

# Physicians awareness of Celiac disease screening in high risk pediatric age groups in King Abdulaziz Medical City, National Guard Health Affairs, Riyadh, Saudi Arabia

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## Abstract

**Background:** Celiac disease (CD) is an autoimmune disease triggered by a permanent sensitivity to gluten in the small intestine and multiple other organs. We aim in this study to assess physicians' knowledge, practice and attitude towards celiac disease screening. Assessing the physicians' knowledge will help us to understand how we can improve the practice regarding celiac disease.

**Methodology:** A cross-sectional study using a validated questionnaire from previous studies distributed electronically among primary care and pediatric physicians. The questionnaire consisted of: 7 questions about physicians characteristics, 15 questions about knowledge, 15 questions about attitude and 5 practice questions. Respondents were asked to identify any queries they had about the questions. The questionnaire took approximately 10 minutes.

**Results:** The mean age of 32.31 years old where 79.9 % of the participants were aged under 40 years old. Moreover, 52.3 % of the participants were females. Considering specialty, we found that 48.5 % of the participants were family medicine physicians while 47.0 % were general pediatrics. Chronic/ intermittent diarrhea and weight loss were the most commonly known symptoms among the participants (85.1 % and 85.6 % respectively) followed by abdominal pain. The most commonly used screening tool of celiac disease, 78.1 % of the participants

had a positive anti-tissue transglutaminase (tTG) antibody and 85.6 % of them were able to identify the diagnosis of CD, however only 20.9 % correctly identified the appropriate management for follow-up.

**Conclusion:** The study shows a moderate knowledge about CD among physicians with no formal training in pediatric gastroenterology. The physicians had moderate knowledge considering symptoms and risk factors of CD with good knowledge considering the diagnosis tool. More educating courses should be provided to the physicians about the diagnosis and management of CD.

**Key words:** awareness, Celiac disease, pediatric age group, Saudi Arabia

Introduction

Celiac disease (CD) is an autoimmune disease triggered by gluten consumption in genetically susceptible individuals. It is characterized by a variable combination of gastrointestinal, extra-intestinal, and dermatological symptoms. Celiac arises in people carrying the class II alleles HLA-DQ2 or HLA-DQ8. It is characterized by a variable combination of symptoms such as chronic diarrhea, weight loss, and abdominal bloating. Some patients can present with the classic triad symptoms such as chronic diarrhea, weight loss, and abdominal bloating. Some patients can present with the classic triad symptoms such as chronic diarrhea, weight loss, and abdominal bloating.

It is considered one of the most common autoimmune diseases worldwide, with a prevalence of 0.5-1% of the general population. The prevalence of celiac among the general healthy Arab adult population was found to range from 0.14% to 3.2%, with Saudi Arabia having the highest prevalence (3.2%) and Tunisia being the lowest (0.14%). In Arab children, the estimated prevalence was found to be ranging from 0.6% to 1.5%. Studies conducted in Saudi Arabia estimated the disease's frequency in children to be 1:250-100. A Meta-Analysis of Prevalence of Celiac disease in Saudi Arabia showed that the highest prevalence of CD in Saudi Arabia was in Al-Qaseem region (3.2%). However, Riyadh and Jeddah regions had the lowest prevalence.

Celiac disease can present at any age starting from early childhood to adulthood, with two peaks of onset; one in the first decade of life and the other one in the second or third decades of life. The classic triad symptoms such as chronic diarrhea, weight loss, and abdominal bloating. Some patients can present with the classic triad symptoms such as chronic diarrhea, weight loss, and abdominal bloating. Some patients can present with the classic triad symptoms such as chronic diarrhea, weight loss, and abdominal bloating.

These risk groups include individuals with diabetes mellitus type 1 with a prevalence range from 5.5% to 20%, autoimmune thyroiditis, Down's syndrome, Turner syndrome, and other autoimmune diseases. These risk groups include individuals with diabetes mellitus type 1 with a prevalence range from 5.5% to 20%, autoimmune thyroiditis, Down's syndrome, Turner syndrome, and other autoimmune diseases.

