



## Introduction

- Celiac disease is an immune mediated disorder of the digestive system that often presents with extraintestinal manifestations.
- The association of celiac disease with dermatitis herpetiformis, Type I Diabetes, Ig A deficiency and chromosomal abnormalities like Turner's and Down's syndrome is well known.
- However, the risk of rheumatological manifestations in Celiac disease remains controversial.

## Aims and Objective

- The primary aim of our study was to investigate the association of rheumatological diseases in patients with Celiac disease.
- Secondary objectives were to stratify the association based on gender.

## Methodology

- All adult hospitalized patients from January 2016 to December 2019 in nationwide inpatient sample (NIS) were captured.
- The study population included all patients with any diagnosis of Celiac disease using ICD-10 codes (International Classification of Diseases, tenth edition).

## Methodology

- The study population was divided into patients with Celiac disease (Study group) and without Celiac disease (Control group). We further identified patients with a diagnosis of SLE (Systemic Lupus Erythematosus), RA (Rheumatoid Arthritis), Fibromyalgia, Polymyalgia Rheumatica (PMR), Polymyositis/Dermatomyositis (PM/DM), Sjogren syndrome and Psoriatic Arthritis (PsA) using ICD-10 codes.
- We used linear regression to compare continuous variables and Chi-square tests for categorical variables. The association between Celiac disease and rheumatological conditions was analyzed using multivariate logistic regression model.

