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Differential Associations of Mediterranean Diet Adherence and Physical Activity with Domain-Specific Quality of Life Among Rotating-Shift Nurses: A Pilot Cross-Sectional Study

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Abstract

Rotating shift work has been associated with impaired quality of life and changes in health behaviors among nurses. Although maintaining a healthy diet and engaging in physical activity may be associated with better quality of life, evidence in shift-working nurses remains limited. This pilot cross-sectional study explored associations between adherence to the Mediterranean diet, physical activity, and quality of life among nurses in Northern Greece from October 2025 to February 2026. A total of 100 nurses working rotating shifts participated in the study. Quality of life, adherence to the Mediterranean diet, and physical activity were assessed using the WHOQOL-BREF, MedDietScore, and IPAQ questionnaires, respectively. The mean MedDietScore was 22.56 ± 4.83, and the mean physical activity was 711.16 ± 576.05 MET-min/week. Adherence to the Mediterranean diet was positively associated with the Physical Health, Psychological Health, and Environment domains. In the multivariable model, physical activity remained positively and independently associated with Physical Health ($\beta = 0.31$, $p = 0.002$), whereas both physical activity and adherence to the Mediterranean diet were positively associated with the Environment domain. These findings suggest that lifestyle behaviors are associated with specific dimensions of quality of life among shift-working nurses and emphasize the need for larger studies.

Keywords: nurses; rotating shift work; Mediterranean diet; physical activity; quality of life

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Academic Editor: Iain A. Brownlee

Received: 30 March 2026
Revised: 28 May 2026
Accepted: 26 June 2026
Published: 1 July 2026

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1. Introduction

Rotating shift work is a fundamental organizational feature of nursing practice. However, this operational necessity places a considerable burden on nurses. In particular, it has been associated with circadian rhythm disruption, fatigue, and sleep disturbances. It also affects mental health and daily functioning. These consequences extend to social life, job performance, and quality of life, while also increasing the risk of stress, metabolic disorders, and cardiovascular disease [1,2]. Therefore, rotating shift work is not merely a technical element of work organization, but a factor that substantially affects nurses' daily functioning and overall well-being [3].

Quality of life in nurses is a multidimensional concept. It includes physical functioning, psychological well-being, social relationships, and perceptions of the environment. In this occupational context, maintaining self-care behaviors can become more difficult.

Irregular work schedules and night work limit the practical implementation of health-promoting behaviors, despite nurses' knowledge of health-related factors [4]. Additionally, rotating shift work has been associated with changes in key lifestyle habits, including dietary behavior and physical activity [5]. As a result, it is important to investigate how health-related behaviors are associated with quality-of-life domains among nurses working rotating shifts.

Nutrition is a key modifiable lifestyle factor and is particularly important for nurses working rotating shifts, as irregular schedules may affect both food choices and meal timing. Among healthy dietary patterns, the Mediterranean diet has received considerable attention because of its favorable associations with cardiometabolic health [6–8]. Moreover, recent evidence suggests that greater adherence to the Mediterranean diet is associated with better health-related quality of life [9,10].

At the same time, shift workers are more likely to skip meals, eat at irregular times, and make less favorable nutritional choices, such as consuming more sugar-sweetened beverages and saturated fats [11]. This dietary burden is not solely attributable to individual choices, but also to organizational constraints, such as work schedules, fatigue, limited break time, and reduced access to healthy food options during shifts [4,5]. In parallel, nurses working shifts have been reported to exhibit poorer dietary habits and a less favorable obesity profile, although in some cases they may also report higher levels of physical activity [5]. Moreover, diet quality seems to decline during night shifts, underscoring the need for improved access to nutritious meal options in the workplace [4]. As a result, shift work may be associated not only with what nurses eat, but also with when and how they eat.

