



The Role of Clinical Nutrition Specialists in Improving Dietary Adherence and Patient Outcomes among Individuals with Celiac Disease: Patients' Perspectives from Al-Marj Medical Educational Center, Libya

Dr. Amna Mousa Mohamed^{1*}, Dr. Rehab Faraj Belhamad², Dr Mona H. Alshlamani³,
Dr Samira Blkasssem Othman⁴

^{1,2,3,4} Department of Clinical Nutrition, Al-Marj Medical Educational Center, Al-Marj, Libya

دور أخصائيي التغذية السريرية في تحسين الالتزام الغذائي ونتائج المرضى المصابين بمرض السيلياك: وجهات نظر المرضى من مركز المرج الطبي التعليمي، ليبيا

د آمنة موسى محمد^{1*}، د. رحاب فرج بلحمد²، د. منى حسن الشلماني³، د. سميرة بلقاسم عثمان⁴
^{4,3,2,1} قسم التغذية العلاجية، مركز المرج الطبي التعليمي، المرج، ليبيا

*Corresponding author: amnaww8@gmail.com

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Abstract:

Celiac disease is a chronic autoimmune disorder requiring lifelong adherence to a gluten-free diet. Clinical nutrition specialists play a crucial role in supporting patients' dietary adherence and improving health outcomes. Objective: This study aimed to evaluate the role of clinical nutrition specialists in improving dietary adherence and patient outcomes among individuals with celiac disease from patients' perspectives at Al-Marj Medical Educational Center, Libya.

Methods: A descriptive-analytical study was conducted on a random sample of 100 patients diagnosed with celiac disease. Data were collected using a structured questionnaire covering awareness, dietary behavior, nutritional counseling, and patient satisfaction. Data were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations.

Results: The findings indicated a high level of patient awareness regarding the importance of a gluten-free diet. Participants reported a high level of satisfaction with clinical nutrition services, particularly in relation to nutritional counseling, individualized dietary planning, and continuous follow-up. Regular follow-up with clinical nutrition specialists was perceived to be associated with improved health outcomes and better dietary adherence. Economic, social, and psychological factors were identified as the main barriers to long-term adherence.

Conclusion: Clinical nutrition specialists play a fundamental role in improving dietary adherence, patient education, and quality of life among individuals with celiac disease. Strengthening nutritional counseling services and addressing socioeconomic barriers are essential for optimal disease management.

Keywords: Celiac Disease, Clinical Nutrition, Dietitian, Gluten-Free Diet, Dietary Adherence, Patient Outcomes, Libya.

الملخص

مرض السيلياك هو حالة مناعية ذاتية تصيب بطانة الأمعاء الدقيقة عند تناول الغلوتين، مما يؤدي إلى تلف الزغابات المعوية، وينتج عن ذلك سوء امتصاص العناصر الغذائية وظهور أعراض هضمية مثل الإسهال وآلام البطن، بالإضافة إلى أعراض نفسية وتقلبات مزاجية.

يُشخص المرض من خلال فحوصات الدم، مثل فحص الأجسام المضادة للترانسغلوتاميناز النسيجي (tTg-IgA)، والتنظير العلوي، والخزعة، والاختبارات الجينية، أو تقييم كثافة العظام. بالإضافة إلى ذلك، قد تكشف الفحوصات المخبرية عن نقص في بعض الفيتامينات، مثل فيتامين د وفيتامين ب 12. وتعتبر المتابعة المنتظمة مع أخصائي التغذية والالتزام بنظام غذائي صارم خالي من الغلوتين من أهم الخطوات وأكثرها فعالية في السيطرة على المرض ومنع تفاقم المضاعفات.

تهدف هذه الورقة إلى تسليط الضوء على دور أخصائي التغذية في رحلة علاج مرضى الداء البطني، بدءًا من التقييم الغذائي بعد التشخيص ومراجعة الفحوصات المطلوبة، وصولًا إلى وضع خطة غذائية متوازنة خالية من الغلوتين تلبي الاحتياجات الغذائية للمريض. كما تتناول الورقة دور أخصائي التغذية في تثقيف المرضى صحيًا بشأن الأطعمة الآمنة، وأهمية قراءة ملصقات الأطعمة، والمتابعة المنتظمة لتقييم الالتزام بالنظام الغذائي وتحسين النتائج الصحية.

أجري استبيان على 100 مريض تم تشخيص إصابتهم بالداء البطني ويرجعون قسم التغذية. في مستشفى المرج التعليمي، تضمن الاستبيان أسئلة مغلقة وأخرى مفتوحة حول إجابات المرضى. وقد لوحظ مستوى عالٍ من الوعي بأهمية دور أخصائي التغذية والرضا عن الرعاية الغذائية المقدمة.

الكلمات المفتاحية: مرض السيلياك، التغذية السريرية، أخصائي التغذية، النظام الغذائي الخالي من الغلوتين، الالتزام الغذائي، نتائج المرضى، ليبيا.

Introduction

Celiac disease is a chronic autoimmune disorder that affects genetically susceptible individuals following the ingestion of gluten-containing foods. (Lebwohl et al., 2023; World Gastroenterology Organisation, 2024) Gluten, a protein found in wheat, barley, and rye, triggers an abnormal immune response that damages the intestinal mucosa, resulting in villous atrophy and impaired nutrient absorption (Rubio-Tapia et al., 2023). The disease may present with a wide range of gastrointestinal and extraintestinal manifestations, including chronic diarrhea, abdominal pain, anemia, fatigue, osteoporosis, and growth impairment in children.