## The gut-joint axis

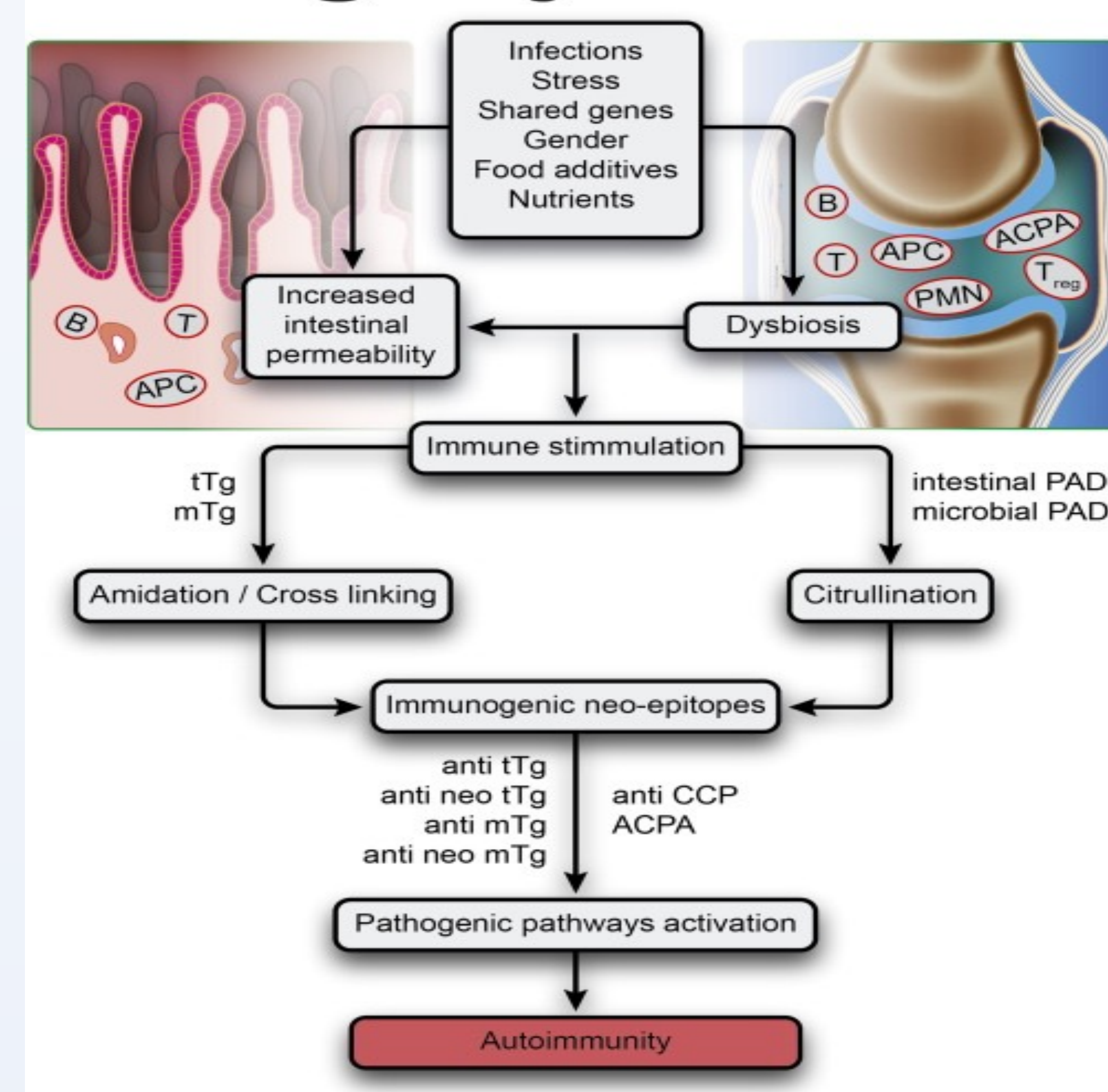
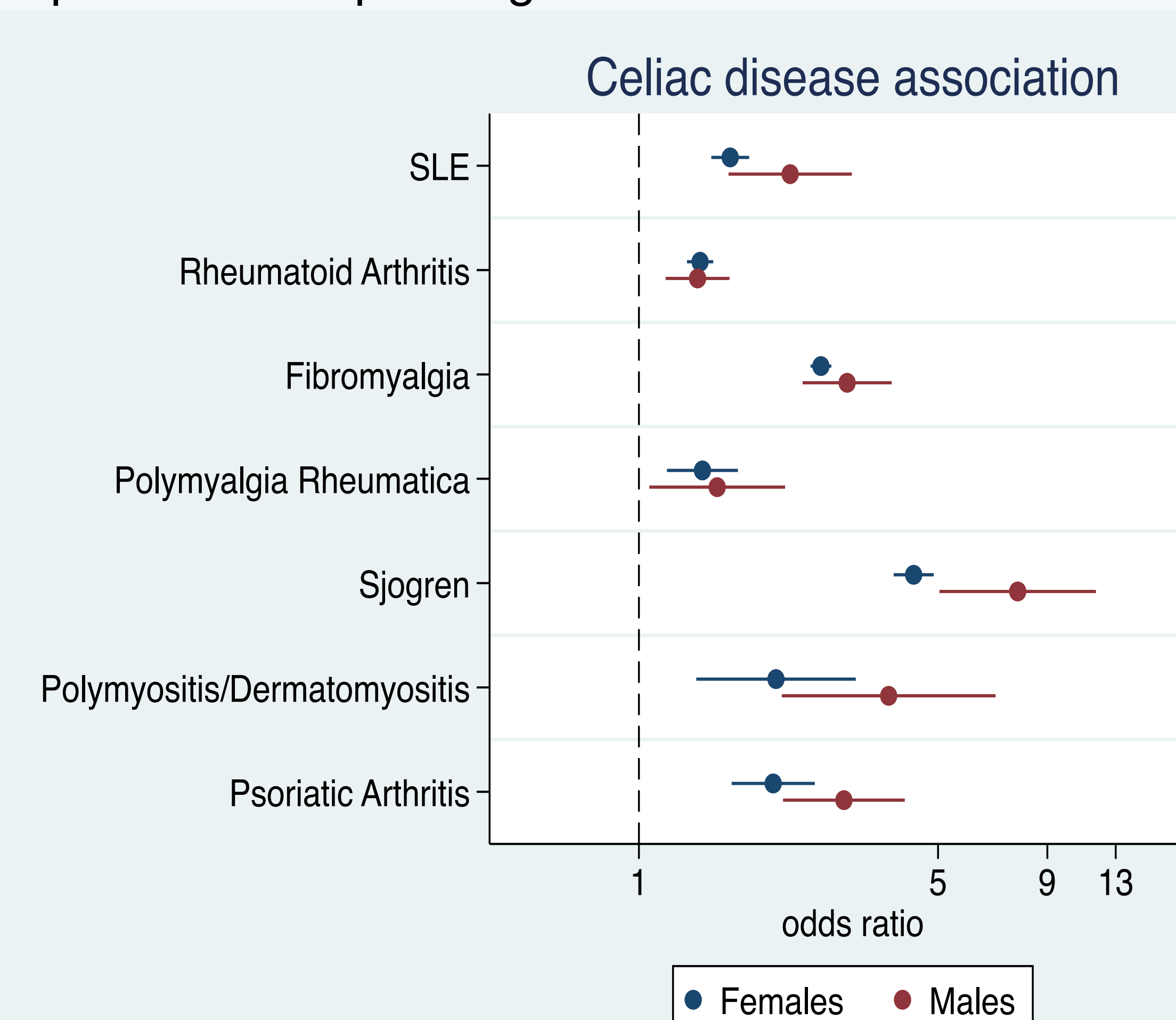


