

Seroprevalence of Helicobacter Pylori in Plaque Psoriasis at Tertiary Care Hospital

SAMRA IRAM¹, ATIYA RAHMAN², OMAR SHAFIQ³, AYESHA ANWAR⁴, SHAMAILA RAFIQUE⁵, MOIZZA TAHIR⁶, NAVEED AKHTAR MALIK⁷

¹Resident, Department of Dermatology, Combined Military Hospital Lahore

²Professor, Department of Dermatology, CMH Lahore & CMH Lahore Medical College, Lahore

³Resident, Department of Rehabilitation Medicine, Combined Military Hospital Lahore

⁴Consultant Dermatology, Combined Military Hospital Kohat

⁵Resident, Department of Dermatology, Pak Emirates Military Hospital Rawalpindi

⁶Associate Professor of Dermatology, CMH Gujranwala

⁷Head of Dermatology Department, Pak Emirates Military Hospital Rawalpindi

Correspondence to Dr. Samra Iram, E-mail: samrairam@gmail.com Cell: 0333-8728790

ABSTRACT

Background: Psoriasis is a common, chronic inflammatory skin disorder whose aetiology is largely unknown. Several microorganisms, including Helicobacter pylori, have been identified as triggering factors for the disease.

Aims: To determine the frequency of seroprevalence of Helicobacter pylori in chronic plaque psoriasis and to determine any relationship between sero-positivity to H. pylori and severity of chronic plaque psoriasis.

Study design: Cross-sectional study

Place and duration of study: Department of Dermatology, Pakistan Emirates Military Hospital, Rawalpindi from 1st September 2020 to 31st March 2021.

Methods: Eighty three patients of chronic plaque psoriasis were enrolled. Psoriasis Area Severity Index was calculated in each patient to determine the severity of psoriasis. Seroprevalence was confirmed by IgG anti H. pylori antibody in sera detected by enzyme linked immunosorbent assay.

Results: Mean age was 46.67±15.32 years. Majority of the patients, 46(55.42%) were between 46 to 70 years of age. Sixty three (75.90%) were males and 20(24.10%) were females. Sixty four (77.11%) of the patients showed sero-positivity to underlying helicobacter pylori infection. Frequency of seroprevalence of Helicobacter pylori increased with severity of plaque psoriasis (p=0.0001).

Conclusion: Chronic plaque psoriasis is associated with high frequency of H. pylori infection and statistically significant correlation was found between severity of psoriasis and underlying H. pylori infection.

Keywords: Psoriasis, Chronic plaque psoriasis, H. pylori, Infection, Frequency, Association

INTRODUCTION

Psoriasis is a common, lifelong, chronic inflammatory skin disorder characterized by well demarcated erythematous, scaly plaques; most commonly on scalp and extensor surfaces of the body. It is a disorder of keratinization affecting approximately 3% of general population¹. The etiology is largely unknown. Various factors like immunological, infective, genetic and metabolic have been widely implicated. Psoriasis, primarily considered as a disease of the skin and joints, have been associated with significant systemic conditions lately. Recently metabolic syndrome and cardiovascular disorders have been associated with psoriasis². These studies have implicated adversely affecting general health of patients with an increased morbidity and mortality due to high frequency of cardiovascular associations. Apparently there is an association with severity of psoriasis; occurring more frequently in patients with large body surface areas affected with psoriatic lesions.³ It impacts quality of life and potentially long-term survival.

Psoriasis has a variable, chronic course which is characterized by remission and relapses of the disease. Multiple studies have been conducted to understand the pathogenesis of the disease and the scientific quest continues. Interestingly, several microorganisms have been identified as triggering factors for the disease; implying that controlling their growth could potentially alter the disease course and severity^{4,5}. Recently data has emerged that Helicobacter pylori may act as a trigger for the development of psoriasis. The frequency of H. pylori infection has varied widely in medical literature, from no association⁶ to up to a frequency of 72%⁷ H. pylori infection in patients of psoriasis. H. pylori infection stimulates inflammatory responses in the body which potentially exacerbates the etiopathologic responses of the body leading to psoriasis plaque formation. Conversely, treatment of H. pylori infection in individuals might lead to diminishing this inflammatory cascade leading to improvement in Psoriasis^{8,9}.

