

Evaluation of Knowledge and Attitudes of Cancer Patients on Vitamin and Mineral Supplements

Abstract

Background: The use of vitamin and mineral supplements (VMS) in different patient populations, especially in cancer patients, has increased in recent years. In this study, we aimed to compare the knowledge and attitudes of cancer patients and healthy population about VMS use. **Materials and Methods:** A questionnaire was administered to cancer patients and healthy control group to get insights into their sociodemographic characteristics and knowledge and attitudes about VMS use. **Results:** Of the 778 participants, 217 (27.8%) were cancer patients. The use of VMS was higher in the cancer patients (60.4%) than in the control group (32.8%). The rates of VMS use were higher in the patients with cancer at an advanced stage. The rate of using Vitamin B12, Vitamin D, folic acid, iron, and calcium was higher in the cancer patients compared to the healthy population. The use of Vitamin B complex and folic acid was higher in the patients with gastric cancer, and the use of Vitamin D and calcium was higher in the patients with breast cancer compared to other cancer types. **Conclusion:** The use of VMS was found to be higher in the cancer patients than in the control group. Living in a city center and having an advanced-stage cancer were seen as the predictive factors for the use of VMS in cancer patients. It was observed that the cancer patients used VMS frequently because the physician in charge recommended and they saw a positive effect after using VMS. The control group obtained the information about VMS through the media. It is possible to have more positive results if VMS is used under a physician's control and indication.

Keywords: Cancer, dietary supplements, healthy individuals, minerals, vitamins

Introduction

The use of nutritional supplements such as vitamins and minerals (VMs) is on the rise in the society. Vitamin and mineral supplements (VMS) can be obtained from pharmacies, supermarkets, and websites or through a physician's prescription.^[1] In the literature, in studies on VMS in various countries, the frequency of their use was reported to be between 25.4% and 85%.^[2,3] It was reported that the rate of VMS use in patients with cancer was between 44.3% and 81%.^[4,5]

In the studies on VMS in different countries and populations, it was reported that VMS was used mostly to improve general health, protect bone health, compensate deficiencies in VMs in the diet, and strengthen immunity.^[6-8] It was observed that individuals using VMS adopted healthy lifestyle habits such as having a balanced diet, exercising, and paying attention to

maintaining their weight.^[8,9] The irregularity in diets and the anxiety about the trust in the foods lead people to use VMS in their quest for better living conditions.^[10]

VMs are the substances necessary for the development and survival of living things. They show their effects even in very small amounts and play a role in the regulation of energy exchange and metabolism of nutrients.^[11] Vitamins require the presence of certain minerals to function properly in our body. In some diseases, mineral requirements such as iron and calcium increase in addition to the Vitamins A, C, B1, B6, and B12 and folic acid; therefore, VMS should be used to meet this need.^[12] To diagnose VM deficiency, laboratory tests are recommended for risky populations, and replacement therapy is applied in case of deficiency.^[13-15] On the other hand, misuse or unnecessary use of VMS can cause toxicity.^[16]

Cancer is one of the important diseases that negatively affect human health. Surgery, chemotherapy, radiotherapy, and

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hormone replacement therapy are mainly used in cancer treatment.^[17] Cure probability is low in advanced-stage cancers; therefore, the patients in this group may resort to VMS in addition to medical treatments for various reasons such as reducing the effects of complications, strengthening the immune system, and improving the quality of life. Furthermore, patients can use VMS to eliminate the anxiety that the medical treatment will be inadequate and to have physical and psychological support. There are publications in the literature suggesting the use of VMS for prevention of cancer. Vitamin E and beta-carotene are recommended for the prevention of breast, stomach, esophagus, and bladder cancers, while Vitamin D and folic acid are recommended for the prevention of colon cancer. The use of high amounts of Vitamin C in cancer treatment was also reported.^[18,19] VMS are required to reduce the side effects of some drugs used in cancer treatment. For example, aromatase inhibitors are associated with further acceleration of bone loss and an increased rate of bone fracture.^[20] In a study, it was reported that Vitamin B12 therapy had a role in the prevention of neuropathy and neuropathic pain in cancer patients.^[21] Postgastrectomy Vitamin B12 deficiency worsens the quality of life; therefore, it is necessary to monitor the postoperative Vitamin B12 levels and treat the Vitamin B12 deficiency.^[22] Cisplatin should be considered a cause of hypomagnesemia. When using cisplatin, serum electrolyte measurement and appropriate replacement of magnesium are recommended.^[23] When administering panitumumab therapy, magnesium levels should be monitored starting from the initiation of the agent to at least 8 weeks after cessation. Hypomagnesemia can usually be managed by daily repletion of magnesium sulfate.^[24]

In this study, we aimed to investigate and compare the cancer patients and the healthy control group in terms of their knowledge and attitudes about VMS and to determine their sources of information, reason for use, perceived benefits, and the characteristics of the group using VMS.

