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Knowledge and Attitudes of Cancer Patients towards Vitamin and Mineral Supplements: A Comprehensive Evaluation

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Abstract

In recent years, the consumption of vitamin and mineral supplements (VMS) has increased in various patient groups, especially among people with cancer. This study aims to assess and compare the awareness and attitudes toward VMS among healthy individuals and cancer patients. A structured questionnaire was distributed to both cancer patients and a healthy control group collecting information about their sociodemographic profiles, knowledge, and perspectives regarding VMS use. Among the 778 respondents, 217 were cancer patients. The prevalence of VMS use was significantly higher among cancer patients (60.4%) compared to the control group (32.8%). Patients with advanced-stage cancer reported a higher tendency to use VMS. The intake of vitamin B12, vitamin D, folic acid, iron, and calcium was significantly higher among cancer patients than in the healthy population. Specifically, subjects with gastric cancer showed an increased usage of vitamin B complex and folic acid, whereas breast cancer patients had a higher intake of vitamin D and calcium. VMS consumption was higher among cancer patients than in the control group. Living in an urban area and having advanced-stage cancer were identified as factors influencing VMS use among cancer patients. The primary motivation for supplement use among cancer patients was physician recommendation and perceived benefits, whereas the control group primarily relied on media sources for information. The findings suggest that the effectiveness of VMS could be optimized when used under medical supervision and appropriate guidance.

Keywords: Dietary supplements, Cancer, Healthy individuals, Minerals, Vitamins

Introduction

The consumption of nutritional supplements, particularly vitamins and minerals (VMs), has been increasing across different populations. VMS are readily accessible through pharmacies, supermarkets, online platforms, and medical prescriptions [1]. Studies conducted in various countries indicate that VMS usage rates range from 25.4% to 85% [2,3]. Among cancer patients, this percentage varies between 44.3% and 81% [4,5].

Research on VMS across different demographics and regions suggests that these supplements are primarily taken to enhance overall health, maintain bone strength, compensate for dietary deficiencies, and boost immune function [6-8]. Individuals who regularly use VMS often follow a healthier lifestyle, including maintaining a balanced diet, engaging in physical activity, and managing their weight [8,9]. Concerns about dietary imbalances and food safety have also contributed to the growing reliance on VMS as a means to improve overall well-being [10].

VMs are essential nutrients required for growth and survival. They play a crucial role in regulating metabolism and energy exchange [11]. For optimal functionality, vitamins depend on the presence of specific

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minerals in the body. Certain conditions increase the body's demand for minerals such as iron and calcium, along with vitamins like A, C, B1, B6, B12, and folic acid, making VMS supplementation necessary [12]. In high-risk groups, laboratory examinations are recommended to detect VM deficiencies, and supplementation is prescribed when needed [13-15]. However, excessive or inappropriate use of VMS can lead to toxicity and adverse health effects [16].

Cancer remains a major health concern, significantly impacting human well-being. Standard treatment approaches include chemotherapy, surgery, hormone replacement therapy, and radiotherapy [17]. However, in cases of advanced-stage cancer, where the likelihood of a cure is lower, patients often turn to VMS alongside their prescribed treatments. They may use these supplements to manage complications, support immune function, and enhance their overall quality of life. Additionally, the psychological reassurance that VMS provides can help ease concerns about the effectiveness of conventional medical treatments.

Some studies in the literature suggest that VMS may play a role in cancer prevention. For instance, vitamin E and beta-carotene have been associated with a reduced risk of breast, stomach, esophageal, and bladder cancers, while vitamin D and folic acid are considered beneficial in lowering the risk of colon cancer. There are also reports indicating that high doses of vitamin C have been used in cancer treatment [18, 19].

VMS can also help mitigate the adverse effects of certain cancer treatments. For instance, aromatase inhibitors are known to accelerate bone loss and increase the risk of fractures, necessitating the use of bone-supporting supplements [20]. Research suggests that vitamin B12 supplementation may help prevent neuropathy and alleviate neuropathic pain in cancer patients [21]. Following gastrectomy, a deficiency in vitamin B12 can negatively impact the quality of life, making it essential to monitor and address postoperative deficiencies [22]. Similarly, cisplatin is a known cause of hypomagnesemia, requiring regular electrolyte monitoring and magnesium supplementation as needed [23]. Patients undergoing panitumumab therapy should have their magnesium levels checked from the start of treatment until at least eight weeks after its completion, as hypomagnesemia is a common side effect that can be managed with daily magnesium sulfate supplementation [24].