The purpose of our study was to determine the frequency of seroprevalence of Helicobacter pylori in chronic plaque psoriasis and to determine any relationship between the frequency of seroprevalence of Helicobacter pylori and severity of chronic plaque Psoriasis.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Department of Dermatology, Pakistan Emirates Military Hospital, Rawalpindi, from September 2020 to March 2021. The study was carried out after necessary approval from institutional ethical review committee. Sample size of the study was calculated to be 83 as determined by WHO calculator by taking 95% confidence level, 8% margin of error and taking percentage of sero-prevalence of Helicobacter pylori in Plaque Psoriasis as 16.4%¹⁰. All patients, of both genders, with chronic plaque psoriasis of at least 2 months duration with age ranging from 18-70 years were potential study participants. Patients of chronic plaque psoriasis with history of gastrointestinal symptoms and/or treated with Proton Pump Inhibitors and H2 Blockers or undergone H. pylori eradication therapy in the last 6 months were excluded from the study. Similarly patients of congestive cardiac failure, chronic liver disease, psychiatric disorders and pregnant females were excluded. Patients were recruited by non-probability, consecutive sampling technique after giving written consent for study participation.

Demographic details like gender, age, body mass index, socio-economic status, residence etc. of each patient were recorded. Duration and severity of disease were noted. Severity of psoriasis was determined by calculating Psoriasis Area Severity Index (PASI) of every study patient. PASI is the most widely used measurement tool for psoriasis in research setting. It divides the body into head and neck, trunk, upper limbs and lower limbs. In each body area erythema, infiltration and surface area involved are measured. The score ranges from 0 (no disease) to 72 (maximum disease)¹¹. Patients were divided into three groups on the basis of

Received on 23-11-2021

Accepted on 13-05-2022

PASI score: Mild disease=less than 5 PASI score, Moderate disease = 5-10 PASI score and Severe disease = >10 PASI score. Sero-prevalence was confirmed by IgG anti H. pylori antibody in sera detected by Enzyme Linked Immunosorbent Assay (ELISA).

Data was entered and analyzed using SPSS-22.0. Effect modifiers like age, gender, duration of disease, BMI, severity of psoriasis, place of living, and monthly income were stratified and Chi square test was applied as the test of significance on the data for determination of p value; whereby p-value ≤0.05 was considered as statistically significant.

RESULTS

Eighty three patients were enrolled in the study with age ranging from 18 to 70 years and having mean age of 46.67±15.32 years. Majority of the patients, 46(55.42%) were between 46 to 70 years of age. There were 63(75.90%) males and 20(24.10%) females. Mean duration of disease was 12.02±9.15 years and mean BMI was 30.83±2.98kg/m2. Frequency of seroprevalence of Helicobacter pylori in Plaque Psoriasis was found in 64(77.11%) of study patients. Stratification of Helicobacter pylori with respect to age, gender, socio-economic status, duration of disease and severity of psoriasis is shown in Table 1. Amongst the various parameters only association of H. pylori infection with severity of disease was found to be significant (p value = 0.0001).

Table 1: Demographic characteristic of study participants and frequency of H. pylori infection along with statistical significance

Parameters	No.	H. pylori		P value
		Present	Absent	
Age (years)				
18-45	37 (44.58%)	28	9	0.781
46-70	46 (55.42%)	36	10	
Gender				
Male	63 (75.90%)	49	14	0.797
Female	20 (24.10%)	15	5	
Duration of Psoriasis (years)				
< 10	50 (60.24%)	40	10	0.440
≥ 10	33 (39.76%)	24	9	
Body mass index (kg/m²)				
< 30	28 (33.73%)	22	6	0.821
≥ 30	55 (66.27%)	42	13	
Place of living				
Rural	19 (22.89%)	16	3	0.401
Urban	64 (77.11%)	48	16	
Socioeconomic status				
Low	2 (2.41%)	1	1	0.432
Lower middle	66 (79.52%)	50	16	
Upper middle	15 (18.07%)	13	2	
Severity of psoriasis				
Mild	20 (24.10%)	8	12	0.0001
Moderate	24 (28.91%)	20	4	
Severe	39 (46.99%)	36	3	

