

Increasing incidence of Celiac Disease in North India : A Review

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Once perceived as a western autoimmune disorder, incidence of celiac disease is increasing in India too. In 2011, a study by AIIMS with 2879 subjects had found that 6 to 8 million Indians are suffering from this disease. 1 in 100 suffer from the disease in North India. While in south India, the estimated incidence is 1 in 1000. Celiac disease is more common than recognized in India. Its prevalence is thought to be approximately 1% in India. Systematic population based prevalence studies have suggested that celiac disease is as frequent in India as that in western countries. Asia is probably the major reservoir of undiagnosed celiac disease in the world. The current prevalence of disorders related with wheat could be attributed to the high yield hybrid varieties of wheat which have increased level of gluten.

[**Keywords** : CD (Celiac Disease), Gluten intolerance, Gluten sensitivity, Mal-absorption, Diarrhoea, Prevalence, Diagnosis, Hybrid]

1. Objectives

There is a lack of studies on prevalence of Celiac disease in India. The objective of the present study is to estimate the prevalence of Celiac disease in India, and to spread awareness among the people.

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2. Prevalence of Celiac Disease in India

The prevalence rate of celiac disease (including in India) is understood to be 1% globally with some variations across countries. In India the diagnosis rate of Celiac disease though is extremely low presently, only about 5% that would mean out of 100 people affected with celiac disease, 95 are not aware of this condition. According to experts at All India Institute of Medical Science, Celiac disease affects close to Six to eight million people in India. Celiac disease, caused by allergy to gluten present in wheat and related grains, is a disorder of considerable and increasing importance in western countries.¹ Originally recognized primarily in children presenting with diarrhoea and mal-absorption, we now understand that it often affects adults, that it may present primarily with non-gastrointestinal manifestations including anaemia, arthropathy, osteoporosis & growth retardation, and what we see clinically is the tip of an iceberg that threatens to grow bigger. The diagnosis of celiac disease is now made with serological tests which may capture those at risk as well as those with actual disease. While small bowel mucosal biopsy is considered essential to the diagnosis of disease, there is now increasing recognition that even a positive serological test is associated with increased risks for vascular disease.²

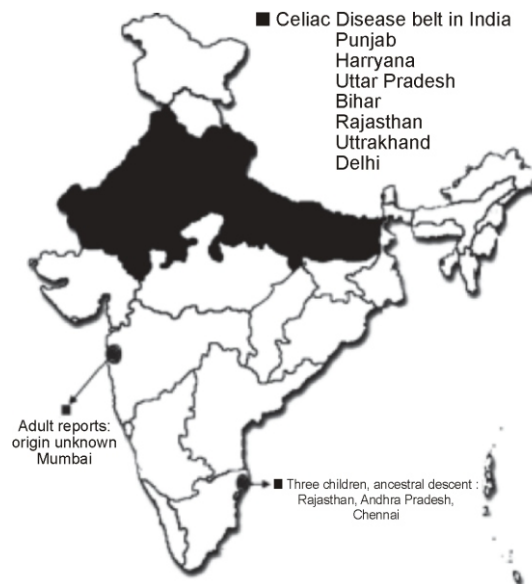


Figure-1 : Celiac disease occurrence in India based on published reports

The estimated population prevalence of diagnosed celiac disease in many western countries approaches 1%.³ The highest

prevalence rates of the disease are noted in the Saharawi People of Africa in whom celiac disease prevalence is believed to be around 5%.⁴ There is little information on celiac disease prevalence in South Asia, and indeed celiac disease is believed to be rare in this part of the world.⁷ Prevalence of celiac disease in a population broadly parallels the amount of wheat consumer in the diet. That's why it is more prevalent in North India in comparison to south India. Differences in celiac disease prevalence between North and South India could be ascribed to differences in dietary patterns (Rice being staple cereal in South India) or due to differences in genetic make-up.⁵ Cereal consumption patterns are very different between North and South India, although there has been a recent change in these patterns particularly in urban areas.