This study aims to assess and compare cancer patients and healthy individuals regarding their knowledge and perceptions toward VMS use. It also seeks to explore their sources of information, reasons for taking VMS, perceived benefits, and the characteristics of individuals who use these supplements.

Materials and Methods

This study included both cancer patients and healthy participants. Demographic information was collected after explaining the study's purpose, from those who agreed to participate, and they completed a questionnaire regarding their use of vitamin and mineral supplements (VMS).

The VMS questionnaire was structured to gather information on the frequency of use, types of VMS commonly used, sources of information, reasons for use, and other related factors. The form consisted of three sections: The first section collected sociodemographic details, along with information on the type and stage of cancer in the case of cancer patients. In the second section, participants were asked to identify which VMS they were currently using a list of the 13 most commonly known VMS. Those who reported using VMS proceeded to the third section, which explored their reasons for using supplements, sources of advice, frequency of use, and whether their physician was aware of their VMS usage.

Participants who had sufficient cognitive ability to think and answer were in the study others were excluded, we informed them about the study and obtained their consent. Exclusion criteria included cognitive impairments that would prevent answering the questions, incomplete questionnaire responses, or missing sociodemographic data **(Figure 1)**.

Materials and Methods

This research was conducted following the principles outlined in the Helsinki Declaration, with ethical approval granted by the local ethics committee (Approval No: 2020/272).

For statistical analysis, the IBM SPSS software (v.22.0, IBM Corp., Armonk, NY, USA) was utilized. Descriptive statistics were presented as numbers, percentages, and means ± standard deviations. The Kolmogorov–Smirnov test was applied to assess the normality of the data distribution. For parametric data,

the t-test was obtained, while the Mann–Whitney U-test was employed for nonparametric data. Categorical variables were compared with the Chi-squared test. Logistic regression analysis was conducted to identify factors influencing VMS usage. A P-value of < 0.05 was considered statistically significant.

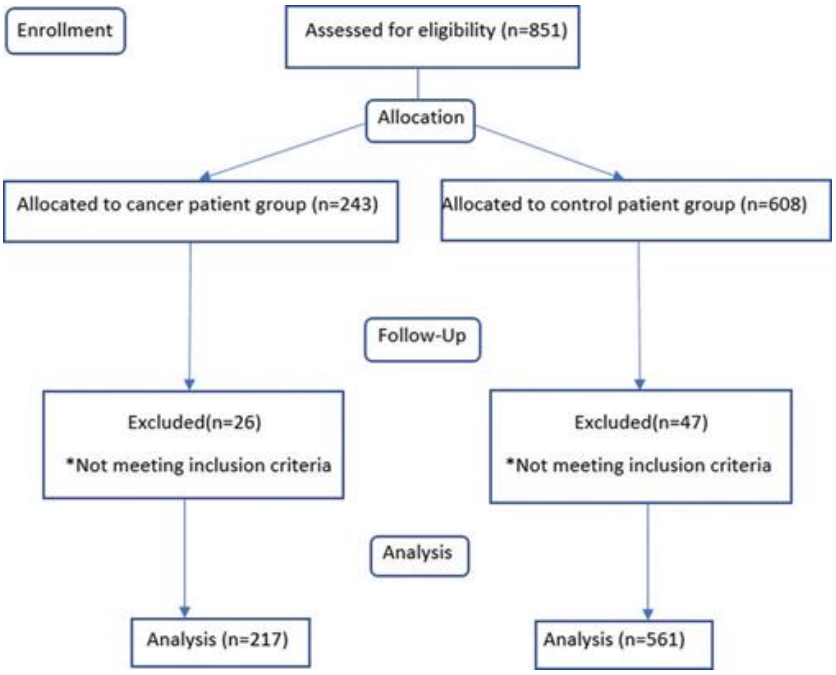

Figure 1. Study flow diagram.