In this context, the Mediterranean diet may be particularly relevant for rotating-shift nurses because it emphasizes fruits, vegetables, legumes, whole grains, olive oil, nuts, and fish, while limiting the intake of highly processed foods, saturated fats, and energy-dense snacks [6–8]. These characteristics may provide a useful dietary framework for addressing common shift-related dietary behaviors, such as irregular meal timing, increased snacking, and limited access to healthy food during night shifts [4,5,11]. Moreover, higher adherence to the Mediterranean diet has been associated with better health-related quality of life, suggesting that it may reflect a broader health-promoting lifestyle pattern [9,10]. Therefore, Mediterranean diet adherence represents not only a general marker of diet quality but also a potentially meaningful lifestyle factor for nurses working rotating shifts, whose irregular schedules may interfere with meal timing, food choices, and access to nutritious options during shifts.

Despite the aforementioned, there remains a limited amount of evidence on the Mediterranean diet, particularly among nurses. Work schedules may not always directly affect nurses' overall adherence to the Mediterranean diet, but they do seem to influence certain aspects of dietary behavior. In addition, the generally low adherence reported in nursing populations further supports the need for additional investigation of this issue [3,12,13]. Therefore, Mediterranean diet adherence represents an appropriate and clinically relevant focus for examining quality of life among nurses working rotating shifts.

Another important health behavior that is directly linked to both physical and mental well-being is physical activity. Adults should engage in at least 150–300 min of moderate-intensity aerobic activity or 75–150 min of vigorous-intensity activity per week, according to the most recent World Health Organization guidelines on physical activity. In parallel, reducing sedentary time is also recommended [14]. Adequate physical activity has been associated with better physical functioning, more favorable mental health, and a reduced risk of chronic disease. However, despite these benefits, maintaining satisfactory levels of physical activity is not always feasible for shift-working nurses: accumulated fatigue, lack

of time, and difficulty maintaining a stable routine act as barriers. Thus, physical activity among nurses working shifts cannot be taken for granted, despite the otherwise active nature of their professional role [15].

In fact, despite inconsistent findings from earlier research, the connection between physical activity and nurses' quality of life appears particularly significant. According to certain research, nurses who work rotational shifts exercise more frequently than those with set schedules. Nevertheless, it has also been emphasized that a substantial proportion of nurses do not exercise regularly [5]. Similarly, recent findings indicate that most nurses were classified as having low or moderate physical activity levels, while moderate physical activity was associated with a more favorable professional quality of life, particularly in terms of compassion satisfaction [15]. These findings suggest that physical activity is not linearly determined by work schedule type. Rather, it may be shaped by individual and work-related factors, such as fatigue, daily organization, and occupational demands. Therefore, it remains crucial to examine the relationship between physical activity and quality of life among nurses working rotational shifts [5,15].

However, exercise and nutrition are not independent of one another. Rather, they represent interrelated components of a more comprehensive way of living. Higher adherence to the Mediterranean diet has been associated with better quality of life and greater physical activity, suggesting that health-promoting behaviors often coexist and may reinforce one another [10]. This finding is especially crucial for nurses who work shifts, since their hectic schedules may impact not just a single habit but the entire self-care framework.

The adverse effects of shift work on health have been well documented. However, evidence on the combined role of Mediterranean diet adherence, physical activity, and domain-specific quality of life among rotating-shift nurses remains limited. Previous studies have often examined dietary habits, physical activity, or quality of life separately. The novelty of the present study lies in the simultaneous examination of two modifiable lifestyle behaviors—Mediterranean diet adherence and physical activity—in relation to the four WHOQOL-BREF domains. This integrated approach may provide a more comprehensive understanding of how lifestyle-related factors are associated with physical, psychological, social, and environmental aspects of quality of life in this occupational group. Therefore, the present pilot cross-sectional study aimed to investigate the associations between Mediterranean diet adherence, physical activity, and domain-specific quality of life among nurses working rotating shifts in Northern Greece.

2. Materials and Methods

2.1. Study Design

The present study was a pilot cross-sectional study. It aimed to investigate the association between adherence to the Mediterranean diet, physical activity, and quality of life among nurses working rotating shifts. Within this framework, the following parameters were assessed: quality of life, adherence to the Mediterranean diet, and physical activity, using the World Health Organization Quality of Life-BREF (WHOQOL-BREF), MedDietScore, and International Physical Activity Questionnaire (IPAQ), respectively.

