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Medicine Manipulation for Paediatric Use: Dispersible aspirin tablets and dose uniformity

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SUMMARY

Concerns about uniformity and the accuracy of the doses resulting from tablet manipulation have previously been reported. When aspirin is required to treat children, an oral liquid is not readily available; therefore health care providers or parents are required to manipulate aspirin tablets to produce the appropriate dose. In this work, aspirin 75mg dispersible tablets were dispersed in a range of waters (room temperature and warm deionized and tap water and sparkling water) and the dose accuracy was measured. The impact of temperature on the dose accuracy for the tap water was less pronounced yet there was overall lower accuracy compared to the deionised water. Dispersion of the tablet in sparkling water does not give an accurate dose. Heating the fluid used in dispersion is practically achievable yet deionized water in the home or a ward is impractical. Sparkling water should be avoided when dispersing aspirin tablets. There is a need to evaluate the apparatus and methods used to manipulate medicines for children as both the water used and the tools to undertake the manipulation have significant effects on the accuracy of the dose obtained.

INTRODUCTION

Pharmaceutical formulations on the market currently do not meet the requirements of all consumers. When administering medicines to children, accurate dosing is complicated due to a lack of commercially available age-appropriate formulations (Nunn, 2003).

Additionally, concerns about uniformity and the accuracy of the doses resulting from tablet manipulation have previously been reported (Broadhurst et al., 2008; Nunn, 2003) inconsistent doses were obtained when samples of dispersed tablets in water were withdrawn from different zones within the medicine cup (Broadhurst et al., 2008).

When aspirin is required to treat children, an oral liquid is not readily available; therefore health care providers or parents are required to manipulate aspirin tablets to produce the appropriate dose. However, there are no guidelines for the manipulation of tablets when producing a fraction of a dose. In this work, aspirin 75mg dispersible tablets were dispersed in a range of waters (room temperature and warm deionized and tap water and sparkling water) and the dose accuracy was measured.

This research aims to determine if the temperature and type of water used to prepare a part-dose of an aspirin tablet affects the accuracy of the dose produced.

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MATERIALS AND METHODS

Aspirin 75mg dispersible tablets (Actavis UK Brand) were used. Tablets were dispersed in 10 mL of water in a 10-mL medicine cup. 1-mL sized oral syringes were used to withdraw 1 mL samples from the base of the measure. Aspirin tablets were also dispersed directly inside different sized syringes to observe the dose accuracy by this method. 5, 10 and 20mL syringes were used and the dose was dispensed from both the top and bottom of the syringe. Samples were assayed at 286nm using high performance liquid chromatography (HPLC). The percentage of the desired dose was calculated for each sample.

RESULTS AND DISCUSSION

Following dispersion of aspirin tablets in all water types, the appearance of the suspensions were the same visually. There was an accumulation of white particles in the base of the beaker up to the 2 mL mark which was most likely undissolved aspirin or other components such as excipients. Fig. 1. shows the dose accuracy for the manipulations based on the type of water used.

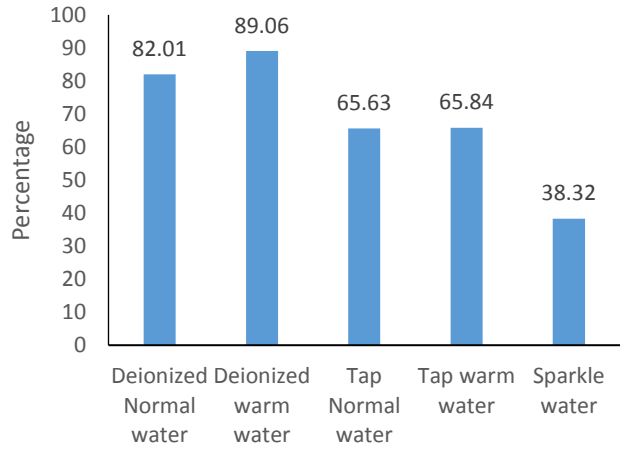

Fig. 1: Percentage of desired dose resulted after dispersing a 75mg Aspirin dispersible tablet in different type of fluids (1-ml withdrawn samples from the base of measure) using HPLC.

The warm deionised water provided much better dose accuracy compared to deionised water at room temperature. The impact of temperature on the dose accuracy for the tap water was less pronounced yet there was overall lower accuracy compared to the deionised water. Dispersion of the tablet in sparkling water does not give an accurate dose. Samples withdrawn gave a maximum of 38% of the percentage of the desired doses. The results from the dispersion directly within the syringe are shown in Fig. 2.

The dosing accuracy from syringes was varied. The greatest error was observed with the 20mL syringe where 3x the dose was provided. The 5mL syringe

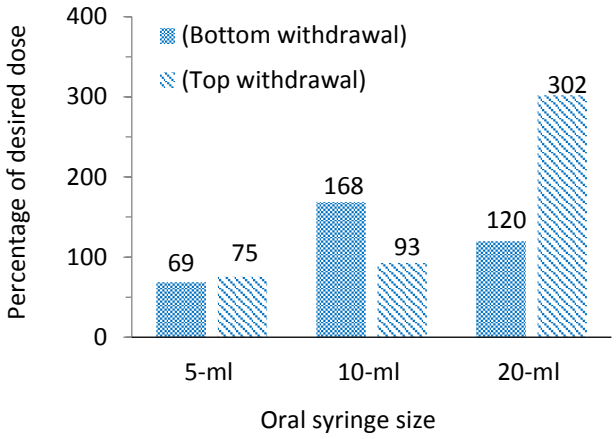

Fig. 2. Comparison of desired dose percentage after dispersion 75mg aspirin dispersible tablet directly inside different sizes oral syringes (1-mL removal).

gave the most consistent values based on the position within the syringe barrel.

CONCLUSIONS

Dispersing aspirin 75mg dispersible tablets to get a fraction of the dose is commonly used for paediatric purposes. Heating the fluid used in dispersion is practically achievable yet deionized water in the home or a ward is impractical. Sparkling water should be avoided when dispersing aspirin tablets.

There is a need to evaluate the apparatus and methods used to manipulate medicines for children as both the water used and the tools to undertake the manipulation have significant effects on the accuracy of the dose obtained.

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