Original Article

Exploring Health Motivations beyond Subscribing in Nutrition Clinics in the Southern Governorates, Jordan

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ABSTRACT

Objectives

This study aimed to explore the health motivations of clients who subscribe to nutrition clinics in the southern governorates of Jordan.

Methods

A cross-sectional study was conducted among 395 participants who subscribed to nutrition clinics in three Southern Governorates of Jordan including Aqaba, Ma'an, and Al-Karak. Participants were interviewed and the data was collected regarding their socio-demographic characteristics, physical activity, registration duration, and body mass index (BMI). Furthermore, responses were collected from participants using validated questionnaire concerning their health motivations beyond subscribing in nutrition clinics. Data were analyzed using SSPS (version 25).

Results

Findings of the study revealed the responses of participants to questions of the questionnaire were mostly "Agree" or "Strongly Agree". Furthermore, the mean score of responses for the whole questionnaire was 4.28 ± 0.40, which reflects very high level of perception among participant regarding health motivations of subscribing in nutrition clinics. The mean scores of responses among participants were significantly higher in females and participants who had work in comparison to their counterparts. In addition, results have shown significant differences in mean scores of responses among corresponding subcategories for the variables of monthly income, registration duration, and BMI with highest scores among participant with monthly income > 600 JOD, registration duration (1- 2 years), and normal BMI, respectively. ***Conclusion:*** Jordanians in Southern Governorates reflected high level of perception the health services of nutrition clinics. Studies including further factors and different geographical regions are highly recommended to clarify the bight face of nutrition clinics.

Keywords

Health; Nutrition; Clinics; Cross-sectional; Jordan

INTRODUCTION

The role of human nutrition is very crucial in the prevention and treatment of many chronic diseases in addition to its role in the management of many of these diseases.[1] Nowadays, nutrition clinics play crucial tasks in shaping the practical sites of nutrition assessment, health-related counseling, nutrition education, and diet therapy. As a result, many specialized hospitals and medical centers consider nutrition clinics as integral part of the healthcare organizations. The tight association between diet and the etiology of many chronic diseases raised the need for such clinics.[1,2] Registered dietitians (RD) and diet technicians (DT) are important members in the nutrition clinics through their roles in providing knowledge, recommendations, consultations, and diet therapy interventions for patients.[3] Many previous studies confirmed the aforementioned roles of dietitians and nutrition clinics. McDonagh and colleagues emphasized the vital importance of diet therapy in the prevention and treatment of cardiovascular diseases (CVDs).[4] Moreover, Eglseer et al. reported that dietitians are essential members in the healthcare team of diabetes management.[3] In the same context, Diab et al. documented that nutrition intervention and counseling play health-related roles among patients with Type 2 diabetes.[5]

People in Jordan is experiencing a nutrition transition in their dietary patterns, unfortunately, this this transition is highly related to malnutrition and many chronic diseases.[6] A local

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study indicated that the prevalence of cardiovascular diseases, obesity, and Type 2 diabetes were 53%, 45%, and 28%, respectively.[7] Another local study designed to draw the roadmap of the national nutrition strategy for enhancing nutrition, preventing malnutrition, and addressing health and nutrition-related problems in the Jordanian community.[8,9]

Actually, this cross-sectional study primarily aimed to explore the health motivations of subscribing in nutrition clinics in the southern governorates of Jordan. To the best of our knowledge, no previous studies have explored this topic.

METHODS AND MATERIALS

Design and sample

A cross-sectional study was conducted from March to August 2024. The study participants were selected among different nutrition clinics from three governorates in the South of Jordan including Aqaba, Ma'an, and Al-Karak. The following formula was used to determine the sample size:

$$n = Z^2_{1-\alpha/2} P (1 - P)/e^2$$

$Z^2 = (1.96)^2$ for 95% confidence, P is the "best guess" for prevalence, and e is the maximum tolerable error for the prevalence estimate. The final sample size was 395 participants (93 males, 302 females). All participants included were aged 19 years and above. A briefing about the objectives of the study was presented for each participants and a signed informed consent form each participant was obtained before involving in the study. Any participant failed in filling the questionnaire completely was excluded from the study. Ethical Approval of the study protocol was obtained by the Ethics committee in the Department of Nutrition and Food Technology in the Faculty of Agriculture / Mutah University (*Approval Number* :AGR/NFT/217/2023).

Data collection

All data was collected form participants through face-to-face interview with the help of professional nutritionist in each clinic. The data collected were socio-demographic data including age, sex, social status, employment, monthly income, monthly income, smoking status, education, physical activity. Furthermore, data about registration duration was recorded for each participant. The duration was classified into less than half year, half to one year, from one to two years, and more than two years. Moreover, the collected data included anthropometric data regarding body mass index which was calculated for each participant after taking his/her weight and height through the equation: BMI = weight (kg) / height (m^2). The BMI categorized according to WHO classifications.[10] The last part of the collected data was questionnaire concerning health motivations beyond subscribing in nutrition clinics. It was composed from twenty questions. Experts in the fields of nutrition, health, and epidemiology formulated this questionnaire. This questionnaire was validated by three doctors specialized in meal planning and diet therapy. Moreover, before collecting data, a pilot study was conducted among 25 subscribers in different nutrition clinics to verify the reliability of the questionnaire with 10 days interval between the test and the retest of the questionnaire. The overall reliability (internal consistency) value was significant with Cronbach's alpha coefficient of 0.855. The participants in the pilot study were excluded from the study and their data was not included in the study. The answers of the questionnaire scored according to Likert scale items with 5-points as shown in Table 1. Also, the level of response for the questionnaire was used to assess the motivational predictors of subscribing into nutrition clinics and classified as shown in Table 1.