2.2. Study Setting, Sample, and Sample Size

The study was conducted in five hospitals located in Northern Greece, with three hospitals affiliated with the 3rd Regional Health Authority (RHA) and two with the 4th RHA. The sample comprised 100 nurses employed in rotating shifts. Participants were recruited through non-probability convenience sampling. The study included nurses who were actively working rotating shifts and voluntarily agreed to complete the questionnaires.

Exclusion criteria were fixed work schedules, incomplete questionnaire responses, and refusal to provide informed consent for participation in the study.

To assess the adequacy of the sample size for the planned regression analyses, a sample size calculation was performed for multiple linear regression. Assuming a conventionally defined medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, power = 0.80, and five predictors, the minimum required sample size was estimated at 92 participants. Therefore, the final sample of 100 nurses was considered adequate for the planned exploratory regression analyses.

2.3. Research Instruments

Three research instruments were used for data collection:

2.3.1. WHOQOL-BREF

The WHOQOL-BREF questionnaire was used to assess quality of life [16,17]. The instrument consists of 26 items and evaluates four domains: Physical Health, Psychological Health, Social Relationships, and Environment. Responses are rated on a 5-point Likert scale, where higher scores represent a better quality of life. The reliability of the subscales in the present sample ranged from acceptable to very good, with Cronbach's α values between 0.70 and 0.84.

2.3.2. MedDietScore

Adherence to the Mediterranean diet was assessed using the MedDietScore questionnaire [18]. The instrument evaluates adherence to the Mediterranean dietary pattern through 11 food groups, including non-refined cereals, fruits, vegetables, legumes, potatoes, fish, olive oil, red meat products, poultry, full-fat products, and alcohol. Each group scored on a 0–5 scale, with total scores ranging from 0 to 55. Scores of 0–20 indicate low adherence, 21–35 moderate adherence, and 36–55 high adherence. The Cronbach's α for the MedDietScore was 0.65 in the current sample.

2.3.3. International Physical Activity Questionnaire (IPAQ)

Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) and expressed as MET-min/week [19]. The results were expressed as MET-min/week, with higher values indicating greater physical activity. According to the IPAQ scoring protocol, physical activity is classified into three categories: low, when participants do not meet the criteria for the other two categories; moderate, when activity reaches at least 600 MET-min/week; and high, when vigorous activity reaches at least 1500 MET-min/week on at least 3 days or when the total volume of activity reaches at least 3000 MET-min/week over 7 days. The Cronbach's α for the IPAQ in the current sample was 0.62.

2.4. Data Collection Procedure

Data were collected between October 2025 and February 2026. Questionnaires were distributed in both paper-based and electronic formats, and participation in the study was voluntary.

Before collecting data, approval from the Scientific Councils of the participating hospitals was obtained to distribute the questionnaires. The questionnaires were then handed out in person at the hospitals and shared electronically via Google Forms, using an online link and a QR code, making it easier for nurses from different hospital departments to participate.

Before completing the questionnaires, participants were informed about the purpose of the study, the voluntary nature of participation, their right to decline or withdraw at any time without any consequences, and the protection of anonymity and confidentiality. Com-

pletion of the questionnaires was considered to indicate informed consent for participation in the study.

2.5. Ethics and Deontology

The study received approval from the Research Ethics and Deontology Committee of the International Hellenic University (protocol code 53/2024; date of approval: 16 July 2024). In addition, permission to conduct questionnaire-based data collection was obtained from the Scientific Councils of the participating hospitals. According to the relevant decision, the research protocol did not conflict with current legislation and was in accordance with generally accepted principles of research ethics, deontology, and research integrity.

2.6. Data Analysis—Statistics

Descriptive and inferential statistics were used for data analysis. Continuous variables were presented as means and standard deviations, while categorical variables were presented as absolute and relative frequencies.

Normality was evaluated with the Shapiro–Wilk test. Comparisons between two groups were performed using the independent-samples t-test, whereas comparisons among more than two groups were conducted using analysis of variance (ANOVA) with Bonferroni post hoc tests.

For the Social Relationships domain, which did not follow a normal distribution, non-parametric tests were used. Correlations among adherence to the Mediterranean diet, physical activity, and quality-of-life domains were examined using correlation coefficients.

