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THE KNOWLEDGE OF IRAQI PHYSICIANS ABOUT CELIAC DISEASE AT BAGHDAD MEDICAL CITY 2024

[*1]Ruaa Baha Aldeen Mahdi Al-Baghdadi, [2]Tamara Abdel Wahab Rasheed, Ola Baha Aldeen Mahdi[3]

[1]Al-Rusafa Health Directorate, Baghdad, Iraq.
[2]Al-Rusafa Health Directorate, Baghdad, Iraq.
[3]Ministry of Health

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***Corresponding Author: Ruaa Baha Aldeen Mahdi Al-Baghdadi**
Al-Rusafa Health Directorate, Baghdad, Iraq.

ABSTRACT

Background: Celiac disease is a lifelong systemic autoimmune disorder elicited by gluten and related prolamins in genetically susceptible individuals, with a global prevalence of approximately 1.4 %, The only available treatment is a lifelong, strict gluten-free diet. The study aim is to assess the knowledge of Iraqi physicians about celiac disease at Baghdad Medical City and association with their sociodemographic data. **Methodology:** A Descriptive cross-sectional study was carried out from the 1st of February till 31th of July 2024, including 358 Iraqi physicians at Baghdad Medical City by convenient sampling to assess their knowledge via direct interview questionnaire; The questions were divided into subsections on (epidemiology, clinical presentation, diagnosis, treatment, and follow-up). Achieved scores in their regional knowledge analysis that varied among specialists, residents, and interns. **Results:** The majority of participants were female (60.3%), with age group was 30-40years, and the common source of information was from the book; overall knowledge was fair at 59.2%. Only 24.3% scored good, while poor stood for 16.5%. Pediatric specialists showed the highest levels of good knowledge, with 50% achieving this level, followed by family medicine specialists, with 37.8% showing good knowledge. In contrast, emergency medicine specialists showed a high percentage of poor knowledge, 47.1%, and none achieving good knowledge, highlighting significant differences across specialties (P = 0.0001). **Conclusion:** Physician knowledge of celiac disease was unsatisfactory, with notable differences across specialties. These findings highlight the need for targeted education to close knowledge gaps, improve early diagnosis, and enhance patient care.

KEYWORDS: The Knowledge, Iraqi Physicians, Celiac Disease, Baghdad Medical City.

INTRODUCTION

Celiac disease (CD) is one of the most prevalent chronic, lifelong immune-mediated systemic disorders triggered by the ingestion of gluten and related prolamins in genetically susceptible individuals. Consumption of gluten-containing foods can provoke a gluten-specific hypersensitivity response, initiating an autoimmune process that damages the small intestinal mucosa. Strict and lifelong adherence to a gluten-free diet leads to resolution of the immune response, resulting in clinical, serological, and histological remission. The initial step in diagnosing CD involves awareness of the condition and recognition of its diverse manifestations.[1,2] Diagnosing celiac disease can be particularly challenging due to its highly variable presentation. With over 200 known symptoms, the disease may affect the gastrointestinal system or manifest in extraintestinal ways. While some individuals are diagnosed during childhood, others develop symptoms in adulthood; the underlying cause of this variability remains unclear.[3,4] Raising awareness about CD is essential to facilitate early detection and intervention. Delayed diagnosis may lead to a range of systemic complications, including growth retardation and delayed puberty in children, infertility, osteoporosis, and various autoimmune or endocrine disorders. In severe cases, life-threatening conditions such as enteropathy-associated T-cell lymphoma can occur.[5-7] Aims of the study to assess the knowledge of Iraqi physicians about celiac disease at Baghdad Medical City and to demonstrate the knowledge association with their socio-demographic data.