A study done in the eastern region of Saudi Arabia stated that gastroenterologists diagnosed about 56% of celiac patients, while other physicians 33%, and primary healthcare physicians diagnosed about 10% of the cases. The study also found that gastroenterologists play an essential role in detecting patients' celiac disease earlier. Therefore, instructing primary health care physicians is necessary to improve awareness of CD in the healthcare system. A study done at King Khalid University Hospital and King Saud University to assess the knowledge of CD among the medical professionals showed poor knowledge and the need to improve awareness of CD in the healthcare system.

In 2018, a study was done in the US among general physicians which found that physicians tend to order unnecessary celiac serological testing, and that is overutilization of hospital resources. Also, it may lead to a false-positive result in which physicians tend to ask for a second blood sample. The biopsy-sparing approach showed decreases in the rate of complications of anesthesia and cost. European Society of Pediatrics Gastroenterology, Hepatology, and Nutrition (ESPGHAN) 2012 guidelines recommended against biopsy if:

- TGA-IgA is ten times more than the upper limit of normal.
- EMA-IgA test is positive in the second blood sample.

In fact, there is little evidence from the United States Task Force on Celiac Disease that these criteria identify asymptomatic individuals. They recommend further studies to recognize the ideal screening approach and its cost-effectiveness.

However, in 2018, a study conducted in New York determined the overall poor adherence to the guidelines of screening celiac disease. Additionally, it showed that if we educate the primary health care physician about celiac disease, the adherence to the guidelines will improve. On the other hand, 75 to 90% of celiac patients in western countries are unrecognized. This under diagnosis may happen due to the physician's poor awareness of the variety of the clinical presentations. The study also showed that the under diagnosis of celiac disease leads to a variety of complications such as intestinal lymphoma, small bowel adenocarcinoma, refractory celiac disease, and other autoimmune diseases.

We aim in this study to assess physicians' knowledge, practice and attitude towards celiac disease screening. Moreover, we aimed to compare between specialties considering their knowledge of celiac disease screening. Assessing the physicians' knowledge will help us to understand how we can improve the practice regarding celiac disease.

## Material and Methods

### Study Area/Setting:

All King Abdulaziz Medical City, National Guard Health Affairs in Riyadh, Saudi Arabia and related Primary Health Care Centers (Health Care Specialty Center, King Abdulaziz City Housing, King Saud City Housing, National Guard Comprehensive Specialized Clinic, Prince Bader Residential City Clinic)

### Study Subjects:

All physicians working in KAMC-NGHA from family medicine and pediatrics (Resident, Staff, Consultants) were included in the study. Pediatrics gastroenterologists and physicians who have a child with celiac disease were

### Study Design:

A cross-sectional study using a validated questionnaire from previous studies was distributed electronically among primary care and pediatric physicians. It is a quantitative, observational cross-sectional study.

### Sample Size:

412 physicians were included in this study; 276 Family Medicine physicians, 67 residents, 55 Consultants, and 154 Staff Physicians, in addition to, 136 Pediatric physicians, 103 residents, 23 General pediatrics consultants, and 10 Pediatricians working under the family medicine department. The total number of physicians was 412. We targeted all the study population without sampling. We assumed a total physician population of 1000 for the sake

### Data Collection Methods, Instrument Used, Measurements:

An online survey was distributed by e-mail. The questionnaire was constructed by the authors of this literature review that addressed the topic of the study. After constructing the questionnaire, it was reviewed by 2

The questionnaire consisted of: 7 questions about physicians characteristics, 15 questions about knowledge, 15 questions about attitude and 5 practice questions. Respondents were asked to identify any queries they had

### Data Management and Analysis Plan:

Only the investigators had access to the data. Data was analyzed using Statistical Package for the Social Sciences (SPSS). All statistical tests were

variables were reported in the form of mean and standard deviation. T-test and ANOVA were used to compare means. Qualitative variables, were in the form of frequency and percentages. Chi-square was used to compare categorical variables.