DISCUSSION

Helicobacter pylori infection is a common infection worldwide, especially in the low and middle economies. It is a gram negative bacterium that has a predilection to infect the human stomach. Mostly it is asymptomatic while 15%–20% of patients develop gastro-intestinal symptoms like abdominal fullness, pain and vomiting etc. H. pylori's role in the causation of gastric ulcers, lymphomas and adenocarcinomas has been established¹². Recently, it has gained a lot of importance in medical research as a potential mechanism to alter body's immunological reactions. H. pylori infection has been associated with various extra-gastrointestinal disorders. Once H. pylori colonizes the gastric mucosa it initiates a strong inflammatory reaction, leading to alteration and uncontrolled release of systemic inflammatory mediators like interleukins; hence producing widespread systemic effects. These altered immunological mechanisms involve cell-mediated and humoral immune reactions^{12,13}. Staphylococcal infection has since long been implicated as a triggering factor for

the development of psoriasis through the role of superantigens. Superantigens are toxins which even in very minute quantity have the ability to polyclonally activate lymphocytes. The superantigens bind on the T-cell receptor and the antigen presenting cells via the major histocompatibility complex expressed on their surfaces with resultant activation of the CD4+ T cells¹⁴. Superantigens i.e. various microbial and viral particles, have been implicated in different dermatological diseases.^{15,16} Studies have emerged on the causal relationship between H. pylori and extragastric diseases especially cardiovascular, metabolic, neurodegenerative and dermatological disorders.¹⁷⁻¹⁹ Amongst the dermatological disorders studies have been carried out to determine an association of H. pylori in rosacea, chronic urticaria, alopecia areata and psoriasis¹⁹⁻²¹.

The prevalence of H. pylori in general population is quite high. Up to one third of the population is infected in north European and North American countries; whereas in South America, Asia and southern European countries about half the population tests positive for the infection.²² Comparing the seroprevalence of H. pylori infection amongst psoriasis patients as compared to the general population has revealed conflicting results. Some studies have found no or negative association whereas others have yielded significant association. Mesquita et al⁷ studied 120 patients of psoriasis and 21 healthy controls. They found 72.07% of psoriasis patients and 33% of the controls tested positive for H. pylori infection (P=0.002). Furthermore they found the severity of psoriasis correlated with the frequency of H. pylori infection (P=0.045). Their results are quite similar to our study findings. Similarly, Qayoom and Ahmad²⁰ enrolled 50 psoriasis patients and an equal number of controls in their study. 40% of their patients as compared to 10% of the controls had underlying anti-H. pylori antibodies in the sera (p<0.005). An Egyptian study conducted by Marae et al²³ on 40 patients of psoriasis vulgaris and age and gender matched controls showed that 31 patients i.e. 77.5% of the patients had underlying H. pylori infection.

Fathy et al²⁴ conducted a case control study on 20 plaque psoriasis patients and 20 age and gender matched healthy controls. The prevalence of seropositivity in patients with psoriasis was 70% (n=14) and significantly higher than controls in whom it was 40% (n=8). Additionally, the authors found that the higher seroprevalence rates were found in patients with severe psoriasis. All 10 of their severe psoriasis patients tested positive for H. pylori infection; whereas 4 of the moderate psoriasis amongst 7 tested positive for H. pylori infection and none of the patient with mild disease had a positive test. These findings are similar to our study results.

Conversely, there are studies which did not find any significant relationship with H. pylori infection. An Iranian study has showed seroprevalence of Helicobacter pylori in Plaque Psoriasis as 16.4% as compared to 13% in controls and no significant relationship between psoriasis severity and prevalence of H. pylori infection was established¹⁰. Likewise, Fabrizi et al⁶ conducted their study on 49 participants who were children and adolescents aged 5-19 years. There were 20 psoriatic patients and 29 controls without skin diseases. They did not find any statistically significant association between psoriasis and H. pylori. Their study results indicated positivity in 10% of psoriasis patients and 17% amongst the control group. This wide disparity in frequency indicates that different demographic factors might be involved e.g. the prevalence of H. pylori infection has been found to be greater in resource stricken countries like those in Asia and South America as compared to industrialized Western countries. Furthermore, studies have indicated that older patients of plaque psoriasis and those living in urban areas have been identified as risk factors for acquisition of H. pylori infection²⁵. However we didn't find any correlation of age or residing in urban or rural areas in our current study.