Materials and Methods

The cancer patients and the healthy individuals were included in the study. After the purpose of the study was explained, the sociodemographic data were collected from the individuals who accepted to participate in the study and they filled the VMS use query form.

The VMS use query form included the following information: frequency of VMS use, commonly used VMS types, source of information, reason for use, and some other factors. The VMS use query form was designed in three parts. In the first part, the participants' sociodemographic characteristics and cancer type and stage were questioned. In the second part, the participants were asked which VMS they used. To this end, the participants were asked to select the VMS they used from a list of 13 most known VMS treatments. The participants who stated that they were using VMS in the second part were asked to answer the

questions in the third part. In this part, the following issues were questioned: the reasons for using VMS, frequency of use, sources of advice, and whether the physician in charge knows that the patient is using VMS.

The individuals having the cognitive functions enough to answer the questions were included in the study. Informed consent was obtained from those who met this condition and agreed to participate in the study. The exclusion criteria were as follows: having a cognitive impairment preventing from answering the questions, not filling the questionnaire completely, and having missing sociodemographic data [Figure 1].

This study was conducted in accordance with Helsinki Principles, and ethical approval was obtained from the local ethics committee (Approval No: 2020/272).

IBM SPSS package program (v.22.0, IBM Corp., Armonk, NY, USA) was used in the statistical data analysis. Descriptive statistics were expressed in number, percentage, and mean ± standard deviation. Kolmogorov–Smirnov test was used to determine whether the data were normally distributed. Student *t*-test was used for the parametric data and Mann–Whitney *U*-test was used for the nonparametric data. The categorical data were compared using the Chi-squared test. Logistic regression analysis was carried out to determine the factors predicting VMS use. Statistical significance was set at $P < 0.05$.

Results

The mean age of the participants was 51.0 ± 15.0 years. Four hundred and eight-nine (62.9%) participants were female and 289 (37.1%) were male. The participants consisted of 217 (27.8%) cancer patients and 561 (72.1%)

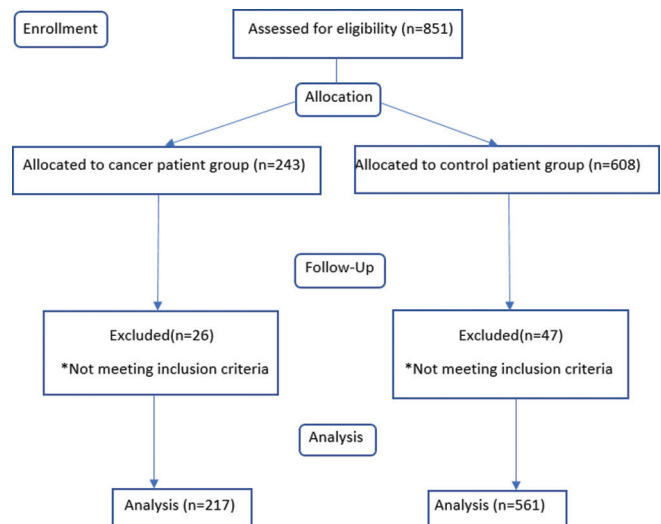


Figure 1: Flow diagram of the study. The scale was applied to 851 people. Of these individuals, 243 were from the cancer group and 608 from the control group. Twenty-six people from the cancer group and 47 people from the control group were excluded because they did not meet the inclusion criteria. As a result, the data of 217 cancer patients and 561 control groups were analyzed

healthy individuals. The participants in the cancer group and the control group were similar in terms of age ($P = 0.455$) and gender ($P = 0.506$) [Table 1].