## Results

The total collected sample was 372 responses, however, gastroenterologist, or one of their children had been diagnosed with celiac disease and because they were was 264 participants with mean age of 32.31 years old where 79.9 % of the participants were aged under 40 years old. Moreover, 52.3 % of the participants were females. Considering specialty, we found that 48.5 % of the participants were family medicine physicians while 47.0 % were general pediatrics. Moreover, 61.4 % of the participants were residents while 17.8 % of them were consultants. Furthermore, 60.6 % of the participants reported that primary health care was their practice setup while 39.4 % reported specialized pediatric clinics. Only 15.2 % of the participants reported using guidelines for the diagnosis and treatment of celiac disease where 35 % of them used ACG while 17.5 % used British society of gastroenterology guidelines (Table 1).

Considering the knowledge of the participants about the symptoms of celiac disease, we found that chronic/intermittent diarrhea and weight loss were the most commonly known symptoms among the participants (85.1 % and 85.6 % respectively) followed by abdominal pain (78.1 %) with no great difference between the different specialty of the participants. However, only 28.4 % and 27.9 % knew that recurrent nausea, recurrent vomiting and chronic constipation are symptoms of celiac disease. On the other hand, 13.5 % of the participants falsely thought that acute bloody diarrhea is one of celiac disease's symptoms. Moreover, considering the difference between the different specialty of participants, we found that the general practitioners had the lowest knowledge considering the main three symptoms including chronic diarrhea (80.0 %), weight loss (70.0 %) and abdominal pain (60 %) while the pediatric physicians had the highest level of knowledge (Figure 1).

Moreover, weight loss was the most common clinical situations that raise the suspicion of celiac disease in a pediatric patient for 70.4 % of the participants, followed by stunted growth/short stature (63.3 %), and unresponsive than half of the sample failed to identify other situations. Considering the difference between specialties, we found that pediatrics tend more to consider weight loss as common symptoms that increased suspicion of CD, higher than other specialties, stunted growth/short stature anemia for family medicine physicians (Figure 2).

Table 1: The general characteristics of the participants

		Count	Column N %
<b>Age category</b>	< 40	211	79.9 %
	> 40	53	20.1 %
<b>Gender</b>	Male	126	47.7%
	Female	138	52.3%
<b>Specialty:</b>	Family Medicine	128	48.5%
	General Practitioner	12	4.5%
	General Pediatrics	124	47.0%
<b>Position:</b>	Resident	162	61.4%
	Staff	29	11.0%
	Associate consultant	11	4.2%
	Assistant consultant	15	5.7%
	Consultant	47	17.8%
<b>What is your practice setup?</b>	Primary health care	160	60.6%
	Specialized pediatric clinics	104	39.4%
<b>Did you use any guidelines for the diagnosis and treatment of celiac?</b>	Yes, (please specify)	40	15.2%
	No	224	84.8%
<b>Yes, (please specify)</b>	AAFP	6	15 %
	ACG	14	35 %
	British Society of Gastroenterology	7	17.5 %
	Other	13	32.5 %

Figure 1: The knowledge of the participants considering symptoms of celiac disease