The prevalence of celiac disease has increased worldwide over the past decades, making it a significant public health concern. Despite advances in diagnostic methods and increased awareness among healthcare professionals, many patients continue to experience difficulties in managing the disease effectively. Furthermore, some individuals may continue to experience persistent symptoms despite treatment due to inadvertent gluten exposure, associated gastrointestinal disorders, or nonresponsive celiac disease, emphasizing the importance of ongoing nutritional assessment and follow-up (Abdulkarim et al., 2002). Since there is currently no pharmacological cure for celiac disease, lifelong adherence to a strict gluten-free diet remains the only effective therapeutic intervention (Academy of Nutrition and Dietetics, 2024; World Gastroenterology Organization, 2024).

Clinical nutrition specialists play a critical role in the management of celiac disease by providing nutritional education, developing individualized dietary plans, monitoring nutritional status, and supporting patients in overcoming barriers to dietary adherence. Their role extends beyond dietary counseling to include psychological support, behavior modification, and continuous follow-up aimed at improving long-term health outcomes (Gładys et al., 2021; Academy of Nutrition and Dietetics, 2024).

Despite the recognized importance of clinical nutrition specialists, many patients continue to face substantial economic, social, and psychological challenges that negatively affect their ability to adhere to a gluten-free diet. Consequently, evaluating the effectiveness of nutritional services from the patients' perspective is essential for improving healthcare delivery and developing evidence-based interventions.

1.1 Research Problem

Adherence to a gluten-free diet represents the cornerstone of celiac disease management. However, maintaining strict adherence remains a major challenge for many patients due to multiple economic, social, psychological, and educational factors. Although clinical nutrition specialists are expected to provide effective support through nutritional education, dietary planning, and regular follow-up, questions remain regarding the effectiveness of these interventions and the extent to which patients benefit from them.

Accordingly, this study seeks to answer the following questions:

1. What is the role of clinical nutrition specialists in supporting patients with celiac disease?
2. To what extent are patients satisfied with the nutritional services provided?
3. What challenges hinder adherence to a gluten-free diet despite nutritional counseling and follow-up?
4. How do nutritional interventions contribute to improving patients' health outcomes?

1.2 Significance of the Study

The significance of this study stems from the growing prevalence of celiac disease and the increasing need for effective nutritional interventions that support long-term dietary adherence. Since dietary management remains the primary treatment approach for celiac disease, understanding the effectiveness of clinical nutrition services is essential for improving patient outcomes.

Scientifically, this study contributes to the limited body of literature concerning the role of clinical nutrition specialists in Libya and provides empirical evidence regarding patients' perceptions of nutritional care.

Practically, the findings may assist healthcare institutions, nutrition professionals, and policymakers in designing comprehensive nutritional programs that enhance dietary adherence, improve quality of life, and reduce disease-related complications among individuals with celiac disease.

1.3 Study Objectives

This study aims to :

1. Evaluate the role of clinical nutrition specialists in providing nutritional education and individualized dietary counseling for patients with celiac disease.
2. Assess patients' satisfaction with the services provided by clinical nutrition specialists.
3. Identify the major challenges affecting adherence to a gluten-free diet.
4. Examine the relationship between nutritional follow-up and health improvement among celiac patients.

Develop evidence-based recommendations for improving nutritional care services and patient outcomes.

Study Assumptions

The present study was based on the following assumptions :

- Regular follow-up with clinical nutrition specialists contributes to improved adherence to a gluten-free diet among individuals with celiac disease.
- Psychological and social support provided by clinical nutrition specialists enhances patients' satisfaction with nutritional counseling services.
- Economic and social challenges may negatively affect patients' ability to maintain long-term adherence to a gluten-free diet despite receiving nutritional support.
- Individualized dietary plans developed by clinical nutrition specialists contribute to improved health outcomes and better management of celiac disease.

These assumptions were formulated based on findings reported in previous literature and were explored through patients' responses to the study questionnaire. The study aimed to assess the extent to which patients' perceptions and experiences support these assumptions within the context of celiac disease management at Al-Marj Medical Educational Center.

1.5 Study Boundaries

- **Spatial Boundary:** Al-Marj Medical Educational Center, Al-Marj, Libya.
- **Temporal Boundary:** The study was conducted over a six-month period during 2025.
- **Human Boundary:** Patients diagnosed with celiac disease who attended clinical nutrition services at Al-Marj Medical Educational Center.
- **Methodological Boundary:** The study adopted a descriptive-analytical approach using a structured questionnaire as the primary data collection instrument.

Literature Review

2.1 Definition of Celiac Disease

Celiac disease is a chronic autoimmune disorder characterized by an inappropriate immune response to gluten proteins found in wheat, barley, and rye. In genetically susceptible individuals, gluten ingestion triggers an inflammatory reaction that damages the mucosal lining of the small intestine, leading to villous atrophy and impaired nutrient absorption. This damage can result in multiple nutritional deficiencies and a wide range of gastrointestinal and extraintestinal manifestations.(Lebwohl et al.,2023;world Gastroenterology Organisation,2024).

The disease may develop at any age and varies considerably in clinical presentation. While some patients experience classical symptoms such as chronic diarrhea, abdominal distension, and weight loss, others may present with atypical symptoms including anemia, osteoporosis, neurological disorders, infertility, fatigue, and depression. Consequently, diagnosis is often delayed, increasing the risk of long-term complications.