Only 315 (40.4%) of the participants were using VMS. The majority of the participants were nonworkers (37.8%), primary school graduates (39.7%), living in a city center (77.5%), nonsmokers (71.2%), and nonalcohol users (93.7%). No statistical difference was found between the participants using VMS in the control group and the cancer group in terms of gender, smoking status, and alcohol use. The VMS use among those who were nonworkers, primary school graduates, and living in a city center was significantly higher in the cancer group than in the control group ($P < 0.001$ for all) [Table 2].

Of the 315 (40.5%) participants using VMS, 131 (60.4%) were in the cancer group and 184 (32.8%) were in the

control group. The cancer patients' rate of VMS use was statistically significantly higher than that of the control group ($P < 0.001$). It was found that the number of cancer patients who used VMS upon a physician's recommendation (44.2%) was higher than the number of those in the control group. It was also found that the cancer patients obtained the information about VMS most frequently from their physicians (49.3%), gave information to their physicians about their use of VMS (52.1%), and achieved positive effects after using VMS (49.8%) ($P < 0.001$ for all). Those in the control group mostly used VMS because they thought it was useful (48.9%), heard the information about VMS most frequently from the media (48.4%), did not inform their physicians (51.1%), and felt no change after using VMS (81.5%) ($P < 0.001$ for all.) [Table 3].

Table 1: Sociodemographic characteristics of its participants

Variables	All patients	Cancer patients	Control groups	P
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

Table 2: Vitamin and mineral supplements usage status according to the sociodemographic characteristics of cancer patients and control groups

Variables	All patients (n=778), n (%)	VMS usage (n=315)		P
		Cancer patients, n (%)	Control groups, n (%)	
Gender				
Female	289 (37.1)	88 (67.2)	116 (63.0)	0.449
Male	489 (62.9)	43 (32.8)	68 (37.0)	
Occupation				
Not working	294 (37.8)	74 (56.5)	52 (28.3)	0.000
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)	0.000
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)	0.000
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

The cancer group consisted of the patients with breast cancer (38.2%), colorectal cancer (22.1%), urogenital cancer (12.4%), gastric cancer (10.6%), lung cancer (10.1%), brain tumor (2.3%), and other cancers (4.1%). While there was no statistically significant difference between the cancer patients using and not using VMS ($P = 0.085$) in terms of cancer type, it was observed that the rate of VMS use was significantly higher in the patients with advanced-stage cancer compared to those in the early stage of cancer ($P < 0.001$) [Table 4].

It was determined that the frequencies of the VMS used by the cancer patients were as follows: calcium (51.1%), Vitamin D (49.6%), Vitamin B12 (47.3%), Vitamin B complex (20.6%), iron (19.8%), folic acid (16.0%), Vitamin C (5.3%), Vitamin A (2.3%), magnesium (2.3%), Vitamin E (1.5%), zinc (1.5%), selenium (1.5%), and Vitamin K (0.8%). The frequencies of the VMS used by the control group were as follows: Vitamin D (17.4%), Vitamin B12 (13.0%), Vitamin B complex (12.5%), calcium (12.0%), iron (8.2%), Vitamin C (6.5%), folic acid (5.4%), selenium (5.4%), magnesium (4.9%), zinc (4.3%), Vitamin K (3.8%), Vitamin A (2.7%), and Vitamin E (2.7%). The rates of using Vitamin B12 ($P < 0.001$), Vitamin D ($P < 0.001$), folic acid ($P = 0.002$), iron ($P = 0.002$), and calcium ($P < 0.001$) were significantly higher in the cancer patients compared to the control group [Table 5].

It was observed that the rate of using Vitamin B complex ($P = 0.001$) and folic acid ($P = 0.003$) in the patients with gastric cancer and the rate of using Vitamin

D ($P < 0.001$) and calcium ($P = 0.007$) in the patients with breast cancer were statistically significantly higher than those in other types of cancer [Table 6].

As for the use of VMS in terms of the disease stage, it was seen that the use of Vitamin C ($P = 0.029$), Vitamin D ($P < 0.001$), and Vitamin B complex ($P < 0.001$) was statistically higher in the patients with early-stage cancer than in the patients with advanced-stage cancer. The use of vitamin B12, folic acid, iron, and calcium was statistically higher in the patients with advanced-stage cancer than in the patients with early-stage cancer ($P < 0.001$ for all.) [Table 7].