METHOD

A descriptive cross-sectional study was conducted to assess physicians' knowledge regarding celiac disease. The study was carried out over a six-month period, from February 1 to July 31, 2024, with data collection occurring 3 to 4 days per week. The study population consisted of a convenient sample of 358 doctors working at Baghdad Medical City hospitals, who were available and willing to participate at the time of data collection. Participants included interns, residents, and specialists who consented to take part in the study. Physicians who were unavailable during data collection or declined due to workload were excluded. Data were collected using a structured questionnaire developed by the researcher and reviewed by a supervisor. It was adapted from internationally recognized questionnaires and modified based on the input of two gastroenterologists—one pediatric and one adult specialist.[8] The questionnaire comprised two main sections: sociodemographic data (age, gender, job title, specialty, years of experience, source of information, and family history of celiac disease), and a knowledge assessment segment covering epidemiology, clinical features, diagnosis, and treatment of celiac disease. The knowledge section included 14 single-answer questions and 5 multiple-answer items, with a total score ranging from 0 to 50. Each correct answer received a score of 1, and incorrect or "I don't know" responses scored 0. Final scores were converted into percentages and categorized into poor (<50%), fair (50–69.9%), and good (≥70%) knowledge levels. Data were analyzed using SPSS version 26. Categorical variables were examined using the chi-square or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant. Ethical approval was obtained from the Arab Board of Family Medicine. Verbal consent was secured from all participants, and confidentiality was maintained throughout the study. **Limitations:** Limited time for data collection and participant availability due to busy schedules.

RESULTS

A study was conducted at the Medical City hospitals involving a total of 358 physicians. The gender distribution indicated that females constituted the majority, with 216 participants (60.3%). Most participants (60.6%) were aged between 30 and 40 years. Regarding professional status, the cohort comprised 20 interns (5.6%), 289 residents (80.7%), and 49 specialists (13.7%). When excluding interns, analysis of specialties among the remaining 338 residents and specialists revealed that internal medicine and its subspecialties represented the largest group (27.2%, n=92), followed by general surgery and subspecialties (24.0%, n=81), family medicine (11.0%, n=37), pediatrics (10.1%, n=34), clinical hematopathology and neurophysiology (9.5%, n=32), emergency medicine (5.0%, n=17), obstetrics and gynecology (4.7%, n=16), psychiatry (4.4%, n=15), and radiology and radiotherapy (4.1%, n=14). The majority of participants (58.7%, n=210) had variable durations of professional experience. Additionally, 41 participants (11.5%) reported having a close relative diagnosed with celiac disease. In table 1.

Table 2 demonstrated a statistically significant association between doctors' professional category and their knowledge of the epidemiology and clinical presentation of celiac disease (P = 0.003). Interns mostly had fair knowledge (65%), while 41.9% of residents and 51.0% of specialists demonstrated good knowledge. Regarding specialty, internal medicine and pediatrics exhibited the highest levels of good knowledge (66.3% and 64.7%, respectively), with emergency medicine displaying the lowest (11.8%).

Table 3 indicated significant associations between knowledge of diagnostic procedures and both gender (P = 0.008) and specialty (P = 0.0001). Female doctors predominantly scored in the fair knowledge category. Internal medicine and pediatric specialists showed the highest proportions of good knowledge (59.8% and 58.8%, respectively), whereas emergency medicine specialists had the highest rate of poor knowledge (58.8%) with none in the good knowledge category.

Table 4 further illustrated significant variations in treatment-related knowledge across specialties (P = 0.004). Family medicine and pediatrics demonstrated the highest good knowledge levels (45.9% and 41.2%, respectively), while general surgery and emergency medicine had notably lower knowledge scores.

Table 5 reinforced the significant association between specialty and overall knowledge regarding celiac disease (P = 0.0001). Pediatricians had the highest proportion of good knowledge (50%), followed by family physicians (37.8%). Conversely, emergency medicine specialists showed the highest rate of poor knowledge (47.1%) and no participants in the good category.

Overall, the majority of participants (59.2%, n=212) demonstrated fair knowledge regarding celiac disease, as shown in Figure 1.

Table 1: Distribution of studied sample according to sociodemographic data at medical city.

Sociodemographic features		No.	%
Gender	Female	216	60.3
	Male	142	39.7
Age	Under 30	116	32.4
	30-40	217	60.61
	41-50	17	4.75
	Over 50	8	2.24

Physicians' category	Intern	20	5.6
	Resident	289	80.7
	Specialist	49	13.7
Resident and specialist specialty (n=338)	internal medicine &subspecialities	92	27.2
	general surgery &subspecialities	81	24.0
	family medicine	37	11.0
	pediatric	34	10.1
	clinical hematopathology & neurophysiology	32	9.5
	emergency medicine	17	5.0
	Obstetrics & gynecology	16	4.7
	psychiatric	15	4.4
	radiotherapy & radiology	14	4.1
Experience duration (Years)	Less than 5	96	26.8
	5 - 10	210	58.7
	11 - 15	28	7.8
	More than 15	24	6.7
Do you have a Relative with Celiac Disease	Yes	41	11.5
	No	317	88.5
Total		358	100

Table 2: The association of the participant's knowledge about celiac disease epidemiology & clinical presentation and their sociodemographic data.