Table 1: 5-point Likert scale

Likert scale	Interval	Difference	Description	Level
1	1.00-1.79	0.79	Strongly disagree	Very low
2	1.80-2.59	0.79	Disagree	Low
3	2.60-3.39	0.79	Neither agree nor disagree	Moderate
4	3.40-4.19	0.79	Agree	High
5	4.20-5.00	0.80	Strongly agree	Very high

Statistical analysis

Statistical package for the social sciences software (SPSS; version 25, IBM, NY) was used for statistical analysis. Categorical data of socio-demographic data and responses of the questionnaire questions were presented as frequencies and percentages. Scores of participants' responses were calculated and presented,

as Mean ± SD and the level of response was determined for each question of the study questionnaire. Mann-Whitney U test and Kruskall-Wallis H test followed by post hoc Dunn's test were used to find out the association of all study variables with mean scores of participants' responses to the questions of study questionnaire. Statistically, $p < 0.05$ was used to consider significant differences for the aforementioned tests.

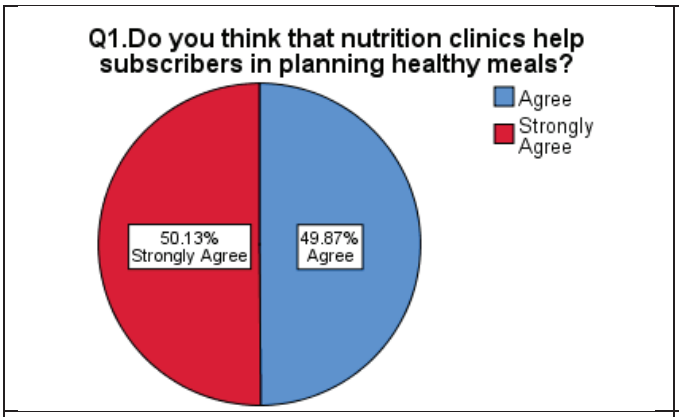
RESULTS

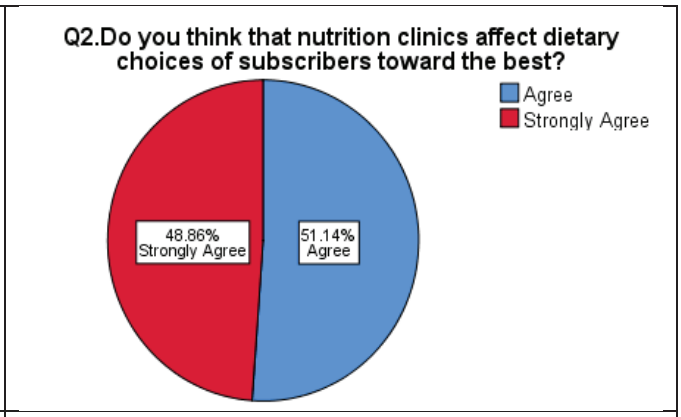
The results of socio-demographic characteristics in Table 2 study indicated that majority of the participants were female that constituted about three quarters of the study population. In addition, the highest percentage of participants aged between 30 and 39 with (40.3%). According to the results of the other variables, higher percentages were shown among married participants, working participants, participants with monthly income between 300-600 JOD, non-smokers, participants with University level education, participants with moderate level of physical activity, participants registered for duration less than six months, and overweight participants in comparison with other subgroups of each variable.

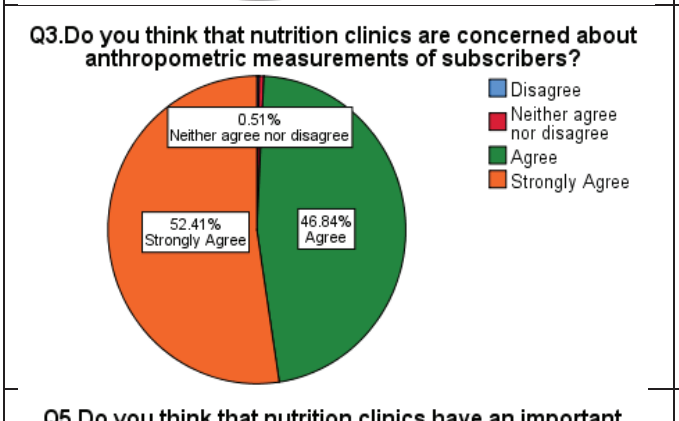
Table 2: Socio-demographic characteristics, physical activity, registration duration, and BMI of the participants attended Nutrition Clinics in Southern Jordan (n=395):

