

ABO blood grouping with negative or positive rhesus factors and relation to autoimmune diseases

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Abstract

Introduction: Autoimmune disease is widely increasing because of many factors like environmental, genetic, and lifestyle. With these factors, there are many quarries related to the relation between autoimmune diseases and blood grouping with positive or negative rhesus factors (+ve, -ve RH).

Objective: This research aims to explore the ABO blood grouping with negative or positive rhesus factors and its relation to autoimmune diseases.

Method: This study is a descriptive systematic review study using Rayyan software to classify and choose articles related from 2013 to 2022 from e-journal websites like CINAHEL, EBSCO, ProQuest, PubMed, and Google Scholar.

Result: The research study showed that there is a relation between autoimmune diseases and blood grouping with positive or negative rhesus factors, most of the articles mentioned that blood group O+ve affected most people with autoimmune diseases.

Conclusion: In conclusion, there is a relation between blood grouping with RH +ve or -ve, but there are many factors that also must be considered like genetic disorders, environmental factors, gender, and age as main factors to disease appearance and blood types can contribute in the severity of disease.

Keywords: Autoimmune diseases; ABO blood grouping; RH factors.

Introduction

Autoimmune diseases are widely increasing nowadays due to many factors like lifestyles, genetic disorders, and environmental factors. Many research studies were done to identify the relation between blood grouping with positive or negative rhesus factors and autoimmune diseases like Rheumatoid Arthritis (RA), Systemic Lupus Erythematosus (SLE), Ankylosing Spondylitis (AS), Ulcerative Colitis (UC), and

other autoimmune diseases [1]. Each type of autoimmune disease can affect parts of the human body like blood vessels, connective tissues, endocrine glands, joints, muscles, red blood cells, and skin [1,2].

Blood grouping sets on the protein types called antigens as been classified into many groups like blood group with A antigens, B antigens, A and B antigens, and O grouping that does not contain A or B antigens and rhesus positive mean that specific antigen on red blood cells, but negative rhesus means no antigen on red blood cells [3,4].

The autoimmune disorders or diseases are conditions in which the person's own immune system is attacking his healthy cells and the cause is not clear as thought to be genetic or environmental factors [1,3]. Many research studies investigate the relation between blood type and rhesus positive or negative with autoimmune diseases [1,3,4]. A study done by Nik et al. (2021) explained that the first report about blood grouping with rhesus factor and autoimmune diseases done by Cohen in 1963 the result showed no significant heterogeneity that some types of autoimmune diseases can be prevalent for some groups of blood like SLE prevalence with O blood grouping and AB blood grouping less effected with diseases and most risk factors is genetic and family history [5]. Also, Hashish et al. (2022) agreed that some groups are more prone to get some diseases the O blood group can have peptic ulcers, and blood A groups can be prone to get stomach cancer and both groups can be associated with autoimmune diseases [6]. Questions about the effect or relation between blood grouping with positive or negative rhesus factors and autoimmune diseases increased. As this research study explored the ABO blood grouping with negative or positive rhesus factors and its relation to autoimmune diseases.

Methodology

This research study is a descriptive systematic review study using Rayyan software to classify and choose articles related that were 64 research articles identified as shown in figure 1 the research article that was taken from 2013 to 2022. The research studies have taken only 34 articles that explain about autoimmune diseases and blood grouping, the articles were also analyzed according to research purpose and aim to be more distinct about the relation between some types of autoimmune diseases and blood grouping with negative or positive rhesus factors that was 30 research studies. The articles were collected from e-journal websites like CINAHEL, EBSCO, ProQuest, PubMed, and Google Scholar.

Result

This research study aimed to explore the ABO blood grouping with negative or positive rhesus factors (+ve, -ve RH) and its relation with autoimmune diseases. The result of this research study is summarized in Table 1. Most of the research studies agreed that there are some relations between ABO blood grouping and RH factors. The research study was done by Kong. (2022) on 958 patients with different types of autoimmune diseases showed that the O blood type with 92.2% with positive RH factors more prone to get Lupus, Hashimoto thyroiditis, and Sjogren's syndrome, but for Multiple Sclerosis disease the blood type A, B with RH positive are more risk to get the disease [4]. Moreover, Karimifar, Moussavi, and Hajhashemi (2019) agreed with Kong (2022) about SLE research done on 146 patients that mostly O blood type more

