questionnaire development

The questionnaire comprised a mix of a tick list and open and closed questions with Likert scales for attitudinal statements, and it comprised items including demographics, healthcare professions and the respondents' work experience, whether analgesics and antipyretics were prescribed according to the institution's guidelines and protocol, HCPs' views and perceptions relating to occurrences of ADRs and medication errors in children who attended the hospital in the preceding three months, and the severity and outcomes of the ADRs.

A Likert scale questionnaire was developed in which respondents could indicate, based on their opinions, the factors associated with the occurrence of ADRs/medication errors in relation to analgesic/antipyretic use, such as insufficient training of healthcare staff and the parents' level of education and knowledge about medication administration.

Questions were derived from a combination of previous research on how to improve hospital/at-home use of analgesics and antipyretics in children with pain/fever and how to minimize ADRs and medication errors [13, 14, 15].

Suggestions were sought from the participants in open questions on how to improve healthcare practice and minimize analgesic/antipyretic misuse in the paediatric population.

To ensure validity and relevance, the questionnaire was verified online by a panel of ten academic and healthcare staff. Reviewers were asked to provide narrative comments about the feasibility, simplicity and time required to answer the questionnaire. It was also piloted with a sample of 20 health professionals at the Maternity and Children's Hospital, Jeddah, KSA. As no changes were made to the questionnaire post-piloting, the pilot responses were included in the analysis dataset.

2.4. Ethical approval

Management authorization was gained from the Ministry of Health Saudi Arabia (MOH), Reference Number (891625), and ethical approval

from the National Committee of Bio and Medical Ethics, Reference Number (873315).

2.5. Data collection and analysis

The responses were exported to SPSS (SPSS Inc., Cary, NC version 19.0). Frequency and percentage were calculated for the descriptive analysis.

3. Results

Two-hundred seventy-four HCPs were approached, and 200 agreed to participate, yielding a response rate of 73%, including physicians (50%, [100]), nurses (24.5%, [49]), pharmacists (16.5%, [33]) and other healthcare providers (9%, [18]) (Table 1).

Table 1 shows the demographics of the 200 HCPs who participated in the survey, the majority of whom were females (73.5%). Forty-three per cent of the participants had less than three years of experience, 27% had four to seven years of experience and 30% had more than eight years of experience.

Among participants, 70% reported that analgesics and antipyretics were prescribed according to the KSA MOH protocols or guidelines, 21% of participants were not sure and 10% reported that prescription of these medicines did not follow MOH protocols or guidelines.

3.1. Occurrence of adverse drug reactions due to antipyretics and analgesics

Twenty-six respondents (n = 26, 13%) reported having witnessed ADRs in children in the past three months due to analgesic or antipyretic administration, 139 (n = 139, 69.5%) did not observe any and the remaining participants (n = 35, 17.5%) were not sure whether such events had occurred (Table 2). The majority of HCPs reported that ADRs could be minimized with appropriate actions, as shown in Table 2. Fifty-five per cent of HCPs believed that their lack of experience may have contributed to ADRs, while 32% did not and 13% were unsure. Most HCPs (81%) reported that parental knowledge was a key factor contributing to the decreased occurrence of ADRs in children (Figure 1). They also believed that other factors contributed to the occurrence of ADRs, such as a lack of medication reconciliation (65%), parents' anxiety leading to overmedication (69%), the easy availability of these medications at home (77%), poor communication between clinical staff and

Table 1. Characteristics of the 200 healthcare professionals participating in the survey.

Variable	Results %
Gender	
Male	25.5%
Female	73.5%
Prefer not to say	1.0%
Profession	
Resident Physician	23.0%
Pediatrician	19.5%
ER Physician	7.5%
Nurse	24.5%
Pharmacist	16.5%
Other	9.0%
Work Experience	
1–3 Years	43.5%
4–7 Years	26.5%
8–11 Years	16.5%
More than 11 Years	13.5%

parents (66%) and HCPs' lack of knowledge (50%) regarding the use of analgesic or antipyretic medications.

3.2. Reported ADRs

The reported ADRs included hypothermia (n = 3), vomiting (n = 3), rash and allergy (n = 2), hepatotoxicity (n = 1) and abdominal pain (n = 1).

3.3. The outcomes of ADRs

ADR outcomes ranged from mild, not requiring medical treatment (n = 5), to moderate, requiring medical treatment (n = 3), severe, requiring hospital admission (n = 1) and mortality (n = 2).

3.4. Occurrence of medication errors due to antipyretics and analgesics

Twenty-nine respondents (n = 29, 14.5%) reported medication errors related to the use of analgesics or antipyretics in the past three months (Table 2). Specifically, they reported that possible contributing factors for these adverse events included poor communication of information (69.5%), interruptions (67.5%), work pressure (66.0%), lack of training (63.0%), lack of support from HCPs (57.0%), pressure from patients (56.0%) and lack of time (53.5%) (Figure 2). Notably, most of the respondents (83.0%) believed that these medication errors could be further minimized (Table 2); their suggestions about minimizing ADR and medication error occurrence are shown in Figure 3.