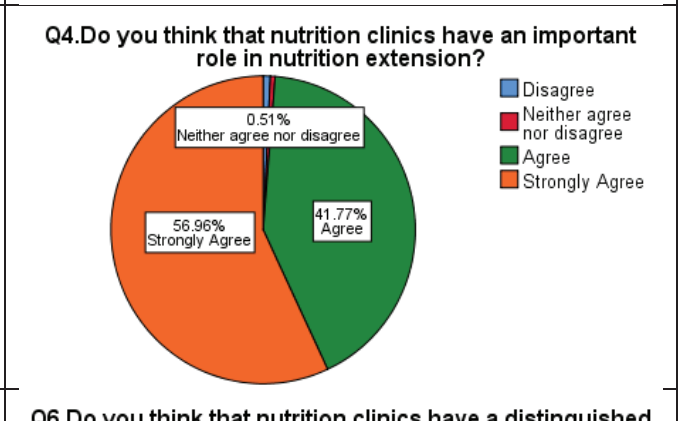
Variables		Frequency (%)
Age	19 - 29	145 (36.7%)
	30 - 39	159 (40.3%)
	40 - 49	63 (15.9%)
	> 50	28 (7.1%)
Sex	Female	302 (76.5%)
	Male	93 (23.5%)
Social status	Single	131 (33.2%)
	Married	213 (53.9%)
	Divorced	51 (12.9%)
Employment	Working	237 (60.0%)
	Not working	158 (40.0%)
Monthly income	< 300 JOD	98 (24.8%)
	300 – 600 JOD	164 (41.5%)
	> 600 JOD	133 (33.7%)
Smoking status	Smoker	147 (37.2%)
	Non-smoker	248 (62.8%)
Education	Illiterate	15 (3.8%)
	High school	72 (18.2%)
	University level	270 (68.4%)
	Postgraduate level	38 (9.6%)
Physical activity	Low	119 (30.1%)
	Moderate	258 (65.3%)
	High	18 (4.6%)
Registration duration	< 6 months	259 (65.6%)
	6 months -1 year	105 (26.6%)
	1 year- 2 years	24 (6.1%)
	> 2 years	7 (1.8%)
BMI	Underweight	9 (2.3%)
	Normal	99 (25.1%)
	Overweight	135 (34.2%)
	Obese I	103 (26.1%)
	Obese II	36 (9.1%)
	Obese III	13 (3.3%)

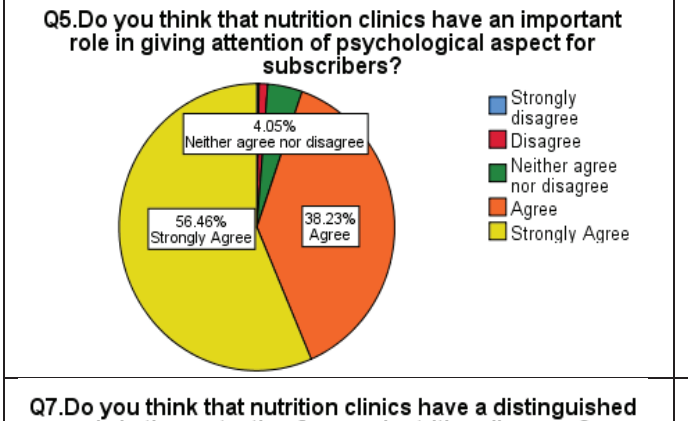
The results as shown in Figure 1 illustrated that the highest percentages of the answers were "Strongly Agree" in about one fourth of the questions of the questionnaire, namely, questions 1,3, 4, and 5. Meanwhile, the answer "Agree" represented the highest percentage of answers for the rest of questions of the questionnaire.

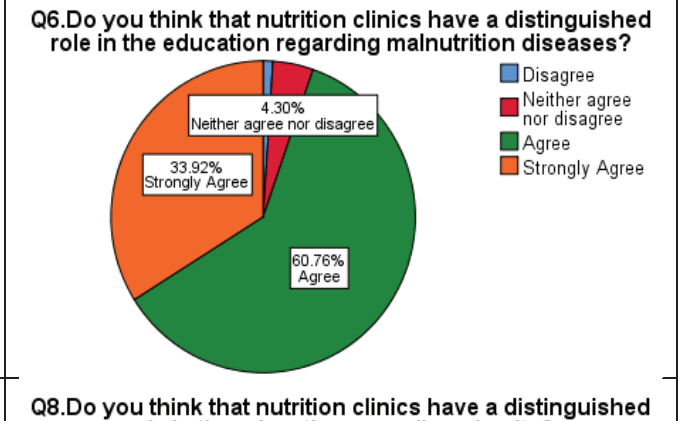

Q1.Do you think that nutrition clinics help subscribers in planning healthy meals?
Agree
Strongly Agree
50.13% Strongly Agree
49.87% Agree

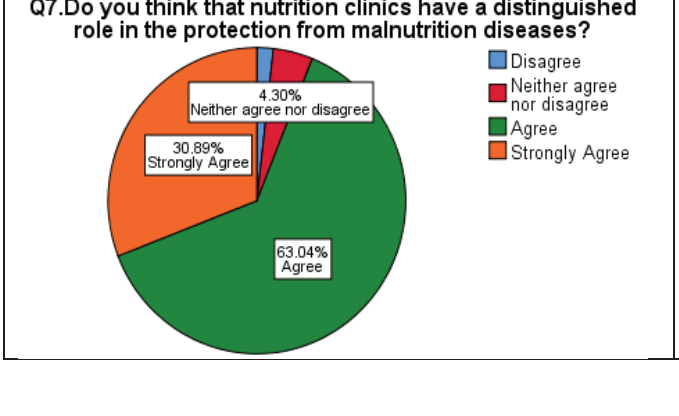

Q2.Do you think that nutrition clinics affect dietary choices of subscribers toward the best?
Agree
Strongly Agree
48.86% Strongly Agree
51.14% Agree