Doctors		**Knowledge epidemiology & clinical presentation**								**P value**
		(Poor)		50-70% (Fair)		> 70% (Good)		Total		
		No = 52	**% 14.53**	**No = 158**	**% 44.13**	**No = 148**	**% 41.34**	**No= 358**	**% 100**	
Gender	Female	29	13.4	103	47.7	84	38.9	216	100	0.246
	Male	23	16.2	55	38.7	64	45.1	142	100	
Age	Under 30	16	13.8	60	51.7	40	34.5	116	100	0.189
	30-40	30	13.82	91	41.94	96	44.24	217	100	
	41-50	3	17.65	5	29.41	9	52.94	17	100	
	Over 50	3	37.5	2	25.0	3	37.5	8	100	
Physicians' category	Intern	5	25.0	13	65.0	2	10.0	20	100	**0.003**
	Resident	36	12.4	132	45.7	121	41.9	289	100	
	Specialist	11	22.45	13	26.53	25	**51.02**	49	100	
Specialty	**internal medicine &subspecialities**	3	3.3	28	30.4	61	**66.3**	92	100	**0.0001**
	general surgery &subspecialities	20	24.7	43	53.1	18	22.2	81	100	
	family medicine	1	2.7	15	40.5	21	**56.8**	37	100	
	pediatric	1	2.9	11	32.4	22	**64.7**	34	100	
	clinical hematopathology & neurophysiology	6	18.75	20	62.5	6	18.75	32	100	
	emergency medicine	6	**35.3**	9	52.9	2	11.8	17	100	
	Obstetrics & gynecology	2	12.5	7	43.75	7	43.75	16	100	
	psychiatric	4	26.7	7	46.6	4	26.7	15	100	
	Radiology & radiotherapy	4	28.6	5	35.7	5	35.7	14	100	
Experience duration (Years)	Less than 5	16	16.7	47	49.0	33	34.3	96	100	0.189
	5 - 10	24	11.43	95	45.24	91	43.33	210	100	
	11 - 15	6	21.43	9	32.14	13	46.43	28	100	

	> 15	6	25.0	7	29.2	11	45.8	24	100	
Have a Relative with CD	No	47	14.8	137	43.2	133	42.0	317	100	0.621
	Yes	5	12.2	21	51.2	15	36.6	41	100	

Table 3: The association of the participant's knowledge about celiac disease diagnostic procedure and their sociodemographic data.

Doctors		**Knowledge about diagnostic procedure**								**P value**
		(Poor)		**(Fair)**		**(Good)**		**total**		
		No= 68	**% 19**	**No= 178**	**% 49.7**	**No= 112**	**% 31.3**	**No = 358**	**% 100**	
Gender	**Female**	41	**18.9**	120	55.6	55	**25.5**	216	100	**0.008**
	Male	27	**19.01**	58	40.85	57	**40.14**	142	100	
Age	Under 30	27	23.3	60	51.7	29	25.0	116	100	0.176
	30-40	37	17.1	106	48.8	74	34.1	217	100	
	41-50	1	5.9	8	47.05	8	47.05	17	100	
	Over 50	3	37.5	4	50.0	1	12.5	8	100	
Physicians' category	Intern	5	25.0	12	60.0	3	15.0	20	100	0.399
	Resident	56	19.4	143	49.5	90	31.1	289	100	
	Specialist	7	14.3	23	46.9	19	38.8	49	100	
Specialty	**internal medicine &subspecialities**	4	**4.3**	33	35.9	55	**59.8**	92	100	**0.0001**
	general surgery &subspecialities	26	32.1	47	58.0	8	9.9	81	100	
	family medicine	4	10.8	23	62.2	10	27.0	37	100	
	pediatric	2	**5.9**	12	35.3	20	**58.8**	34	100	
	clinical hematopathology& neurophysiology	5	15.6	19	59.4	8	25.0	32	100	
	emergency medicine	10	**58.8**	7	41.2	0	**0.0**	17	100	
	Obstetrics & gynecology	4	25.0	10	62.5	2	12.5	16	100	
	psychiatric	6	40.0	6	40.0	3	20.0	15	100	
	Radiology & radiotherapy	2	14.3	9	64.3	3	21.4	14	100	
Experience duration (Years)	Less than 5	20	20.8	53	55.2	23	24.0	96	100	0.593
	5 - 10	41	19.5	98	46.7	71	33.8	210	100	
	11 - 15	3	10.7	15	53.6	10	35.7	28	100	
	> 15	4	16.7	12	50.0	8	33.3	24	100	
Have a Relative with CD	No	60	18.9	159	50.2	98	30.9	317	100	0.890
	Yes	8	19.51	19	46.34	14	34.15	41	100	