4. Discussion

The current study highlights HCPs' views and perceptions concerning the use of analgesics and antipyretics in paediatric patients in four major Saudi hospitals. The vast majority of participants reported witnessing ADRs associated with the use of analgesics and antipyretics in paediatric patients which were either mild or serious and some of which resulted in severe cases in morbidity, prolongation of hospital stay and mortality of the affected children.

Most of the surveyed participants reported that insufficient parental knowledge of medication, the easy availability of these medications at home and parental anxiety leading to overmedication were the major causative factors of reported ADRs. They also reported that most ADRs and medication errors could be minimized, mainly by enhancing both their own and parents' knowledge. They suggested several strategies to minimize ADRs and medication errors, including advising parents on how to manage fever at home and how to dispense the correct doses of antipyretic/analgesic medications.

Our findings on the perceptions of HCPs regarding the use of analgesics and antipyretics appear comparable with the limited research evidence base in KSA and the Middle East [14].

Medication errors related to the use of analgesics and antipyretics were reported with various levels of severity. HCPs believed medication errors could be further minimized by thoroughly and carefully checking the names of medications, by enhancing communication between medical staff and parents and by providing sufficient training for medical staff and more awareness for the parents.

In similar research conducted in Saudi Arabia, 35 HCPs reported observing 51 errors during the preceding 12 months. Thirty-five errors were described, the most reported being wrong medication prescribed, dispensed or administered and the wrong dose prescribed. Three key barriers to medication error reporting were a lack of awareness of the reporting policy workload, time constraints associated with reporting and the non-availability of the reporting form [15].

In this study, most HCPs did not witness any ADRs caused by the use of analgesics and antipyretics in children in their clinical practice. A few ADRs were reported, such as vomiting, abdominal pain, rash and

Table 2. Results of questionnaire administered to HCPs.

Variable	Results % (n)
1. Do you think analgesics and antipyretics are being prescribed according to institution's guidelines and protocols?	
Strongly disagree	2.0% (4)
Disagree	7.5% (15)
Unsure	21.0% (42)
Agree	34.5% (69)
Strongly agree	35.0% (70)
2. Has a child patient in your care experienced an ADR due to analgesic/antipyretic use in the past 3 months?	
Yes	13.0% (26)
No	69.5% (139)
Can't remember	17.5% (35)
3. Do you think that ADRs could be further minimised?	
Yes	84.6% (22)
No	11.5% (3)
Don't know	3.9% (1)
4. Has a child patient in your care experienced a medication error due to analgesic/antipyretic use in the past 3 months?	
Yes	14.5% (29)
No	69.0% (138)
Can't remember	16.5% (33)
5. Do you think that medication errors could be further minimized?	
Yes	83.0% (166)
No	6.5% (13)
Don't know	10.5% (21)

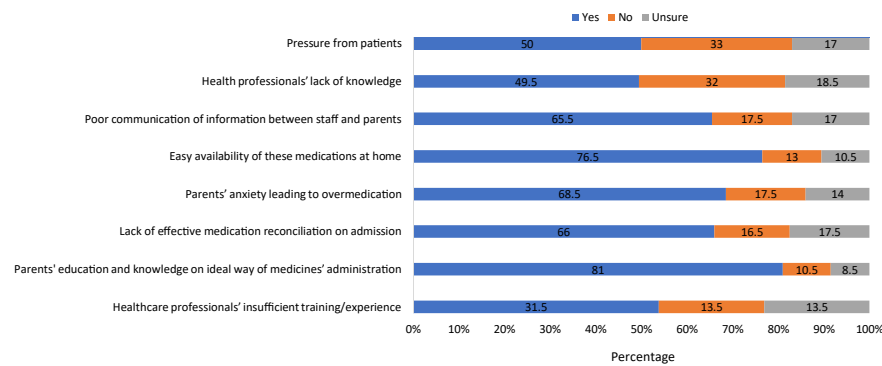


Figure 1. Responses to question "In your experience, do you think that the following generally contribute to the occurrence of antipyretics/analgesics ADR?".

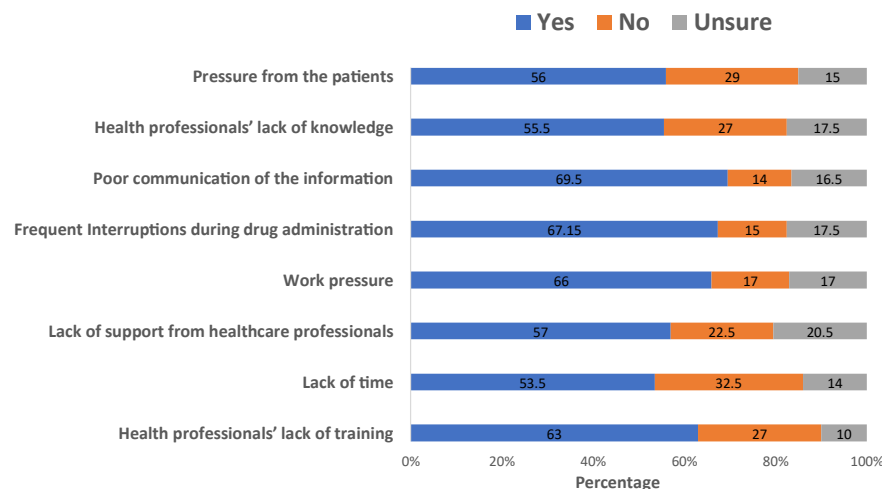


Figure 2. Responses to question "In your experience, do you think that the following generally contribute to the occurrence of medication errors?".