The internal consistency of the study instruments was assessed using Cronbach's α coefficient. In addition, multiple linear regression models were used to examine the independent associations of demographic, occupational, and lifestyle variables with each quality-of-life domain. Multicollinearity among predictors in the multiple linear regression models was assessed using tolerance and variance inflation factor values.

Statistical significance was set at $p < 0.05$. Statistical analyses were performed using IBM SPSS Statistics, version 24.0.

2.7. Use of Generative AI

A generative artificial intelligence (AI) tool, ChatGPT (Open AI; web version) was used during manuscript preparation to assist with English-language editing and phrasing. However, no generative AI tools were used for data generation, statistical analysis, interpretation of results, or drawing scientific conclusions. All content has been reviewed, verified, and approved by the authors.

3. Results

The study involved 100 nurses working rotating shifts. Among them, 72% were women and 28% were men. The mean age of the participants was 37.72 years (SD = 8.70), the mean duration of professional experience as nurses was 13.44 years (SD = 8.68), and the mean duration of work in rotating shifts was 12.97 years (SD = 8.56). Most participants were employed in Intensive Care Units (41%), while others worked in Emergency Departments, surgical wards, and various other hospital departments. In terms of educational attainment, 43% of the nurses held postgraduate degrees (Tables 1 and 2).

The descriptive analysis revealed moderate adherence to the Mediterranean diet, while physical activity levels varied considerably among participants. In terms of quality of life, the WHOQOL-BREF domain scores ranged from 12.35 to 13.78, with clear dispersion across the sample (Table 2).

Table 1. Participant Characteristics.

Variable	Category	*n*	%
Gender	Male	28	28.0
	Female	72	72.0
Educational level	Secondary education (EPAL, SAEK)	16	16.0
	University education	13	13.0
	Technological Educational Institutes (TEI)	27	27.0
	Postgraduate degree (MSc)	43	43.0
	Doctoral degree (PhD)	1	1.0
Age group	20–30	27	27.0
	31–40	37	37.0
	41+	36	36.0
Marital status	Single	37	37.0
	Prefer not to answer	1	1.0
	Divorced	6	6.0
	Married	46	46.0
	Cohabiting	8	8.0
	Widowed	2	2.0
Children	Yes	48	48.0
	No	52	52.0
Years of professional experience	<5	26	26.0
	5–10	19	19.0
	>10	55	55.0
Current department	Hematology	1	1.0
	Other	3	3.0
	Anesthesiology	9	9.0
	Cardiology	2	2.0
	Intensive Care Unit (ICU)	41	41.0
	Oncology	2	2.0
	Orthopedics	2	2.0
	Internal Medicine	11	11.0
	Pediatrics	1	1.0
	Coronary Care Unit	1	1.0
	Emergency Department (ED)	13	13.0
	Surgical Ward	13	13.0
	Psychiatry	1	1.0

Notably, correlation analysis indicated that adherence to the Mediterranean diet was positively associated with various aspects of quality of life, particularly Physical Health (r = 0.29), Psychological Health (r = 0.27), and Environment (r = 0.39). No statistically significant association was observed with Social Relationships. Furthermore, physical activity was significantly associated with Physical Health (r = 0.33). All WHOQOL-BREF domains were also positively related, with the strongest correlation observed between Psychological Health and Social Relationships (r = 0.60). Overall, these findings indicate that both Mediterranean diet adherence and physical activity were associated with specific domains of quality of life, with Mediterranean diet adherence showing a broader range of associations (Table 3).

Gender-based comparisons showed no significant difference in Physical Health, whereas women scored higher in Psychological Health and Environment (Tables S7 and S8). In addition, because the Social Relationships domain was not normally distributed, it was examined using non-parametric testing, which also indicated higher scores among women

(Table S6). However, no statistically significant gender difference was observed in MedDietScore ($p = 0.18$).

Table 2. Descriptive Statistics of the Main Study Variables.

