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Prevalence Of COVID-19 Pandemic In Province Of Anbar, Iraq

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Abstract:

Study sample of the 1101 patients with "COVID-19" showed that the infection rate of corona virus in men (66.3%) is Twice as high as it is in women(33.7%). According to age factor, patients with ages (26-35) years old were higher significantly compared other ages at (χ^2: 60.351, p- value: < 0.01). The distribution of Study sample according to blood types was as follows, 28.34 %, 16.44 %, 14.26 %, 11.63 %, 9.9%, 8.26%, 7.45 %, and 3.72 % for B^+, AB^+, O^+, A^+, B^-, AB^-, A^-, O^-, respectively.Current study was found the number of cases with blood type B^+ was substantially higher than in the other blood groups, while the ratio of number cases with type O^- blood in the corona virus infection was substantially lower than other blood groups compared age at P- value: < 0.01. On the other hand, the single patients rate (62.94%) is higher than the married patients rate (37.06%), while the infected non-smokers corona virus infection portion (85.5%) is far higher than the incidence for smokers (17.5%) at statistically < 0.01.

Key words: Corona virus, ABO type, "COVID-19"

Introduction:

At the end of the year 2019, the corona virus epidemic was first reported in the Wuhancity , China[1]. "COVID-19" (RNA virus) with a tiny of 26 to 32 kb genome , ranging in diameter from (65 to 125nm), caused this disease [2]. It is a member of the Coronaviridae family. Initially, the virus was identified as the latest 2019 coronavirus (2019-nCoV) by Chinese researchers[3]. After increasing of rate of pandemic Coronavirus in China had spread quickly throughout the world[4].So far , cases of ("COVID-19") that have severely affected human life have been recorded by more than two hundred countries globally[5].

Because of a common outbreak and a large mortality rate, the World Health Organization deemed global health emergency[6]. Many studies have proven that Corona is genetically identical to the SARS-CoV that occurred in 2003, on the other hand cell carrier for corona virus and (SARS-CoV) via ACE2[7] , [8]. Recently, the NGS of SARS-CoV-2 revealed a sequence similarity

with ratio of 99.98% [9]. There are many of risk factors that reported with "COVID-19" susceptibility, such as age , sex , ABO blood type and chronic disease [10] , [8].

Cell-surface glycoproteins that are primarily present on red blood cells and on a number of other cell lines and tissues are the ABO blood group antigens. They are indirectly encoded by a single locus on chromosome 9 (9q34.1- q34.2) [11]. Many research's findings are particularly interested in ABO type. The relevance of the blood group ABO in blood transfusion and medical organ transplants has been established. According to some studies, Blood group is a key independent risk factor for cardiovascular diseases and venous thromboembolism [12]. The goal of this study was to understand the blood type relationship with gender, age, smoking and chronic diseases for "COVID-19" patients.

Materials and Methods:

Sample collection method:

Study samples of (1101) patients infected with "COVID-19" were collected from province of Anbar, Iraq during period from July 2020 to Nov. 2020. Samples were diagnosed by "real time PCR technique and biozekcovid 19 rapid test". In this study, factors such as gender, age, smoking, blood type, chronic diseases, and marital status were within the considerations and ethics of scientific research.

Statistical analysis:

SPSS version 25.0 was used to analyze the sample data. In order to compare the different categories, we used chi-square tests or Fisher's exact tests.

Results:

Table (1) showed significant difference between gender and age of confirmed "COVID-19" patients at χ^2: 60.351, p- value: < 0.01. On other hand, the results showed that the infection rate of corona virus in men (66.3%) is as high as it is in women (33.7%). patients (26-35) years of age were higher significantly compared with other ages.

