

Knowledge and Practices of Paracetamol Administration Among Caregivers of Pediatric Age Group Patients

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ABSTRACT

Introduction: Paracetamol is a widely used over the counter drug for pyrexia and mild to moderate pain in all age groups. **Objective:** To assess the knowledge and practices of paracetamol administration among caregivers of the pediatric age group patients attending the university family practice. **Materials and Methods:** A clinic-based descriptive cross-sectional survey was carried out among clients attending the family practice of the Faculty of Medicine, University of Kelaniya, Sri Lanka using pretested interviewer administered questionnaire. **Results:** Ninety eight caregivers participated. Majority were females (97%) with a mean age of 32 years. Age of the patients ranged from 1 to 132 (mean: 48 months). The commonest indication for paracetamol was fever (98%) and in 99% of the patients, mother was the administrator. Forty three percent of the children received a supra-therapeutic dose (>15 mg/kg/dose). None exceeded 20 mg/kg/dose. 16% exceeded the recommended dosing frequency. Children above 3 years were at an increased risk of receiving incorrect paracetamol dose ($\chi^2=19.55$, $df=1$, $P>0.001$) A majority (75%) said they followed doctors' advice on paracetamol dose. There was no association between level of education of care giver, deciding dose as directed by doctor and product information leaflet and dosing accuracy. Only one caregiver was able to calculate the paracetamol dose according to weight. A majority (85%) knew about paracetamol poisoning but it was not associated with dosing accuracy. **Conclusion and Recommendations:** Administration of supratherapeutic doses of paracetamol is common and risk increased with child's age. Knowledge on calculating the weight appropriate paracetamol dose is poor. Physicians should educate care givers on judicious use of paracetamol.

Keywords: Administration, knowledge, pediatric, paracetamol, practices

Introduction

Paracetamol also known as acetaminophen is a widely used over the counter drug for pyrexia and mild to moderate pain in all age groups. It has similar efficacy to aspirin, but has no demonstrable anti-inflammatory activity; it is less irritant to the stomach and for that reason is now generally preferred to aspirin, particularly in the elderly. Paracetamol has been in use for the past 60-70 years and ever since aspirin was found to be a causative agent for Reye syndrome in 1980s; paracetamol has come to stay as the drug of first choice for fever in children. It is the most common over the counter drug used for self-medication by mothers in the age group 12 years and below.^[1]

Over dosage with paracetamol is particularly dangerous as it may

cause hepatic damage which is sometimes not apparent for 4 to 6 days.^[2] Many reported cases of severe hepatotoxicity in children have been attributed to cumulative toxicity from repeated doses rather than acute intoxication from a single massive overdose.^[3] In Sri Lanka, De Silva *et al.* reported five cases of acute liver cell damage following repeated doses of paracetamol exceeding maximum therapeutic dose (90 mg/kg/24 h).^[4]

Use of adult rather than pediatric preparations,^[5] failure to read and understand instructions on the label, or use of an incorrect measuring device or preparation were cited as the usual causes of unintentional overdosing^[3] in a group of patients who underwent liver transplant due to paracetamol toxicity in California.

Assessing the knowledge and practices on paracetamol administration among caregivers of the pediatric age group will enable doctors to identify shortcomings and intervene in view of preventing over dose.

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Objectives

Assess the knowledge and practices of paracetamol administration among caregivers of the pediatric age group patients attending the university family practice.

Materials and Methods

A clinic-based descriptive cross-sectional survey was carried out among clients attending the family practice of the Faculty of Medicine, Ragama. Information was gathered using a pretested questionnaire administered by trained interviewers before the consultation. All consenting caregivers accompanying patients under the age of 12 years who attended the clinic during the period of 2 months were included in the study. Respondents who were not the usual person to give paracetamol to the accompanying child were excluded. The recommended paracetamol dose was considered as 10–15 mg/kg/dose. Data was analyzed using SPSS 16v.

Results

During the study period of 2 months, questionnaires were administered among 98 respondents fulfilling the study criteria. A majority of the respondents were females (97%) and were the mothers of the accompanying child (95%). Their age ranged from 19 to 52 years with a mean of 32 years. A majority (93%)

were unemployed. The education level of the respondents were satisfactory with the majority (98%) having passed grade 5 [Figure 1].

Patient profile

Age of the patients ranged from 1 to 132 months with a mean of 48 months highlighting that half of our patients were 48 months or below [Figure 2]. Forty-three percent of the patients were females. The indication for administering paracetamol was fever in 98% but only 30% confirmed using a clinical thermometer. In most of the instances, the mother (99%) gave the medication.