Variable	M	SD	Minimum	Maximum
Age	37.72	8.70	24.00	57.00
Number of Children	0.83	0.96	0.00	3.00
Years of professional experience as a nurse	13.44	8.68	1.00	31.00
Years in rotating shifts	12.97	8.56	1.00	31.00
Physical Health (WHOQOL-BREF)	12.35	2.05	7.33	16.67
Psychological Health (WHOQOL-BREF)	13.78	1.99	7.33	19.33
Social Relationships (WHOQOL-BREF)	13.66	3.01	6.67	20.00
Environment (WHOQOL-BREF)	12.31	2.52	6.22	17.33
Physical activity (IPAQ, MET-min/week)	711.16	576.05	0.00	2319.10
Mediterranean diet (MedDietScore)	22.56	4.83	11.00	34.00

Table 3. Correlations between MedDiet, IPAQ, and Quality-of-Life Domains ($N = 100$).

Variable	1	2	3	4	5	6
1. Mediterranean diet	—	0.11	0.29 **	0.27 **	0.12	0.39 **
2. Physical activity (IPAQ)	0.11	—	0.33 **	0.01	0.14	0.18
3. Physical Health	0.29 **	0.33 **	—	0.46 **	0.36 **	0.55 **
4. Psychological Health	0.27 **	0.01	0.46 **	—	0.60 **	0.51 **
5. Social Relationships	0.12	0.14	0.36 **	0.60 **	—	0.50 **
6. Environment	0.39 **	0.18	0.55 **	0.51 **	0.50 **	—

Note: ** $p < 0.01$.

Additionally, differences across age groups were observed for Psychological Health, whereas no statistically significant differences were observed for Physical Health or Environment (Table S9). Further pairwise analysis showed that nurses aged 20–30 years had lower Psychological Health scores compared with those aged 41 years or older (Table S2).

Similarly, group comparisons based on years of professional experience revealed significant differences in Psychological Health and Environment, while no statistically significant difference was observed for Physical Health (Table S10). More specifically, pairwise analysis indicated that nurses with 5–10 years of experience had lower Psychological Health scores than those with more than 10 years of experience. Regarding Environment, the 5–10 years group scored lower than both the <5 years and >10 years groups (Table S3).

In relation to dietary behavior, group comparisons based on Mediterranean diet adherence showed significant differences in Physical Health and Environment, but not in Psychological Health (Table S11). In particular, pairwise comparisons indicated that participants with high adherence to the Mediterranean diet reported higher Physical Health and Environment scores than those with low adherence (Table S4).

At the same time, the internal consistency analysis showed acceptable reliability for the WHOQOL-BREF subscales, with Cronbach's α values ranging from 0.70 to 0.84. Specifically, Cronbach's α was 0.73 for Physical Health, 0.75 for Psychological Health, 0.70 for Social Relationships, and 0.84 for Environment. In this sample, Cronbach's α was 0.62 for the IPAQ and 0.65 for the MedDietScore (Table S5).

Finally, collinearity diagnostics indicated no evidence of serious multicollinearity among the predictors, with tolerance values ranging from 0.396 to 0.978 and VIF values ranging from 1.023 to 2.523. Multiple linear regression analyses were performed to examine whether demographic, occupational, and lifestyle variables were independently associated with each quality-of-life domain. Physical activity showed the strongest independent association with Physical Health. For Psychological Health and Social Relationships, gender was the only statistically significant associated factor. In the Environment model, gender, Mediterranean diet adherence, and physical activity were positively associated with the outcome (Table 4).

Table 4. Integrated Multiple Linear Regression Models for WHOQOL-BREF Domains.

