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## Preoperative fasting in children: An audit and its implications in a tertiary care hospital

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### Abstract

#### Background:

Prolonged preoperative fasting in children is a common problem, especially in highvolume centers. All international professional society guidelines for preoperative fasting recommend 2 h for clear fluids, 4 h for breast milk and 6 h for solids, nonhuman and formula milk in children. These guidelines are rarely adhered to in practice.

#### Aims:

An audit was undertaken to determine the length of preoperative fasting time in children and its causes.

#### Settings and Design:

Cross-sectional study of 50 children below 15 years posted for elective surgeries.

#### Materials and Methods:

An initial audit was performed at our institution on preoperative fasting time in 50 children below 15 years of age for elective surgeries. The mean preoperative fasting times were found to be much longer than the recommended times. Ward nurses were then educated about internationally recommended preoperative fasting guidelines in children. Anesthesiologists started coordinating with surgeons and ward nurses to prescribe water for children waiting for more than 2 h based on changes in surgery schedule by instructing ward nurses through telephone on the day of surgery. A reaudit was done 6 months after the initial audit.

#### Statistical Analysis Used:

SPSS 16 software.

#### Results:

The initial audit revealed a mean preoperative fasting time of 11.25 h and 9.25 h for solids and water, respectively. Incorrect orders by ward nurses (74%) and change in the surgical schedule (32%) were important causes. After changing the preoperative system, mean preoperative fasting times in children

decreased to 9 h and 4 h for solids and water, respectively in reaudit. Change in surgical schedule (30%) was the major cause for prolonged preoperative fasting in reaudit.

### Conclusions:

Simple steps such as education of ward nurses and better coordination among the anesthesiologists, surgeons and nurses can greatly reduce unnecessary preoperative starvation in children.

**Keywords:** Audit, children, fasting guidelines, preoperative fasting

## Introduction

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It is well documented that general anesthesia attenuates the protective laryngeal reflexes and increases the risk of pulmonary aspiration. The main reason for the traditional rule, “nil by mouth from midnight” of the day before operation is to ensure an empty stomach at the time of anesthesia.[1] Children, like adults, are required to fast before anesthesia.

Many professional societies have issued their guidelines on preoperative fasting.[2] The American Society of Anesthesiologists (ASA) (1999), Association of Paediatric Anaesthetists of Great Britain and Ireland (APAGBI) (2003), Royal College of Nursing (RCN) (2005) and European Society of Anaesthesia (ESA) (2005) have all recommended preoperative fasting of 2 h for clear fluids, 4 h for breast milk and 6 h for solids, nonhuman and formula milk in children (2-4-6 rule).[3–6] Clinical practice however is usually slow to change. We noticed that children are fasted more than the recommended period. We conducted an audit to determine the length of preoperative fasting and the cause for nonadherence to standard guidelines.

## Materials and Methods

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Approval from the ethical committee of our institute and consent from parents were obtained prior to the surveys. Children less than 15 years of age scheduled for elective surgeries were randomly surveyed on four different days. Children with risk of aspiration, vomiting, obese, gastroesophageal reflux, enteral tube feeding and gastrointestinal obstruction were excluded. Parents were asked the time of last oral intake of solids/milk/juice/water prior to surgery and the instructions given to them by ward staff. Files were scrutinised for preanesthesia clinic and ward orders. Order of surgery in the scheduled operating list and changes, if any, were noted.

The initial audit revealed that many children were fasting longer than recommended. The results were presented to the anesthesiologists, surgeons and nursing staff of our institution. The following changes were implemented in preoperative fasting management. We educated ward nurses about internationally recommended preoperative fasting guidelines for children. Posters were put up in wards and in preanesthesia clinic. After coordinating with surgeons and ward nurses, anesthesiologists prescribed water to children waiting for more than 2 h in case of changes in surgery schedule by instructing ward nurses through telephone on the day of surgery. We performed a reaudit after 6 months of the initial audit with the same methodology as above to assess the changes in fasting status of children at our institution. Statistical analysis was performed using SPSS 16 software.