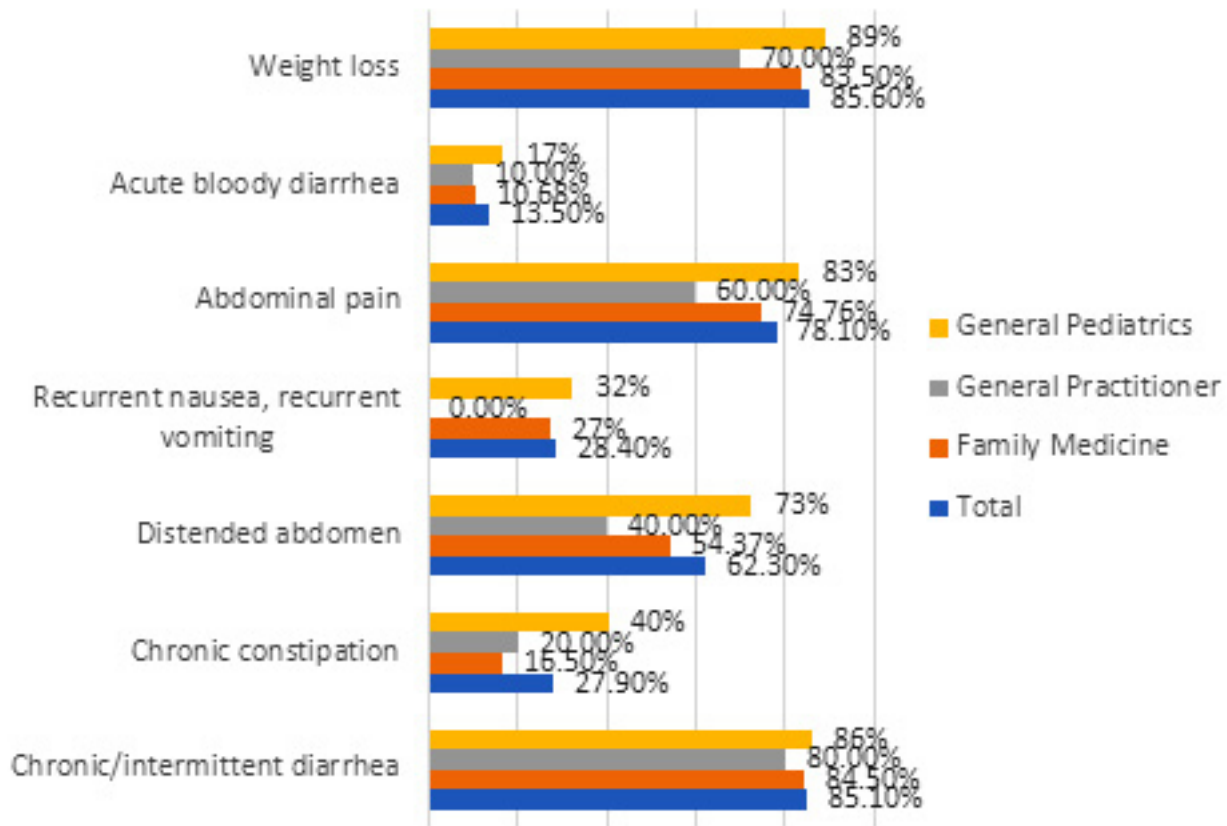
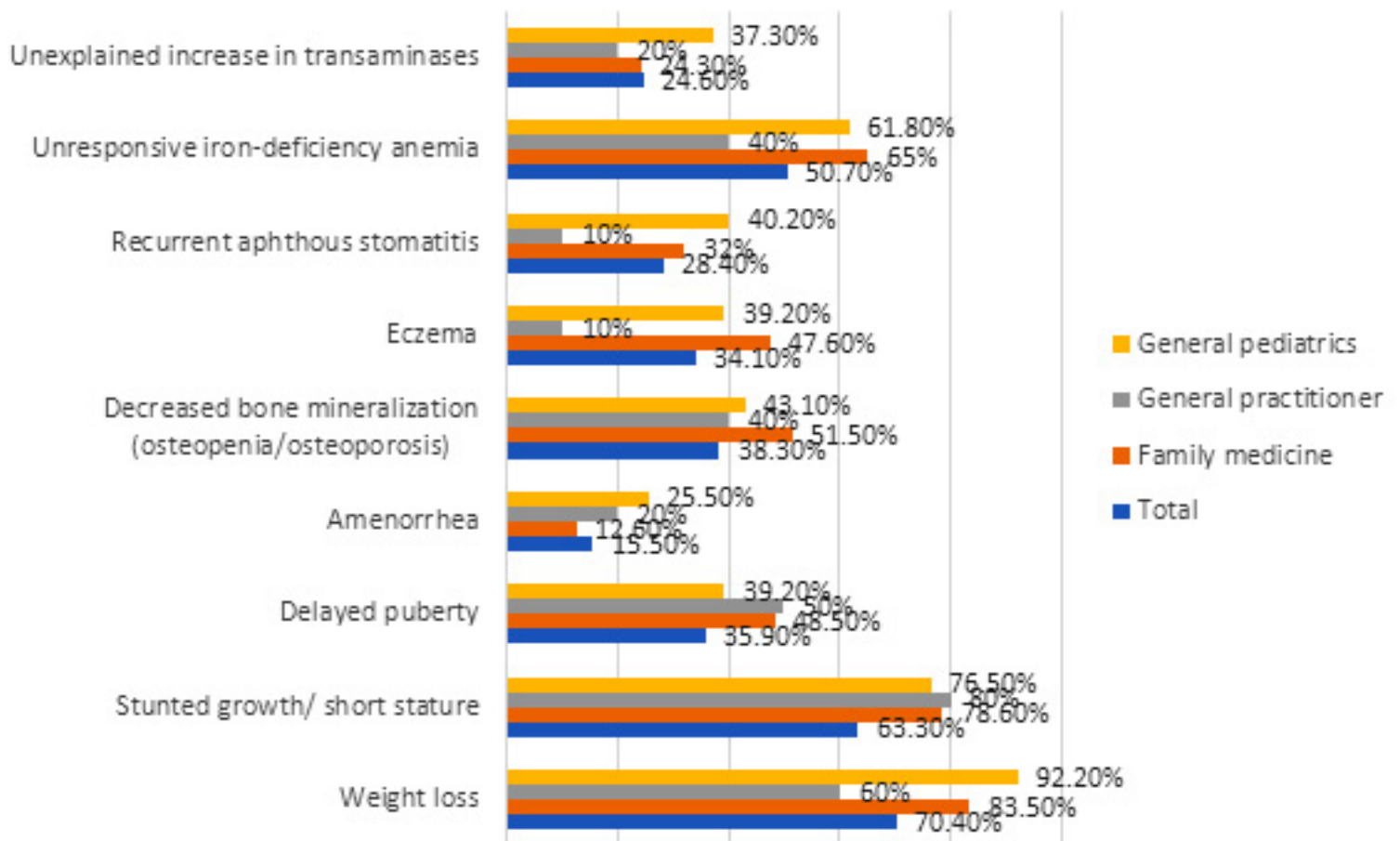




