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Phagocytic activity in people recovering from Corona Virus infection

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Abstract: The study aimed to measure the phagocytic activity of people recovering from Covid 19 after month and compare with people not infected as control. (100) samples of venous blood were collected randomly during the period from November 23, 2021 to March 23, 2022, and the result was 63 infections (40 male, 23 . female) and 37 not infected (20 male,17female). The number of people who recovered a month after infection was 63 (40 males and 23 females). The results of the study related to the phagocytic activity of cells were reached Polynuclear, with high significant differences at (P<0.01)in the optical absorbance rate, which reflects the extent of NBT staining reduction between persons recovering from Covid-19 virus and those without the disease.

Keywords : (Coronavirus , Phagocytosis , nitroblue tetrazolium., Polynuclear . MERS)

Introduction:
Neutrophils :leukocytes that form the phagocytosis of the host against invading pathogens and the first line of the immune response and phagocytosis of the host against invading pathogens [1]. During inflammation induced by tissue injury, they are also major effector cells[2] susceptible to bacterial and fungal infections. [3]. There it engages and kills bacteria and fungi and clears infection through a number of different mechanisms including chemotaxis, phagocytosis, cytokine production and release of reactive oxygen species, and granule proteins [4, 5]. In addition to their important role in modulating the adaptive immune response and innate immunity [6] neutrophils are therapeutic targets in the immune regulation of many diseases during adaptive and innate immune responses. [7, 8] Covid-19 is a pathogenic virus. From the genetic analysis carried out using the whole genome sequence that can be obtained, it happens that bats are the reservoir of the COVID-19 virus, but no intermediate host has been detected. Symptoms of this virus are cough, fever, loss of taste or smell , fatigue, vomiting shortness of breath, [9,10] some cases do not show symptoms. There are new therapeutic attempts targeting interact with neurons in COVID-19 patients are summarized, and we demonstrate here the observed immunological aberration of neutrophils in COVID-19. [11,12].

Material and methods:

1. Incubator(memmert,www.memmert.com)
2. Centrifuge (made in Germany,2012)
3. Spectrophotometer (EMCLAB GmbH Germany)

Methods:

- Put 0.5 milliliters of blood in an tubes containing Heparin
- Put 0.5 milliliters of the mixture of NBT -Cl dye (Nitro blue tetrazolium chloride) and Tris solution on it,where we prepare the dye solution by dissolving 0.001 g of NBT dye in 1 milliliters of Tris solution with PH of 7.4
- Place the test tubes containing the blood samples and a mixture(NBT +Tris) after shaking them carefully slowly
- In an Incubator for one hour at a temperature 37
- Then we put the sample in the Centrifuge at 3000 rpm for only 3 minutes

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- After separating it the filtrate separate from the sediment and is at the top while the sediment is at the bottom
- Take the filtrate carefully and put it in clean test tube (plan tube)
- We measure the absorbance with a spectrophotometer and at an absorbance of 515 nm

Results

A total of (100) samples were analyzed. Forty samples were from women ; while men were sixty only. All samples examine to measurement of phagocytic activity of PMNs in blood for persons who healing from covid-19 and persons who not infected , during period from 23rd November 2021 to 23rd march 2022 by using spectrophotometer. The table (1) has shown the results of 100 samples which divided into 40 of female and 60 of male and The persons who healed from covid-19 were 63 and uninfected persons were 37 which.

No.	Sex	positive	negative	Total
1	Male	40	20	60
2	Female	23	17	40
3	Total	63	37	100