Table (1) : gender * Age Crosstabulation								
			Age					Total
			Less than 18 yr	18-25yr	26-35yr	36-45yr	More than 45 yr	
gender	female	Count	62	4	150	96	59	371

		%	57.4%	5.7%	35.6%	27.4%	38.8%	33.7%
	male	Count	46	66	271	254	93	730
		%	42.6%	94.3%	64.4%	72.6%	61.2%	66.3%
Total		Count	108	70	421	350	152	1101
Chi square : 60.351					p- value : < 0.01**			

** strong statistically significance.

In this study, results appeared that there is no significant difference between gender and ABO type at χ^2: 10.483, P- value: 0.163 (table 2).

Table 2 : gender * ABO Crosstabulation											Total
			ABO								Total
			A^-	A^+	AB^-	AB^+	B^-	B^+	O^-	O^+	
gender	female	Count	30	35	32	51	31	118	17	57	371
		% within ABO	36.6	27.3	35.2	28.2	28.4	37.8	41.5	36.3	33.7
	male	Count	52	93	59	130	78	194	24	100	730
		% within ABO	63.4	72.7	64.8	71.8	71.6	62.2	58.5	63.7	66.3
Total		Count	82	128	91	181	109	312	41	157	1101
Chi- square : 10.483					P- value : 0.163						

Results showed significance differences between ABO type and Age at χ^2: 231.682 , P- value : < 0.01 .The distribution of the ABO type in 1101 corona virus infected patients from the Hospitals of Anbar showed a distribution of 28.34 %, 16.44 %, 14.26 % , 11.63 % , 9.9% , 8.26%, 7.45 % , and 3.72 % for B^+, AB^+, O^+ , A^+, B^- , AB^- , A^- , and O^- , respectively (Table 3).

Table 3 : Age * ABO Crosstabulation		
	ABO	Tota

			A⁻	A⁺	AB⁻	AB⁺	B⁻	B⁺	O⁻	O⁺	l
Age	1	Count	9	16	11	9	5	35	7	16	108
		%	11.0	12.5	12.1	5.0%	4.6%	11.2	17.1	10.2	9.8%
	2	Count	0	23	0	6	0	7	2	32	70
		%	0.0%	18.0	0.0%	3.3%	0.0%	2.2%	4.9%	20.4	6.4%
	3	Count	40	41	12	66	42	169	12	39	421
		%	48.8	32.0	13.2	36.5	38.5	54.2	29.3	24.8	38.2
	4	Count	21	22	55	77	48	71	9	47	350
		%	25.6	17.2	60.4	42.5	44.0	22.8	22.0	29.9	31.8
	5	Count	12	26	13	23	14	30	11	23	152
		%	14.6	20.3	14.3	12.7	12.8	9.6%	26.8	14.6	13.8
Total		Count	82	128	91	181	109	312	41	157	1101
Chi − square : 231.682						P- value : < 0.01**					
1: less than 18 year , 2 : from 18-25 , 3 : 26-35 , 4 : 36 − 45 , and 5 : more than 45 year											

** strong statistically significance.

According to table 4 , no statistically significant between ABO type and chronic diseases at χ^2: 7.797, P- value : < 0.351.

Table 4 : Chronic duseases * ABO Crosstabulation											
			ABO								Total
			A⁻	A⁺	AB⁻	AB⁺	B⁻	B⁺	O⁻	O⁺	
Chronic diseaeses es	Yes	Count	61	84	71	141	82	226	29	119	813
		% within ABO	74.4%	65.6%	78.0%	77.9%	75.2%	72.4%	70.7%	75.8%	73.8%
	No	Count	21	44	20	40	27	86	12	38	288
		% within ABO	25.6%	34.4%	22.0%	22.1%	24.8%	27.6%	29.3%	24.2%	26.2%
Total		Count	82	128	91	181	109	312	41	157	1101

Chi − square : 7.797	P- value : 0.351

Chronic diseases include: Diabetes, High blood pressure, and Cardiovascular diseases

This study showed statistical significance between smoking and gender at χ^2: 111.732, P- value : < 0.01(table 5). Our results showed that the infected smokers "COVID-19" incidence (17.5%) is far lower than the incidence for non-smokers (85.5%).