Table 1: Association of Celiac disease with Rheumatologic diseases

Rheumatologic diseases	Females		Males	
	Unadjusted OR	Adjusted OR <sup>a</sup>	Unadjusted OR	Adjusted OR <sup>a</sup>
SLE	2.49 <sup>b</sup>	1.72 <sup>b</sup>	2.89 <sup>b</sup>	2.51 <sup>b</sup>
RA	1.83 <sup>b</sup>	1.34 <sup>b</sup>	1.55 <sup>b</sup>	1.34 <sup>b</sup>
Fibromyalgia	3.06 <sup>b</sup>	2.09 <sup>b</sup>	3.44 <sup>b</sup>	2.59 <sup>b</sup>
PMR	1.65 <sup>b</sup>	1.35 <sup>b</sup>	1.65 <sup>b</sup>	1.52 <sup>b</sup>
PM/DM	2.86 <sup>b</sup>	2.11 <sup>b</sup>	4.51 <sup>b</sup>	4.44 <sup>b</sup>
PsA	2.71 <sup>b</sup>	1.57 <sup>b</sup>	3.32 <sup>b</sup>	2.63 <sup>b</sup>
Sjogren	6.68 <sup>b</sup>	3.91 <sup>b</sup>	10.25 <sup>b</sup>	7.37 <sup>b</sup>

<sup>a</sup> Adjusted for age, race, Elixhauser score and other rheumatologic conditions  
<sup>b</sup> significant and/or p<0.001

Graph 1: Forrest plot of gender-based association



## Results

- Our study included a sample size of 122,238,462 patients, of which celiac disease was present in 158,910 (0.13%) and was absent in 122,079,552 (99.87%) patients.
- In the study group, highest association was seen with Sjogren in males (aOR=7.37) and females (aOR=3.91), with p<0.001, followed by PM/DM (aOR=4.44 in males and aOR=2.11 in females [p-value <0.001] compared to the control group.
- Females with Celiac disease also had higher association of SLE (aOR=1.72), RA (aOR=1.34), Fibromyalgia (aOR= 2.09), PMR (aOR=1.35) and PsA (aOR=1.57), all with p<0.001.
- Similarly in males, Celiac disease had higher association of SLE (aOR=2.51), RA (aOR=1.34), fibromyalgia (aOR=2.59), PMR (aOR=1.52), and PsA (aOR, 2.63).

## Conclusion

- There is a significantly higher association of various Rheumatologic conditions in Celiac disease patients, more so in males than in females.
- Although, more studies are warranted to determine the causal relationship, knowledge about the association between the two can help with early diagnosis and better management of the underlying conditions in such patients.

## Contact

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