According to logistic regression analysis in all patient groups, having cancer (odds ratio [OR]: 1.262, 95% confidence interval [CI]: 1–1.370, $P < 0.001$) and living in a city center (OR: 1.349, 95% CI: 1.137–1.888, $P = 0.027$) were the predictive factors for VMS use [Table 8].

According to logistic regression analysis in the cancer patients, living in a city center (OR: 1.222, 95% CI: 1.062–1.795, $P = 0.021$) and having advanced-stage cancer (OR: 11.707, 95% CI: 5.648–24.265, $P < 0.001$) were the predictive factors for VMS use [Table 9].

Discussion

In our study, the rate of VMS use was 40.5% in all the participants. The rate of VMS use was 60.4% in the cancer patients and 32.8% in the control group. It was observed that the cancer patients used significantly more VMS than the control group. These results were in line with those of the studies conducted in different countries.^[2-5]

Table 3: Patients' views on vitamin and mineral supplements practices

Patients' views on VMS practices	All patients, n (%)	Cancer patients, n (%)	Control groups, n (%)	P
Do you use VMS?				
Used	315 (40.5)	131 (60.4)	184 (32.8)	0.000
No used	463 (59.5)	86 (39.6)	377 (67.2)	
What is the reason if you use VMS?				
I think it's useful	119 (37.8)	29 (13.4)	90 (48.9)	0.000
It feels good	68 (21.6)	6 (2.8)	62 (33.7)	
Because the physician recommended	128 (40.6)	96 (44.2)	32 (17.4)	
Where did you get the information about VMS?				
Friend-family	33 (10.5)	7 (3.2)	26 (14.1)	0.000
Physician	148 (47.0)	110 (49.3)	38 (20.7)	
Media	99 (31.4)	10 (4.6)	89 (48.4)	
Internet	35 (11.1)	4 (1.8)	31 (16.8)	
Did you notify the health personnel of the VMS method you used?				
No	104 (33.0)	10 (4.6)	94 (51.1)	0.000
Yes	192 (61.0)	113 (52.1)	78 (42.9)	
Since it is not asked	19 (6.0)	8 (3.7)	11 (6.0)	
How VMS usage affected you?				
No change	173 (54.9)	23 (10.6)	150 (81.5)	0.000
Positive	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

In our study, no difference was found between the patients using VMS in the cancer group and the control group in terms of gender, smoking status, and alcohol use. On the other hand, it was observed that the VMS use among those who were nonworkers, primary school graduates, and living in a city center was higher in the cancer group compared to the control group.

According to the regression analysis carried out for all the participants, having cancer and living in a city center were the predictive factors for VMS use. In our study, in the regression analysis carried out for the cancer patients, living in a city center was found to be a predictive factor for VMS use. This may be due to the fact that the people living in a city center have easier access to this group of support products and they are worried about consuming less natural foods rich in VM in city life and desire to use VMS.^[25] In addition, for the cancer patients, having advanced-stage cancer was a predictive factor for the use of VMS. The tendency to use VMS in

addition to medical treatment increases in patients with the concern that the effect of oncological treatment will be low in the advanced stage of cancer. This situation may be caused by the negativity of the VM balance required for the body as a result of the deterioration of nutrition in the later stages of the disease and the fact that some patients tend to use VMS to do something themselves about the disease.

The higher use of VMS in the nonworkers and the low-educated individuals can be explained by the fact that these individuals spend a long time at home watching the media and they tend to use VMS with the effect of television programs and VM advertisements. There are some conflicting results in the literature on this subject. There are also some studies reporting that educational status does not affect VMS use^[26-28] and that higher education level is associated with regular VMS use.^[1,9]

In the literature, there are publications reporting that there is no relationship between VMS use, gender, and age,^[27] which is in accordance with our study. On the other hand, there are studies reporting that women use VMS more frequently than men.^[9,26] It has been reported that women use calcium products for their bone health, men use VMS to improve their heart health and lower their cholesterol level, and individuals over the age of 60 use VMS for their heart, bone, joint, and eye health.^[8]

In our study, the cancer patients reported that they frequently used VMS upon a physician's recommendation, obtained the information about VMS most frequently from their physicians, informed their physicians about their use of VMS, and obtained a positive effect after using VMS. On the contrary, the individuals in the control group reported that they used VMS thinking that it was beneficial for their health, obtained the information about VMS from the media, did not inform their physician that they used VMS, and did not experience enough positive effects. In various