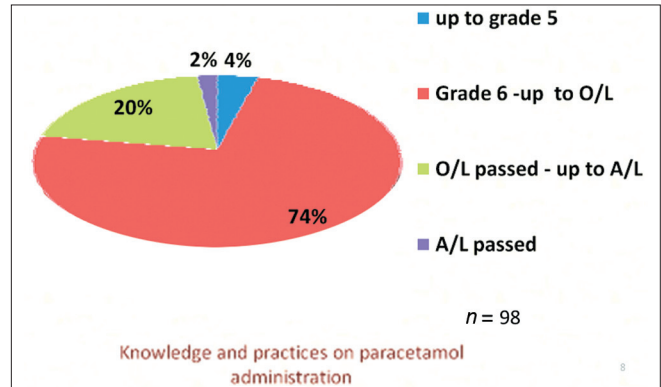


Figure 1: Education level of respondents

Age group (months)	Number of children	Correct (%)	Below recommended (%)	Above recommended (%)
≤12	18	10 (55.5)	6 (33.3)	2 (11.1)
13-24	11	8 (72.7)	2 (18)	1 (9)
25-36	18	14 (77.7)	2 (11.1)	2 (11.1)
37-48	12	4 (33.3)	0	8 (66.6)
49-60	5	2 (40)	0	3 (60)
61-72	6	1 (16.6)	0	5 (83.3)
73-84	6	1 (16.6)	0	5 (83.3)
85-96	4	0	0	4 (100)
97-108	10	2 (20)	0	8 (80)
109-120	7	1 (14.3)	1 (14.3)	5 (71.4)
≥120	1	0	0	1 (100)

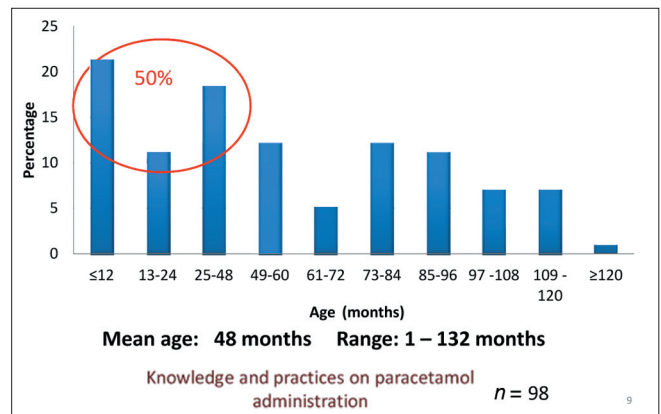


Figure 2: Patient profile: Age distribution

Factor	Age ≤36 months	Age >36 months	Total
Correct dose	32	11	43
Incorrect dose	15	37	52
Total	47	48	95

*Children above 3 years were at an increased risk of receiving incorrect paracetamol dose ($\chi^2=19.55$, $df=1$, $P>0.001$)

Factor	Correct dose	Below recommended	Above recommended
Doctor's advice	32	8	33
Product information	15	5	6

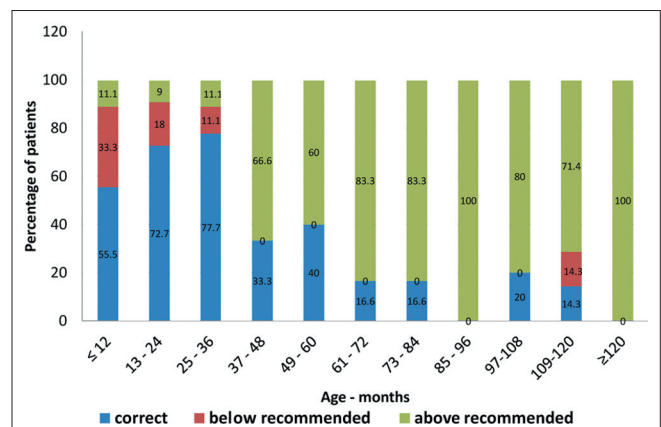


Figure 3: Age and paracetamol dosing accuracy

Dose of paracetamol administered by 44% of the respondents had been weight appropriate. Few (11%) had given a sub-recommended dose (<10 mg/kg/dose), while 43% had given a supra-therapeutic dose (>15 mg/kg/dose). None exceeded 20 mg/kg/dose. Eighty percent had followed the correct (four times per day) dosing frequency while 16% exceeded.

There was no association between level of education and dosing accuracy. The risk of receiving an incorrect dose increased with increasing age [Figure 3 and Table 1]. Children above 3 years were at an increased risk of receiving incorrect paracetamol dose ($\chi^2=19.55$, $df=1$, $P>0.001$) [Table 2]. There were no associations between doctor's advice and product information with correct dosing [Table 3].