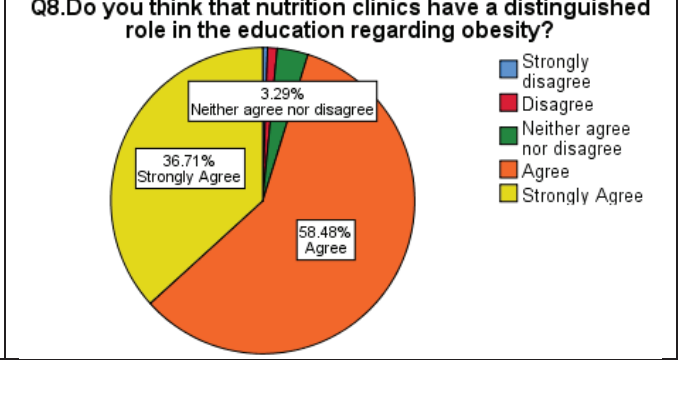

Q3.Do you think that nutrition clinics are concerned about anthropometric measurements of subscribers?
Disagree
Neither agree nor disagree
Agree
Strongly Agree
0.51% Neither agree nor disagree
52.41% Strongly Agree
46.84% Agree


Q4.Do you think that nutrition clinics have an important role in nutrition extension?
Disagree
Neither agree nor disagree
Agree
Strongly Agree
0.51% Neither agree nor disagree
56.96% Strongly Agree
41.77% Agree

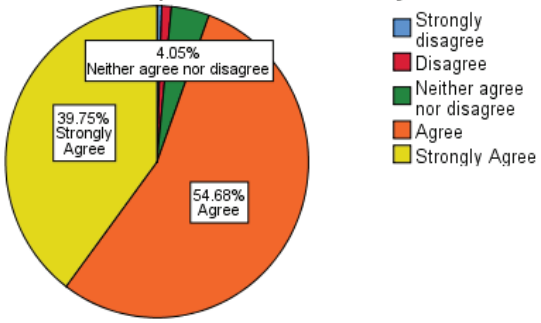

Q5.Do you think that nutrition clinics have an important role in giving attention of psychological aspect for subscribers?
Strongly disagree
Disagree
Neither agree nor disagree
Agree
Strongly Agree
4.05% Neither agree nor disagree
56.46% Strongly Agree
38.23% Agree


Q6.Do you think that nutrition clinics have a distinguished role in the education regarding malnutrition diseases?
Disagree
Neither agree nor disagree
Agree
Strongly Agree
4.30% Neither agree nor disagree
33.92% Strongly Agree
60.76% Agree

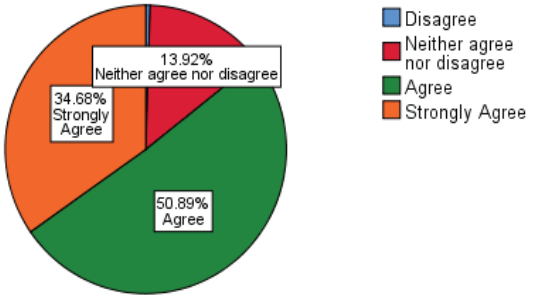

Q7.Do you think that nutrition clinics have a distinguished role in the protection from malnutrition diseases?
Disagree
Neither agree nor disagree
Agree
Strongly Agree
4.30% Neither agree nor disagree
30.89% Strongly Agree
63.04% Agree


Q8.Do you think that nutrition clinics have a distinguished role in the education regarding obesity?
Strongly disagree
Disagree
Neither agree nor disagree
Agree
Strongly Agree
3.29% Neither agree nor disagree
36.71% Strongly Agree
58.48% Agree

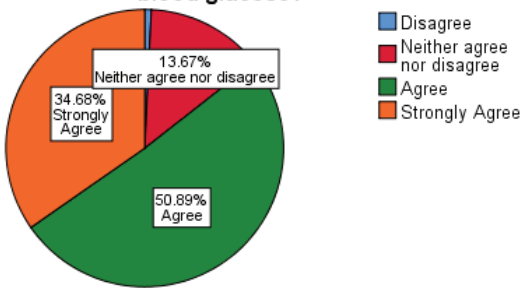
Q9.Do you think that nutrition clinics have a distinguished role in the protection from obesity?



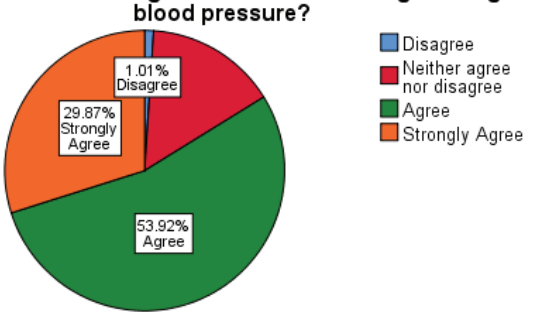
Q10.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood triglycerides and cholesterol?



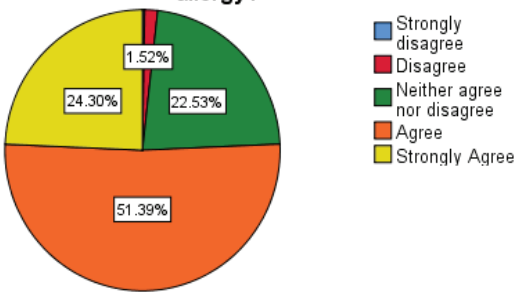
Q11.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood glucose?