The survey was initially administered to 851 individuals, including 243 cancer patients and 608 control participants. Exclusion occurred for 26 cancer patients and 47 control participants who could not meet the inclusion criteria. Ultimately, data from 217 cancer patients and 561 control participants were included in the analysis.

Results

The participants had an average age of 51.0 ± 15.0 years, with 489 (62.9%) females and 289 (37.1%) males. Among the total of 778 participants, 217 (27.8%) were diagnosed with cancer, while 561 (72.1%) were from the healthy control group. There was no significant difference between the two groups with age (P = 0.455) and gender (P = 0.506) **(Table 1)**.

Table 1. Demographic information of study participants

Characteristic	Total participants	Cancer patients	Control group	P-value
Age (years) (Mean ± SD)	51.0 ± 15.0	51.3 ± 12.6	50.6 ± 14.3	0.455*
Gender, n (%)				
Female	489 (62.9%)	136 (62.7%)	353 (62.9%)	0.506**
Male	289 (37.1%)	81 (37.3%)	208 (37.1%)	
Total	778 (100%)	217 (100%)	561 (100%)	-

*P: Independent samples t-test, *P: Chi-square test; SD: Standard deviation

Of the total participants, 315 (40.4%) reported using VMS. A large portion of the respondents were nonworking individuals (37.8%), had completed only primary school (39.7%), lived in urban areas (77.5%), did not smoke (71.2%), and abstained from alcohol (93.7%). No significant differences were observed between the control and cancer groups regarding gender, smoking habits, or alcohol consumption. However, the cancer group showed a significantly higher rate of VMS use among primary school graduates, non-workers, and individuals living in city centers, with all comparisons yielding P-values less than 0.001 **(Table 2)**.

Table 2. VMS usage based on sociodemographic characteristics in cancer patients and control groups

Variables	All participants (n = 778)	VMS Usage (n = 315)	Cancer patients	P-value
Gender				
Female	489 (62.9%)	88 (67.2%)	116 (63.0%)	0.449
Male	289 (37.1%)	43 (32.8%)	68 (37.0%)	
Occupation				
Not working	294 (37.8%)	74 (56.5%)	52 (28.3%)	< 0.001
Retired	102 (13.1%)	22 (16.8%)	26 (14.1%)	
Worker	78 (10.0%)	13 (9.9%)	14 (7.6%)	
Officer	255 (32.8%)	6 (4.6%)	89 (48.4%)	
Self-employed	49 (6.3%)	16 (12.2%)	3 (1.6%)	
Education				
Not reading	63 (8.1%)	32 (24.4%)	3 (1.6%)	< 0.001
Primary school	309 (39.7%)	65 (49.6%)	57 (31.0%)	
High school	113 (14.5%)	27 (20.6%)	25 (13.6%)	
University	293 (37.7%)	7 (5.3%)	99 (54.8%)	
Residence				
Village	33 (4.2%)	7 (5.3%)	3 (1.6%)	< 0.001
Town	142 (18.3%)	37 (28.2%)	16 (8.7%)	
City center	603 (77.5%)	87 (66.4%)	165 (89.7%)	
Smoking				
Yes	224 (28.8%)	48 (36.6%)	51 (27.7%)	0.060
No	554 (71.2%)	83 (63.4%)	133 (72.3%)	
Alcohol use				
Yes	49 (6.3%)	8 (6.1%)	10 (5.4%)	0.492
No	729 (93.7%)	123 (93.9%)	174 (94.6%)	
Total	778 (100%)	131 (100%)	184 (100%)	-

P-value: Chi-square test; VMS: Vitamin and mineral supplements

Of the total participants, 315 reported using VMS. Among these, 131 were cancer patients, and 184 were from the control group. Cancer patients were significantly more likely to use VMS than healthy people in the control group. It was also acknowledged that a higher proportion of cancer patients (44.2%) started using VMS based on their doctor's advice, compared to the control group. Additionally, cancer patients primarily received information about VMS from their healthcare providers (49.3%), were more likely to inform their doctors about their VMS use (52.1%), and reported beneficial effects from using VMS (49.8%). In contrast, the control group mainly believed in the usefulness of VMS (48.9%), got most of their information from media sources (48.4%), did not share their VMS use with their doctors (51.1%), and felt no effects after using VMS (81.5%) ($P < 0.001$ for all) **(Table 3)**.