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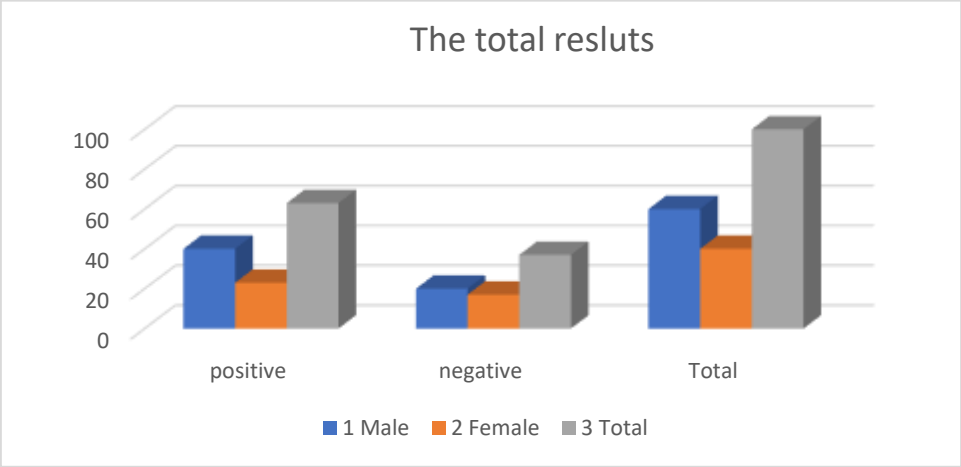
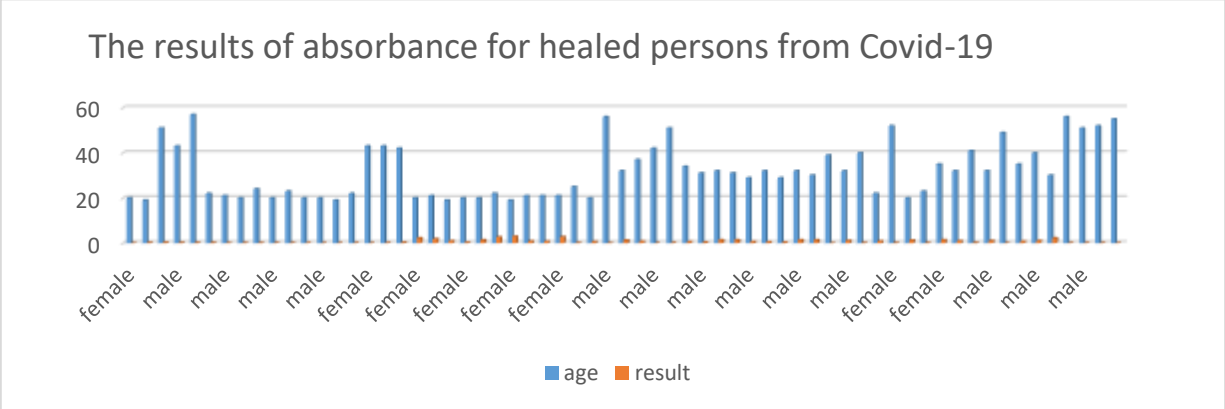


Figure (1) : Has shown the results of 100 samples which divided into 40 of female and 60 of male and The persons who healed from covid-19 were 63 and uninfected persons were 37 which .



Figure(2) : Has shown the result of absorbance of cells for healed persons from covid-19 which they were 63 persons divided into 40 of males and 23 of females .

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Further, the people who didn't infected with covid-19 were (37) persons from (100) persons. Figure(3) has shown them which divided into 20 persons of male and 17 persons of female.

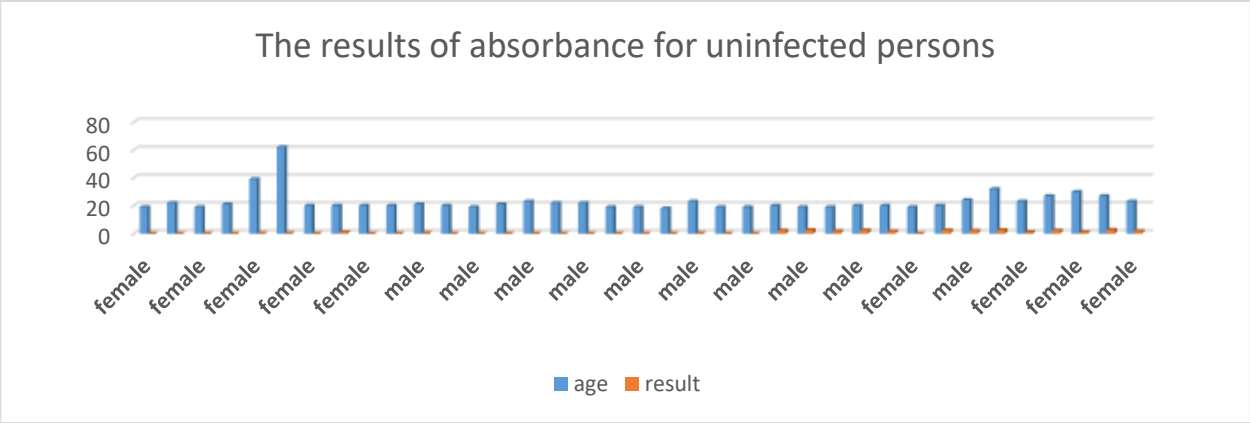

Figure (3) : The people who didn't infected with covid-19 were (37) persons from (100) persons. has shown them which divided into 20 persons of male and 17 persons of female.