Table 5 : smoking * gender Crosstabulation					Total
			gender		Total
			Female	Male	
smoking	NO	Count	369	539	908
		% within gender	99.5%	73.8%	82.5%
	Yes	Count	2	191	193
		% within gender	0.5%	26.2%	17.5%
Total		Count	371	730	1101
Chi – square : 111.732			P- value : < 0.01**		

** strong statistically significance.

Relationship between Status Marital and ginder is strong statistical significance χ^2: 70.317, P-value : < 0.01 (table 6) . In this study , the single patients rate 693/1101 (62.94%) is higher than the married patients rate 408/1101 (37.06%).

Table 6 : gender * Status Marital Crosstabulation					Total
			Status Marital		Total
			Single	Married	
gender	Female	Count	170	201	371
		% within state	24.5%	49.3%	33.7%
	Male	Count	523	207	730
		% within state	75.5%	50.7%	66.3%
Total		Count	693	408	1101
		% within state	100.0%	100.0%	100.0%
Chi – square : 70.317			P- value : < 0.01		

Discussion:

Novel researchs indicates that spread of age , gender, smoking , and blood type are linked to the sensitivity of "COVID-19" infection. Older males patients with "COVID-19" are more likely to progress to serious illness. Besides, both males and females were affected by Pandemic "COVID-19" , as shown in the results of this study in table (1). Another study by Remuzziet al.[13], the incidence of mortality for men and women in Italy are 80 % and 20 % , respectively. In China, many studies reported that the infection of male incidence is greater than the infection of female [14]. Differences between men and women play a significant role in immune systems are regulated and react to stimuli. [15] .The innate, humeral, and cellular immune responses in females stronger than males, leading to the rate of clearing or reducing the virus load quickly. gender refers to an organism's biological and genetic status in the medical field, such as whether it has the XX or XY genotype[15]. Women have stronger immune responses that are antiviral, infectious, and cellular. Men and women are affected differently by various human diseases. [16]. A case fatality rate of 2.8 % for males versus only 1.7 % for women was found in a study of 44,672 cases from China. It has been assumed that this could be due to a greater prevalence of comorbidities among males compared to females [17].

In addition, infections with "COVID-19" may not be occur by the blood group of individuals, but it was linked to "COVID-19" infection. Current study was found that Infected individuals possess B+ type had a higher risk of hospitalization following corona virus infection, while infected persons possess O- type had a lower risk, indicating that the blood type of ABO could be used as a biomarker to assess the risk of "COVID-19" infection.

The ABO type distribution has also led in previous research to major variations in other viral infections. ZhannaKaidarova and other researchers have reported that genetic vulnerability raises the risk of having serious outcomes following the West Nile virus infection in people with A and D blood type [18].

A recent research in China identified a correlation between the ABO and corona infection status in patients with "COVID-19" compared with the general population [19]. However, this evidence does not support yet another analysis [20].Cheng et al., for instance, stated that the vulnerability to SARS-CoV infection in Hong Kong was distinguished by the blood group systems of the ABO [21]. The authors found that compared with non-O blood group patients , blood group O- patients had a lower chance of getting infected that agreed with Zhao et al.,[19].

Differences in antigen expression in the blood group can increase or decrease the sensitivity of the host to vary infections. Antigens of blood group can play a major role in infection by acting as microorganism's receptors and/or co-receptors. In contrast, several antigens of blood group

facilitate intracellular absorption, signal transduction, or cell adhesion by organizing membrane micro domains. The response of innate immune against infection can be changed by blood group antigens [22].