2.2 Types of Celiac Disease

Researchers commonly classify celiac disease into four major categories :

2.2.1 Classical Celiac Disease

This form is characterized by symptoms directly associated with intestinal malabsorption, including chronic diarrhea, weight loss, abdominal pain, and nutritional deficiencies. It is the most recognizable presentation of the disease.

2.2.2 Non-Classical Celiac Disease

Patients may exhibit limited gastrointestinal symptoms but experience extraintestinal manifestations such as osteoporosis, anemia, liver dysfunction, headaches, fatigue, and neurological disturbances.

2.2.3 Potential Celiac Disease

Individuals in this category demonstrate positive serological markers and genetic predisposition but show no significant intestinal damage. These patients require regular monitoring due to the possibility of disease progression.

2.2.4 Refractory Celiac Disease

This rare and severe form occurs when symptoms and intestinal damage persist despite strict adherence to a gluten-free diet for an extended period. Such patients often require specialized medical and nutritional management .

2.3 Gluten-Free Diet and Disease Management

A strict gluten-free diet (GFD) remains the only effective treatment for celiac disease.

Complete elimination of gluten allows intestinal healing, improves nutrient absorption, reduces symptoms, and prevents long-term complications. Academy of Nutrition and Dietetics, 2024; Pinto-Sánchez, et al., 2023).

Foods may be classified into three categories :

A. Foods Containing Gluten

- Wheat and wheat products.
- Barley and barley-based products.
- Rye and mixed grain products.
- Bread, pasta, cakes, biscuits, and pastries.

B. Foods with Hidden Gluten

- Processed sauces and condiments.
- Ready-made soups.
- Frozen meals.
- Processed meats and food additives.
- Certain confectionery products.

C. Naturally Gluten-Free Foods

- Fresh fruits and vegetables.
- Meat, poultry, fish, and eggs.
- Rice and corn.
- Legumes and nuts.
- Milk and dairy products without additives.

Successful adherence requires continuous education, food-label interpretation skills, and regular follow-up with qualified clinical nutrition specialists.

2.4 Role of Clinical Nutrition Specialists in Celiac Disease Management

Clinical nutrition specialists represent an essential component of the multidisciplinary healthcare team involved in celiac disease management. Their responsibilities include :

- Providing evidence-based nutritional education.
- Developing individualized dietary plans.
- Assessing nutritional deficiencies and monitoring nutritional status.
- Teaching patients how to identify gluten-containing foods.
- Supporting behavioral changes necessary for long-term dietary adherence.
- Offering psychological support and motivation.
- Monitoring treatment outcomes through regular follow-up visits.

According to Gładys et al.,2021; Academy of Nutrition and Dietetics, 2024), structured dietary counseling significantly improves adherence to gluten-free diets and enhances patient outcomes. Continuous nutritional monitoring also reduces the risk of nutritional deficiencies and disease-related complications.

2.5 Challenges Affecting Dietary Adherence

Despite increased awareness regarding celiac disease, many patients continue to experience significant challenges that affect compliance with dietary recommendations.

Economic Challenges: Gluten-free products are frequently more expensive than conventional foods, creating a substantial financial burden for patients and their families.(Silvester et al., 2022; Fraser, 2023) .

Social Challenges : Many individuals encounter difficulties participating in social events, restaurants, and family gatherings due to concerns about accidental gluten exposure.

Psychological Challenges: Long-term dietary restrictions may contribute to anxiety, depression, stress, and social isolation.

Healthcare Challenges: Limited access to specialized nutrition services and inadequate nutritional education may reduce adherence and increase disease complications.

These barriers highlight the importance of comprehensive nutritional support programs and continuous patient education.

2.6 Previous Studies

Study 1: Gładys et al. (2021)

This study investigated the impact of dietary counseling on adherence to a gluten-free diet among celiac patients. The findings demonstrated that structured nutritional education significantly improved dietary compliance and increased patient awareness regarding disease management.

Study 2: Fraser (2023)

Fraser examined the effectiveness of nutrition therapy in supporting individuals with celiac disease. The study concluded that individualized dietary counseling improved nutritional status, reduced symptoms, and enhanced quality of life.

Study 3: Nutrition Assessment and Management in Celiac Disease (2024) programs and continuous patient education .

Study 4: Academy of Nutrition and Dietetics Evidence-Based Guideline (2024)

The guideline highlighted the central role of registered dietitians in providing evidence-based nutritional interventions and improving patient outcomes through individualized dietary planning and education.

Study 5: Group-Based Educational Intervention Study (2022)

This study demonstrated that group-based nutritional education improved gastrointestinal symptoms, patient knowledge, and quality of life among individuals with celiac disease.

2.7 Summary of Literature Review

The reviewed literature consistently indicates that celiac disease requires lifelong dietary management and continuous professional support. Although a gluten-free diet is highly effective, long-term adherence remains challenging because of economic, psychological, and social barriers. Previous studies confirm that clinical nutrition specialists play a crucial role in improving patient awareness (Hall et al, 2022) dietary adherence, nutritional status, and quality of life. However, further research remains necessary to evaluate patient experiences and optimize nutritional care programs, particularly within developing healthcare systems.

Research Methodology

3.1 Research Design

This study adopted a descriptive-analytical research design to investigate the role of clinical nutrition specialists in improving dietary adherence and patient outcomes among individuals with celiac disease. The descriptive approach was selected because it enables the systematic collection, analysis, and interpretation of data related to patients' experiences, perceptions, and satisfaction with nutritional services.

3.2 Study Setting

The study was conducted at Al-Marj Medical Educational Center, Al-Marj, Libya, which provides clinical nutrition services and follow-up care for patients diagnosed with celiac disease.