Table 3. Patients' perceptions of vitamin and mineral supplement usage

Patients' perceptions of VMS usage	Total participants (n = 778)	Cancer patients (n = 217)	Control group (n = 561)	P-value
Do you use VMS?				
Used	315 (40.5%)	131 (60.4%)	184 (32.8%)	0.000
Not used	463 (59.5%)	86 (39.6%)	377 (67.2%)	
Reason for VMS Usage				
I believe it's beneficial	119 (37.8%)	29 (13.4%)	90 (48.9%)	0.000
It feels good	68 (21.6%)	6 (2.8%)	62 (33.7%)	
Recommended by physician	128 (40.6%)	96 (44.2%)	32 (17.4%)	
Source of Information on VMS				
From friends/family	33 (10.5%)	7 (3.2%)	26 (14.1%)	0.000
From physician	148 (47.0%)	110 (49.3%)	38 (20.7%)	
From media	99 (31.4%)	10 (4.6%)	89 (48.4%)	
From internet	35 (11.1%)	4 (1.8%)	31 (16.8%)	
Did you inform healthcare personnel about VMS use?				
No	104 (33.0%)	10 (4.6%)	94 (51.1%)	0.000
Yes	192 (61.0%)	113 (52.1%)	78 (42.9%)	
Not asked	19 (6.0%)	8 (3.7%)	11 (6.0%)	

Impact of VMS Usage				
No effect	173 (54.9%)	23 (10.6%)	150 (81.5%)	0.000
Positive effect	142 (45.1%)	108 (49.8%)	34 (18.5%)	
Total	778 (100%)	217 (100%)	561 (100%)	

P-value: Chi-square test, VMS: Vitamin and mineral supplements.

The cancer group included individuals with various types of cancer, with the most common being colorectal cancer (22.1%), breast cancer (38.2%), gastric cancer (10.6%), urogenital cancer (12.4%), brain tumor (2.3%), lung cancer (10.1%) and other types of cancer (4.1%). No significant difference was found between cancer patients using VMS and those not using VMS regarding the type of cancer ($P = 0.085$). However, it was noted that the use of VMS was significantly higher among patients in advanced stages of cancer compared to those in the early stages ($P < 0.001$) **(Table 4)**.

Table 4. VMS usage about cancer type and stage among cancer patients

Variables	Cancer Patients (n (%))	Yes (n (%))	No (n (%))	P-value
Cancer Type				
Lung	22 (10.1%)	14 (10.7%)	8 (9.3%)	0.085
Brain	5 (2.3%)	4 (3.1%)	1 (1.2%)	
Colorectal	48 (22.1%)	26 (19.8%)	22 (25.6%)	
Breast	83 (38.2%)	54 (41.2%)	29 (33.7%)	
Gastric	23 (10.6%)	18 (13.7%)	5 (5.8%)	
Urogenital	27 (12.4%)	12 (9.2%)	15 (17.4%)	
Other	9 (4.1%)	3 (2.3%)	6 (7.0%)	
Cancer Stage				
Early	119 (54.8%)	46 (35.1%)	73 (84.9%)	0.000
Advanced	98 (45.2%)	85 (64.9%)	13 (15.1%)	
Total	217 (100%)	131 (100%)	86 (100%)	

P value: Chi-square test. VMS: Vitamin and Mineral Supplements.

The table presents the usage of various VMS among cancer patients and control groups. The most commonly used supplements by cancer patients were vitamin B12 (47.3%), vitamin D (49.6%), calcium (51.1%), and iron (19.8%), with significant differences observed between the two groups for these nutrients ($P < 0.001$ for vitamin B12, vitamin D, and calcium, $P = 0.002$ for iron). In contrast, the control group reported higher usage of the vitamin B complex (12.5%) and other supplements not specified as commonly used by cancer patients. The use of vitamin A, vitamin C, vitamin E, and magnesium showed no significant differences between the two groups. Furthermore, the control group was more likely to use other supplements (14.7%) compared to cancer patients (6.6%), with this difference being statistically significant ($P = 0.017$). The findings highlight that cancer patients, especially those undergoing advanced treatment, tend to use specific supplements more frequently than the general population, with notable differences in the usage of several vitamins and minerals **(Table 5)**.