The results of the study related to the measurement of the phagocytic activity of nuclear pleomorphic cells (neutrophils) revealed that there was a significant difference (P.<0.01) in the rate of optical absorbance, which reflects the extent of NBT dye reduction among people recovering from covid-19 virus (healed persons) (0.7±0.628) and people without the disease (uninfected persons) (0.8 ± 0.808) table number (4) .

The studied totals	number of persons	average of absorbance	term	± standard deviation	standard error
the healed persons from covid-19	63	0.6288	2.698-0.011	± 0.702355	0.0884
the uninfected persons	37	0.80811	2.709-0.01	±0.98627	0.1621

Table (4) : the measurement of the phagocytic activity of nuclear pleomorphic cells (neutrophils) revealed that there was a significant difference (P.<0.01) in the rate of optical absorbance, which reflects the extent of NBT dye reduction among people recovering from covid-19 virus (healed persons) and people without the disease (uninfected persons) .

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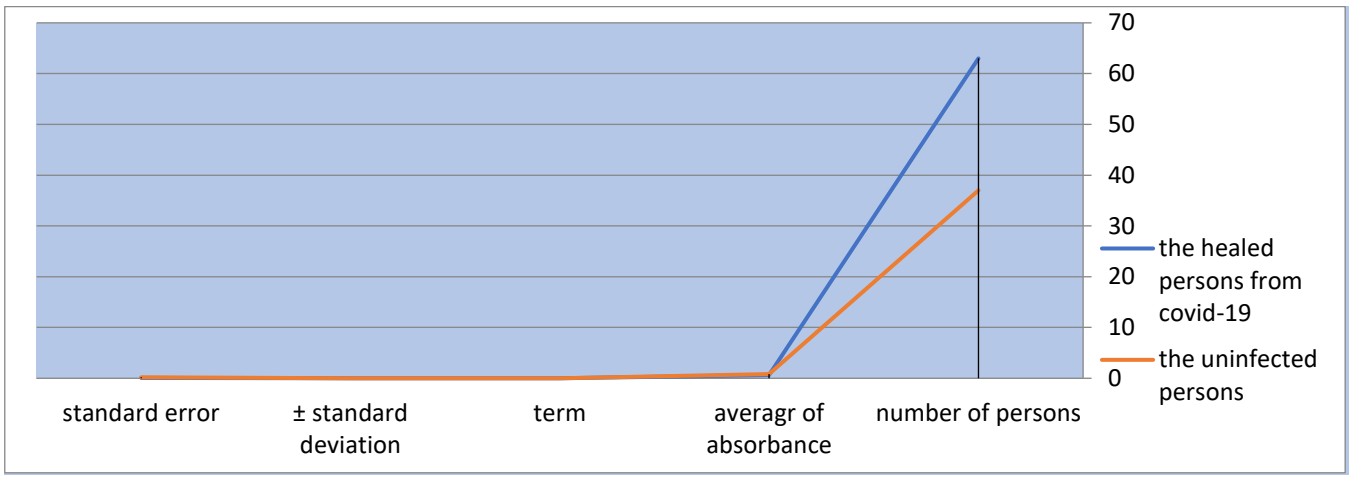
Figure(4) The rate of optical absorbance of NBT dye by neutrophils in both recovered and uninfected covid-19 persons, was expressed (mean ±SD).



Figure(4):The rate of optical absorbance of NBT dye by neutrophils in both recovered and uninfected covid-19 persons, was expressed (mean ±SD).

Discussion

The function of neutrophils is removal of debris and pathogens through phagocytosis [14]. They also other immunological roles, such as releasing NETs*1 to inactivate viral infection [13] and producing cytokines to restrict viral replication [15].

The proportion of neutrophils in the bloodstream of an adult is usually between 2,500 to 7,000 neutrophils/μL for the average personal.[16]

In this study we used whole blood to determine phagocytic activity we discuss how neutrophilic inflammation contributes to the higher mortality in person healing of coved-19 with underlying co-morbidities. [17]

Activating signatures Neutrophils are a prominent feature the haematopoietic transcriptome in severe cases [18,19] and in this study we want to know if there was different significant between person healing from covid-19 and control (not infection) .Based on a study conducted on 100 blood samples were collected from healthy donors and person healing from COVID-19 respiratory tract infection.

Male gender is a poor predictor [20], as men are more susceptible [21,22] Whereas, females are less susceptible to viral infections, possibly due to increased production of immune cells and antibodies, and decreased production of cytokines. Specifically, female patients have higher activity of macrophages and neutrophils compared to males. Female also have a higher production and response to antibodies. This difference between the sexes is more pronounced by age and severity of infection for both sexes.

Conclusions: The results of the study related to the phagocytic activity of cells were reached Polynuclear, with high significant differences at ($P<0.01$)in the optical absorbance rate.

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