3.3 Study Population

The target population consisted of all patients diagnosed with celiac disease who attended the Department of Clinical Nutrition at Al-Marj Medical Educational Center during the study period.

The total study population included 340 patients diagnosed with celiac disease.

3.4 Study Sample

A simple random sampling technique was used to select participants from the study population.

A total of 100 patients were included in the study. The selected sample represented different age groups, genders, and disease durations to ensure adequate representation of the target population.

3.5 Data Collection Instrument

Data were collected using a structured questionnaire developed based on relevant

Literature and previous studies related to celiac disease management and nutritional counseling.

The questionnaire consisted of four main sections :

Section I: Demographic Characteristics Gender, age, duration of diagnosis, and family history of celiac disease.

Section II: Patient Awareness and Dietary Behavior

- Understanding of celiac disease
- Adherence to a gluten-free diet
- Previous consultations with nutrition specialists
- Perceived effectiveness of dietary plans

Section III: Role of Clinical Nutrition Specialists

- Quality of nutritional counseling
- Communication and responsiveness
- Ability to answer patient questions

Practical dietary guidance

- Section IV: Patient Satisfaction
- Satisfaction with nutritional services
- Satisfaction with communication
- Satisfaction with dietary outcomes

Ethical approval for this study

was obtained from the administration of Al-Marj Medical Educational Center, Libya. All participants received a clear explanation of the study objectives and procedures before participation. Informed consent was obtained from all participants, and participation was entirely voluntary. Confidentiality and anonymity were maintained throughout the research process. No identifying personal information was recorded, and all collected data were used exclusively for scientific research purposes. The study was conducted in accordance with internationally accepted ethical principles governing research involving human participants.

3.9 Statistical Analysis

Data were entered, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS).

The following statistical techniques were employed:

Descriptive Statistics:

1. Frequencies
2. Percentages
3. Means
4. Standard Deviations

The normal distribution

Table (1): Normal Distribution

Axes	Sig (Kolmogorov–Smirnov test)
Variables	0.120

The result of the Kolmogorov–Smirnov test indicates a statistical significance value (Sig) of 0.120 for all variables, which is greater than the conventional significance level of $\alpha = 0.05$. This suggests that there is insufficient statistical evidence to reject the null hypothesis, which states that the data distribution does not differ from the normal distribution. In other words, the survey data for all variables can be considered normally distributed, allowing for the use of statistical analyses that assume normality.

This result confirms the validity of the basic assumption for applying these inferential tests and enhances the reliability of the results derived from subsequent statistical analyses. Furthermore, it indicates that the variances among the data do not exhibit substantial skewness or unusual clustering,

Study Reliability and Validity

Table (2): Study Reliability and Validity

Variables	Cronbach's alpha	Internal consistency
Patients' Awareness and Follow-up with the Dietitian	0.72	0.80
Skills and Instructions Provided by the Dietitian	0.78	0.88
Patients' Satisfaction with Dietitian Services	0.70	0.82
Relationship with the Dietitian and Recommendations	0.75	0.85
Questionnaire	0.74	0.86

The results of the reliability and validity analysis indicate that all domains included in the study demonstrate good levels of reliability and dependability, thereby reinforcing confidence in the obtained results. The domain

“Patients’ Awareness and Follow-up with the Dietitian” recorded a Cronbach’s alpha of 0.72 with an internal consistency of 0.80, indicating “Skills and Instructions acceptable internal consistency and an adequate measurement of the intended concept. The domain Provided by the Dietitian” showed a Cronbach’s alpha of 0.78 and internal validity of 0.88, reflecting a high level of internal consistency and excellent measurement quality for the skills and guidance delivered by the dietitian. For the domain “Patients’ Satisfaction with Dietitian Services”, the Cronbach’s alpha was 0.70 with an internal validity of 0.82, suggesting that this domain reliably measures the degree of patient satisfaction. The domain “Relationship with the Dietitian and Recommendations” achieved a Cronbach’s alpha of 0.75 and internal validity of 0.85, demonstrating that it accurately assesses patients’ interaction with the dietitian and adherence to his/her recommendations. Considering the questionnaire as a whole, it attained a Cronbach’s alpha of 0.74 and an internal validity of 0.86, confirming that the questionnaire is well-designed, ensures internal consistency, and effectively measures the targeted concepts. This reinforces its reliability for use in statistical analyses and the accurate derivation of research findings.

Table (3): Demographic information

Variable	Categories	100 percentage %
Gender	male	39%
	Female	61%
Age	10-35 y	59%
	40-75 y	41%

The demographic information collected from the questionnaire reflects the distribution of the sample according to key variables of gender and age. The results showed that the proportion of females exceeded that of males, with males accounting for 39% and females 61%, indicating a higher representation of the female participants in the sample.

Regarding age groups, most participants belonged to the younger category, with those aged 10 to 35 years representing approximately 59% of the sample, while the older age group, ranging from 40 to 75 years, accounted for 41%. This distribution reflects a relative diversity of the sample in terms of gender and age groups, which is important when interpreting the results, as these demographic variables may influence participants’ responses and behaviors regarding follow-up with the dietitian and their satisfaction with the services provided.