## Results

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Fifty children were audited initially. Thirty (60%) were males and twenty (40%) were females. The age distribution is shown in [Table 1](#). The preoperative fasting time for food [solids and milk (breast and nonhuman)] in the initial audit ranged between 4 h and 18.75 h (mean  $\pm$  SD was  $11.25 \pm 3.5$  h). The preoperative time without water in the initial audit ranged between 2 h and 18.75 h (mean  $\pm$  SD was  $9.25 \pm 4.25$  h). None of the patients were on intravenous fluids. Percentage of children without food and water for various time intervals are shown in [Figures 1](#) and [2](#).

Preoperative fasting time for both food and water were longer for the cases posted later in the day [Figures 3 and 4]. Various causes for prolonged fasting are shown in Table 2. Majority of the patients were asked to fast from midnight regardless of the time of going to the operation theatre by ward nurses. Change in scheduled list of surgery was also an important cause. This initial audit led us to implement changes in the preoperative fasting management as described above in the methods section.

Reaudit was done after 6 months of the first audit with the same methodology. The reaudit also included fifty children. Twenty-nine (58%) were males and twenty one (42%) were females. The age distribution in the reaudit is shown in Table 1. The preoperative fasting time for food [solids and milk (breast and nonhuman)] in the reaudit ranged between 4.75 h and 13.5 h (mean  $\pm$  SD was  $9 \pm 2.5$  h). Mean preoperative fasting time for food decreased from 11.25 h to 9 h. Children without food for more than 12 h decreased from 44% to 12% [Figure 1]. The preoperative time without water in the reaudit ranged between 2 h and 8.25 h (mean  $\pm$  SD was  $4 \pm 1.5$  h). Mean preoperative time without water decreased from 9.25 h to 4 h. Children without water for more than 8 h decreased from 60% to 2% [Figure 2]. None of the patients were on intravenous fluids.

The scheduled time of surgery did not have an unfavorable influence on the period of fasting during reaudit, unlike the initial audit [Figures 3 and 4]. For afternoon cases, the mean preoperative fasting time for food was reduced from 15.25 h to 7.75 h and the mean preoperative time without water was halved (from 14 h to 3.75 h). For the first and other morning cases, only time without water decreased [Figures 3 and 4]. Among causes for prolonged fasting status, rescheduling of cases was still 30%. Incorrect nurses' order decreased significantly from 74% to 20% [Table 2].

## Discussion

Children, like adults, are often advised to have nothing to eat or drink from the midnight before surgery. Prolonged fasting causes thirst, hunger, anxiety and drowsiness.[7] A metaanalysis of 25 trials found that children who were denied oral fluids for more than 6 h preoperatively did not benefit in terms of intraoperative gastric volume and pH as compared with children who were permitted unlimited fluids up to 2 h preoperatively.[8] ASA, ESA, APAGBI and RCN have formulated liberal guidelines for preoperative fasting in children (2-4-6 rule).[3-6] These guidelines, while assuring appropriate levels of patient safety, have been directed at improving the overall perioperative experience for infants, children and their parents.[9]

The preoperative fasting time in children was much greater than recommended at our institution in the initial audit. Even in developed countries like United States, prolonged preoperative fasting remains as a major problem. In a study at an United States medical center, preoperative fasting time was 12 h for liquids and over 14 h for solids.[10] A follow-up study conducted at the same institution 4 years later still showed prolonged preoperative fasting time for clear liquids of 11 h and for over 14 h for solids.[11]

Elective operation lists at our institution run from 7.30 am and, usually, the last elective case is started before 4 pm. The major reason for prolonged fasting time in our initial audit was that majority of the children were asked to fast from midnight regardless of the time of going to the operation theatre by ward nurses. Change in scheduled list of surgery was also an important cause. After implementing changes in preoperative fasting management, like correct prescription by ward nurses and active involvement of anaesthesiologists, the preoperative fasting time for water came down drastically from 9.25 h to 4 h. The fasting time for food also decreased from 11.25 h to 9 h. Fasting time for food continues to remain longer than recommended. Most children have their dinner by 8 pm to 10 pm, and it is difficult to wake up children at midnight to eat once again just to adhere to the guidelines. Rescheduling of surgical case lists by surgeons still remains a major obstacle. There were no surgical delays or cancellations due to inappropriate fasting times in our study. These findings are similar to the study by Murphy *et al.*, where there were no surgical cancellations or delays after new fasting guidelines.[12]

The guidelines are not strictly carried out, especially when the volume of cases is high and direct supervision is lacking. Parents usually follow instructions from nurses with whom they are more in direct contact during the preoperative period; hence, the importance of instructing nurses about the guidelines. Multidisciplinary teams responsible for the care of surgical patients should be aware of the evidence in relation to preoperative fasting, the relevant clinical guidelines and policies. Compliance with preoperative fasting guidelines is difficult, but achievable. We plan to conduct yearly audits to further improve the results.