Figure 2: Clinical situations that raise the suspicion of celiac disease in pediatric patient



Moreover, 72 % of the participants knew that children with a Down syndrome as a risk group that was targeted for screening while pediatrics were the highest groups considered those with type 1 diabetes mellitus, autoimmune thyroiditis, Down syndrome and 32.6 % (Figure 3).

Down syndrome as a risk group that was targeted for screening while pediatrics were the highest groups considered those with type 1 diabetes mellitus, autoimmune thyroiditis, Down syndrome and 32.6 % (Figure 3).

Moreover, we found that 51.8 % of the participants knew that intestinal lymphoma is one of the malignancies related to CD as well as small bowel adenocarcinoma (43.9 %). Considered taminase antibody and 85.6 % of them were able to identify endomysium antibody as best tool for follow-up. Moreover, 79.1 % of the participants knew that low total IgA level could lead to a false negative result in celiac screening while 64.7%

knew that Celiac disease can be diagnosed without duodenal biopsies in cases of symptomatic children and 74.9 % of them knew that age of onset of Celiac disease often started gluten-free diet is not recommended before intestinal biopsy and 52.1 % knew that it should be recommended only after results of biopsy are reported. Furthermore, 79.5 % of the screened and 84.7 % knew that patients should have regular follow-up by specialists in gastroenterology (Table 2).