Table 5. VMS usage status of patients according to VMS type

VMS	All patients (n (%))	VMS usage		
		Cancer patients (n (%))	Control groups (n (%))	P-value
Vitamin A	8 (2.5%)	3 (2.3%)	5 (2.7%)	0.812
Vitamin B complex	50 (15.9%)	27 (20.6%)	23 (12.5%)	0.052
Vitamin B12	86 (27.3%)	62 (47.3%)	24 (13.0%)	0.000
Vitamin C	19 (6.0%)	7 (5.3%)	12 (6.5%)	0.665
Vitamin D	97 (30.8%)	65 (49.6%)	32 (17.4%)	0.000
Vitamin E	7 (2.2%)	2 (1.5%)	5 (2.7%)	0.480
Vitamin K	8 (2.5%)	1 (0.8%)	7 (3.8%)	0.091
Folic acid	31 (9.8%)	21 (16.0%)	10 (5.4%)	0.002

Selenium	12 (3.8%)	2 (1.5%)	10 (5.4%)	0.074
Zinc	10 (3.2%)	2 (1.5%)	8 (4.3%)	0.159
Iron	41 (13.0%)	26 (19.8%)	15 (8.2%)	0.002
Magnesium	12 (3.8%)	3 (2.3%)	9 (4.9%)	0.235
Calcium	89 (28.3%)	67 (51.1%)	22 (12.0%)	0.000
Other	36 (11.1%)	9 (6.6%)	27 (14.7%)	0.017

P-value: Chi-square test; VMS: Vitamin and mineral supplements

The data revealed that participants with gastric cancer had a significantly higher usage rate of vitamin B complex and folic acid compared to patients with other cancer types. Additionally, breast cancer patients demonstrated a statistically significant higher use of vitamin D and calcium than patients with other forms of cancer. These findings suggest that certain types of cancer are associated with increased usage of specific vitamins and minerals, highlighting potential differences in supplement usage patterns based on cancer type **(Table 6)**.

Table 6. Vitamin and mineral supplements usage status in cancer patients by cancer type