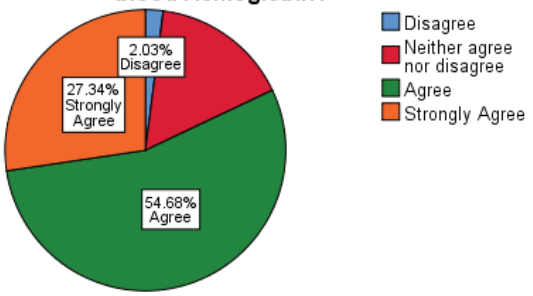
Q12.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood pressure?



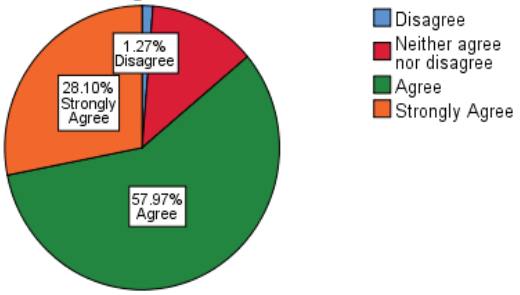
Q13.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with food allergy?



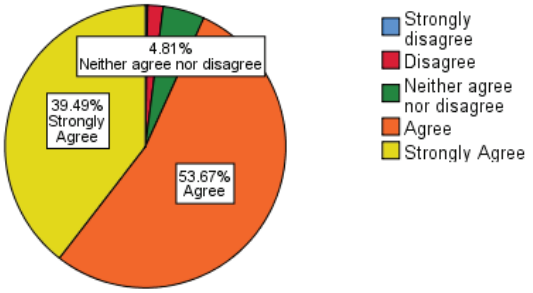
Q14.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with low blood Hemoglobin?



Q15.Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with thyroid gland diseases?



Q16.Do you think that nutrition clinics make connection between nutritional status and results of laboratory tests for subscribes with chronic diseases?



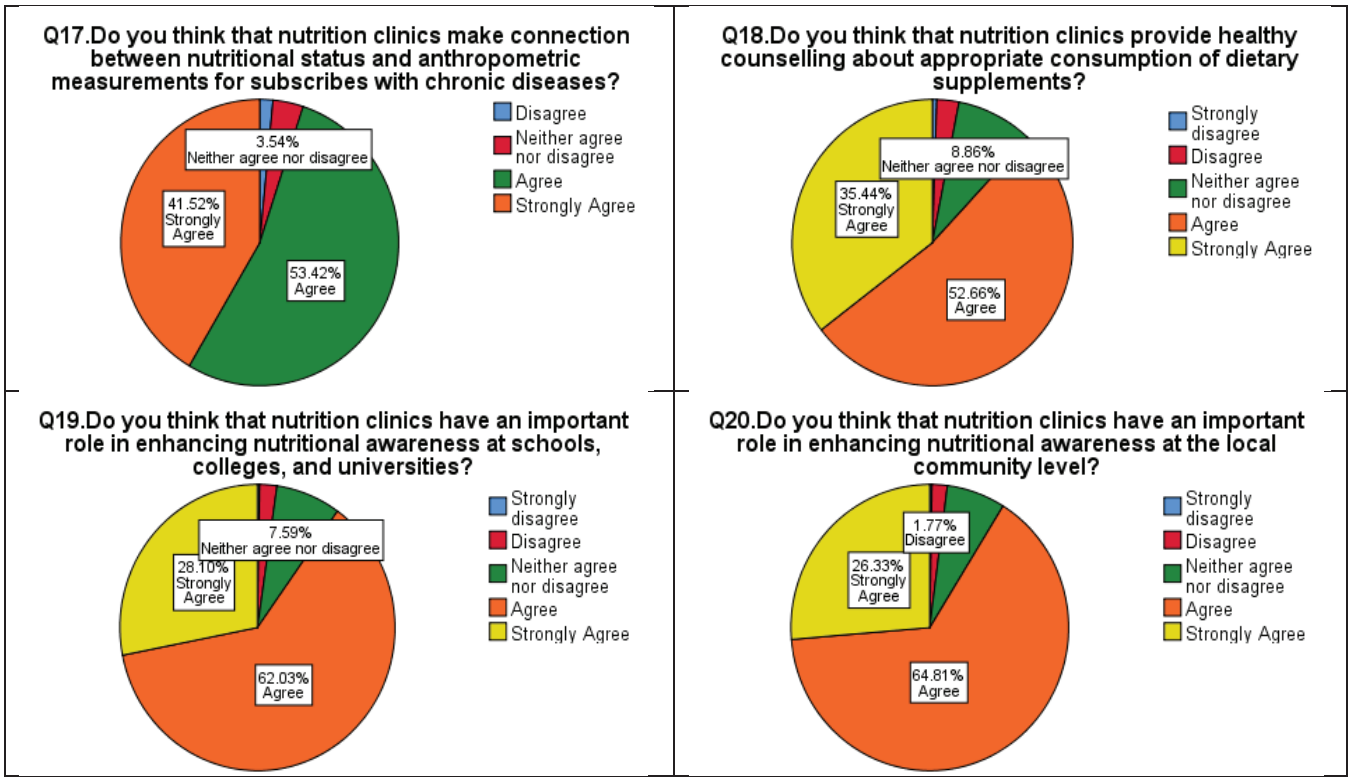


Figure 1: Distribution of participants' responses to the questions of study questionnaire:

Table 3 shows that the mean score for the answers of the whole questionnaire was 4.28 ± 0.40. Moreover, according to Likert scale, Table 3 depicts that for each question of the questionnaire, the participants' responses were classified as "*Very High Level*" according to Likert scale and this reflects distinguished level of perception for the motivational predictors of subscribing into nutrition clinics.