risk to get SLE but they added the blood group A and B types also at risk and statistically significant for A group ($P=0.016$) and group B ($P=0.005$). Related to RH positive is more risky than negative ($P=0.019$) [7]. Another research study with different results was done by Nik et al. (2021) cross-sectional study based on communication on 434 SLE patients and 828 RA patients that suffer from hemolytic anemia that most of the patients were B blood type with positive RH (SLE ($P=0.03$), RA ($P=0.02$)) [5]. The systematic review study explained by Suliman and Yetman (2021) about many autoimmune diseases and each disease directed to a type of blood grouping and RH factors mentioned the blood type A was common in vasculitis, Behçet's disease, and rheumatoid arthritis. And agreed with other researchers that blood O type is common with SLE, Sjögren's syndrome, systemic sclerosis, and familial mediterranean fever with RH+ for rheumatic disease [3]. For rheumatoid arthritis there were two research studies were done by Cildag, Kara, and Senturk (2017), Salem et al. (2021), and Suliman, Yetman (2021) that results showed both researchers agreed that type A blood with RH+ was common for patients with rheumatoid arthritis [3,8,9]. Furthermore, the SLE disease is more common in blood type O as previous research mentioned [8]. For Hashimoto thyroiditis there were three research studies explaining the relation between the disease and blood grouping the result showed that type O blood grouping was more prone to get the disease [10-12]. Inflammatory bowel disease consists of Chron's disease and ulcerative colitis disease. There are research studies showing non-O blood type associated with Chron's disease this research was done by Chen et al. (2022). For Fibromyalgia disease a research study done by Koca, Özdemir, and Baykara (2017) the result showed most of the patients were type O blood type (54.5%, $p=0.03$) statistically significant [17]. The research study discussing multiple sclerosis disease explored that if the patient with type A or B with RH+ seems to be more susceptible to have the disease more than O blood type. [18]. In Familial Mediterranean Fever the research study done by Terzi et al. (2017) discussed cohort study that types B more prone to get the disease ($p=0.008$) statistically significant [19]. In figure 2 the result showed most of the research articles agreed that the blood group O with RH+ve prone to get autoimmune diseases than other blood groups.

In Table 2 there were also many research studies that discussed and explored the relationship between blood grouping and autoimmune diseases there was no significant relation between blood types and autoimmune diseases. The research studies were about Systemic lupus erythematosus, Multiple sclerosis, Rheumatoid arthritis, psoriasis, and Ankylosing spondylitis done by Harris, and Malkovsky (2020), Behçet's disease done by Özyurt et al. (2013), and SLE done by Assar et al. (2021) all these researchers explained that there was no relation between autoimmune diseases and blood types (1,20,21). Also, a research study by Lai et al. (2022) explaining ulcerative colitis showed no association between blood type and ulcerative colitis that type A has high baseline hemoglobin and type O has higher baseline ESR levels [13,14]. Related to psoriatic arthritis cross-sectional and clinical and laboratory research done the result showed that there was no significant relation between psoriatic arthritis and blood grouping [15,16].

Table 1: Research studies with relation between autoimmune diseases and blood grouping: Change in Clinical Parameters from Baseline (Day of Hospital Admission) Pre and Post Use of First and Second CytoSorb® Device).

