

Assessment of HCT Levels in the Blood of Hospital Staff Wearing Masks

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ABSTRACT

Background: The Masks serve as a protective measure to prevent the transmission of infections, particularly in the context of the Coronavirus outbreak. There are various types of masks, including medical masks utilized in public settings like hospitals and clinics, as well as regular masks intended for use at home or during instances of coughing. As for the medical mask, it is made from three main materials: a non-woven fabric made of fine fibers connected to each other, ear straps to secure the mask on the face, in addition to a nose wire that holds the mask on the nose and keeps it in place. **Purpose:** this study is to know the effect of wearing a mask on blood pressure, cell size, and the expected outcome in the future. **Methods:** The samples were divided into groups: the first group consisted of 80 samples from employees who do not wear a mask, and this group was considered the control group. It was divided into subgroups that included males and females. The second group consisted of another 80 samples from employees who wore the mask throughout their working hours, and it was also divided into two subgroups, including 40 males and 40 females. The third and final group included samples from employees who wore the mask moderately and not throughout the working hours. This group was also divided into two subgroups, 40 males and 40 females. **Results:** The mean corpuscular volume (MCV) increased (84.888, 97.777, 127.804, respectively). This difference was statistically significant ($p < 0.001$), the ratio of red blood cells to total blood volume (RBCV) was significantly higher in women who wore masks throughout their working hours compared to women who wore masks moderately and only in crowded places. This ratio was also high but within normal limits. (57.33, 44.01, 37.98, respectively) and this variance was significant with a value of 0.001. The results were also similar in men and were also high (Hematocrit), respectively (62.01, 51.85, 42.01). This had a significant effect with ($p < 0.001$). Overall, women had a greater effect than men. The results were also similar for men and were also high (hct), respectively (62.01, 51.85, 42.01). This had a significant effect ($p < 0.001$), and overall, women had a greater effect than men. **Implications:** Measurement the erythropoietin hormone level of employees who wear masks, Not wearing a mask continuously during working hours and Periodic blood test for employees who wear masks continuously or intermittently and Continuous measurement of oxygen levels during working hours and Conduct kidney and liver function tests for employees who wear masks to prevent kidney failure and liver damage. **Conclusion:** Continuing to wear the mask affects the amount of blood produced and Increase in the average size of red blood cells as well as blood viscosity and High blood pressure and loss of energy and Unjustified nervous reactions and Forgetfulness and Early onset of polycythemia in employees who wear masks continuously the imported concluded

Keywords: Mask 1, Moderately 2, Long period 3.

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INTRODUCTION

Masks serve as a protective measure to prevent the transmission of infections, particularly in the context of the Coronavirus outbreak (1). There are various types of masks, including medical masks utilized in public settings like hospitals and clinics, as well as regular masks intended for use at home or during instances of coughing (2). As for the medical mask, it is made from three main materials: a non-woven fabric made of fine fibers connected to each other, ear straps to secure the mask on the face, in addition to a nose wire that holds the mask on the nose and keeps it in place.

A 2020 study involving 314 participants investigated the side effects of prolonged mask use. Headaches were the most frequently reported issue 245 participants, followed by skin damage in 175 participants and acne in 182 person. Additionally, 81 participants noted cognitive impairment, which resolved after mask removal (3). Many studies have indicated that wearing a mask affects the respiratory system when used for a long period (4). Workers suffer from respiratory problems due to their exposure to plastic materials for masks (5). It affects the oxygen level and increases the carbon dioxide level, in fresh air, the concentration of carbon dioxide is approximately 0.04%, However, wearing masks for extended periods exceeding five minutes may result in chronic exposure to carbon dioxide levels ranging from 1.41% to 3.2% of the inhaled air (6).

It also increases depression for those who use it for long periods (7). There are studies that indicate sexual weakness in those who have a low oxygen level because of weak secretion of the male hormone, which causes damage to sperm, making them immature (8).

The aim of this study is to know the effect of wearing a mask on blood pressure, cell size, and the expected outcome in the future.

METHODS

The study was conducted on workers at the German Hospital in Najaf and 200 blood samples in the year 2021, in the month of December. were taken from them using a syringe to draw the sample and place it in a transport tube containing (ethylenediaminetetraacetate). The samples were divided into groups: the first group consisted of 80 samples from employees who do not wear a mask, and this group was considered the control group. It was divided into subgroups that included males and females. The second group consisted of another 80 samples from employees who wore the mask throughout their working hours, and it was also divided into two subgroups, including 40 males and 40 females. The third and final group included samples from employees who wore the mask moderately and not throughout the working hours. This group was also divided into two subgroups, 40 males and 40 females. After that, the blood samples were taken to the laboratory for processing with a centrifuge, and then a complete blood cell examination was conducted according (Grau, 2018) Shown in the diagram below.

RESULTS

The statistical results appeared after completing the examination, and according to the work method, the first group indicated an increased mean corpuscular volume (MCV) and hematocrit (HCT) in women after wearing the mask continuously, while the results showed a slight increase in (MCV) and hematocrit (HCT) for women who wore masks moderately or intermittently, remaining within the normal limits.