Study Variable

Table (4): Study Variable

Question	Mean	Stander Deviation	Rank
Family history of celiac disease	2.28	0.76	8
Following a gluten-free diet	2.87	0.34	5
Previous visit to a dietitian	2.93	0.25	2
Improvement after following the diet	2.88	0.33	4
Assistance in creating a dietary plan	2.92	0.27	3
Effectiveness of the dietary plan	2.79	0.41	7
Feeling supported by the dietitian	2.85	0.43	6
The role of the dietitian is important	2.98	0.14	1
Overall Mean	2.81	0.37	-

1. Patient Awareness and Follow-up with the Dietitian

The findings related to the “Patient Awareness and Follow-up with the Dietitian” domain revealed generally positive responses across all items, with mean scores ranging from 2.28 to 2.98. The overall mean score for this domain was 2.81 (SD = 0.37), indicating a favorable level of patient awareness and engagement with dietitian follow-up.

Among the assessed items, “The role of the dietitian is important” achieved the highest mean score (2.98 ± 0.14), ranking first and demonstrating a strong consensus among participants regarding the importance of the dietitian in the management of celiac disease. Similarly, “Previous visit to a dietitian” (2.93 ± 0.25) and “Assistance in creating a dietary plan” (2.92 ± 0.27) ranked second and third, respectively, highlighting the value participants place on professional nutritional counseling and individualized dietary planning.

Other items, including “Improvement after following the diet” (2.88 ± 0.33), “Following a gluten-free diet” (2.87 ± 0.34), and “Feeling supported by the dietitian” (2.85 ± 0.43), also demonstrated relatively high mean scores, reflecting positive patient experiences with dietary management and follow-up services.

In contrast, “Family history of celiac disease” recorded the lowest mean score (2.28 ± 0.76) and the highest standard deviation, suggesting greater variability in participants’ responses. This variation may be attributed to

differences in awareness of family medical history or the absence of known affected relatives among some participants. Overall, the results suggest that participants demonstrated positive perceptions of dietitian follow-up and recognized the importance of nutritional guidance in the effective management of celiac disease.

Skills and Instructions Provided by the Dietitian².

Table (5): Skills and Instructions

Question	Mean	Stander Deviation	Rank
Comfort in asking questions	2.96	0.20	2
The dietitian is cooperative and responsive	2.94	0.24	3
Recommendation to visit the dietitian	3.00	0.00	1
Overall Mean	2.97	0.15	-

The results of the “Skills and Instructions Provided by the Dietitian” domain indicated positive perceptions of the dietitian’s communication skills and professional support. The overall mean score was 2.97 (SD = 0.15), reflecting a high level of consistency in participants’ responses.

The item “Recommendation to visit the dietitian” achieved the highest mean score (3.00 ± 0.00), indicating uniform responses among all participants. This reflects complete agreement regarding the importance of referral to and follow-up with a dietitian.

“Comfort in asking questions” ranked second (2.96 ± 0.20), suggesting that most participants felt comfortable communicating their concerns during consultations. Similarly, “The dietitian is cooperative and responsive” (2.94 ± 0.24) reflected positive perceptions of the dietitian’s responsiveness and cooperation.

Overall, the findings suggest that participants perceived the dietitian as supportive and accessible, which may enhance patient engagement and adherence to dietary recommendations.

“Patient Satisfaction with Dietitian Services”³.

Table (6): Patient Satisfaction with Dietitian Services

Variable	Mean	Stander Deviation
overall satisfaction among participants	3.85	0.62

The results of the “Patient Satisfaction with Dietitian Services” domain indicate a high level of overall satisfaction among participants, with a mean score of 3.85 on a 1–4 scale and a standard deviation of 0.62. This outcome reflects a generally positive evaluation by patients regarding the quality of services provided by the dietitian, including dietary guidance, psychological support, and the provision of necessary information for managing a celiac-specific diet.

The moderate standard deviation indicates relative consistency in participants’ responses, enhancing the reliability of this assessment. Overall, it can be concluded that most patients express a high level of satisfaction with dietitian services, reflecting the effectiveness of communication, the competence of guidance provided, and the important role the dietitian plays in improving patients’ health status and daily quality of life.

4. Relationship with Nutritional and Recommendations

Table (7): Relationship with Nutritional and Recommendations

Question	Mean	Stander Deviation	Rank
Understanding the diet	2.94	0.24	1
Identifying allowed and prohibited foods	2.94	0.24	1
Planning balanced meals	2.92	0.27	3
Explaining gluten components	2.93	0.26	2
Accessing essential nutrients	2.92	0.27	3
Overall Mean	2.93	0.26	-

The findings of the “Relationship with the Nutrition Specialist and Recommendations” domain demonstrated generally positive perceptions among participants regarding the nutritional guidance provided. The overall mean score was 2.93 (SD = 0.26), indicating consistent responses across all items.

Both “Understanding the diet” and “Identifying allowed and prohibited foods” obtained the highest mean scores (2.94 ± 0.24), reflecting the importance of clear dietary education in supporting patients with celiac disease.

“Explaining gluten components” followed closely (2.93 ± 0.26), while “Planning balanced meals” and “Accessing essential nutrients” both recorded similar mean scores (2.92 ± 0.27). These results suggest that patients value both theoretical understanding and practical dietary guidance provided by the nutrition specialist.

Overall, the findings highlight the role of structured nutritional education in supporting dietary adherence and improving patient experience.

4. Results and Data Analysis

This chapter presents the findings of the study based on the responses of 100 patients diagnosed with celiac disease who attended the Department of Clinical Nutrition at Al-Marj Medical Educational Center. The results are organized according to the study objectives and research questions.