Thus Celiac disease is low or absent in Japan and Southeast Asia where rice is the main cereal consumed and in Sub - Saharan Africa where maize is the staple cereal in the diet. In the Indian Sub - continent, wheat consumption is high in Pakistan and in the States of North India, which also constitute the celiac belt of India.²

In India, Celiac disease is suspected to be more prevalent in the North Indian Population where wheat is primarily grown and forms the staple cereal. These States would include Punjab, Haryana, Delhi, Uttar Pradesh, Maharastra, Rajasthan, Bihar, Uttarakhand, Madhya Pradesh & Gujarat . So far, it was considered non-existent in South India but there is now evidence that it is being diagnosed in the native population of South India too though it is rarer than in the North. Studies show that the prevalence of celiac disease has been doubling every 20 years. It is not clear why there has been an increase in the number of cases but the reasons could be many - an overall increase in the consumption of wheat, usage of the new strain of wheat which is considered more antigenic, increased use of antibiotics etc.⁶

Table-1 : Prevalence of Celiac Disease among Indian Children

Place, Year	<i>n</i>	Material	Prevalence (%)
Pediatric			
Chandigarh, 1993 ¹³	137	MAS	26
	62 < 2 y age		9
	75 > 2 y age		91

Delhi, 1994 ¹⁴	47	Chronic diarrhea	6.8
Delhi, 1994 ¹⁵	800	Chronic diarrhea	7.5
Lucknow, 2006 ²²	246	Chronic diarrhea failure to thrive, anemia	16.6
Aligarh, 2006 ²²	346	Chronic diarrhea	11.3
Ludhiana, 2006 ³⁴	4347	School Children	0.32
Adults			
Ludhiana, 2001 ³⁷	202*	CD	
Chandigarh, 2002 ²³	19	Refractory IDA	57.8
Chandigarh, 2002 ²⁴	55	Villous atrophy	20
Lucknow, 2004 ²⁶	99	MAS	9
Mumbai, 2006 ²⁷	50	Chronic diarrhea	26

CD : Celiac disease; IDA : Iron-deficiency anemia; MAS : Mal-absorption syndrome

*Over 6 years period (1995-2000): Significant growth rate of 79.4% compounded annually; trend equation of 15.49 case/y (p<0.01)

Source : Indian Journal of Gastroenterology, Vol. 26, Sep-Oct 2007.

Celiac disease must not be confused with gluten allergy or its tolerance. The condition is the one where gluten consumption may cause damage to the small intestine. It is a kind of an autoimmune disorder occurring in people who are genetically predisposed. It is estimated that in India every 1 in 100 people suffer from celiac disease. Celiac disease is now seen as one of the emerging health epidemics. It is estimated that approximately 6 to 8 million Indians suffer from celiac disease. "Experts believe that the condition remains highly under-reported in the country."⁷

The biggest impediment in prevention & treatment of celiac disease is the limited awareness about it and its causes.⁸ Professor Govind Makharia (Department of Gastroenterology & Human Nutrition, AIIMS) said in a statement during 17th International Celiac disease Symposium (ICDS) organized by ISG (Indian Society of Gastroenterology), ISSCD (International Society for the study of Celiac disease) and the APAGE (Asia-Pacific Association of Gastroenterology).

3. Wide gap between CD Prevalence and Diagnosis



Diagnosis of Celiac disease increasing in western world, but in India very limited data is available regarding diagnosis and patient awareness. Where as the rate of new diagnosis of celiac disease has increased 7.5 % every year for the past few decades throughout the industrialized western world.⁹ Wheat, the staple food for crores of Indians, is also responsible for celiac disease - an autoimmune disorder - among lakhs of them. The numbers are rising but most Indians are unaware, experts said at a recent International Symposium on wheat related Disorders Jan 2019.^{12, 13}