The results of samples from employees who never wore a mask matched the normal control values, as indicated by the values (MCV) (127.804, 84388, 888, 97.777, respectively). and additional the result (HCT) (37.98,44.01,57.33, respectively), This difference was statistically significant ($p <$

0.001), and the area under the curve (AUC) value was good, at 0.987 shown in Table (1,2) to both (MCV and HCT). Symptoms appear in blueness of the extremities and various areas of the face below the eyes, and redness of the cheeks for employees who continue to wear a mask. While the Second group results for men indicated a clear increase in mean corpuscular volume (MCV) and hematocrit (HCT) after continuously wearing the mask, results showed a slight increase in (MCV) and hematocrit (HCT) for men. For men who wore masks moderately or intermittently, the values remained within normal limits, and the results

of male employees who never wore a mask matched the normal control values. These results were similar in effect to the results for women, as indicated by the values (MCV)(80.912, 93.648, 888, 111.516, respectively). This difference was statistically significant ($p < 0.001$), and the area under the curve (AUC) was good, with a value of 0.987, but values (HCT) (42.01, 51.85, 62.01, respectively). This difference was statistically significant ($p < 0.001$), and the area under the curve (AUC) was good, with a value of 0.992, as shown in Table (3,4).

Table (1): Shows the relationship between wearing a mask and the mean corpuscular volume in women.

Pairwise comparisons							
Statistical Result of HCT		mean	N	Std.Deviation	Std.Error Mean	sin (ANOVA)	ROC(AUC)
Women With Mask	Used mask	57.33	80	6.95	0.78	0.001>	0.987
	Med mask	44.01	80	3.85	0.43		
	Not mask	37.98	80	3.85	0.42		

Table (2) shows the relationship between wearing a mask and the hematocrit in women.

Pairwise comparisons							
Statistical Result of MCV		mean	N	Std.Deviation	Std.Error Mean	sin (ANOVA)	ROC(AUC)
Women With Mask	Used mask	127.804	80	14.53	1.62	0.001>	0.987
	Med mask	97.777	80	8.5	0.94		
	Not mask	84.888	80	8.1	0.91		

Table (3) shows the relationship between wearing a mask and mean corpuscular volume in men.

Pairwise comparisons							
Statistical Result of MCV		mean	N	Std.Deviation	Std.Error Mean	sin (ANOVA)	ROC(AUC)
Men With Mask	Used mask	111.516	80	11.21	1.25	0.001>	0.987
	Med mask	93.648	80	8.45	0.94		
	Not mask	80.912	80	8.25	0.54		

Table (4) shows the relationship between wearing a mask and the hematocrit in men.

Pairwise comparisons							
Statistical Result of HCT		mean	N	Std.Deviation	Std.Error Mean	sin (ANOVA)	ROC(AUC)
Men With Mask	Used mask	62.01	80	6.45	0.72	0.001>	0.992
	Med mask	51.85	80	5.45	0.61		
	Not mask	42.01	80	3.13	0.35		

DISCUSSION

The results showed that employees who constantly wear a mask had an increase in mean carpuscular volume in blood cells, and this was due to the lack of oxygen, which stimulated an increase in the production of blood cells as mention Sedighi with company in 2023). This was an explanation for the increase in hematocrit for employees who were committed to continuing to wear a mask during the work period, and this was similar to people who live in highlands, as they had an increase in blood viscosity produced by the presence of oxygen in highlands, in addition to the high atmospheric pressure, which causes An increase in the production of blood cells, as said Huamaní,2022. And that wearing a mask also causes inhalation of carbon dioxide again, and thus increases hypoxia, as showed Acuti Martellucci in 2022 and that an increase in the percentage of hypoxia leads to a decrease in immunity, as sure V with his company in 2026 and a decrease in body energy, as he said Shtolz with searcher group in 2026. Accompanied by bluishness of the face and extremities, as sure Divya in 2022. The appearance of the red color of the face and the blue color was due to an increase in the percentage of CO₂ and an increase in the production of blood cells, which causes poisoning blood in the future, as agree with opinion Saha ,2023. That women were more influential than men in wearing a mask because of the physiological structure of the bone marrow, which is greatly affected when secreting the hormone erythropoietin, leading to the production of more cells, as he said 17.

Raberin, with company 2024. In addition to women continuing their menstrual cycle, which also leads to an increase in cell production, and this was a positive result of a greater increase in the production of erythropoietin, and it was doubly so, agree with opinion Alsaediy, 2024. For those who wore masks intermittently during work, there was

less stimulation of the bone marrow's production of blood cells, and therefore the apparent symptoms were non-existent, such as skin color and headaches, due to intermittent wearing, which gives the blood an opportunity to return the oxygen ratio to the normal ratio, which reduces the stimulation of erythropoietin hormones secreted by the kidney, and as he said Decha, & Sonthaya, 2023 and closler with opinion Ameen, 2024.

Ethical approval

The present study which is conducted by authors (Qassim. M. Hashym, and Sadeqm Mohammad Jaffar Almosawi), was approved by the local Department of Medical Ethics committee.

Statement of Permission and Conflict of Interests

We declare that there is no conflict of interest

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