4.6 Summary of Findings

The analysis revealed several important findings :

1. Participants demonstrated high awareness regarding the importance of adhering to a gluten-free diet.
2. Clinical nutrition specialists played a significant role in providing nutritional education and individualized dietary counseling.
3. Patient satisfaction with nutritional services was very high.
4. Regular follow-up with nutrition specialists was significantly associated with improved health outcomes.
5. Economic, social, and psychological challenges remained the primary barriers to long-term dietary adherence.
6. No statistically significant differences in patient satisfaction were observed according to gender or age group.

Overall, the findings strongly support the importance of integrating clinical nutrition specialists into multidisciplinary celiac disease management programs to improve patient outcomes and quality of life.

5. DISCUSSION

The findings of this study indicate an important role of clinical nutrition specialists in improving dietary adherence and health outcomes among individuals with celiac disease. The results demonstrated high levels of patient awareness regarding the importance of maintaining a strict gluten-free diet, reflecting the effectiveness of nutritional education.

Most participants regularly consulted nutrition specialists and reported improvements in their perceived health status following nutritional counseling and follow-up. This finding is consistent with previous studies highlighting the importance of continuous nutritional education and individualized dietary counseling in improving disease management (Gładys et al., 2021; Fraser, 2023; Lionetti et al., 2022).

Furthermore, high levels of patient satisfaction were observed regarding clinical nutrition services. Participants valued individualized dietary plans, communication, and continuous monitoring provided by nutrition specialists. These findings are consistent with the Academy of Nutrition and Dietetics (2024), which emphasizes personalized nutrition care in celiac disease management.

Regular follow-up with nutrition specialists was reported by participants to be associated with improved health outcomes, suggesting that continuous professional support contributes to better dietary adherence and disease control.

Economic, social, and psychological barriers were identified as major challenges affecting long-term adherence. These findings highlight that nutritional care alone may not be sufficient and should be supported by broader psychosocial interventions.

No differences in satisfaction levels were observed according to age or gender, indicating uniform service quality across participant groups (Silvester et al., 2022).

Overall, the findings emphasize the essential role of clinical nutrition specialists in providing education, counseling, and continuous support to improve adherence and quality of life in patients with celiac disease.

6 . Conclusions

Clinical nutrition specialists play a fundamental role in the management of celiac disease. Their contribution extends beyond dietary instruction to include patient education, individualized counseling, and continuous follow-up.

The study findings highlight that patient benefit from nutritional support through improved awareness, better dietary adherence, and enhanced perceived health outcomes.

However, economic, social, and psychological barriers remain significant challenges that require comprehensive management strategies.

Integrating clinical nutrition services with broader psychosocial support systems is recommended to improve long-term outcomes and quality of life in individuals with celiac disease.

7. Recommendations

Based on the study findings, the researchers recommend the following:

1. Strengthening the role of clinical nutrition specialists within healthcare institutions through professional development programs and continuous training.
2. Increasing public awareness regarding celiac disease and the importance of strict adherence to a gluten-free diet.
3. Developing structured follow-up programs to ensure long-term dietary compliance and continuous monitoring of patient progress.
4. Expanding access to affordable gluten-free products and encouraging local food manufacturers to increase product availability.
5. Integrating psychological and social support services into celiac disease management programs to address emotional and behavioral challenges.
6. Encouraging collaboration among physicians, nutrition specialists, psychologists, educators, and family members to provide comprehensive patient care.
7. Utilizing digital health technologies, including mobile applications and online educational platforms, to improve patient education and self-management.
8. Conducting larger multicenter studies across different regions of Libya to further investigate factors influencing dietary adherence and patient outcomes.
9. Establishing national guidelines for the nutritional management of celiac
10. Disease based on evidence-based clinical practices.
11. Supporting future research examining the relationship between psychological well-being, social support, and dietary adherence among individuals with celiac disease .

Recommendations for Future Research

Future studies should focus on:

- The impact of family support on dietary adherence.
- Psychological determinants of treatment compliance.
- Quality of life among celiac patients in Libya.
- Economic barriers to accessing gluten-free foods.
- Digital nutrition education interventions for chronic disease management.

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Appendix A: (Questionnaire)

Section I : Socio-Demographic Characteristics

Please select or fill in the appropriate response :

Gender: _____

Age: _____ years

Duration since diagnosis of celiac disease: _____

Section II: Patients' Awareness and Follow-up with the Dietitian

Please tick the most appropriate answer :

1. Response options: Yes / No / To some extent
2. Do you have a family history of celiac disease?
3. Are you currently following a gluten-free diet?
4. Have you ever consulted a dietitian regarding celiac disease management?
5. Do you experience improvement in your symptoms after following a gluten-free diet?
6. Did the dietitian assist you in developing a personalized dietary plan?
7. Was the dietary plan effective in improving your health status?
8. Do you feel supported by the dietitian during dietary management?
9. Do you believe that dietitians play an important role in managing celiac disease?

Section III: Information Provided by the Dietitian :

Please indicate whether the following information was provided: -

- Disease definition
- Etiology and risk factors
- Clinical manifestations (symptoms)
- Possible complications

Importance of adherence to a gluten-free diet Response options : Yes / No / To some extent

Section IV: Skills and Counseling Provided by the Dietitian

Response options : Yes / No / To some extent

1. Do you feel comfortable asking questions to the dietitian?
2. Was the dietitian cooperative and responsive to your needs?
3. Would you recommend consulting a dietitian to other patients with celiac disease?