According to experts the prevalence of celiac disease has jumped four folds in India since 1960s and now approximately 80 lakh people are affected.¹⁰ Studies reveals that 90 % of Indians are unaware of this disease. Thus a wide gap exists in India between the Celiac disease prevalence in the population (1%) and the prevalence based on diagnosis (0.02% - 0.27 %). Thus 90 to 95 % of Celiac disease remains undetected. There are very limited data available on prevalence of CD in India. The majority of data are from North India. The incidence of CD is increasing.²⁵ The prevalence of CD in India is probably not different from Caucasian populations²⁶ In a field study conducted among school children in Punjab, the estimated frequency of the disease was 1 in 310(0.3%)²⁷. This prevalence is probably an underestimation. The Siblings of CD patients have a high prevalence of CD (22%). In other studies, the prevalence of CD among the first degree relatives has been reported to be 8% to 25% (28-30). There are regional variations in the prevalence of CD due to genetic and dietary

factors, that is, the wheat - rice shift from the North to the South in India.³¹

4. Celiac Disease Genotype

Celiac disease has affected those with a specific gene type called DQA1 or B1. This gene in turn expresses the gene DQ2 or DQ8, which is prone to celiac disease.⁽¹⁰⁾ A 2015 study, however, revealed that only the presence of DQ2 or DQ8 is not enough for acquiring the disease, and other gene type can also exhibit the disease.¹¹ Out of 20,000 adults tested, 30 % did not have DQ2 or DQ8 in their genes. The Study found 1.2% of population in Haryana, 0.085% in Assam and one in a thousand people in South India had Celiac disease.¹¹

According to experts Celiac disease is just one of the many disorders related to wheat, and gluten is just one of the many triggers. The current prevalence of disorders related to wheat could be attributed to the “hybrid Varieties” of wheat which have increased levels of gluten.¹² Modern wheat breeding has increased in the protein parts that Cause celiac disease, known as epitopes. NORMAN BORLAUG, the Nobel prize - winning wheat breeder, not only introduced higher - yielding wheat but inadvertently created a high - gluten - wheat that humans have not evolved to digest. Why is modern wheat making us sick? That’s the question posed by author Eli Rogosa in her new book restoring heritage grains.¹³

Wheat is the most widely grown crop on our planet, yet industrial breeders have transferred this ancient stuff of life into a commodity of yield and profit - witness the increase in gluten intolerance and wheat belly. Modern wheat depends on synthetic fertilizers and herbicides that damage our health, land, water and environment. Fortunately, heritage ‘landrace’ wheat that evolved our millennia in the organic fields of traditional farms do not need biochemical intervention to yield bountifully, are gluten - safe (low gluten), have rich flavour and high nutrition. Yet the robust, majestic wheats that nourished our ancestors are on the verge of extinction.¹⁴

What’s with wheat is the story of how wheat production has changed over the course of millennia. Surprisingly, the wheat plant we know today is not the same as the plant our ancestors once harvested. This could be the reason behind the increase in celiac disease and gluten tolerance all around the world.¹⁵

5. Types of Wheat Cultivated in India

1. **Khapli wheat**—Also known as Samba, Emmer or Diabetic wheat. India is the biggest cultivator of khapli wheat in the world. It is rich in dietary fibre, chapati (Indian flat bread) made with khapli wheat can keep you full for longer and it reduces the lipid and glucose levels in the blood.
2. **Sharbati wheat**—This wheat cultivated in Sehore region of Madhya Pradesh. This golden grain is richer in protein content when compared with other types of wheat.
3. **Common bread wheat**—This is the most common variety of wheat produced not just in India, but worldwide. It also contains lots of protein. In India it is known as dwarf wheat.
4. **Durum wheat**—India also produces Durum wheat, also known as pasta wheat or macaroni wheat. This is because the coarse grain of the wheat is ground to make semolina, which is then formed into pasta, noodles, macaroni etc. It contains a high amount of gluten and has a similar nutritional value to common bread wheat.

Semolina flour is used in making pasta and Italian puddings. It is made from durum wheat, (The hardest type of wheat grown) the flour is highest in gluten.

6. Is main culprit the hybrid wheat?

Today's hybridized wheat contains hard - to - digest proteins that aren't found in the parent plant. Wheat raises blood sugar levels, causes immunoreactive problems, inhibits the absorption of important minerals and other nutrients and aggravates our intestines. Hybridized wheat indeed, today's wheat is a far cry from what it was 50 years ago. Back in the 1950s, scientists began cross - breeding wheat to make it hardier, shorter and better growing. This work, which was the basis for the Green Revolution - and one that won U.S. plant scientist Norman Borlaug the Nobel Prize - introduced some compounds to wheat that aren't entirely human friendly.¹⁶ Today's hybridized wheat contains sodium azide, a known toxin. It also goes through a gamma irradiation process during manufacturing.¹⁷ The ancient or diploid wheats (*e.g.* *Triticum monococcum*) are poorly antigenic, while the modern hexaploid wheats (*e.g.* *Triticum aestivum*) have highly antigenic glutens, more