Table 4: The association of the participant's knowledge about celiac disease treatment & follow up and their sociodemographic data.

Doctors		**Knowledge about treatment & follow up**								**P value**
		(Poor)		(Fair)		(Good)				
		No= 123	**% 34.4**	**No= 135**	**% 37.7**	**No= 100**	**% 27.9**	**No = 358**	**% 100**	
Gender	**Female**	63	**29.2**	88	40.7	65	**30.1**	216	100	**0.039**
	Male	60	**42.3**	47	33.1	35	**24.6**	142	100	
Age	Under 30	43	37.1	47	40.5	26	22.4	116	100	0.580
	30-40	71	32.7	82	37.8	64	29.5	217	100	

	41-50	6	35.3	4	23.5	7	41.2	17	100	
	Over 50	3	37.5	2	25.0	3	37.5	8	100	
Physicians' category	Intern	10	50.0	6	30.0	4	20.0	20	100	0.270
	Resident	96	33.2	115	39.8	78	27.0	289	100	
	Specialist	17	34.7	14	28.6	18	36.7	49	100	
Specialty	internal medicine &subspecialities	27	29.35	37	40.22	28	30.43	92	100	**0.004**
	general surgery &subspecialities	39	**48.1**	25	30.9	17	21.0	81	100	
	family medicine	9	24.32	11	29.73	17	**45.95**	37	100	
	pediatric	3	8.8	17	50.0	14	**41.2**	34	100	
	clinical hematopathology& neurophysiology	12	37.5	11	34.4	9	28.1	32	100	
	emergency medicine	9	**52.9**	8	47.1	0	0.0	17	100	
	Obstetrics & gynecology	3	18.8	8	50.0	5	31.2	16	100	
	psychiatric	4	26.7	7	46.6	4	26.7	15	100	
	Radiology & radiotherapy	7	50.0	5	35.7	2	14.3	14	100	
Experience duration (Years)	Less than 5	36	37.5	38	39.6	22	22.9	96	100	0.689
	5 - 10	68	32.4	82	39.0	60	28.6	210	100	
	11 - 15	10	35.72	9	32.14	9	32.14	28	100	
	> 15	9	37.5	6	25.0	9	37.5	24	100	
Have a Relative with CD	No	110	34.7	122	38.5	85	26.8	317	100	0.411
	Yes	13	31.7	13	31.7	15	36.6	41	100	

Table 5: The association of the participant's knowledge about celiac disease and their sociodemographic data.

Doctors		**Knowledge**								**P value**
		(Poor)		**(Fair)**		**(Good)**		**total**		
		No = 59	**% 16.5**	**No = 212**	**% 59.2**	**No = 87**	**% 24.3**	**No 358**	**% 100**	
Gender	Female	33	15.3	130	60.2	53	24.5	216	100	0.750
	Male	26	18.3	82	57.8	34	23.9	142	100	
Age	Under 30	22	19.0	76	65.5	18	15.5	116	100	0.098
	30-40	32	14.7	124	57.1	61	28.2	217	100	
	41-50	2	11.8	9	52.9	6	35.3	17	100	
	Over 50	3	37.5	3	37.5	2	25.0	8	100	
Physicians' category	Intern	5	25.0	14	70.0	1	5.0	20	100	0.111
	Resident	46	15.9	174	60.2	69	23.9	289	100	
	Specialist	8	16.3	24	49.0	17	34.7	49	100	
Specialty	**internal medicine &subspecialities**	2	**2.1**	57	62.0	33	**35.9**	92	100	**0.0001**
	general surgery &subspecialities	26	32.1	45	55.6	10	12.3	81	100	
	family medicine	1	**2.7**	22	59.5	14	**37.8**	37	100	
	pediatric	1	**2.9**	16	47.1	17	**50.0**	34	100	
	clinical hematopathology& neurophysiology	5	15.6	22	68.8	5	15.6	32	100	
	emergency medicine	8	**47.1**	9	52.9	0	0.0	17	100	
	Obstetrics & gynecology	1	6.2	13	81.3	2	12.5	16	100	
	psychiatric	5	33.3	7	46.7	3	20.0	15	100	
	Radiology & radiotherapy	5	35.7	7	50.0	2	14.3	14	100	
Experience duration (Years)	Less than 5	19	19.8	65	67.7	12	12.5	96	100	0.060
	5 - 10	30	14.3	122	58.1	58	27.6	210	100	
	11 - 15	5	17.9	13	46.4	10	35.7	28	100	
	> 15	5	20.8	12	50.0	7	29.2	24	100	
Have a	No	53	16.7	186	58.7	78	24.6	317	100	0.844