Variables	VMS usage	Lungs	Brain	Colorectal	Breast	Gastric	Urogenital	Other	P-value
Vitamin A	Yes	0 (0%)	0 (0%)	2 (4.2%)	0 (0%)	0 (0%)	1 (3.7%)	0 (0%)	0.447
	No	22 (100%)	5 (100%)	46 (95.8%)	83 (100%)	23 (100%)	26 (96.3%)	9 (100%)	
Vitamin B complex	Yes	3 (13.6%)	1 (20.0%)	10 (20.8%)	4 (4.8%)	8 (34.8%)	0 (0%)	1 (11.1%)	0.001
	No	19 (86.4%)	4 (80.0%)	38 (79.2%)	79 (95.2%)	15 (65.2%)	27 (100%)	8 (88.9%)	
Vitamin B12	Yes	7 (31.8%)	2 (40.0%)	12 (25.0%)	23 (27.7%)	11 (47.8%)	6 (22.2%)	1 (11.1%)	0.338
	No	15 (68.2%)	3 (60.0%)	36 (75.0%)	60 (72.3%)	12 (52.2%)	21 (77.8%)	8 (88.9%)	
Vitamin C	Yes	0 (0%)	0 (0%)	3 (6.3%)	3 (3.6%)	0 (0%)	1 (3.7%)	0 (0%)	0.753
	No	22 (100%)	5 (100%)	45 (93.8%)	80 (96.4%)	23 (100%)	26 (96.3%)	9 (100%)	
Vitamin D	Yes	2 (9.1%)	1 (20.0%)	8 (16.7%)	41 (49.4%)	6 (26.1%)	6 (22.2%)	1 (11.1%)	0.000
	No	20 (90.9%)	4 (80.0%)	40 (83.3%)	42 (50.6%)	17 (73.9%)	21 (77.8%)	8 (88.9%)	
Vitamin E	Yes	0 (0%)	0 (0%)	1 (2.1%)	0 (0%)	0 (0%)	1 (3.7%)	0 (0%)	0.634
	No	22 (100%)	5 (100%)	47 (97.9%)	83 (100%)	23 (100%)	26 (96.3%)	9 (100%)	
Vitamin K	Yes	1 (4.5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.179
	No	21 (95.5%)	5 (100%)	48 (100%)	83 (100%)	23 (100%)	27 (100%)	9 (100%)	
Folic acid	Yes	2 (9.1%)	0 (0%)	3 (6.3%)	7 (8.4%)	8 (34.8%)	1 (3.7%)	0 (0%)	0.003
	No	20 (90.9%)	5 (100%)	45 (93.8%)	76 (91.6%)	15 (65.2%)	26 (96.3%)	9 (100%)	
Selenium	Yes	0 (0%)	0 (0%)	1 (2.1%)	0 (0%)	0 (0%)	1 (3.7%)	0 (0%)	0.634
	No	22 (100%)	5 (100%)	47 (97.9%)	83 (100%)	23 (100%)	26 (96.3%)	9 (100%)	
Zinc	Yes	1 (4.5%)	0 (0%)	0 (0%)	1 (1.2%)	0 (0%)	0 (0%)	0 (0%)	0.639
	No	21 (95.5%)	5 (100%)	48 (100%)	82 (98.8%)	23 (100%)	27 (100%)	9 (100%)	
Iron	Yes	1 (4.5%)	0 (0%)	3 (6.3%)	11 (13.3%)	6 (26.1%)	2 (7.4%)	1 (11.1%)	0.325
	No	21 (95.5%)	5 (100%)	45 (93.8%)	72 (86.7%)	17 (73.9%)	25 (92.6%)	8 (88.9%)	
Magnesium	Yes	0 (0%)	0 (0%)	2 (4.2%)	1 (1.2%)	0 (0%)	0 (0%)	0 (0%)	0.683
	No	22 (100%)	5 (100%)	46 (95.8%)	82 (98.8%)	23 (100%)	27 (100%)	9 (100%)	
Calcium	Yes	6 (27.3%)	1 (20.0%)	8 (16.7%)	39 (47.0%)	6 (26.1%)	6 (22.2%)	1 (11.1%)	0.007
	No	16 (72.7%)	4 (80.0%)	40 (83.3%)	44 (53.0%)	17 (73.9%)	21 (77.8%)	8 (88.9%)	
Other	Yes	1 (4.5%)	0 (0%)	2 (4.2%)	2 (2.4%)	1 (4.3%)	1 (3.7%)	2 (22.2%)	0.219
	No	21 (95.5%)	5 (100%)	46 (95.8%)	81 (97.6%)	22 (95.7%)	26 (96.3%)	7 (77.8%)	
Total		22 (100%)	5 (100%)	48 (100%)	83 (100%)	23 (100%)	27 (100%)	9 (100%)	-

P-value: Chi-square test; VMS: Vitamin and mineral supplements

Regarding VMS usage based on the cancer stage, the results indicated that patients in the early stages of cancer had a significantly higher use of vitamin D, vitamin C, and vitamin B complex compared to those in the advanced stages. On the other hand, advanced-stage cancer patients showed a significantly higher usage of Folic acid, vitamin B12, iron, and calcium compared to those in the early stages **(Table 7)**.

Table 7. Vitamin and mineral supplements usage status in cancer patients by disease stage