The implication of H. pylori in the etio-pathogenesis of psoriasis opens therapeutic options for disease management. In 2008, Hubner and Tenbaum²⁶ published a case report describing

complete improvement of palmoplantar psoriasis in their patient following *H. pylori* eradication therapy. Onsun et al⁹ conducted a large-scale study, on 300 cases and 150 controls, to investigate the prevalence of *H. pylori* seropositivity in psoriatic patients, its relationship with psoriasis severity and therapeutic response in study participants. 184 patients i.e. 61.3% had underlying *H. pylori* infection. Subsequently, they divided the *H. pylori* infected patients of psoriasis in three treatment groups: *H. pylori* eradication treatment only, acitretin only and both *H. pylori* eradication and acitretin. They concluded that patients with combination therapy of *H. pylori* eradication and acitretin had statistically significant improvement in psoriasis, calculated objectively by decrease in Psoriasis Area Severity Index scores before and after treatment. *H. pylori* eradication therapy has been touted as beneficial in other dermatological disorders e.g. chronic urticaria²⁷, idiopathic thrombocytopenic purpura and rosacea etc^{8,28,29}.

CONCLUSION

Chronic plaque psoriasis is associated with high frequency of *H. pylori* infection. Furthermore, statistically significant correlation was found between severity of psoriasis and underlying *H. pylori* infection. Our study provides a basis for the development of new therapeutic strategies for chronic plaque psoriasis. The impact of *H. pylori* eradication therapy on the status of psoriasis is a feasible research pursuit. Future local studies need to corroborate or refute our study results.

