

## Effect of Metoclopramide on G6PDH Activity in First Trimester of Pregnancy

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### ABSTRACT

The aim of this study was to investigate effect of Metoclopramide drugs on G6PD and antioxidant enzymes. Metoclopramide drugs are currently being used to Reduce or prevent nausea and vomiting in patients. This is the first study to show effect of Metoclopramide on glucose-6-phosphate dehydrogenase (G6PD) and antioxidant enzyme activities in first trimester in pregnancy. For in vitro studies, G6PD was purified from human erythrocyte Metoclopramide hydrochloride showed no inhibition effects

**Keywords:** Glucose-6-phosphate dehydrogenase; Antioxidant enzymes; Inhibition, Metoclopramide drug,

### Introduction

Metoclopramide hydrochloride (Figure. 1) is Benzamide, 4-amino-5-chloro-N-[2-(diethylamino) ethyl]-2- methoxy-, mono hydrochloride, monohydrate; 4-Amino-5-chloro -N-[2-(diethylamino) ethyl]-o-anisamide mono hydrochloride monohydrate. [1] Symptomatic treatment of nausea and vomiting including that associated with acute migraine Delayed (but not acute) chemotherapy-induced nausea and vomiting Radiotherapy-induced nausea and vomiting Prevention of postoperative nausea and vomiting. [2,3].

Glucose-6-phosphate dehydrogenase (d-glucose-6-phosphate: NADP<sup>+</sup> oxidoreductase EC 1.1.1.49; G6PD) oxidizes glucose-6-phosphate to 6-phosphogluconolactone, reducing NADP<sup>+</sup> to NADPH. The pentose phosphate pathway (PPP) is the only source of NADPH in the erythrocytes. The main function of the pathway seems to be to protect the erythrocytes against oxidative damage that is caused by free radical in the number of molecules in cells, including membrane lipids, proteins, and nucleic acids [4,5]. Formation of these harmful radicals is an occurring intracellular metabolic process [6,7].

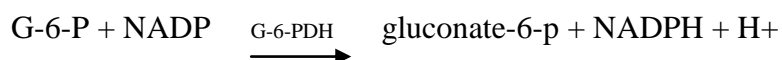
### **Aim of Study**

- 1- To estimate G6PDH levels in pregnant women with Metoclopramide and control group.
- 2- To find any correlation between G6PDH and other external factor and some BMI parameter in all study group

### **Methodology**

In this study, taken Forty blood samples in the EDTA tube for pregnant women in the first trimester of pregnancy, as they were collected from (Imamine Al-Kadhimin Medical City Hospital) for forty orders, after which g6pdh was measured in the laboratories of the Nahrain Medical College, after which the statistical work was done with SPS.

The enzyme activity is determined by measurement of the rate absorbance change at 340 nm due to the reduction of NADP. G-6-P



SAMPLE:

Erythrocytes.

PREPARATION OF SAMPLE:

Wash 0.2 ml of blood with 2 ml aliquots of 0.9% NaCl solution. Centrifuge after each wash for 10 min at around 3000 rpm. Repeat 3 times. Suspend the washed centrifuged erythrocytes in 0.5 ml of solution 4 and let stand for 15 min at +4°C and then centrifuge again. Use the supernatant in the assay within 2 hours. [8-10]

Device name: Apel PD-303 spectrophotometer

#### **MANUAL USE**

Wavelength: 340 nm (Hg 334 nm or Hg 365 nm)

Cuvette: 1 cm light path

Temperature: +37°C

Measurement: against air

Pipette into test tube

Semi Micro

RI 1.00 ml

<http://annalsofrscb.ro>

R2 0.003 ml

Haemolysate 0.015 ml

Mix .incubate for 5 minutes at +37°C , then add ,

R3 0.015 ml

Mix ,read initial absorbance and start timer simultaneously

Read again after 1,2 and 3 minutes

The following equation is used .

$$\text{G-6-PDH mU/gHb} = \frac{\text{mU .erthrocytes per ml} \times 100}{\text{Hb (g/dl)} \times 1000}$$