Variables	VMS usage	Early stage cancer	Advanced stage cancer	P-value
Vitamin A	Yes	0 (0%)	3 (3.5%)	0.158
	No	46 (100%)	82 (95.5%)	
Vitamin B	Yes	10 (21.7%)	17 (20.0%)	0.000
Complex	No	36 (78.3%)	68 (80.0%)	
Vitamin B12	Yes	16 (34.8%)	46 (54.1%)	0.000
	No	30 (65.2%)	39 (45.9%)	
Vitamin C	Yes	4 (8.7%)	3 (3.5%)	0.029
	No	42 (91.3%)	82 (96.5%)	
Vitamin D	Yes	23 (50.0%)	42 (49.4%)	0.000
	No	23 (50.0%)	43 (50.6%)	
Vitamin E	Yes	1 (2.2%)	1 (1.2%)	0.250
	No	45 (97.8%)	84 (98.8%)	
Vitamin K	Yes	0 (0%)	1 (1.2%)	0.417
	No	46 (100%)	84 (98.8%)	
Folic acid	Yes	7 (15.2%)	14 (16.5%)	0.000
	No	39 (84.8%)	71 (83.5%)	
Selenium	Yes	1 (2.2%)	1 (1.2%)	0.250
	No	45 (97.8%)	84 (98.8%)	
Zinc	Yes	1 (2.2%)	1 (1.2%)	0.250
	No	45 (97.8%)	84 (98.8%)	
Iron	Yes	7 (15.2%)	19 (22.4%)	0.000
	No	39 (84.8%)	66 (77.6%)	
Magnesium	Yes	1 (2.2%)	2 (2.4%)	0.158
	No	45 (97.8%)	83 (97.6%)	
Calcium	Yes	22 (47.8%)	45 (52.9%)	0.000
	No	24 (52.2%)	40 (47.1%)	
Other	Yes	0 (0%)	8 (9.4%)	0.074
	No	46 (100%)	77 (90.6%)	
Total		46 (100%)	85 (100%)	-

P-value, Chi-square test; VMS: Vitamin and mineral supplements

Logistic regression analysis revealed that being diagnosed with cancer and residing in a city were significant predictors of VMS use across all patient groups **(Table 8)**.

Table 8. Logistic regression analysis for the independent predictive factors of using VMS in all patients

Variables of cancer patients	OR	95% CI	P-value
Cancer			

Yes	1.262	1.185-1.370	0.000
Residence			
City center	1.349	1.137-1.888	0.027

P- value, logistic regression test, cancer patients, and residence were included in this regression analysis; OR: Odds ratio, CI: Confidence interval.

Logistic regression analysis in cancer patients identified living in a city odds confidence interval and having advanced-stage cancer as significant predictors of VMS use **(Table 9)**.

Table 9. Logistic regression analysis for the independent predictive factors of using VMS in cancer patients

Variables of cancer patients	OR	95% CI	P-value
Residence			
City center	1.222	1.062-1.795	0.021
Stage cancer			
Advanced	11.707	5.648-24.265	0.000

P value, Logistic regression test; stage cancer, andresidence were included in this regression analysis. OR: Odds ratio, CI: Confidence interval

Discussion

In this study, the overall usage rate of VMS among participants was 40.5%. Specifically, 60.4% of patients and 32.8% of the healthy group reported using VMS, with cancer patients using significantly more VMS. These findings align with similar studies conducted internationally [25].

When analyzing the use of VMS, no significant differences were found between the cancer and control groups regarding gender, smoking habits, and alcohol consumption. However, the cancer group demonstrated higher VMS usage among nonworking individuals, primary school graduates, and those residing in a city compared to the control group.

Regression analysis revealed that having cancer and residing in a city center were key factors predicting VMS use across all participants. In the cancer patient cohort, living in a city center was also identified as a significant predictor of VMS use. This could be attributed to the easier access to such supplements in urban areas, as well as concerns about the potential lack of natural vitamin and mineral-rich foods in city life. Additionally, advanced-stage cancer was found to be a strong predictor of VMS use among cancer patients. As the disease progresses, patients may become more inclined to use VMS, fearing that the effectiveness of oncological treatments might diminish. This behavior could stem from the nutritional deficiencies often seen in the later stages of cancer and the desire for patients to take proactive steps in managing their health.

The increased usage of VMS among non-workers and those with lower education levels can be attributed to the point that these individuals often spend more time at home, where they may be influenced by media, including television programs and advertisements promoting VMS. However, the previous studies on this topic present mixed findings. Some studies suggest that education level does not have an impact on VMS usage [26-28], while others indicate that higher education is linked to more consistent VMS use [1,9].

Regarding factors such as gender and age, our study aligns with research indicating no significant relationship between these variables and VMS use [27]. Also, some studies suggest that women were likely to use VMS more than men [9,26]. Additionally, it has been noted that women often use calcium supplements for bone health, men commonly use VMS for cardiovascular benefits, and individuals over 60 typically use VMS to support bone, heart, joint, and eye health [8].