Ultimately, it can be hypothesized that the decreased susceptibility of blood group O individuals and the increased susceptibility of blood group B individuals to "COVID-19" may be related to the presence in the blood of natural anti-blood group antibodies, particularly anti-B antibodies. However, there may be other pathways needing more study. This research reveals the link between Smoking and "COVID-19". In current study, Smokers less than non-smokers in "COVID-19" infection.So several epidemiologic studies globally suggest a lower proportion of smokers among "COVID-19" patients [23,24,25]. Smoking creates epigenetic changes in the respiratory epithelium leading to mucous (goblet) cell metaplasia.As goblet cells are a significant source of ACE2 in the lungs, this can help understand the elevated levels. Nevertheless, salivary cells are also a major source of mucosa, presenting a significant first inhalation barrier to pathogens that can prevent pathogen invasion and eventual infection[26]. Normal structural changes in allelic ACE2 types can interact with the intermolecular connection of such vary with SARS-CoV-2 spike protein. It is possible that, on stimulation of smoking , some ACE2 allelic vary that prevent SARS-CoV-2 binding can undergo positive selection[27-45].

Conclusions:

 In the current study, Blood group B[+] patients had a high risk of corona virus infection, while O[-] blood group was associated with a low risk, implying that some ABO type were associated with susceptibility to corona virus . Some clinical features of patients with "COVID-19" were linked to the blood type. The use of ABO blood typing in the management of "COVID-19" infection may be beneficial.Researchs are required to explain the causes behind the recorded low incidence of smokers among patients with corona virus.

References:

1.   Wu, J. T. et al. Estimating clinical severity of "COVID-19" from the transmission dynamics in Wuhan, China. Nat. Med.**26**, 506–510 (2020).

2.   Kaul, D. An overview of coronaviruses including the SARS-2 coronavirus–Molecular biology, epidemiology and clinical implications. Curr. Med. Res. Pract. (2020).

3.   Zhu, N., Zhang, D. & Wang, W. China Novel Coronavirus Investigating and Research Team. A novel coronavirus from patients with pneumonia in China, 2019 [published January 24, 2020]. N Engl J Med.

4.   Wang, D. et al. Clinical characteristics of 138 hospitalized patients with 2019 novel

coronavirus–infected pneumonia in Wuhan, China. Jama**323**, 1061–1069 (2020).

5. Lu, R. et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. Lancet**395**, 565–574 (2020).

6. Al Meani, S. A. L., Hamad, A. A., Abdulkareem, A. H., Ahmed, M. M. &Salih, R. M. Assessment of C-Reactive Protein and Lactate Dehydrogenase Levels in Patients Infected with "COVID-19". Ann. Rom. Soc. Cell Biol. 1023–1027 (2021).

7. Al Meani, S. A. L., Ahmed, M. M., Abdulkareem, A. H., Hamid, N. M. & Ibrahim, M. O. Effect of "COVID-19" Virus on Biomass Index of Infected Patients. Syst. Rev. Pharm.**11**, 1134–1136 (2020).

8. Abdulkareem, A. H., Al Meani, S. A. L., Ahmed, M. M. &Salih, R. M. Role of Potential Nanomateriales in Reducing Bacterial Resistance against Antibiotics (A Review). Ann. Rom. Soc. Cell Biol. 4023–4038 (2021).

9. Al Meani, S. A. L., Abdulkareem, A. H., Ibrahim, M. O., Ahmed, M. M. &Mukhlif, M. Y. Assessment the Correlation of D-dimer and Ferritin Level in Patients Infected with "COVID-19" in Anbar Governorate of Iraq. Syst. Rev. Pharm.**11**, 1130–1133 (2020).

10. Fang, L., Karakiulakis, G. & Roth, M. Are patients with hypertension and diabetes mellitus at increased risk for "COVID-19" infection? Lancet. Respir. Med.**8**, e21 (2020).

11. Franchini, M. &Bonfanti, C. Evolutionary aspects of ABO blood group in humans. Clin. Chim. acta**444**, 66–71 (2015).

12. Jenkins, P. V. & O'Donnell, J. S. ABO blood group determines plasma von Willebrand factor levels: a biologic function after all? Transfusion**46**, 1836–1844 (2006).

13. Remuzzi, A. &Remuzzi, G. "COVID-19" and Italy: what next? Lancet (2020).

14. Wu, C., Chen, X. &Cai, Y. Xia J'an, Zhou X, Xu S, et al. Risk Factors Assoc. With Acute Respir. Distress Syndr. Death Patients With Coronavirus Dis. (2019).