Autoimmune Disease	Author and year	Type of the study	Sample size	Result
Hashimoto's disease Multiple sclerosis, Lupus, Sjogren's syndrome	Kong. (2022)	Cross-sectional study	2,044 patients with different blood types and autoimmune diseases	O+ (92.2%) patient with Lupus, systemic sclerosis, and Sjogren's Syndrome, Hashimoto disease group. A and B (+) for multiple sclerosis patients.
Hashimoto's thyroiditis	Jasim, Hasen and Ghazi (2022)	case-control investigation	50 patients with Hashimoto's disease and 50 healthy subjects)	(52%) of HT patients were of the blood type (O), with statistically significant differences (P= 0.33). This means that people with type O blood may be at high risk of developing autoimmune hypothyroidism, while those with type AB blood may be protected against such a disorder.
Chron's Disease, ulcerative colitis	Chen et al. (2022)	case-control study	275 Chronis Disease patients, 132 ulcerative colitis (UC) patients	Results confirmed that non-O Blood groups were significantly associated with an increased risk of CD.
Systemic lupus erythematosus (SLE) and rheumatoid arthritis (RA)	Nik. et al. (2021)	Short communication is based on a cross-sectional study	434 SLE and 828 RA patients.	lupus patients, Coombs-positive autoimmune hemolytic Anaemia and arthritis were more common among the B blood type and Rh-positive group,
Rheumatic disease	Salem et al (2021)	multi-center cross-sectional study,	304 patients	207 (68.1%) were diagnosed with rheumatoid arthritis, and 40 (13.2%) had systemic lupus erythematosus. The A and Rh (+) blood groups were more commonly observed in patients with rheumatic diseases.
Rheumatic disease, spondyloarthropathy vasculitis undifferentiated connective tissue disease Behçet's disease rheumatoid arthritis, familial Mediterranean fever, systemic sclerosis, Crohn's disease, Ulcerative colitis, Celiac disease, Systemic lupus erythematosus, multiple sclerosis, Hashimoto's disease.	Suliman, Yetman (2021)	Systematic review	10 studies	Diseases that with type A blood were spondyloarthropathy, vasculitis, Behçet's disease, rheumatoid arthritis Diseases with type O blood were: familial Mediterranean fever, systemic lupus erythematosus, systemic sclerosis, Sjögren's syndrome Most people with rheumatic disease — 92.2 percent — had an Rh+ blood type.
Thyroid disorders	Mehta (2020)	Observational study	220 people diagnosed with thyroid gland disorders	People with BLOOD GROUP "O" are more prone to developing thyroid disorders
Systemic lupus erythematosus (SLE)	Karimifar, Moussavi, and Hajihashemi (2019)	cross-sectional study	performed on 146 patients with SLE	The most common blood type in patients studied was O blood group and then A, B and AB, respectively. (P = 0.016), Additionally, patients with Rh + had a significantly higher score than patients with Rh- (P=0.019).
multiple sclerosis	Lopetegi et al. (2019)	short report	265 patients	The presence of Rh+ plus A or B seems to be a risk in developing multiple sclerosis.
Familial Mediterranean Fever	Terzi et al (2017)	Cohort study	271 patients and 271 healthy controlled subjects	In present study cohort, blood type B was more frequent among FMF patients (p=0.022).
rheumatic disease	Cildag, Kara, and Senturk (2017)	Cross-sectional	823 patients	42.5% patients had A type, vasculitis, Behçet's and RA were more common in the patients with A blood type; FME, SLE, SSc and SjS were more common in the patients with O blood type. Rheumatic diseases. 92.2% patients were Rh positive.

Fibromyalgia syndrome	Koca, Özdemir, and Baykara (2017)	case-control study	200 female patients with FS	In the FS group, 109 people (54.5%) was O type blood group, 60 people was A type (%30), 21 people was B type (%10.5), 10 people was AB type (%5) There were more O-type blood group carrying patients were detected in the FS group. clinical follow and treatment (p=0.03).
Hashimoto's thyroiditis	Mohamed (2015)	Blood withdrawal and classification according to blood group type	Unknown	The results was show also that in the patients with the same O blood group has a significant chance of injury with hypothyroidism than hyperthyroidism.