## Conclusion

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In conclusion, multidisciplinary team work among anesthesiologists, surgeons and nurses is necessary to achieve a balance between a child's starvation, safety, hydration and well being before surgery. This can be done by education, auditing and good coordination among the multidisciplinary team.

## Footnotes

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**Source of Support:** Nil

**Conflict of Interest:** None declared.

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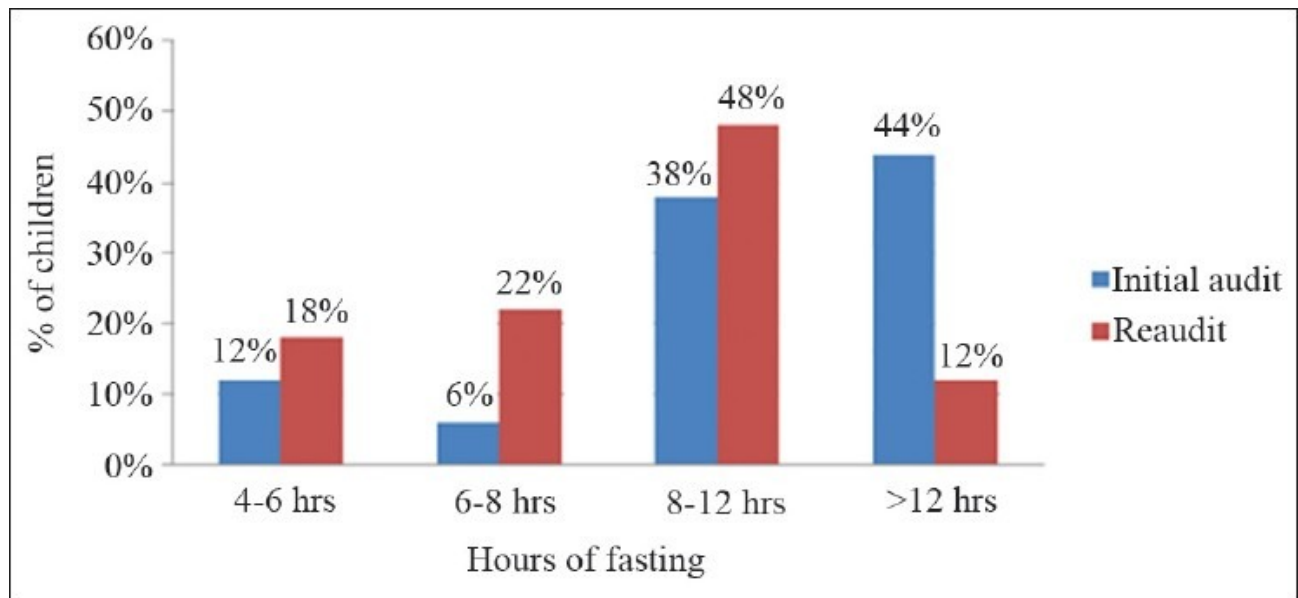
## Figures and Tables

**Table 1**

| Age group (years) | Initial audit (%) | Reaudit (%) |
|-------------------|-------------------|-------------|
| ≤1                | 17 (34)           | 16 (32)     |
| 1-5               | 13 (26)           | 17 (34)     |
| 5-10              | 9 (18)            | 7 (14)      |
| 10-15             | 11 (22)           | 10 (20)     |