A majority (75%) said they followed doctors' advice on paracetamol dose while 26% followed the dose recommendations accompanying the product. Six percent decided on the dose based on the severity of the symptoms. Respondents hardly knew how to calculate the weight appropriate dose with only one succeeding.

Only 50% appreciated the difference of strength between different dosage forms. Most were aware about the adult tablet (100%), 94% on children's tablet and the syrup. Fewer (39%) were aware of the infant drops and only one respondent knew about suppositories. Though aware, none used children's paracetamol tablet. Of the respondents aware of infants' drops, none appreciated the difference in strength between infants' drops and the conventional syrup.

Knowledge on the measuring devices used for administering syrups is imperative to get the dose correct. The measuring devices used were the standard cup/spoon (69.8%), tea spoon (13.9%), and the dropper (23.2%). Of the respondents, 40% knew the correct capacity of a tea spoon; 24.5% were incorrect, and 37.5% did not know. Of the respondents who used syrup (36), a majority (83%) used the standard measuring device (spoon or cup) and the rest (10) used the tea spoon. Of the tea spoon users, only 6 knew its capacity correctly.

A majority (85%) knew about paracetamol poisoning and 61% of them identified that poisoning can occur by administering a single high dose as well as giving the correct dose more frequently than recommended. Only 26% knew liver as the affected organ in paracetamol poisoning.

There was no association between dosing accuracy and awareness of paracetamol toxicity.

Discussion

This study was done in a "weekday morning only" teaching practice offering free consultation with prescription to be purchased. The clientele may differ in their social background from an average Sri Lankan general practice setting. That does not

necessarily mean that the clientele of an average practice is going to be better in their understanding and practice of paracetamol administration. In fact it might be worse in a community where the mothers are employed and the child is taken care of by a domestic helper or an old relative.

Most patients relied on the doctor for the paracetamol dose. But doctor's advice was not associated with correct dosing [Table 3]. This further confirms the results of Guruge *et al.*,^[6] (2007) that concluded Paracetamol dosage was written correctly by only 46.7% with 8.1% writing potentially toxic dose. In the same study 65.6% of doctors wrote regular doses of paracetamol and 34.4% wrote as s.o.s/if needed. Only 5.4% had given clear directions as not more than 4 doses per day. In our study Eighty percent had followed the correct (4 times per day) dosing frequency while 16% exceeded. This highlights that patients' have improved their knowledge on paracetamol dosing frequency reflecting better prescription by doctors over time.

Most mothers tend to use drugs for self medication once prescribed for a particular illness in the future occurrence of the same symptoms as shown by Kariyawasam *et al.* In this study only 4% knew the harmful effects of self medication (many other drugs including paracetamol) In contrast in our study majority (85%) knew about paracetamol poisoning and 61% of them identified that poisoning can occur by administering a single high dose as well as giving the correct dose more frequently than recommended. This is a favorable change in knowledge on medication which has occurred over the time.

There may be even a difference between the dose prescribed and what is administered to the patient. This must be looked into in future research.

Caregivers' awareness on different paracetamol brands and the prevalence of concomitant use of multiple paracetamol brands was not evaluated in this study. This could be another reason for unintentional overdosing.

As the number of syrup users was small the association between syrup measuring devices and dosing accuracy could not be assessed.

Though majority knew about paracetamol toxicity, this was not associated with better dosing accuracy. This is probably because inaccurate dosing was due to lack of knowledge than mere ignorance. Therefore a decrease in overdosing can be expected through interventions to increase knowledge and skills to increase paracetamol dosing.

Conclusions

Administration of supratherepatic doses of paracetamol was common (43%). Children above 3 years are at an increased risk of receiving a supra therapeutic dose.

Majority decides on paracetamol dose on doctors' advice and had very poor knowledge on calculating paracetamol dose according to body weight. Dosing accuracy is not associated with level of education.

Only 50% appreciated the difference of strength between different dosage forms. Of the respondents aware of infants' drops, none appreciated the difference in strength between infants' drops and the conventional syrup. Children's paracetamol tablet is an unpopular dosage form.

Majority used the standard measuring devices to measure syrup. Awareness on paracetamol toxicity was not associated with better dosing.

Recommendations

Whatever the true frequency of paracetamol associated hepatotoxicity from multiple unintentional overdoses in children, it is important for physicians to take proactive role in advising parents on the safe use of this drug. As a part of anticipatory preventive care physicians should discuss fever management, relieve undue fears related to high fever and judicious use of paracetamol. This discussion should include appropriate weight based dosing schedule, correct measuring devices and potential risks of excess paracetamol. Doctors not only need to draw more attention to prescribe the correct dose of paracetamol but also explain it to the patient.

Introducing/popularizing scored tablets with smaller strengths with accompanying dose recommendations might improve dosing accuracy in the older children.

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