Table 3: Mean values of participants' responses to the questions of study questionnaire and the levels of response:

Study Questions	Minimum	Maximum	Mean ± SD	Level	Rank
Q1. Do you think that nutrition clinics help subscribers in planning healthy meals?	4.00	5.00	4.50 ± 0.50	Very high	4
Q2. Do you think that nutrition clinics affect dietary choices of subscribers toward the best?	4.00	5.00	4.49 ± 0.50	Very high	5
Q3. Do you think that nutrition clinics concern about anthropometric measurements of subscribers?	2.00	5.00	4.51 ± 0.53	Very high	3
Q4. Do you think that nutrition clinics have an important role in nutrition extension?	2.00	5.00	4.55 ± 0.55	Very high	2
Q5. Do you think that nutrition clinics have an important role in giving attention of psychological aspect for subscribers?	1.00	5.00	4.49 ± 0.65	Very high	1
Q6. Do you think that nutrition clinics have a distinguished role in the education regarding malnutrition diseases?	2.00	5.00	4.28 ± 0.59	Very high	13

Study Questions	Minimum	Maximum	Mean ± SD	Level	Rank
Q7. Do you think that nutrition clinics have a distinguished role in the protection from malnutrition diseases?	2.00	5.00	4.23 ± 0.61	Very high	14
Q8. Do you think that nutrition clinics have a distinguished role in the education regarding obesity?	1.00	5.00	4.30 ± 0.63	Very high	10
Q9. Do you think that nutrition clinics have a distinguished role in the protection from obesity?	1.00	5.00	4.32 ± 0.65	Very high	6
Q10. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood triglycerides and cholesterol?	2.00	5.00	4.20 ± 0.68	Very high	12
Q11. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood glucose?	2.00	5.00	4.19 ± 0.69	Very high	11
Q12. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with high blood pressure?	2.00	5.00	4.13 ± 0.69	Very high	15
Q13. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with food allergy?	1.00	5.00	3.98 ± 0.74	Very high	20
Q14. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with low blood Hemoglobin?	2.00	5.00	4.07 ± 0.71	Very high	19
Q15. Do you think that nutrition clinics provide appropriate nutritional counseling about correct handling with thyroid gland diseases?	2.00	5.00	4.13 ± 0.67	Very high	17
Q16. Do you think that nutrition clinics make connection between nutritional status and results of laboratory tests for subscribes with chronic diseases?	1.00	5.00	4.30 ± 0.67	Very high	7
Q17. Do you think that nutrition clinics make connection between nutritional status and anthropometric measurements for subscribes with chronic diseases?	2.00	5.00	4.35 ± 0.62	Very high	8
Q18. Do you think that nutrition clinics provide healthy counselling about appropriate consumption of dietary supplements?	1.00	5.00	4.20 ± 0.74	Very high	9
Q19. Do you think that nutrition clinics have an important role in enhancing nutritional awareness at schools, colleges, and universities?	1.00	5.00	4.16 ± 0.66	Very high	16
Q20. Do you think that nutrition clinics have an important role in enhancing nutritional awareness at the local community level?	1.00	5.00	4.15 ± 0.64	Very high	18
Weighted Mean ± SD			**4.28 ± 0.40**	**Very high**	

As shown in Table 4, females significantly scored higher scores than males with a mean value of 4.30 ± 0.40 with (p = 0.032). Similarly, participants who had work significantly scored higher than those without any work (p=0.036). Regarding the variable of social status, the finding of this research indicated that there was only a significant difference between married and single participants with higher scores among the former subgroup. Monthly income play a crucial role that affected the mean scores among different subgroups of this variable (p=0.000). Actually, significant differences were shown between participants with monthly income with < 300 JOD and participants with monthly income between 300 and 600 JOD with higher scores among the later subgroup. In the same context, participants with monthly income > 600 JOD had significantly reported higher scores than participants with monthly income between 300 and 600 JOD reported. To put simply, participants with the highest monthly income reported the highest scores. According to the variables of registration duration and body mass index, these two variables recorded significant differences with p-values of 0.000 and 0.007, respectively. Multiple pairwise significant differences were documented between certain subgroups within the two aforementioned variables as shown in Table 4. Four variables including age, smoking, physical activity, and education had not registered any significant differences in the mean scores among their subgroups.

Table 4: Association of socio-demographic characteristics, physical activity, registration duration, and BMI of the participants with mean values of participants' responses to the questions of study questionnaire:

Variables		Mean ± SD	*p-value*	*Post-hoc*$^{\varphi}$
Age$^{\$}$	19 - 29	4.24 ± 0.39	0.418	
	30 - 39	4.29 ± 0.41		
	40 - 49	4.27 ± 0.42		
	> 50	4.39 ± 0.37		
Sex$^{\#}$	Female	4.30 ± 0.40	0.032*	
	Male	4.19 ± 0.39		
Social status$^{\$}$	Single	4.20 ± 0.39	0.027*	1-2
	Married	4.34 ± 0.41		
	Divorced	4.22 ± 0.39		
Employment$^{\#}$	Working	4.31 ± 0.40	0.036*	
	Not working	4.23 ± 0.41		
Monthly income$^{\$}$	< 300 JOD	4.15 ± 0.43	0.000*	1-2 1-3
	300 - 600	4.29 ± 0.39		
	> 600 JOD	4.35 ± 0.36		
Smoking status$^{\#}$	Smoker	4.28 ± 0.39	0.720	
	Non-smoker	4.28 ± 0.41		
Physical activity$^{\$}$	Low	4.22 ± 0.44	0.288	
	Moderate	4.30 ± 0.38		
	High	4.37 ± 0.39		
Registration duration$^{\$}$	< 6 months	4.18 ± 0.38	0.000*	1-2 1-3 2-3
	6 months -1 year	4.42 ± 0.36		
	1 year- 2 years	4.64 ± 0.38		
	> 2 years	4.33 ± 0.47		
Education$^{\$}$	Illiterate	4.27 ± 0.51	0.071	
	High school	4.18 ± 0.37		
	University level	4.30 ± 0.40		
	Postgraduate level	4.29 ± 0.40		
BMI$^{\$}$	Underweight	3.96 ± 0.41	0.007*	1-2 1-5 2-3 2-4
	Normal	4.38 ± 0.40		
	Overweight	4.23 ± 0.42		
	Obese I	4.23 ± 0.36		
	Obese II	4.35 ± 0.40		
	Obese III	4.32 ± 0.42		

$^{\#}$ *Mann-Whitney U test*
$^{\$}$ *Kruskall-Wallis H test*
$^{\varphi}$ *Dunn's test*
*: *Statistical significance at p-value ≤ 0.05.*

DISCUSSION

Healthcare is considered a basic necessity for any society.[11] The transition among Jordanian people to westernized dietary pattern has increased dramatically in the last decades. This transition is associated with many health and nutrition-related problems. Consequently, these problems considered as driving forces for the need for nutrition interventions programs and effective nutrition clinics within health organization.[12] This study provided valuable insights into the health motivations of subscribers into nutrition clinics. This study explored the high-level response of Jordanian subscribers to nutrition clinics and this reflects their increased level of awareness regarding the importance of such clinics in prevention and providing appropriate guidance for participants.

On the other hand, this study clarified the major variables that influence subscribes into nutrition clinics. There is not much data concerning the association between many socio-demographic variables and participants' motivations in subscribing into nutrition clinics. Findings of the study indicated that females scored significantly higher responses to the questions of study questionnaire than males and this reflect distinguished trends and higher motivations among females to healthy behaviors. A study conducted by Bertakis et al. indicated that females were often more interested in the engagement and participation in nutrition and health-promoting activities.[13] Furthermore, Stefan reported that females were more eager than males in having appropriate nutritional and health information that enhance their ability in purchasing healthier goods.[14] Regarding income variable, which is paralleled with employment variable, this study revealed that higher income level significantly related to higher scores of motivations among participants in subscribing into nutrition clinics. This result aligned with a many previous studies, which indicated that higher income highly related with higher consciousness for the need to health education and nutritional counseling.[15-19] Regarding social status, this variable has shown significant association with participants' responses but no previous studies investigated such association. Actually, such association may be explained by the higher intake for a variety of delicious dishes and beverages by married people.

Concerning registration duration variable, participants with long durations reported significantly higher scores than others, suggesting that prolonged interaction with nutritionist within nutrition clinics enhance their adherence to the nutritional recommendations, nutritional knowledge, and awareness for the benefits and services provided by such clinics. A study conducted by Ivanov reported that prolonged and successful physician–patient relationship improve adherence of diabetic patients to dietary recommendations and interventions.[20] On the other hand, this study indicated that BMI was significantly associated with scores of participants' motivations beyond subscribing in nutrition clinics. In this study, underweight individuals reported the lowest scores comparing to other BMI categories. This may indicate that overweight and obese participants perceive nutrition clinics as more relevant to their needs, possibly due to their knowledge of the nutrition and health-related complications of their BMI. Generally speaking, physicians are more likely to give health recommendation and dietary guidelines for people with when the high BMI including overweight and obese persons.[21] Interestingly, age, smoking status, physical activity, and education level did not show significant associations with participants' responses. This contrasts with studies where these factors often influence health perception and behaviors. Nutbeam documented that elderly people age and higher levels of education were correlated with better health literacy.[22] While this study provided valuable insights, several limitations should be considered: The geographic limitation to Southern Jordan may affect generalizability; the cross-sectional nature of the study prevents causal inferences, and potential response bias due to self-reported data.

CONCLUSION

Overall, the study reflects high belief level among Jordanians in Southern Governorates regarding health-based services provided by nutrition clinics regarding issues related to health and nutrition support. Furthermore, the study highlights the critical role of socio-demographic factors, physical activity, registration duration, and BMI of the participants in shaping individuals' perceptions of nutrition services. Future researches are needed with other factors and through other geographical regions to clarify the significant importance of nutrition clinics as one of allied health services for enhancing health and nutrition of participants.