Section V: Patient Satisfaction with Dietitian Services

Please select the most appropriate response :

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied

Section VI: Dietitian–Patient Relationship and Recommendations

Response options : Yes / No / To some extent

1. Understanding of the gluten-free diet
2. Ability to identify permitted and prohibited foods
3. Planning balanced gluten-free meals
4. Explanation of gluten-containing foods and ingredients
5. Guidance on obtaining essential nutrients .

Appendix B: (Figures/Charts)

Demographic information :

Variabe	categories	100 percentage %
Gender	male	39%
	female	61%
Age	10-35 y	59%
	40-75 y	41%

Gender Distribution of the Study Sample

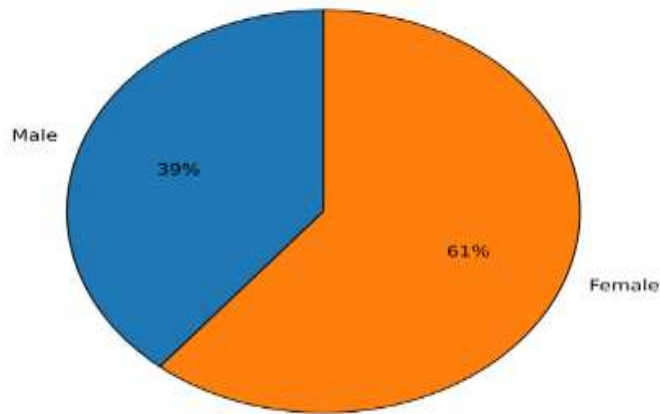


Figure 1. Gender Distribution of the Study Sample
 Male: 39%
 Female: 61%

Age Distribution of the Study Sample

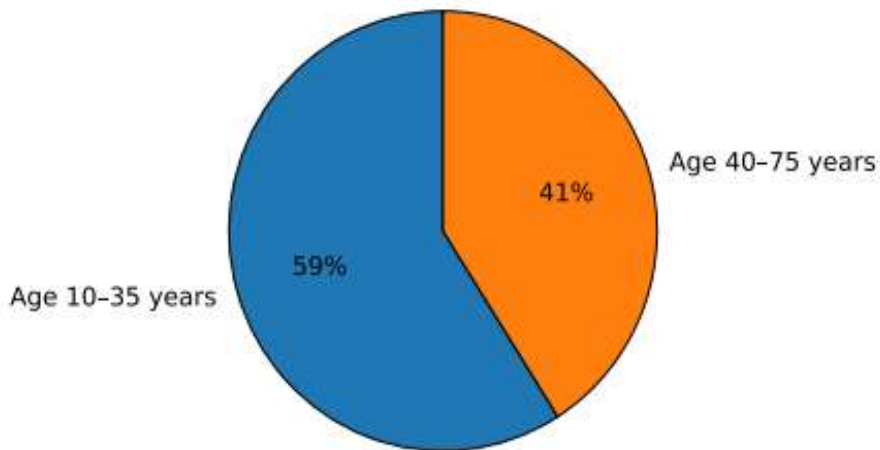


Figure 2. Age Distribution of the Study Sample
 Age 10-35 years: 59%
 Age 40-75 years: 41%

Study Variable

1. Patient Awareness and Follow-up with the Dietitian

Question	Mean	Stander Deviation	Rank
Family history of celiac disease	2.28	0.76	8
Following a gluten-free diet	2.87	0.34	5
Previous visit to a dietitian	2.93	0.25	2
Improvement after following the diet	2.88	0.33	4
Assistance in creating a dietary plan	2.92	0.27	3
Effectiveness of the dietary plan	2.79	0.41	7
Feeling supported by the dietitian	2.85	0.43	6
The role of the dietitian is important	2.98	0.14	1
Overall Mean	2.81	0.37	-

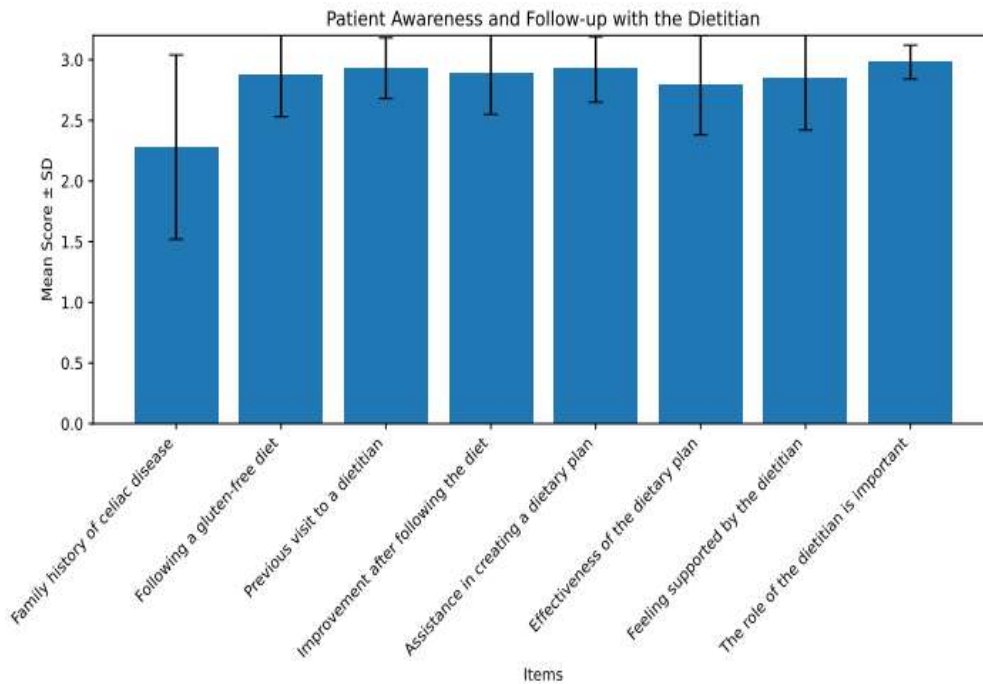


Figure 3. Mean scores (\pm standard deviation) of patient awareness and follow-up with the dietitian across different questionnaire items.