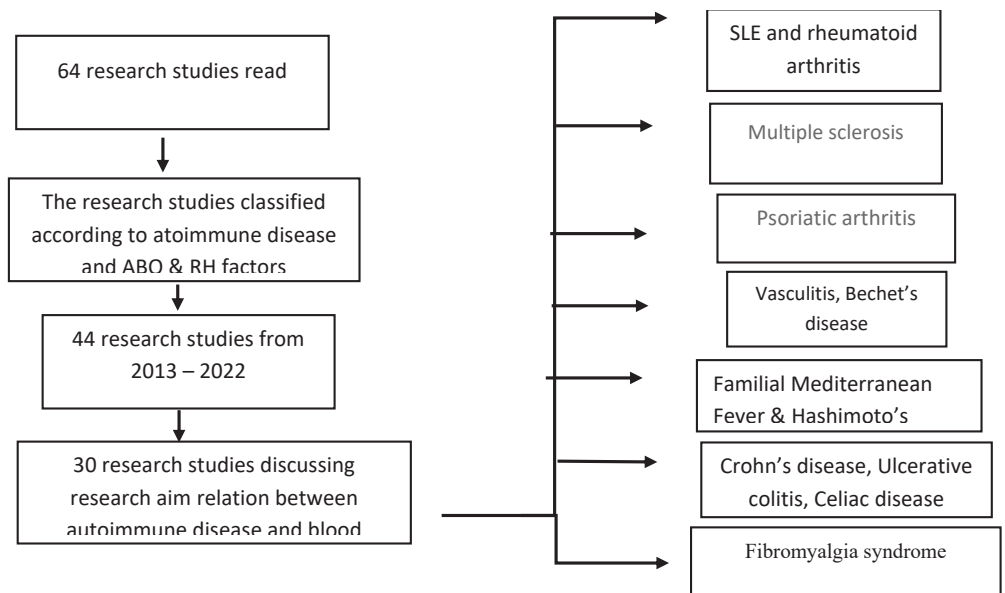


Figure 1: Research study methodology summary: Shows 64 research studies taken and classified according to the research aim 31 research studies discussing different types of autoimmune diseases like SLE, rheumatoid arthritis, multiple sclerosis, inflammatory bowel diseases, fibromyalgia, Hashimoto's, and vasculitis.

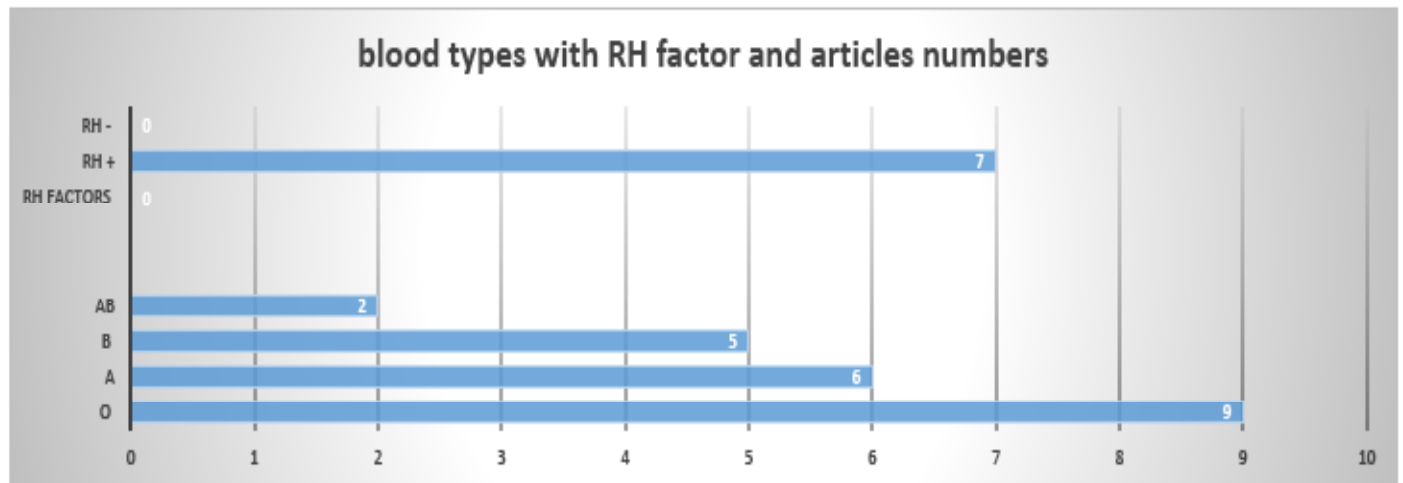


Figure 2: Classification of ABO blood grouping and RH factors in articles: Shows 64 research studies taken and classified according to the research aim 31 research studies discussing different types of autoimmune diseases like SLE, rheumatoid arthritis, multiple sclerosis, inflammatory bowel diseases, fibromyalgia, Hashimoto's, and vasculitis.