Relative with CD	Yes	6	14.6	26	63.4	9	22.0	41	100	

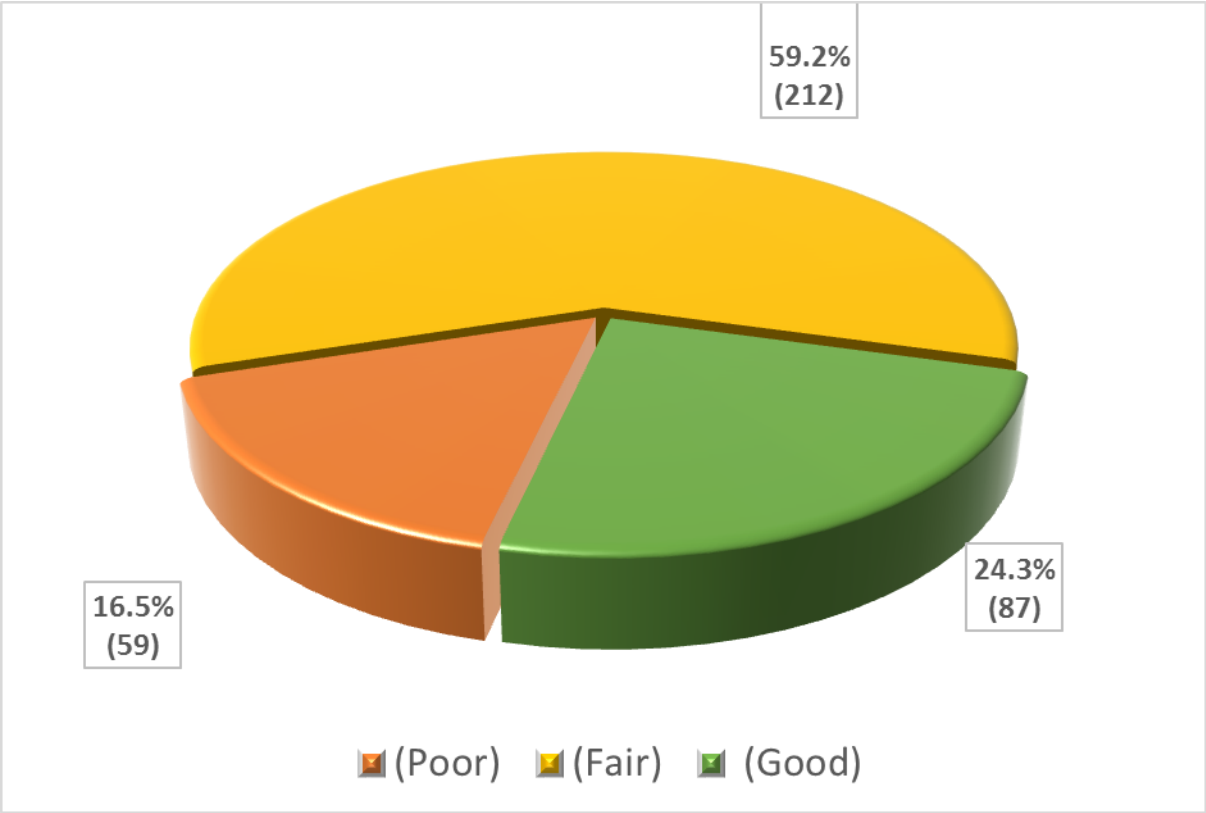

Fig 1: Distribution of overall Knowledge score of studied sample regarding celiac disease.