Conflict of interest: Nil

REFERENCES

1. Armstrong AW, Mehta MD, Schupp CW, Gondo GC, Bell SJ, Griffiths CEM. Psoriasis Prevalence in Adults in the United States. *JAMA Dermatol* 2021;157(8):940-46.
2. Fernandez-Armenteros JM, Gomez-Arbones X, Buti-Soler M, Betriu-Bars A, Sanmartin-Novell V, Ortega-Bravo M, Martinez-Alonso M, et al. Psoriasis, metabolic syndrome and cardiovascular risk factors. A population-based study. *J Eur Acad Dermatol Venereol* 2019; 33(1):128-35.
3. Deng Y, Chang C, Lu Q. The inflammatory response in psoriasis: A comprehensive review. *Clin Rev Allergy Immunol* 2016; 50: 377-89.
4. Yu M, Zhang R, Ni P, Chen S, Duan G. Helicobacter pylori Infection and psoriasis: a systematic review and meta-analysis. *Medicina* 2019; 55:645.
5. Campanati A, Ganzetti G, Martina E, Giannoni M, Gesuita R, Bendia E, et al. Helicobacter pylori infection in psoriasis: results of a clinical study and review of the literature. *Int J Dermatol* 2015;54:e109-14.
6. Fabrizi G, Carbone A, Lippi ME, Anti M, Gasbarrini G. Lack of evidence of relationship between Helicobacter pylori infection and psoriasis in childhood. *Arch Dermatol* 2001; 137:1528.
7. Mesquita PM, DiogoFilho A, Jorge MT, Berbert AL, Mantese SA, Rodrigues JJ. Relationship of Helicobacter pylori seroprevalence with the occurrence and severity of psoriasis. *Anais brasileiros de dermatologia*. 2017;92(1):52-7.
8. Ali M, Whitehead M. Clearance of chronic psoriasis after eradication therapy for Helicobacter pylori infection. *J Eur Acad Dermatol Venereol* 2008;22:753-4.
9. Onsun N, ArdaUlusal H, Su O, Beycan I, BiyikOzkaya D, Senocak M. Impact of Helicobacter pylori infection on severity of psoriasis and response to treatment. *Eur J Dermatol* 2012;22:117-20.
10. Azizzadeh M, Nejad ZV, Ghorbani R, Pahlevan D. Relationship between Helicobacter pylori infection and psoriasis. *Ann Saudi Med* 2014; 34(3):241-4.
11. Mrowietz U, Kragballe K, Reich K, Spuls P, Griffiths CE, Nast A, et al. Definition of treatment goals for moderate to severe psoriasis: a European consensus. *Arch Dermatol Res* 2011;303(1):1-10.
12. Leontiadis GI, Sharma VK, Howden CW. Non-gastrointestinal tract associations of Helicobacter pylori infection. *Arch Intern Med* 1999; 159:925-40.
13. Sharndama HC, Mba IE. Helicobacter pylori: an up-to-date overview on the virulence and pathogenesis mechanisms. *Braz J Microbiol* 2022; 6:1-18.
14. Totte JE, van der Feltz WT, Bode LG, van Belkum A, van Zuuren EJ, Pasmans SG. A systematic review and meta-analysis on Staphylococcus aureus carriage in psoriasis, acne and rosacea. *Eur J Clin Microbiol Infect Dis* 2016;35(7):1069-77.
15. Solanki LS, Srivastava N, Singh S. Superantigens: a brief review with special emphasis on dermatologic diseases. *Dermatol Online J* 2008;14(2):3.
16. Malfitano AM, Cahill R, Mitchell P, Frankel G, Dougan G, Bifulco M, et al. Helicobacter pylori has stimulatory effects on naive T cells. *Helicobacter* 2006;11(1):21-30.
17. Franceschi F, Covino M, RoubaudBaudron C. Review: Helicobacter pylori and extragastric diseases. *Helicobacter* 2019;24(Suppl 1): e12636.
18. Gravina AG, Zagari RM, De Musis C, Romano L, Loguercio C, Romano M. Helicobacter pylori and extragastric diseases: A review. *World J Gastroenterol* 2018;24(29):3204-21.
19. Hernando-Harder AC, Booken N, Goerdts S, Singer MV, Harder H. Helicobacter pylori infection and dermatologic diseases. *Eur J Dermatol* 2009;19:431-44.
20. Qayoom S, Ahmad QM. Psoriasis and Helicobacter pylori. *Indian J Dermatol Venereol Leprol* 2003;69:133-4.
21. Behrangi E, Mansouri P, Agah S, Ebrahimi-Daryani N, Mokhtare M, Azizi Z, et al. Association between helicobacter pylori infection and alopecia areata: a study in Iranian population. *Middle East J Dig Dis* 2017; 9(2): 107-10.
22. Eusebi LH, Zagari RM, Bazzoli F. Epidemiology of Helicobacter pylori infection. *Helicobacter*. 2014;19(Suppl 1):1-5.
23. Marae AH, Shehata WA, Azmy R, Abousaeida AM. Helicobacter pylori infection in the palm and sole of psoriatic patients. *Menoufia Med J* 2021;34:71-75
24. Fathy G, Said M, Abdel-Raheem SM, Sanad H. Helicobacter Pylori Infection: a possible predisposing factor in chronic plaque-type psoriasis. *J Egypt Women Dermatol Soc* 2010; 7:39-43
25. Altamimi E, Alsharkhat N, AlJawarneh A, Abu Hamad MDR, Assi AA, Alawneh S, et al. Declining prevalence of Helicobacter pylori infection in Jordanian children, report from developing country. *Heliyon* 2020; 20;6(7): e04416.
26. Martin Hübner A, Tenbaum SP. Complete remission of palmoplantar psoriasis through Helicobacter pylori eradication: a case report. *Clin Experimental Dermatol* 2008;33(3):339-40.
27. Federman DG, Kirsner RS, Moriarty JP, Concato J. The effect of antibiotic therapy for patients infected with Helicobacter pylori who have chronic urticaria. *J Am Acad Dermatol* 2003;49:861-4.
28. Kuttubay Z, Zara T, Engin B, Serdaroglu S, Tüzün Y, Yılmaz E, et al. Helicobacter pylori infection and skin disorders. *Hong Kong Med J* 2014; 20:317-24.
29. Magen E, Delgado JS. Helicobacter pylori and skin autoimmune diseases. *World J Gastroenterol* 2014;20:1510-16.