Discussion

This research study aims to discuss and explain the relation between autoimmune diseases and ABO blood grouping with rhesus factors as many research studies explored the relation. Autoimmune diseases occur when the person's own body attacks his normal cells and causes damage to the organs [22,23]. Many research articles discussed the relation between Autoimmune diseases and ABO blood grouping with RH factors and emphasized on RH -ve were more prone to get the disease by using large-scale and self-report surveys done in 2016 by Scleroderma Education Project [1,13]. In this research study, the result showed differences that mostly were RH +ve and did not agree with previous research. Most of the research studies found that most of the research was done on lupus and rheumatoid arthritis diseases and the effect of blood grouping on disease progress [5,7]. These diseases influence the antigen-antibody system as blood grouping with RH factors determines the presence or absence of the antigen on the red blood cell surface [5,7,8]. There was research explaining the blood type and attraction to the disease because of antigen like blood type B has an antigen called D-galactose that has the same formation of viruses and have a greater risk of getting the disease, on the other hand, blood type A has a combination of fucose and N-Acetyl galactosamine that some types of food contains and can cause reaction, and type O blood group not contain these antigens that can destroy these antigens and no being sick very much [24,25]. This research is contradicted with most of the articles which showed O blood type is more prone to get the disease than other blood types. For autoimmune diseases, many factors contribute to get the illness rather than blood types and RH factors that were genetic, environmental, gender, and age [10,22,23,26,27]. Furthermore, there were some research studies that explained that there no relation between blood type with RH factors and autoimmune diseases even the progress of the disease as described in Table 2 [1,14,15,16,20-30]. This can be indicated that some researchers found the association and some did not, this can guide to ward different thoughts toward autoimmune diseases and other factors may have strong relation than ABO blood grouping. There was much evidence related to the interaction between environmental and genetic factors that cause the disease to appear rather than blood types, and women gender aged more than 30 are more prone to get the disease than men [23,26,28]. As the research studies done by Angum et al. (2020) and Ngo, Steyn, and McCombe (2014) both related to gender and influence on disease the result showed women were more prone because of many factors related to hormonal changes with genetic predisposing and environmental changes, but the blood types and RH factors can be contributed to the severity of disease occurrence as described by Jasim, Hasen, and Ghazi (2022) [10,28,29]. Furthermore, research done by Shomon (2015) discusses the factors that can contribute to autoimmune disease and emphasizes genetic mutation, and the environment with lifestyle can affect the human and not blood grouping as some researchers agreed [31].

Conclusion

In conclusion, this descriptive systematic review research study aimed to explore the ABO blood grouping with negative or positive rhesus factors and its relation to autoimmune diseases that showed that there was some relation to blood grouping and RH factors according to most research studies. These studies showed mostly O +ve was more prone to get illness than other blood groups with citrine instance and predisposing factors like genetic, environmental, and lifestyle factors that help in disease appearance

[5,10,19,28,31]. The blood antigens play a role in preventing the disease or attracting the disease to the human body as described by Blood Group Antigens (2023) [25].

This research study can help people to identify their blood grouping and prevent the occurrence of the disease by changing their lifestyle or early recognition of the disease mostly if there is a family history.

Recommendations

The recommendation is that more research studies can identify the effect of autoimmune diseases on blood antigens and how the disease interacts or severity with different blood types with RH factors.

References

1. Harris ES, Harris HD, Miroslav Malkovsky. Blood Type Distribution in Autoimmune Diseases: An Anonymous, Large-Scale, Self-Report Pilot Study. 2020.
2. Medline Plus. Autoimmune disorders: MedlinePlus Medical Encyclopedia. Medlineplus.gov. 2017.
3. Suliman M, Yetman D. Blood Type and Immunity: Is There a Connection?. Healthline. 2021.
4. Kong. CY. Ltd HP. Blood Types and Autoimmune Diseases: The Connection. Health Match. 2022.
5. Nik A, Mirfeizi Z, Rezaieyazdi Z, Khodashahi M, Danevash S, et al. ABO and Rh blood groups in patients with lupus and rheumatoid arthritis. Caspian journal of internal medicine. 2021; 12: 568-72.
6. Hashish A, El Nokrashy A, Abouelkheir H, Elnagdy N, Elnagdy A, et al. Blood grouping and Rh factor in Egyptian Patients with Non-infectious Uveitis. Egypt J Ophthalmol (Mansoura Ophthalmic Center). 2022; 2: 177-84.
7. Karimifar M, Moussavi H, Hajhashemi A. Prevalence of ABO and Rh blood groups in systemic lupus erythematosus and their association with disease activity. Soc Diabet Nephrop Prev. 2019; 4: e26-e26.
8. Cildag S, Kara Y, Senturk T. ABO blood groups and rheumatic diseases. European Journal of Rheumatology. 2017; 4: 250-3.
9. Salem GS, Gamal NM, Esraa Talaat, El-Hammady DH, Nevin Hammam, et al. Clinical Impact of the ABO Blood Type in Patients with Rheumatic Diseases: Is there a Link to the ABO and Rhesus? mediterranean journal of rheumatology. 2021; 32: 237-7.
10. Jasim AY, Hasen ER, Ghazi JM. 'Incidence of Hashimoto's thyroiditis and its relationship to age, sex, smoking and blood groups', NTU Journal of Pure Sciences. 2022; 1: 1-9.
11. Mehta P. 'Abo blood group and its unusual relationship with thyroid disorders', Indian Journal of Public Health Research & Development. 2020.
12. Mohamed Hasan M. Relationship between Blood Group and Thyroid Diseases. Asian Acad Res J Multidiscip. 2015; 3: 451-6.
13. Chen J, Chen H, Lin Y, Zheng W, Wang C. Association between ABO blood group and risk of Crohn's disease: A case-control study in the Chinese Han population. J Clin Lab Anal. 2022; 36: 1-6.
14. Lai HC, Chou JW, Wu YH, Huang PJ, Cheng KS, et al. ABO blood type and clinical characteristics of patients with ulcerative colitis: A hospital-based study in central Taiwan. PLoS One. 2022; 17: 1-8.
15. Karahan S, Özyurt K. No Relationship between Blood Groups and Psoriatic arthritis. Ahi Evran Med J. 2022; 7: 183-9.
16. Dharmawan N, Widhiati S, Oktavriana T, Harahap I. The differences of blood type in relation to psoriasis and its onset: Cross sectional study. J Gen - Proced Dermatology Venereol Indones. 2021; 5: 142-6.
17. Koca TT, Özdemir F, Baykara R. Is having O blood type a risk factor for Fibromyalgia syndrome? The importance of nutrition