Skills and Instructions Provided by the Dietitian2.

Question	Mean	Stander Deviation	Rank
Comfort in asking questions	2.96	0.20	2
The dietitian is cooperative and responsive	2.94	0.24	3
Recommendation to visit the dietitian	3.00	0.00	1
Overall Mean	2.97	0.15	-

Skills and Instructions Provided by the Dietitian

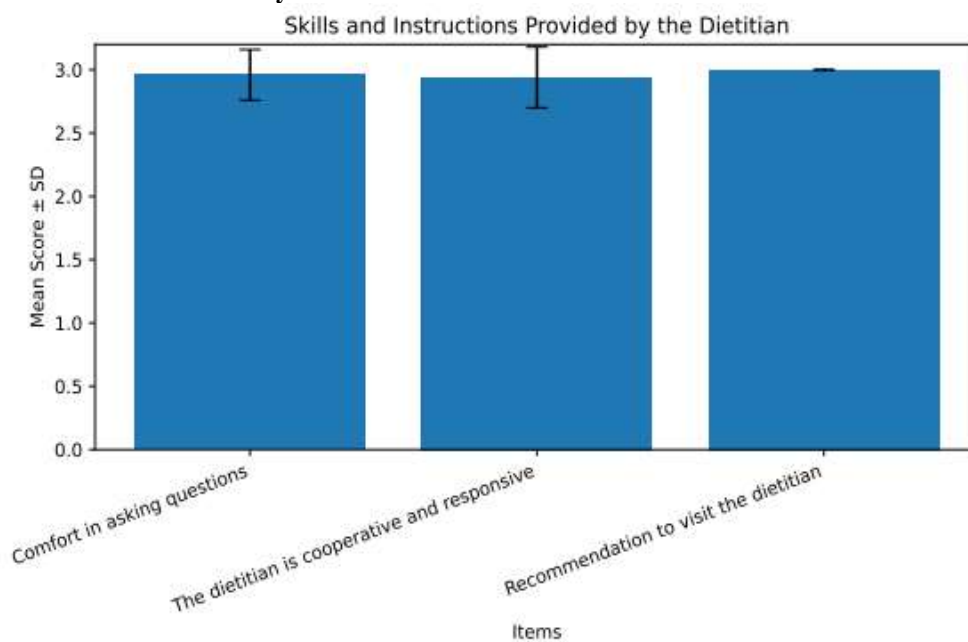


Figure 4. Mean scores (\pm standard deviation) of skills and instructions provided by the dietitian as perceived by patients.

4. Relationship with Nutritional and Recommendations

Question	Mean	Stander Deviation	Rank
Understanding the diet	2.94	0.24	1
Identifying allowed and prohibited foods	2.94	0.24	1
Planning balanced meals	2.92	0.27	3
Explaining gluten components	2.93	0.26	2
Accessing essential nutrients	2.92	0.27	3
Overall Mean	2.93	0.26	-

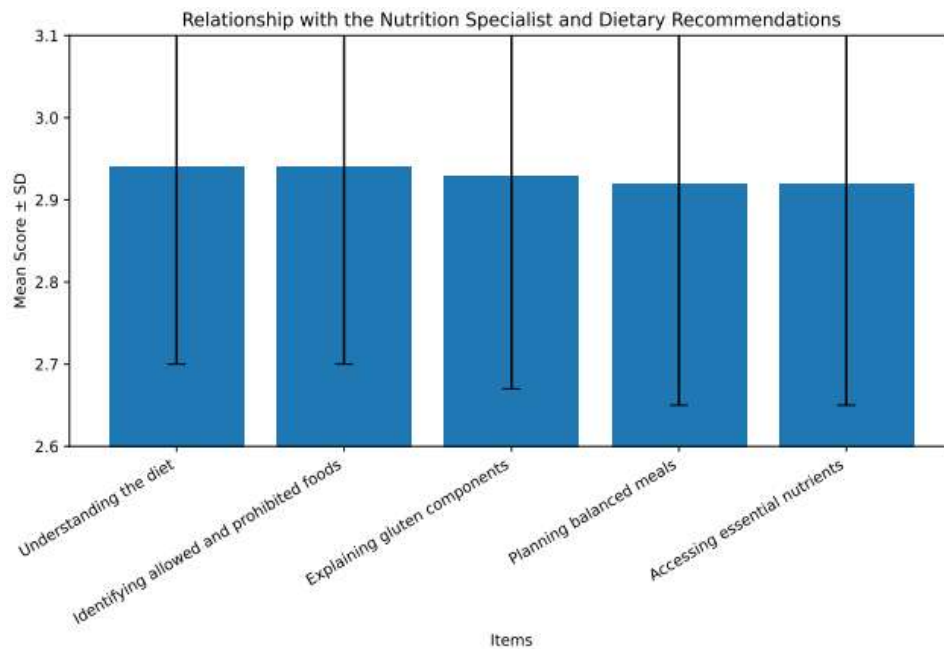


Figure 5. Mean scores (\pm standard deviation) of items related to the relationship with the nutrition specialist and dietary recommendations.

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