15. Oertelt-Prigione, S. The influence of sex and gender on the immune response. Autoimmun. Rev.**11**, A479–A485 (2012).

16. Fish, E. N. The X-files in immunity: sex-based differences predispose immune responses. Nat. Rev. Immunol.**8**, 737–744 (2008).

17. Surveillances, V. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases ("COVID-19")—China, 2020. China CDC Wkly.**2**, 113–122 (2020).

18. Lanteri, M. C. et al. W est N ile virus nucleic acid persistence in whole blood months after clearance in plasma: implication for transfusion and transplantation safety. Transfusion**54**, 3232–3241 (2014).

19. Zhao, J. et al. Relationship between the ABO Blood Group and the "COVID-19"

Susceptibility. medRxiv (2020).

20.   Moher, D. et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst. Rev.**4**, 1 (2015).

21.   Cheng, Y. et al. ABO blood group and susceptibility to severe acute respiratory syndrome. Jama**293**, 1447–1451 (2005).

22. Cooling, L. Blood groups in infection and host susceptibility. Clin. Microbiol. Rev.**28**, 801–870 (2015).

23. Cai, G., Bossé, Y., Xiao, F., Kheradmand, F. & Amos, C. I. Reply to: Cigarette Smoking and "COVID-19": A Complex Interaction. Am. J. Respir. Crit. Care Med. (2020).

24.   Saleh, Marwan Mahmood, et al. "The Effect of High Temperature on the Hematological Parameters of Bakery Workers." Systematic Reviews in Pharmacy**11**.2: 100-103(2020).

25.   Jalil, A. T., Shanshool, M. T., Dilfy, S. H., Saleh, M. M., & Suleiman, A. A. Hematological And Serological Parameters For Detection Of Covid-19. Journal of microbiology, biotechnology and food sciences, e4229-e4229(2021).

26.   Alkubaisy, S. A., Saleh, M. M., Yaseen, M. M., Salih, O. A., Qader, S. W., &Saleh, E. N. Evaluation study of the anti-ulcer activities of Cuminumcyminum Seed extract against ethanol-induced gastric ulcer in rats. Research Journal of Biotechnology, **14**, 149-255(2019).

27.   Hussain, M. et al. Structural variations in human ACE2 may influence its binding with SARS-CoV-2 spike protein. J. Med. Virol. (2020).

28.   Saleh, M. M., Jalil, A. T., Abdulkereem, R. A., & Suleiman, A. A. Evaluation of Immunoglobulins, CD4/CD8 T Lymphocyte Ratio and Interleukin-6 in COVID-19 Patients. TURKISH JOURNAL of IMMUNOLOGY, 8(3), 129-134.

29.   Moghadasi, S., Elveny, M., Rahman, H.S. et al. A paradigm shift in cell-free approach: the emerging role of MSCs-derived exosomes in regenerative medicine. J Transl Med **19,** 302 (2021). https://doi.org/10.1186/s12967-021-02980-6

30.   JALIL, A. T., DILFY, S. H., KAREVSKIY, A., & NAJAH, N. (2020). Viral Hepatitis in Dhi-Qar Province: Demographics and Hematological Characteristics of Patients. International Journal of Pharmaceutical Research, 12(1).

31.   Dilfy, S. H., Hanawi, M. J., Al-bideri, A. W., &Jalil, A. T. (2020). Determination of Chemical Composition of Cultivated Mushrooms in Iraq with Spectrophotometrically and High Performance Liquid Chromatographic. Journal of Green Engineering, 10, 6200-6216.

32.   Jalil, A. T., Al-Khafaji, A. H. D., Karevskiy, A., Dilfy, S. H., &Hanan, Z. K. (2021). Polymerase chain reaction technique for molecular detection of HPV16 infections among women

with cervical cancer in Dhi-Qar Province. Materials Today: Proceedings.