in Fibromyalgia syndrome. *J Clin Med Kazakhstan*. 2017; 1: 20-3.

18. Lopetegi I, Muñoz-Lopetegi A, Arruti M, Prada A, Urcelay S, et al. ABO blood group distributions in multiple sclerosis patients from Basque Country; O- as a protective factor. *Multiple Sclerosis Journal - Experimental, Translational and Clinical*. 2019; 5: 205521731988895.

19. Terzi H, Şahin A, Hüzmeli C, TÜresin AK, Bağci G, et al. The relationship between ABO blood groups and gene mutations frequently observed in Familial Mediterranean Fever. *Int J Res Med Sci*. 2017; 5: 1380.

20. Özyurt K, Öztürk P, Gül M, Benderli YC, Çölgeçen E, et al. ABO blood groups, Rhesus factor, and Behçet's disease. *Acta Dermatovenerologica Alpina, Pannonica Adriatic*. 2013; 22: 63-4.

21. Assar S, Mohamadzadeh D, Golmohammadi S, Fatahi Z. The association of main blood groups and development of Systemic Lupus Erythematosus and its organ involvements. *Rheumatol Res*. 2021; 6: 99-107.

22. Wang L, Wang FS, Gershwin ME. Human autoimmune diseases: a comprehensive update. *Journal of Internal Medicine*. 2015; 278: 369-95.

23. Pisetsky DS. Pathogenesis of autoimmune disease. *Nat Rev Nephrol*. 2023; 19: 509-24.

24. DC DKROJ. Your Blood Type and AutoImmune Disease, Inflammation and Fatigue. www.helpmychronicpain.com. 2023.

25. Blood Group Antigens - Creative Biolabs. www.creative-biolabs.com. 2023.

26. Dinse GE, Parks CG, Weinberg CR, Co CA, Wilkerson J, et al. Increasing Prevalence of Antinuclear Antibodies in the United States. *Arthritis Rheumatol*. 2020; 72: 1026-35.

27. Ceccarelli F, Agmon-Levin N, Perricone C. Genetic Factors of Autoimmune Diseases 2017. *J Immunol Res*. 2017; 2017: 2-3.

28. Ngo ST, Steyn FJ, McCombe PA. Gender differences in autoimmune disease. *Frontiers in Neuroendocrinology*. 2014; 35: 347-69.

29. Angum F, Khan T, Kaler J, Siddiqui L, Hussain A. The Prevalence of Autoimmune Disorders in Women: A Narrative Review. *Cureus*. 2020; 12.

30. Dadras MS, Golfeshan A, Younespour S. ABO blood group antigens in patients with psoriasis and pemphigus vulgaris. *Iran J Dermatology*. 2015; 18: 16-9.

31. Shomon M. Causes and Risk Factors of Autoimmune Disease. *Verywell Health*. Verywell Health. 2015.

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