100 =Factor to convert from ml to dl

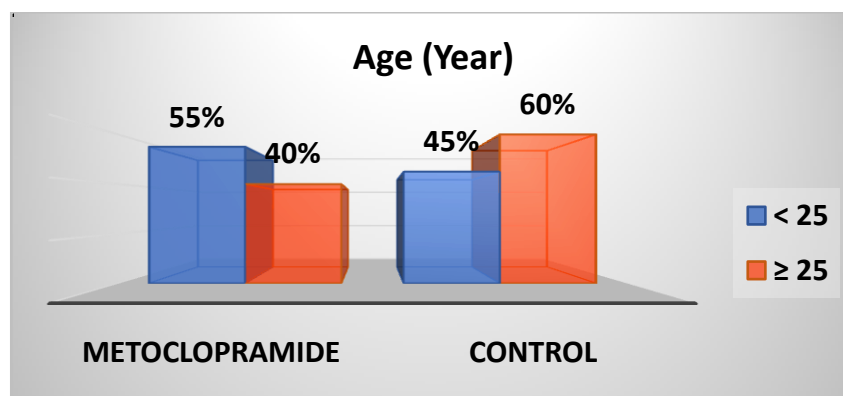
Hb(g/dl) = Haemoglobin concentration determined for each specimen

## RESULTS

The total number of study participants was 40. All of them were pregnant women in the 1st trimester and they were divided into two groups: Metoclopramide group included 20 pregnant women used metoclopramide for treatment of nausea and vomiting and control group included 20 pregnant women didn't use metoclopramide.

### 3.1. Age

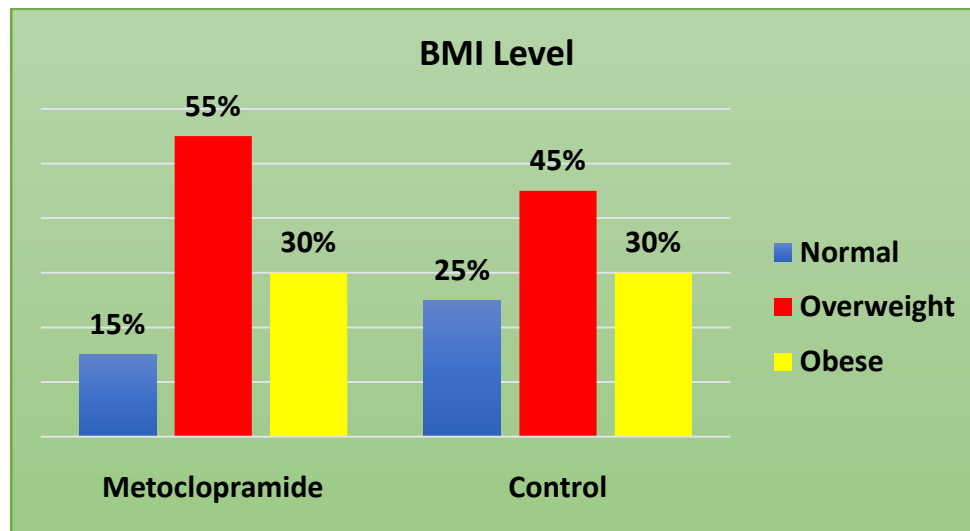
The distribution of study groups by age is shown in figure (3.1). Study participants' age was ranging from 20 to 31 years with a mean of 24.6 years and a standard deviation (SD) of  $\pm 2.9$  years. The highest proportion of study participants in metoclopramide group was aged < 25 years (55%); while 60% of controls were aged  $\geq 25$  years (60%).



**Figure 3.1:** Distribution of study groups by age

### 3.2. Body Mass Index (BMI)

Figure 3.2 shows the distribution of study groups by BMI level. In this study, the highest proportion of study participants in metoclopramide and control groups was overweight (55% and 45% respectively).



**Figure 3.2:** Distribution of study groups by BMI level

The comparison in age and BMI between study groups is shown in table (3.1). No statistical significant differences ( $P \geq 0.05$ ) in age and BMI between study groups.