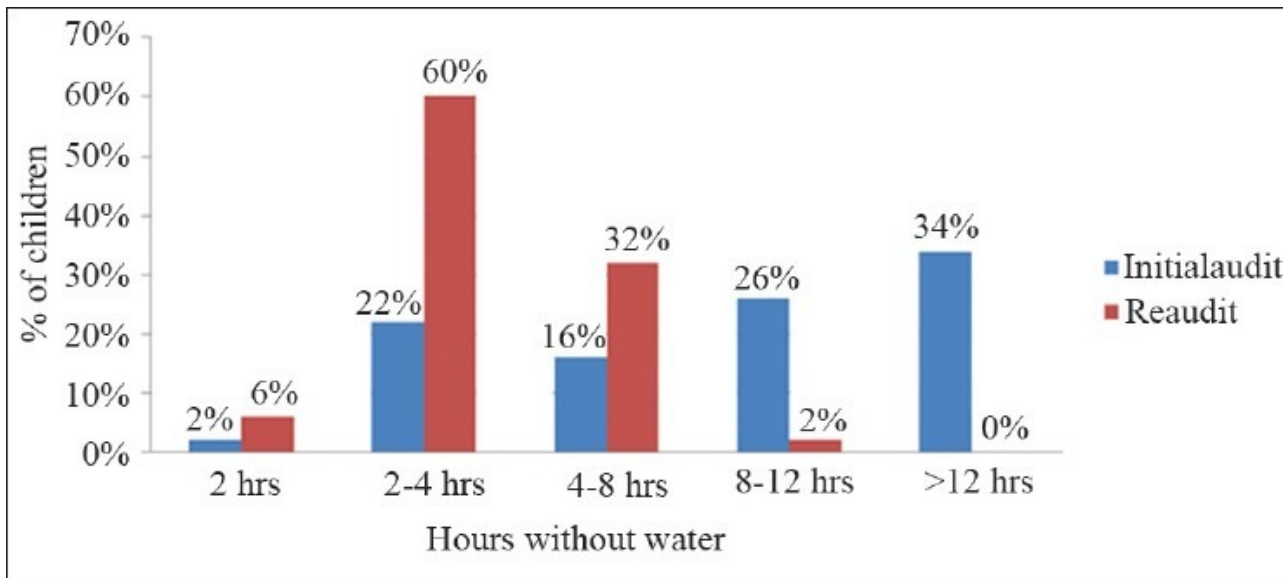
The age distribution of children

**Figure 1**



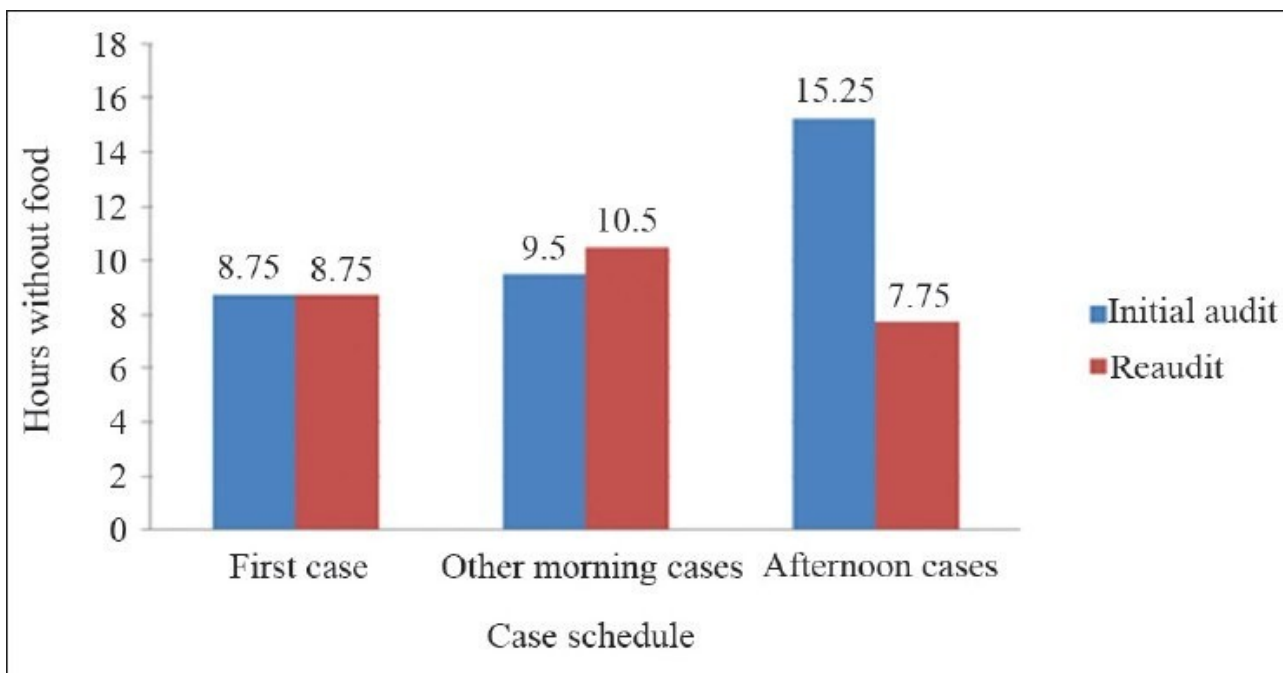
Preoperative time without food [solids and milk (breast and nonhuman)]