33. Marofi, F., F. Abdul-Rasheed, O., SulaimanRahman, H., Setia Budi, H., Jalil, A. T., ValerievichYumashev, A., ... &Jarahian, M. (2021). CAR-NK cell in cancer immunotherapy; A promising frontier. Cancer Science.

34. Widjaja, G., Jalil, A. T., Rahman, H. S., Abdelbasset, W. K., Bokov, D. O., Suksatan, W., ... &Ahmadi, M. (2021). Humoral Immune mechanisms involved in protective and pathological immunity during COVID-19. Human Immunology.

35. Jalil, A.T., Kadhum, W.R., Faryad Khan , M.U. et al. Cancer stages and demographical study of HPV16 in gene L2 isolated from cervical cancer in Dhi-Qar province, Iraq. ApplNanosci (2021).

36. Sarjito, I., Elveny, M., Jalil, A. T., Davarpanah, A., Alfakeer, M., Bahajjaj, A. A. A., &Ouladsmane, M. (2021). CFD-based simulation to reduce greenhouse gas emissions from industrial plants. International Journal of Chemical Reactor Engineering.

37. TurkiJalil, A., HussainDilfy, S., Oudah Meza, S., Aravindhan, S., M Kadhim, M., & M Aljeboree, A. (2021). CuO/ZrO2 Nanocomposites: Facile Synthesis, Characterization and Photocatalytic Degradation of Tetracycline Antibiotic. Journal of Nanostructures.

38. Hanan, Z. K., Saleh, M. B., Mezal, E. H., &Jalil, A. T. (2021). Detection of human genetic variation in VAC14 gene by ARMA-PCR technique and relation with typhoid fever infection in patients with gallbladder diseases in Thi-Qar province/Iraq. Materials Today: Proceedings.

39. Vakili-Samiani, S., Jalil, A. T., Abdelbasset, W. K., Yumashev, A. V., Karpisheh, V., Jalali, P., ... &Jadidi-Niaragh, F. (2021). Targeting Wee1 kinase as a therapeutic approach in Hematological Malignancies. DNA Repair, 103203.

40. Ngafwan, N., Rasyid, H., Abood, E. S., Abdelbasset, W. K., Al-Shawi, S. G., Bokov, D., &Jalil, A. T. (2021). Study On Novel Fluorescent Carbon Nanomaterials In Food Analysis. Food Science And Technology.

41. Marofi, F., Rahman, H. S., Al-Obaidi, Z. M. J., Jalil, A. T., Abdelbasset, W. K., Suksatan, W., ... &Jarahian, M. (2021). Novel CAR T therapy is a ray of hope in the treatment of seriously ill AML patients. Stem Cell Research & Therapy, 12(1), 1-23.

42. Jalil, A. T., Shanshool , M. T. ., Dilfy, S. H. ., Saleh, M. M., & Suleiman, A. A. . (2021). HEMATOLOGICAL AND SEROLOGICAL PARAMETERS FOR DETECTION OF COVID-19. Journal of Microbiology, Biotechnology and Food Sciences, e4229.

43. Abosaooda, M., Majid, W. J., Hussein, E. A., Jalil, A. T., Kadhim, M. M., Abdullah, M. M., ... &Almashhadani, H. A. (2021). Role of vitamin C in the protection of the gum and implants

in the human body: theoretical and experimental studies. Int. J. Corros. Scale Inhib, 10(3), 1213-1229.

44. Dilfy, S. H., Al-bideri, A. W., &Hanawi, M. J. (2020). Effect of Pleurotusostreatus Extract on Epidermal Growth Factor Receptor Expression during Healing of Aspirin-induced Peptic Ulcer in Male Rats. Jordan Journal of Biological Sciences, 13.

45. Hanawi, M. J., Dilfi, S. H., &AlBideri, A. W. (2020). Histological Study of Therapeutic Effect of P. ostreatus on Gastric Ulcer in Male Rats. Systematic Reviews in Pharmacy, 11(1), 26-34.