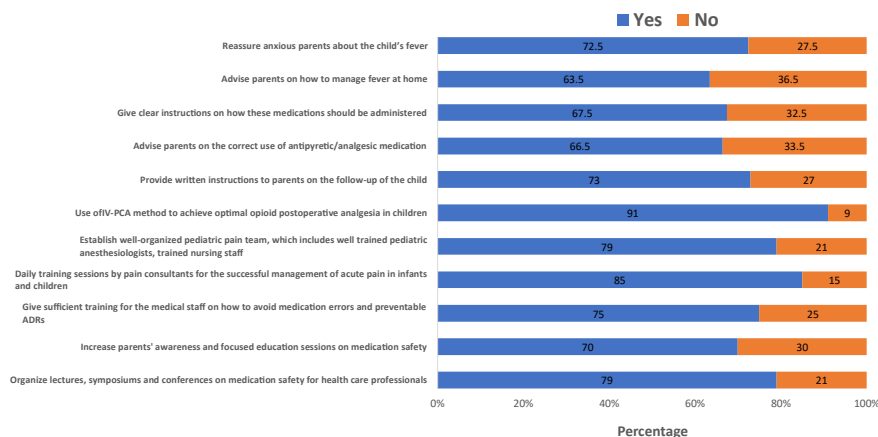


Figure 3. Responses to question “In your experience, how we can improve hospital/at home use of Analgesics & antipyretics in children and minimize ADRs and medication errors”.

hypothermia. Vomiting as an ADR to analgesics is common, particularly with narcotic analgesics [16].

Most HCPs in this research reported that parental knowledge was a key factor contributing to the occurrence of ADRs in children. A study was conducted to identify parents' medical knowledge of minor ailments concerning their children and found a significant association between their knowledge levels and their management of OTC medicines. The study concluded that parents with a greater knowledge of children's ailments had better management of the ailments [17].

In our results, more than half of the respondents reported that a lack of HCP experience and training may have contributed to the occurrence of ADRs and medication errors. These results are in accordance with previous studies providing tangible evidence that inadequate training and lack of experience by HCPs played a major role in the occurrence of adverse events [18].

Useful information on the pharmacological management of pain and fever in children should be disseminated to parents by general HCPs and is crucial to minimizing the incidence of such events. In a self-reported survey completed by 650 parents who sought medical assistance on antipyretic use for their children, medical personnel (40.7%) as well as mothers' or grandmothers' experience (30%) were the main sources of information. Despite this, a total of 57% of parents treated their children with incorrect doses which could cause severe toxicity [18].

It is of paramount importance that physicians are consulted by both caregivers and parents regarding the appropriate use of analgesics and antipyretics. Pharmacists can also play a major role, as they can provide appropriate advice concerning the correct administration of the medication. The surveyed HCPs suggested reassuring anxious parents about their child's fever, advising parents on how to manage the child's fever and pain at home, increasing parental awareness and having focused education sessions on medication safety through organizing lectures, symposia and conferences on paediatric medication safety.

The limitation of this study is that participants were comprised of a convenience sample of physicians, pharmacists and nurses working at four hospitals in Jeddah city; hence, the data may not be generalizable. In addition, the data was based on self-reporting, with inherent recall and social desirability response biases. However, despite these limitations, there are clearly key issues which demand attention, with regard to using analgesics and antipyretics in children. Due to the lack of any other statistically significant evidence from large nationwide or multinational studies, the data from the current study and findings presents valuable pilot evidence for both physicians and parents caring for children with fever and/or acute pain.

4.1. Future work

Further studies may help establish the degree of association between the contributing factors reported by the HCPs in KSA and the occurrence of adverse effects. This will help in planning and implementing appropriate interventions which will help decrease the occurrence of such adverse events.

5. Conclusion

HCPs in four major hospitals in Western Saudi Arabia reported that ADRs and medication errors related to the use of analgesics and antipyretics in paediatric patients are not an uncommon occurrence. In their opinion, several factors are associated with the occurrence of these events, including parental knowledge about medications and insufficient training of HCPs. Adherence to the recommended posology and method of administration can help HCPs and parents prevent or substantially reduce the risk of ADRs to analgesics and antipyretics. Further studies can help in planning and implementing appropriate interventions which will help decrease the occurrence of such adverse events.

Declarations

Author contribution statement

M. Tobaiqy: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

M. Radwi, Z. Attieh, A. Almalki and A.H. Alhasan: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

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