In our research, patients mentioned that they predominantly used VMS based on their physician's advice, communicated with their doctors about their VMS usage, and experienced positive effects after taking them. In contrast, healthy participants in the control group indicated that they used VMS with the belief that they were good for their health, they mentioned that they received their information from the media, did not tell their physicians about their usage, and did not experience significant positive effects. Previous studies have shown that VMS are commonly used to enhance overall health, address nutritional gaps, and treat specific conditions [6,8,29].

While VMS can provide benefits, their excessive and unsupervised use can be very harmful to health [30]. The sources from which individuals gather information are critical in influencing their choice of VMS. Similar to our

findings, other studies involving adults have shown that a significant proportion (66.2%–69.1%) used VMS following their physician's recommendation [3,27]. In a Turkish study, this figure was 60.5%, while a study conducted in the United States reported a lower rate of 23% [8]. The higher VMS usage rate among patients with cancer may be attributed to their more frequent interactions with healthcare providers during treatment, where they are more likely to share their VMS use to ensure there are no interactions with their oncological medications.

Vitamins such as C and E, known for their antioxidant properties, can mitigate free radical formation but might interfere with the effectiveness of chemotherapy drugs. To avoid potential interactions, the American Cancer Research Institute advises cancer patients undergoing chemotherapy or radiotherapy to refrain from excessive antioxidant use and to take supplements only when recommended by a physician [31]. In this study, the cancer patients adhered to this guidance, predominantly using supplements after consulting their healthcare providers.

Consistent with existing research, cancer patients in this study frequently used supplements like vitamin B12, vitamin D, calcium, iron, vitamin B Complex, and vitamin C. Other common supplements in the literature include vitamin E, magnesium, fish oil, and omega-3 fatty acids [6,8,9].

Our findings also revealed that cancer patients had significantly higher usage rates of vitamin B12, iron, vitamin D, folic acid, and calcium compared to the healthy individuals group. Oncologists recommend calcium and vitamin D to mitigate treatment-related bone loss and myelosuppression, particularly in patients with prostate and breast cancer who face a higher risk of osteoporosis due to hormonal therapies [32]. This trend was particularly evident among breast cancer patients, whose use of vitamin D and calcium was higher, likely due to the use of these supplements in conjunction with hormone replacement therapy.

In our study, we found that the rate of iron supplement usage was notably high among cancer patients. Anemia affects between 30% and 90% of individuals with cancer, and its causes are multifactorial. Factors contributing to cancer-related anemia include tumor-related acute or chronic blood loss, malnutrition, deficiencies in vitamin B12, iron, and folic acid, bone marrow infiltration, hemolysis, and the suppression of erythropoietin production due to chemotherapy or radiotherapy. We observed that patients with cancer and gastric cancer had higher usage rates of vitamin B complex and folic acid compared to other cancer types. This could be due to vitamin B12 deficiency caused by impaired absorption in the terminal ileum and decreased intrinsic factor production resulting from gastric carcinoma [33].

Physicians often recommend VMS to alleviate the side effects of cancer treatments. These supplements are generally prescribed to patients diagnosed with or at risk of nutrient deficiencies. However, the literature highlights that excessive VMS use can be harmful to health [34,35]. Because some supplements may interact with anticancer treatments or cause toxicity, patients must be informed about these risks at the start of their treatment, and VMS must always be taken under medical supervision.

A limitation of our study was its design as a single-center investigation. Additionally, we were unable to determine the specific indications for VMS usage or evaluate potential side effects, toxicity, or laboratory changes resulting from their use.

Conclusion

In this study, the use of VMS was acknowledged to be more prevalent among cancer patients than in the healthy individual group. Factors such as living in a city and having advanced-stage cancer were identified as predictors for VMS use among cancer patients. Additionally, patients with gastric cancer were more likely to use folic acid and vitamin B complex, while those with breast cancer had higher usage of vitamin D and calcium compared to other cancer types. The use of VMS, particularly vitamin B12, was more common in advanced-stage cancer patients than in those with early-stage cancer. Cancer patients reported frequent use of VMS, largely due to their physician’s recommendations, and noted positive effects from the supplements. In contrast, healthy participants in the control group primarily relied on media sources for information about VMS and experienced fewer positive effects. These findings suggest that VMS use is more beneficial when guided by a healthcare provider.

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