DISCUSSION

Celiac disease (CD) is increasingly recognized as a common, chronic autoimmune condition with highly variable clinical presentations ranging from typical gastrointestinal symptoms to silent or extraintestinal manifestations. This variability often leads to under-recognition and diagnostic delays, particularly when physicians possess insufficient knowledge of the disease's spectrum.[9] The present study evaluated the knowledge of 358 physicians at Baghdad Medical City regarding CD, focusing on sociodemographic influences, clinical awareness, diagnostic procedures, and management. In our study, the majority of participants were female (60.3%) and aged between 30 and 40 years. These demographics closely align with findings from Riznik et al. in Central Europe (76% female, mean age 50 years) and Barzegar et al. in Iran (predominantly female, aged 36–50 years).[9,10] Conversely, Khan et al. in Saudi Arabia reported a predominantly male (70%) and younger (<30 years) participant pool, highlighting regional variations in workforce demographics.[11] Most respondents in our study reported books and internet sources as primary information tools, echoing Sahin et al.'s findings in Turkey, whereas Riznik et al. noted seminar-based learning as more common in Central Europe.[9,12] In terms of professional roles, residents formed the bulk of respondents (80.7%), consistent with trends reported by Assiri et al. in Saudi Arabia.[13] Specialty distribution also varied, with internal medicine, surgical subspecialties, and family medicine being the most represented, reflecting a diverse clinical background similar to the distribution observed in Kozhakhmetova et al.'s study in Kazakhstan.[14] Knowledge concerning the epidemiology and clinical presentation of CD was moderate, with most participants achieving fair (44.1%) to good (41.3%) scores. Encouragingly, most respondents correctly identified CD as a lifelong autoimmune disorder that can present at any age and without gastrointestinal symptoms. However, knowledge gaps were evident regarding associations with conditions like Turner syndrome, autoimmune hepatitis, and epilepsy—conditions frequently overlooked despite established associations.[14,15] This trend was consistent across other studies from Kazakhstan, Saudi Arabia, and Turkey, all reporting low recognition of such atypical manifestations.[11,14,15] Clinical features such as anemia, diarrhea, and skin manifestations were well identified in our cohort (89.9%, 97.8%, and 69.3%, respectively), aligning with Jinga et al. and Khan et al., though recognition of infertility, constipation, and osteoporosis remained suboptimal.[11,15] Such gaps could contribute to delays in diagnosis and increased risk of complications such as intestinal lymphoma and reduced quality of life.[9] Diagnostic knowledge was mixed. While most physicians were aware of serologic testing and upper GI biopsy as standard diagnostic tools, confusion remained around biopsy site selection, with many incorrectly identifying

D1 and dismissing D2 as a target site. This misperception was also noted in prior regional studies.[14,16] Although Anti-tTG IgA testing was correctly chosen by 66.5% of respondents as a first-line screening tool, awareness of genetic testing was limited (31%), mirroring findings by Kozhakhmetova et al. (20.5%).[14] Notably, gender and specialty significantly influenced diagnostic knowledge, with males and internal medicine specialists outperforming others (P = 0.008, P = 0.0001), a trend also reflected in Riznik et al.'s work.[9,17] Knowledge of treatment and follow-up was the weakest area. Misconceptions about hidden gluten sources in processed foods, spices, and cosmetics were widespread, as 75.7% wrongly believed tomato paste to be gluten-free. These findings suggest an urgent need for enhanced education on gluten contamination risks. Although follow-up protocols were better understood, the overall distribution showed only 27.9% with good knowledge. Family medicine and pediatric specialists scored highest in this domain (P = 0.004), which corresponds with previous studies by Riznik et al., where pediatric gastroenterologists and family physicians had higher treatment knowledge scores.[9,17]

CONCLUSION

Over half of the participants demonstrated fair overall knowledge of celiac disease, with good knowledge significantly associated with specialties like pediatrics, family medicine, and internal medicine. While knowledge of epidemiology and diagnosis was moderate, treatment and follow-up remained the weakest area. Many physicians were unaware of less common symptoms, risk factors, and hidden gluten sources. Having a relative with CD did not improve knowledge levels.

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