Figure 3: Clinical situations in which screening for celiac disease in pediatrics patients

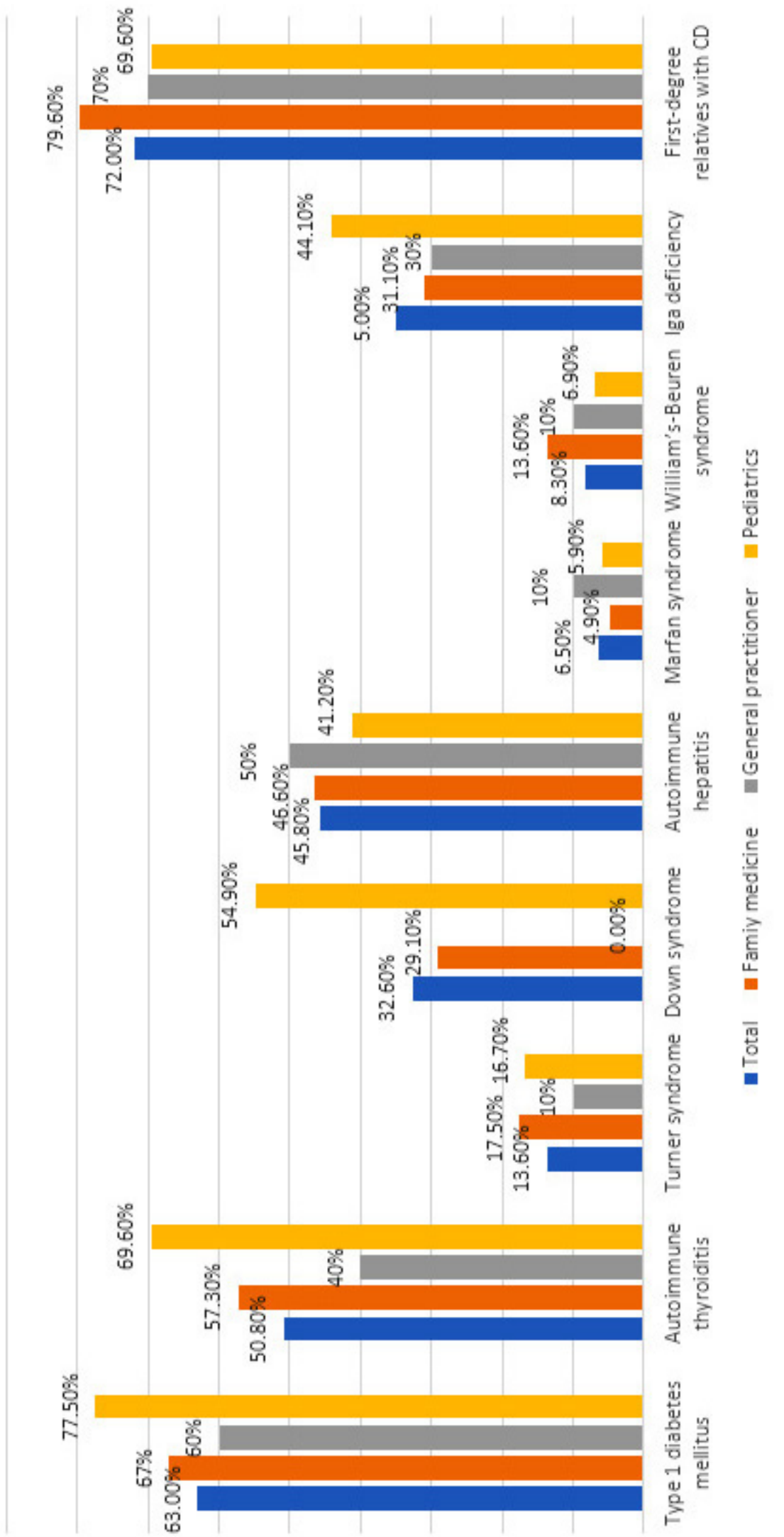


Table 2: The knowledge of the participants considering diagnosis of CD

		Count	Column N %
Which of the following malignancies are related to celiac diseases?	Hepatocellular carcinoma	23	8.7%
	Intestinal lymphoma	137	51.8%
	Small bowel adenocarcinoma	116	43.9%
Which of the following investigations, is the best as the first-line for the screening of celiac disease?	Anti-tissue transglutaminase antibody (Correct answer)	168	78.1%
	Anti-endomysium antibody	20	9.3%
	Total IgA	13	6.0%
	Abdominal ultrasound	2	0.9%
	HLA DQ 2 or DQ8	5	2.3%
	Bowel biopsy	7	3.3%
Which of the following investigations, is the best to confirm the diagnosis of celiac disease?	Anti-tissue transglutaminase antibody	9	4.2%
	Anti-endomysium antibody	10	4.7%
	Total IgA	6	2.8%
	Abdominal ultrasound	2	0.9%
	HLA DQ 2 or DQ8	4	1.9%
	Bowel biopsy (Correct answer)	184	85.6%
Which of the following investigations, is the best to follow up after diagnosis of celiac disease?	Other (please specify)	7	3.3%
	Anti-tissue transglutaminase antibody	106	49.3%
	Anti-endomysium antibody (Correct answer)	45	20.9%
	Total IgA	25	11.6%
	Abdominal ultrasound	3	1.4%
	HLA DQ 2 or DQ8	8	3.7%
	Bowel biopsy	21	9.8%
Low total IgA level could lead to a false negative result in celiac screening?	Yes (Correct answer)	170	79.1%
	No	45	20.9%
In symptomatic children, Celiac disease can be diagnosed without duodenal biopsies?	Yes (Correct answer)	139	64.7%
	No	76	35.3%
In asymptomatic children, Celiac disease can be diagnosed with duodenal biopsies?	Yes	144	67.0%
	No (Correct answer)	71	33.0%
The age of onset of Celiac disease often starts as early as six months?	Yes (Correct answer)	161	74.9%
	No	54	25.1%
Do you recommend a gluten-free diet before intestinal biopsy?	Yes	105	48.8%