capable of inducing celiac disease.^{17a} India for centuries grew diploid and later tetraploid wheat which is less antigenic, while hexaploid wheat used in making bread is recently introduced. Thus change back to older varieties of wheat may have public health consequences. Public health authorities may well want to examine both these avenues, *i.e.* infant feeding recommendations and wheat varieties cultivated in the country, for opportunities to avert the epidemic of celiac disease which is impending in our contry.^{17b}

In India, many more people are gluten insensitive than is commonly believed. Perceived as 'Western disease' gluten sensitivity has never really been taken seriously in India. It's most extreme form is celiac disease, caused by acute allergy to gluten, present in wheat and related grains such as barley and rye. A lack of awareness has meant it remains highly under - diagnosed.¹⁸ Dr. B. S. Ramakrishna wrote an editorial in IJMR calling Celiac disease an 'Impending Epidemic' and stating that "What we see clinically is the tip of an iceberg that threatens to grow bigger."

Awareness of CD is the need in developing countries particularly when the disease is treatable. Dimensions of CD in India seems to be huge and it is still unexplored from all quarters (population studies, atypical manifestation, inadequate referrals etc.) CD with extra intestinal manifestations known to occur particularly among adults should be searched. Malignancy as a complication of CD should be given importance in India and such cases should be reported. Where rice is the staple diet is likely to show up CD as the life style is changing rapidly and ethnic mixing is taking place.¹⁹ Wheat has been a fundamental source of nutrition for ages in India. Due to the growing sensitivity related to this power grain, it has become imperative to create awareness on a larger scale. The fact that wheat- related diseases are also associated with other conditions such as mouth ulcers, anaemia, osteoporosis, arthritis, easy fractures, etc., there is an urgent need to explore treatment options and safer or less harmful alternatives to wheat.²⁰ Once thought of as a Western disease, Celiac disease is yet to receive the much needed concern in India and Asia as a whole. The incidence of this condition has increased five - fold in the last since 1974. Apart from the fact that it can occur at any age and is highly under diagnosed, Celiac disease and gluten insensitivity can impact both physical and mental health. The need of the hour is to increase awareness among people and

physicians alike.²¹ Celiac disease and sensitivity to gluten in wheat are commonly unreported in India due to lack of awareness. This is also the biggest impediment in prevention and treatment.²² Statistics peg the prevalence of Celiac disease at 1% at a global level. Additionally, the prevalence of wheat - related disease is about 6% and more than 90% cases remain undiagnosed.²³ There is a lack of studies on the prevalence of celiac disease from Asian nations including India. It is estimated that the prevalence of CD in the North Indian community is 1 in 100. Its prevalence is thought to be approximately 1% in India. celiac disease is more common than is recognized in India. Although once considered uncommon, there is increasing recognition of celiac disease in Asia. It is now clear that CD is a disorder as frequent in certain Asian Countries as that in western countries, although it often remains undiagnosed. Systematic population based prevalence studies have suggested that celiac disease is as frequent in India as that in western countries. Asia is probably the major reservoir of undiagnosed celiac disease in the world.²⁴

7. Conclusion

Once perceived as a Western auto immune disorder, incidences of Celiac disease is increasing in India too. In 2011, a study by AIIMS with 2879 subjects had found that 6 to 8 million Indians are suffering from this disease - one in a hundred suffer from the disease in North India. While in South India, the estimated incidence is 1 in 1000. Globally, about 40 to 60 million people suffer from the disease. Both doctors and patients need to be made aware of this disease, more prevalent in North India. Screening for the disease is not expensive, but doctors at the primary health centres need to be made aware so they could diagnose the disease. Celiac disease, which the experts say 90% Indians are unaware of, has affected those with a specific gene type called DQA1 or B1. This gene in turn expresses the genes DQ2 or DQ8, which is prone to CD. The current prevalence of disorders related to wheat could be attributed to the high yield hybrid varieties of wheat which have increased level of gluten.

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