Outcome	Variable	B	SE	β	t	*p*	95% CI for B
Physical Health	Constant	8.50	1.14	—	7.39	<0.001	[6.22, 10.78]
Physical Health	Gender	0.44	0.44	0.09	1.00	0.319	[−0.43, 1.32]
Physical Health	Years of professional experience	−0.06	0.36	−0.02	−0.16	0.873	[−0.77, 0.66]
Physical Health	Age group	0.14	0.38	0.05	0.38	0.703	[−0.62, 0.92]
Physical Health	MedDiet group	0.60	0.40	0.15	1.49	0.137	[−0.19, 1.39]
Physical Health	IPAQ group	1.28	0.39	0.31	3.26	**0.002**	[0.50, 2.07]
Psychological Health	Constant	10.03	1.12	—	8.92	<0.001	[7.80, 12.27]
Psychological Health	Gender	1.01	0.43	0.22	2.34	**0.021**	[0.15, 1.87]
Psychological Health	Years of professional experience	−0.34	0.35	−0.14	−0.96	0.335	[−1.04, 0.36]
Psychological Health	Age group	0.68	0.38	0.27	1.80	0.075	[−0.07, 1.44]
Psychological Health	MedDiet group	0.54	0.39	0.14	1.37	0.172	[−0.23, 1.32]
Psychological Health	IPAQ group	0.28	0.38	0.07	0.74	0.460	[−0.48, 1.05]
Social Relationships	Constant	8.64	1.71	—	5.04	<0.001	[5.24, 12.05]
Social Relationships	Gender	1.54	0.66	0.23	2.33	**0.022**	[0.23, 2.86]
Social Relationships	Years of professional experience	−0.58	0.54	−0.18	−1.07	0.284	[−1.73, 0.46]
Social Relationships	Age group	0.65	0.58	0.19	1.13	0.259	[−0.46, 1.88]
Social Relationships	MedDiet group	0.49	0.59	0.09	0.83	0.407	[−0.71, 1.75]
Social Relationships	IPAQ group	1.00	0.60	0.16	1.70	0.092	[−0.22, 2.17]
Environment	Constant	6.24	1.34	—	4.66	**<0.001**	[3.54, 9.01]
Environment	Gender	1.69	0.51	0.31	3.28	**0.001**	[0.69, 2.79]
Environment	Years of professional experience	−0.73	0.42	−0.26	−1.73	0.086	[−1.62, 0.10]
Environment	Age group	0.75	0.45	0.24	1.66	0.099	[−0.14, 1.69]
Environment	MedDiet group	0.94	0.46	0.19	2.02	**0.046**	[0.02, 1.88]
Environment	IPAQ group	1.11	0.46	0.21	2.41	**0.018**	[0.15, 2.02]

Note: B = unstandardized coefficient; SE = standard error; β = standardized coefficient; CI = confidence interval. Bold *p*-values indicate statistical significance ($p < 0.05$).

4. Discussion

This study aimed to examine the associations between Mediterranean diet adherence, physical activity, and domain-specific quality of life among nurses working rotating shifts

in Northern Greece. The main findings showed that Mediterranean diet adherence was positively associated with several quality-of-life domains, particularly Physical Health, Psychological Health, and Environment. In contrast, physical activity showed a more specific association with Physical Health. In the multivariable models, physical activity showed the strongest independent association with Physical Health, whereas gender was independently associated with Psychological Health and Social Relationships. In the Environment model, gender, Mediterranean diet adherence, and physical activity were positively associated with the outcome. Overall, the findings show that lifestyle-related factors may be differentially associated with specific dimensions of quality of life among rotating-shift nurses.

The findings are broadly consistent with previous nursing research showing that nurses' quality of life is associated not only with shift work itself, but also with demographic and professional characteristics. Sorić et al. reported that education and age-related characteristics were associated with specific WHOQOL-BREF domains among Croatian hospital nurses, whereas shift work by itself was not significantly linked to overall quality of life [20]. In the present study, age group, years of professional experience, and gender were also associated with selected quality-of-life domains. This supports the view that nurses' well-being cannot be attributed to work schedule alone, but may reflect a broader interaction between individual characteristics, professional experience, lifestyle behaviors, and the occupational environment.

A key finding of the present study was that Mediterranean diet adherence showed a broader pattern of associations with quality of life than physical activity. Specifically, Mediterranean diet adherence was associated with Physical Health, Psychological Health, and Environment, while group comparisons also indicated that participants with higher adherence reported higher Physical Health and Environment scores than those with lower adherence. This finding is consistent with previous evidence suggesting that healthier dietary patterns may be linked to better quality-of-life outcomes [9,10]. It is also in line with previous work by Leyva-Vela et al., who reported generally low adherence to the Mediterranean diet among Spanish nurses with shift patterns and highlighted the relevance of dietary behavior in this occupational group [3]. Similarly, Liang et al. reported that healthier dietary patterns among night-shift nurses were associated with better quality-of-life scores across several dimensions. However, they used different dietary assessment tools and quality-of-life instruments [21].

