

## A Comparative Study on Body Temperature Measurement Technique: Mercury Thermometer vs Digital Thermometer

Sanket Mathukiya<sup>1</sup>, Jitendra Patel<sup>2</sup>, Swati Mahajan<sup>3</sup>, Aalisha U. Dodhiya<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of General Medicine, GMERS Medical College & General Hospital, Vadnagar

<sup>2</sup>Associate Professor, Department of Physiology, GMERS Medical College & General Hospital, Vadnagar

<sup>3</sup>Associate Professor, Department of Physiology, GMERS Medical College, Panchmahal (Godhara)

<sup>4</sup>Medical Student – USMLE Aspirant

Received: 20-03-2023 / Revised: 21-04-2023 / Accepted: 25-05-2023

Corresponding author: Dr. Aalisha U. Dodhiya

Conflict of interest: Nil

### Abstract:

**Introduction:** The body temperature is one of vital parameter and common method to measuring is oral body temperature with help of clinical thermometer. Clinically two types of thermometers being used to measure body temperature, one is mercury thermometer and second one is digital thermometer. In current study is comparison made between two techniques.

**Aims and Objectives:** The aim of the study was to compare the Body temperature measured using two different thermometers: mercury thermometer vs. digital thermometer & to correlate the Body temperature measured using these two instruments.

**Material and Method:** After taking informed consent of the subject, oral body temperature of the subjects measured. 132 subjects participated in the study. Three readings were taken with the both the instrument (mercury thermometer and digital thermometer) of every subject and then the average of three reading was taken. The obtained data was analyzed using appropriate statistical software.

**Result:** The data obtained analyzed as follows:

The mean value of the body temperature measured using mercury thermometer and digital thermometer is  $(97.32 \pm 0.9)$  and  $(97.99 \pm 0.57)$  respectively and the p value is  $<0.001$ .

The correlation coefficient ( $r^2$ ) of body temperature measured using mercury and digital thermometer is 0.47 and the p value is  $<0.001$ .

**Conclusion:** From the above study, we can conclude that there was significant difference found in both techniques. Here, a difference obtained in body temperature measured using two different instruments (Mercury thermometer and Digital thermometer). This shows that there are chances of variation in body temperature measured using different technique.

**Keywords:** Temperature, Thermometer, Technique.

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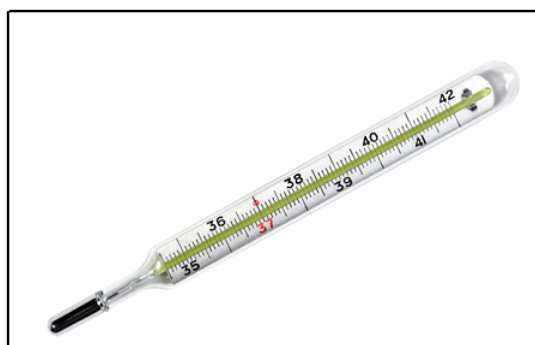
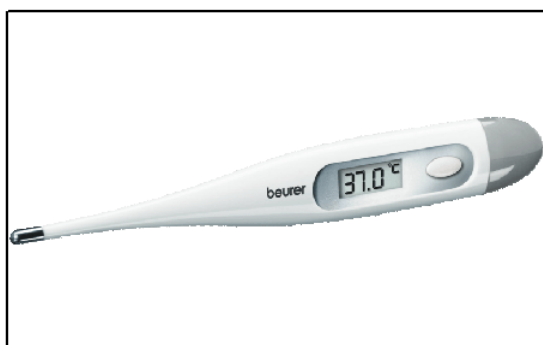
### Introduction

Body temperature is one of the four main vital signs that must monitored to ensure safe and effective care. Despite applying in all healthcare environments, wide variations exist on the methods and techniques used to measure body temperature. A wide variation indicates inaccuracy of the digital thermometer in measuring the temperature or human errors in mercury thermometer as it measured manually in mercury thermometer.

### Aims and Objectives:

The aim of the study was to compare the Body temperature measured using two different thermometers: mercury thermometer vs. digital thermometer & to correlate the Body temperature measured using these two instruments.

### Material and Method



**Figure 1: Digital and Mercury thermometer**

After taking informed consent of the subject, oral body temperature of the subjects measured. 132 subjects participated in the study. Three readings were taken with the both the instrument (mercury

thermometer and digital thermometer) of every subjects and then the average of three reading was taken. The obtained data was analyzed using appropriate statistical software.

**Results**

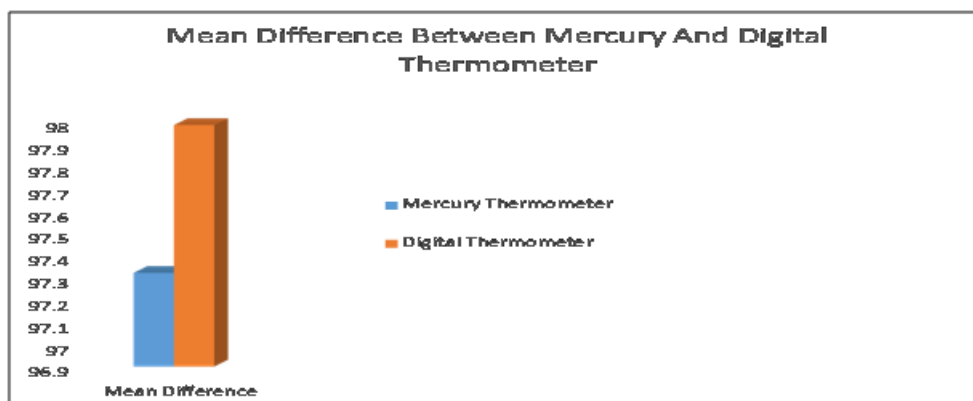
**Table 1: Correlation of mercury thermometer vs. digital thermometer**

		Mercury	Digital
Mercury (and with digital vice-versa)	r <sup>2</sup> (correlation coefficient)	1	0.47
	p value	<0.001	<0.001

**Table 2: Mean ±Std. Deviation of Mercury vs. Digital thermometer.**

	No. of subjects	Mean ± Std. Deviation
Mercury	132	97.32 ± 0.9 (p<0.001)
Digital	132	97.99 ± 0.57 (p<0.001)

The mean value of the body temperature measured using mercury thermometer and digital thermometer is (97.32±0.9) and (97.99±0.57) respectively and the p value is <0.001. The correlation coefficient (r<sup>2</sup>) of body temperature measured using mercury and digital thermometer is 0.47 and the p value is <0.001.



**Table 3 : Graphical presentation of mean difference between mercury and Digital Thermometer**

**Discussion**

The mean difference in this study showed a statistical significance(p<0.001). This finding supported from the study of Biomedical Instrumentation and Technology. It indicates that statistically significant difference does not support the use of digital thermometer for the improvement in safety, speed and simplicity of the technique.[3] On the other hand, similar studies conducted in Iran and USA states that digital thermometer gave the best concordance

with mercury thermometer as the mean difference was not clinically significant and also the correlation showed strong positive relation (r = 0.99).[4,5,6] But one study found that mercury thermometer and digital thermometer were clinically and statistically significant with mean difference of 0.278 and p>0.05. [7]

**Conclusion**

From the above study, we can conclude that there

was significant difference found in both techniques. This shows that there is variation in body temperature measured using different technique. As variation found proper technique and appropriate care should take while measuring the body temperature in either of the methods.

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