**Figure 2**



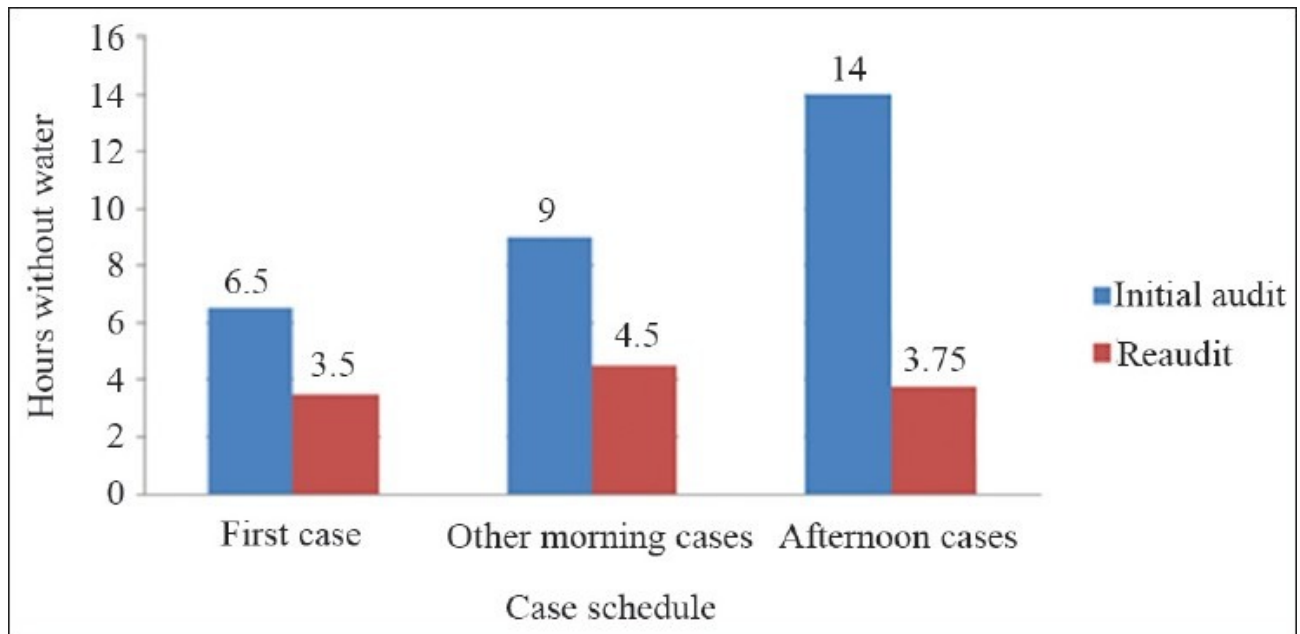
Preoperative time without water

Figure 3



Relation between case schedule and time without food

Figure 4



Relation between case schedule and time without water

**Table 2**

| <b>Causes for prolonged fasting status</b> | <b>Initial audit (%)</b> | <b>Reaudit (%)</b> |
|--|--------------------------|--------------------|
| Incorrect ward nurses' order               | 74                       | 20                 |
| Rescheduling of surgery list               | 32                       | 30                 |
| Parents not following nurses' order        | 10                       | 8                  |
| Incorrect preanesthesia clinic orders      | 8                        | 4                  |

Various causes for prolonged fasting

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