Several mechanisms may explain why Mediterranean diet adherence was associated with broader quality-of-life domains. The Mediterranean diet is characterized by higher intake of plant-based foods, olive oil, legumes, whole grains, fish, and other nutrient-dense foods, which have been linked to favorable cardiometabolic and overall health outcomes [6–8]. Beyond its nutritional content, adherence to this dietary pattern may also reflect a more organized and health-promoting lifestyle. For rotating-shift nurses, who often face irregular meal timing and limited access to healthy food during shifts, better adherence to the Mediterranean diet may indicate a greater ability to maintain self-care behaviors despite occupational constraints. This may partly explain its association not only with Physical Health, but also with Psychological Health and Environment. However, given the cross-sectional design of the study, these interpretations should be considered exploratory and should not be interpreted as evidence of causal relationships.

Physical activity was mainly associated with the Physical Health domain. This finding is expected, as physical activity is closely related to perceived energy, mobility, functional capacity, and physical functioning. Previous research has shown that physical activity patterns among shift-working nurses are not uniform. For instance, Peplonska et al. reported that rotating night-shift nurses had higher occupational physical activity but lower

leisure-time activity than day workers [22]. Similarly, recent evidence suggests that many nurses report low or moderate physical activity levels, while moderate physical activity may be associated with more favorable professional quality of life [15]. The present findings support the relevance of physical activity for perceived physical health, while also suggesting that its association with broader psychosocial domains may be less pronounced than that of dietary adherence.

Another key finding was that women nurses reported higher scores in Psychological Health, Social Relationships, and Environment. This result should be interpreted cautiously, particularly because the sample included a higher proportion of women than men. Gender differences in quality of life may reflect a combination of occupational, psychosocial, and contextual factors rather than gender alone. In addition, younger nurses and those with 5–10 years of professional experience showed less favorable outcomes in selected domains. These findings may indicate that certain stages of professional life are associated with different adaptation demands and perceived well-being. Park and Lee reported that stress, sleep disturbances, and subjective health status were associated with quality of life among clinical nurses [23]. This supports the view that psychosocial and occupational factors, in addition to lifestyle behaviors, may be relevant to nurses' well-being. However, because workload intensity, occupational stress, sleep quality, and fatigue were not directly assessed in the present study, these interpretations remain exploratory.

The internal consistency of the WHOQOL-BREF subscales was acceptable to very good in the present sample. In contrast, the Cronbach's α values for the IPAQ and MedDietScore were relatively modest. This may be partly explained by the fact that both instruments assess complex lifestyle behaviors composed of heterogeneous items rather than a single homogeneous construct. Therefore, findings involving physical activity and Mediterranean diet adherence should be interpreted with appropriate caution and further evaluated in larger studies.

A strength of the present study is its integrated analytical approach. Previous studies have often examined shift work, dietary habits, physical activity, or quality of life separately [3,20–23]. In contrast, this study examined Mediterranean diet adherence and physical activity simultaneously in relation to the four WHOQOL-BREF domains among nurses working rotating shifts. This approach provides a more detailed understanding of how different modifiable lifestyle behaviors may be associated with distinct aspects of quality of life. The study also contributes evidence from the Greek healthcare setting, where data on lifestyle behaviors and quality of life among rotating-shift nurses remain limited.

Several limitations should be acknowledged. The cross-sectional design precludes causal inference. In addition, the pilot nature of the study, small sample size, and geographically restricted recruitment may limit generalizability. All key variables were assessed using self-reported questionnaires, which may have introduced recall bias, social desirability bias, and measurement variability. Detailed shift-related variables, such as shift duration, rotating-shift intensity, and frequency of night shifts, were not collected. Given the pilot sample size, the present analysis focused on main associations rather than interaction effects, which should be examined in larger future studies. Finally, potentially relevant confounding factors, such as sleep quality, fatigue, workload intensity, occupational stress, dietary timing, recovery between shifts, and comorbidities, were not comprehensively assessed. These factors may be associated with both lifestyle behaviors and quality of life and should be incorporated in future larger studies.