**Table 3.1: Comparison in certain information between study groups**

Variable	Study group		P - Value
	Metoclopramide Mean $\pm$ SD	Control Mean $\pm$ SD	
Age (Year)	24.6 $\pm$ 3.0	24.5 $\pm$ 3.0	0.988
BMI (kg/m <sup>2</sup> )	28.57 $\pm$ 3.0	27.65 $\pm$ 2.8	0.324

### 3.3. Hemoglobin and PCV

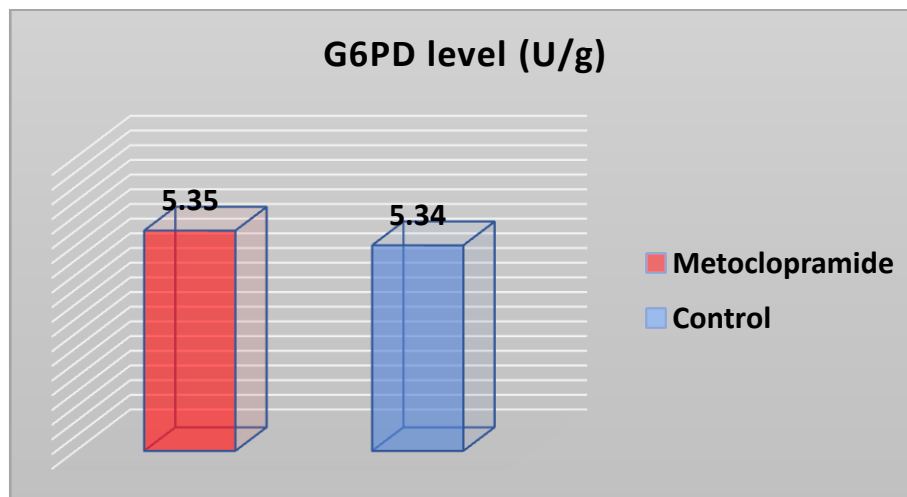
The comparison in Hb and PCV between study groups is shown in table (3.2). Means of Hb and PCV were significantly higher in controls than that in metoclopramide group (12.7 versus 12.1 g/dl,  $P = 0.003$ ; and 37.5 versus 35.6%,  $P = 0.006$  respectively).

**Table 3.2: Comparison in hemoglobin and PCV between study groups**

Variable	Study group		P - Value
	Metoclopramide Mean $\pm$ SD	Control Mean $\pm$ SD	
Hemoglobin (g/dl)	12.1 $\pm$ 0.6	12.7 $\pm$ 0.6	<b>0.003</b>
PCV (%)	35.6 $\pm$ 2.2	37.5 $\pm$ 1.9	<b>0.006</b>

### 3.4. G6PD

The comparison in G6PD level between study groups is shown in figure and table (3.3). We noticed that there was no statistical significant difference in G6PD level between study groups (5.35 versus 5.34 U/g, P= 0.959).



**Figure 3.3: G6PD level in study groups**

**Table 3.3: Comparison in G6PD level between study groups**

G6PD level (U/g)	Study group		P - Value
	Metoclopramide Mean $\pm$ SD	Control Mean $\pm$ SD	
	5.35 $\pm$ 0.62	5.34 $\pm$ 0.59	<b>0.959</b>

### Correlation between G6PD level with age and BMI

Weak statistically significant association detected between G6PD level and BMI ( $r=0.377$ ,  $P=0.005$ ). No statistically significant correlation was detected ( $P=0.189$ ) between G6PD level and age as shown in table (3.4).

**Table 3.4: Correlation between G6PD level with age and BMI**

Variable	G6PD level (U/g)	
	r	P - Value
Age (Year)	0.212	0.189
BMI (kg/m <sup>2</sup> )	0.377	0.005

### Statistical analysis

The data analyzed using Statistical Package for Social Sciences (SPSS) version 26. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Independent t-test (two tailed) was used to compare the continuous variables accordingly. Pearson's correlation test (r) was used to assess correlation between G6PD level and both of age and BMI. A level of P – value less than 0.05 was considered significant.

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