Authors' contribution

MOI played a key role in the project through conceptualization, designing, and data analysis. NAD add a valuable effort by assisting in interpretation and curation of data. IRD contributed significantly in the acquisition of data and providing guidance throughout the entire process. All authors revised and approved the final version of the manuscript.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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REFERENCES

1. Śliż D, Jodczyk AM, Łakoma K, Kucharska A, Panczyk M, Rostkowska OM. et al Examining the Nutrition of Cardiological Patients in Hospitals: Evaluating the Discrepancy between Received Diets and Reference Diet Based on ESC 2021 Guidelines-Hospital Diet Medical Investigation) (HDMI) Study. *Nutrients.* 2023 Oct 30;**15**(21):4606. https://doi:10.3390/nu15214606.
2. Downer S, Berkowitz S A, Harlan T S, Olstad D L, Mozaffarian D. Food is medicine: actions to integrate food and nutrition into healthcare. *BMJ*. 2020; **369** :m2482 https://doi:10.1136/bmj.m2482
3. Eglseer D, Bauer S. Predictors of Dietitian Referrals in Hospitals. *Nutrients.* 2020 Sep 18;**12**(9):2863. https://doi:10.3390/nu12092863.
4. McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M. et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J.* 2021 Sep 21;**42**(36):3599-3726. https://doi:10.1093/eurheartj/ehab368. Erratum in: *Eur Heart J*. 2021 Dec 21;42(48):4901. https://doi:10.1093/eurheartj/ehab670.
5. Diab A, Dastmalchi LN, Gulati M, Michos ED. A Heart-Healthy Diet for Cardiovascular Disease Prevention: Where Are We Now? *Vasc Health Risk Manag.* 2023 Apr 21;**19**:237-253. http://doi:10.2147/VHRM.S379874.
6. Nasreddine L, Ayoub JJ, Al Jawaldeh A. Review of the nutrition situation in the Eastern Mediterranean Region. *East Mediterr Health J*. 2018 Apr 5;**24**(1):77-91.
7. Al-Awwad NJ, Ayoub J, Barham R, Sarhan W, Al-Holy M, Abughoush M. et al. Review of the Nutrition Situation in Jordan: *Trends and Way Forward. Nutrients*. 2021 Dec 28;**14**(1):135. https://doi.org/10.3390/nu14010135
8. The Ministry of Health, Jordan, MOH. Jordan National Stepwise Survey (STEPs) for Noncommunicable Diseases Risk Factors 2019. Available online: https://www.moh.gov.jo/ebv4.0/root_storage/en/eb_list_page/stepwise_survey_(steps)_2020_technical_report-english.pdf
9. The Ministry of Health, Jordan, MOH. National Nutrition Strategy 2023-2030. Available online: https://moh.gov.jo/ebv4.0/root_storage/en/eb_list_page/nutriotion_english_final. pdf
10. World Health Organization, WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO expert committee. Technical report series no. 854. Geneva: World Health Organization; 1995 (http://whqlibdoc.who.int/trs/WHO_TRS_854.pdf).
11. Hossain, M. S., Yahya, S. B., Rahman, S., Sobhani, F. A., & Rahman, R. Corporate Social Responsibility in Healthcare: A case of Islamic Banks (IBs) in Bangladesh. *Bangladesh Journal of Medical Science*, 2019;**18**(3): 567–573. https://doi.org/10.3329/bjms.v18i3.41627
12. Ibrahim MO. Association between major socio-demographic and psychosocial factors with the dietary pattern among elderly people in Amman, Jordan. *Clinical Nutrition and Hospital Dietetics*. 2021; **41** (2): 72-97. https://doi.org/10.12873/412mohammed
13. Bertakis KD, Azari R, Helms LJ, Callahan EJ, Robbins JA. Gender differences in the utilization of health care services. *J Fam Pract*. 2000 Feb;**49**(2):147-52.
14. Ek S. Gender differences in health information behaviour: a Finnish population-based survey. Health Promot Int. 2015 Sep;30(3):736-45. http://10.1093/heapro/dat063
15. Galobardes B, Shaw M, Lawlor DA, Lynch JW, Davey Smith G. Indicators of socioeconomic position (part 1). *J Epidemiol Community Health*. 2006 Jan;**60**(1):7-12. https://doi:10.1136/jech.2004.023531.
16. Van der Heyden JH, Demarest S, Tafforeau J, Van Oyen H. Socio-economic differences in the utilization of health services in Belgium. *Health Policy*. 2003 Aug;**65**(2):153-65. http://doi:10.1016/s0168-8510(02)00213-0.
17. Roos NP, Mustard CA. Variation in health and health care use by socioeconomic status in Winnipeg, Canada: does the system work well? Yes and no. *Milbank Q.* 1997;**75**(1):89-111. http://doi:10.1111/1468-0009.00045.
18. Hannan C. Women, gender equality, and diabetes. *Int J Gynaecol Obstet*. 2009 Mar;104 Suppl **1**:S4-7. https://doi:10.1016/j.ijgo.2008.11.021.
19. Endevelt R, Baron-Epel O, Karpati T, Heymann AD. Does low socioeconomic status affect use of nutritional services by pre-diabetes patients? *Int J Health Care Qual Assur.* 2009;**22**(2):157-67. https://doi:10.1108/09526860910944647.
20. Beverly EA, Worley M, Prokopakis K, Ivanov N. Patient-physician com-munication and diabetes self-care. *J Clin Outcomes Manag*, 2016; **23**(11): 509-18. Available online: https://www.mdedge.com/jcomjournal/article/146123/diabetes/patient-physician-communication-and-diabetes-self-care
21. Klumbiene J, Petkeviciene J, Vaisvalavicius V, Miseviciene I. Advising overweight persons about diet and physical activity in primary health care: Lithuanian health behaviour monitoring study. *BMC Public Health.* 2006 Feb 14; **6:30**. https://doi:10.1186/1471-2458-6-30.
22. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International.* 2000; **15** (3): 259-267. https://doi:org/10.1093/heapro/15.3.259