The findings have practical implications for workplace health promotion among rotating-shift nurses. Rather than focusing exclusively on individual behavior change, workplace strategies should also consider the broader occupational environment in which dietary habits and physical activity take place. Practical approaches may include improved

access to healthier food options during evening and night shifts, structured nutrition education, protected meal breaks, and feasible physical activity programs adapted to rotating schedules. Particular attention may be needed for potentially vulnerable subgroups, such as younger nurses and those with intermediate professional experience, who may face increased adaptation and work-related demands.

Future research should extend this pilot study through larger, multicenter, and longitudinal designs. Such studies would allow clearer assessment of temporal relationships and could examine whether Mediterranean diet adherence and physical activity are prospectively associated with changes in quality-of-life domains. Larger samples would also permit more reliable subgroup and sensitivity analyses, as well as the examination of whether the associations of Mediterranean diet adherence and physical activity with quality of life differ across demographic subgroups, such as gender or age. In addition, future studies should collect more detailed shift-related information, such as shift duration, frequency of night shifts, and rotating-shift intensity, and should include validated measures of sleep quality, fatigue, occupational stress, and workload, as these factors may confound or modify the associations between lifestyle behaviors and quality of life among rotating-shift nurses.

5. Conclusions

The present study showed that among nurses working rotating shifts, adherence to the Mediterranean diet and physical activity were both associated with quality of life. However, their patterns of association differed across domains. Mediterranean diet adherence was associated with a broader range of quality-of-life aspects, particularly Physical Health, Psychological Health, and Environment. In contrast, physical activity was more specifically associated with Physical Health. Additionally, gender, age, and years of professional experience were associated with selected quality-of-life outcomes, underscoring the multifactorial nature of well-being in this occupational group. Overall, the findings support the importance of workplace health-promotion strategies that encourage healthier dietary habits, feasible physical activity, and broader well-being initiatives for nurses working rotating shifts.

Supplementary Materials: The following supporting information can be downloaded at https://www.mdpi.com/article/10.3390/dietetics5030039/s1. Table S1. Distributional Properties of the WHOQOL-BREF Domains; Table S2. Pairwise Differences in Psychological Health Across Age Groups; Table S3. Pairwise Differences in Psychological Health and Environment Across Professional Experience Groups; Table S4. Pairwise Differences in Physical Health and Environment Across Mediterranean Diet Adherence Groups; Table S5. Internal Consistency of the Study Instruments and WHOQOL-BREF Subscales; Table S6. Non-Parametric Group Differences in Social Relationships; Table S7. Descriptive Statistics of WHOQOL-BREF Domains by Gender; Table S8. Between-Gender Comparisons in WHOQOL-BREF Domains; Table S9. Group Differences in WHOQOL-BREF Domains by Age Group; Table S10. Group Differences in WHOQOL-BREF Domains by Years of Professional Experience; Table S11. Group Differences in WHOQOL-BREF Domains by Mediterranean Diet Adherence.

Author Contributions: Conceptualization, A.S., K.K., M.L. and E.M.; methodology, A.S., K.K., M.L. and E.M.; validation, K.K., M.L. and E.M.; formal analysis, A.S., K.K., M.L. and E.M.; investigation, A.S.; data curation, K.K., M.L. and E.M.; writing—original draft preparation, A.S., K.K., M.L. and E.M.; writing—review and editing, A.S., S.P., K.K., M.L. and E.M.; visualization, A.S., S.P., K.K., M.L. and E.M.; supervision, S.P., K.K., M.L. and E.M.; project administration, A.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics and Deontology Committee of the International Hellenic University (protocol code 53/2024; date of approval: 16 July 2024). In addition, permission to conduct questionnaire-based data collection was obtained from the Scientific Councils of the participating hospitals.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available upon reasonable request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

Acknowledgments: During the preparation of this manuscript, the authors used ChatGPT (Open AI; web version) to assist with English-language editing and phrasing. The authors reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

MedDietScore	Mediterranean Diet Score
MET	Metabolic Equivalent of Task
IPAQ	International Physical Activity Questionnaire
WHOQOL-BREF	World Health Organization Quality of Life-BREF

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