	No (Correct answer)	110	51.2%
Do you recommend a gluten-free diet only after the intestinal biopsy?	Yes (Correct answer)	112	52.1%
	No	103	47.9%
First degree relatives of celiac disease patients should be screened?	Yes (Correct answer)	171	79.5%
	No	44	20.5%
Celiac disease patients should have regular follow-up by specialists in gastroenterology?	Yes (Correct answer)	182	84.7%
	No	33	15.3%





**Table 4: Practices of the physicians considering patients with CD**

	Count	Column N %
How often do you see celiac disease patients per year?	1-2 times per year	95 (48.0%)
	3-5 times per year	48 (24.2%)
	> 6 times per year	18 (9.1%)
	Never	37 (18.7%)
Do you refer the patient to gastroenterology in cases of positive serological tests for final diagnosis?	Yes	170 (85.9%)
	No	28 (14.1%)
Do you refer celiac disease patients to dietitian for a gluten free diet?	Yes	179 (90.4%)
	No	19 (9.6%)
Do you provide celiac disease health education to every patient you encounter?	Yes	108 (54.5%)
	No	90 (45.5%)
Do you follow-up celiac disease patients?	Yes	116 (58.6%)
	No	82 (41.4%)

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**Table 5: The relation between the level of knowledge and demographic factors**

		Knowledge				P-value
		Low knowledge		High		
		Count	Row N %	Count	Row N %	
Age	< 40	129	73.7%	46	26.3%	0.000*
	> 40	18	45.0%	22	55.0%	
Gender	Male	69	63.9%	39	36.1%	0.156
	Female	78	72.9%	29	27.1%	
Specialty:	Family Medicine	72	69.9%	31	30.1%	0.584
	General Practitioner	8	80.0%	2	20.0%	
	General Pediatrics	67	65.7%	35	34.3%	
Position:	Resident	100	74.1%	35	25.9%	0.021*
	Staff	12	57.1%	9	42.9%	
	Associate consultant	6	66.7%	3	33.3%	
	Assistant consultant	11	84.6%	2	15.4%	
	Consultant	18	48.6%	19	51.4%	
Did you use any guidelines for the diagnosis and treatment of celiac disease?	Yes	9	28.1%	23	71.9%	0.000*
	No	138	75.4%	45	24.6%	