Table 4: Vitamin and mineral supplements usage status according to the cancer type and stage of cancer patients

Variables	Cancer patients, n (%)	VMS usage		P
		Yes, n (%)	No, n (%)	
Cancer type				
Lungs	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

Table 5: Vitamin and mineral supplements usage status of patients according to vitamin and mineral supplements type

VMS	All patients, n (%)	VMS usage		P
		Cancer patients, n (%)	Control groups, n (%)	
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

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
Vitamin A	Yes	0	0	2 (4.2)	0	0	1 (3.7)	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	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	3 (6.3)	3 (3.6)	0	1 (3.7)	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	1 (2.1)	0	0	1 (3.7)	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	0.179
	No	21 (95.5)	5 (100)	48 (100)	83 (100)	23 (100)	27 (100)	9 (100)	
Folic acid	Yes	2 (9.1)	0	3 (6.3)	7 (8.4)	8 (34.8)	1 (3.7)	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	1 (2.1)	0	0	1 (3.7)	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	1 (1.2)	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	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	2 (4.2)	1 (1.2)	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	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

studies, it was reported that VMS were used most often to improve and protect general health and to overcome dietary deficiencies and treat diseases.^[6,8,29]

Excessive and unindicated use of VMS can be harmful to health.^[30] The sources of information are effective in deciding which VMS to use. Similar to our study, in the studies conducted with adults, it was reported that the participants most frequently (66.2%–69.1%) used VMS upon a physician’s recommendation.^[3,27] In a similar study conducted in Turkey, this rate was found to be 60.5%.^[1] In a study in the USA, this rate was reported to be 23%.^[8] The higher rates of VMS use seen in cancer patients may be due to the fact that they are more frequently in contact with their physicians during the treatment period, and they inform their physicians because of the concern that additional supportive treatments may develop reactions in case they are used together with the oncological drugs.

Antioxidants such as Vitamins C and E can reduce the formation of free radicals and may also decrease the effectiveness of chemotherapy agents. The American Cancer Research Institute recommends that patients receiving radiotherapy and chemotherapy avoid overdose

of antioxidant supplements and use VMS upon a physician’s recommendation.^[31] We observed that the cancer patients in our study also used VMS in accordance with these recommendations, mostly upon a physician’s recommendation and knowledge.

In our study, it was found that the cancer patients used most of the VMS such as calcium, Vitamin D, Vitamin B12, Vitamin B Complex, iron, folic acid, and Vitamin C, which was in line with the literature. In the literature, it was reported that Vitamin C, Vitamin D, calcium, Vitamin E, zinc, magnesium, multivitamins, omega-3, and fish oil were among the most commonly used nutritional supplements.^[6,8,9]

In our study, it was observed that the rates of using Vitamin B12, Vitamin D, folic acid, iron, and calcium were significantly higher in the cancer patients compared to the control group. Appropriate exercise and nutrition programs and adequate calcium and Vitamin D support are recommended by oncology physicians to reduce the risk of myelosuppression and prevent bone loss, especially in patients with breast and prostate cancers who are exposed to hormonal manipulation in terms of cancer treatment-related osteoporosis.^[32] In our study, it was seen that the use of

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

Variables	VMS usage	Early stage cancer	Advanced stage cancer	P
Vitamin A	Yes	0	3 (3.5)	0.158
	No	46 (100)	82 (95.5)	
Vitamin B Complex	Yes	10 (21.7)	17 (20.0)	0.000
	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	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	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

Vitamin D and calcium in the patients with breast cancer was higher than in other cancer types. This is caused by the increase in the use of Vitamin D and calcium together with hormone replacement therapies, especially in postmenopausal patients with breast cancer.

In our study, the rate of iron use was also high in the cancer patients. Anemia was observed in 30%–90% of the cancer patients. The etiology of cancer anemia is multifactorial. The following problems can lead to anemia: acute and chronic blood loss in relation to the tumor cachexia and malnutrition; the deficiency in iron, Vitamin B12, and folic acid; hemolysis; bone marrow infiltration; and the suppression of bone marrow and erythropoietin synthesis by chemotherapy and radiotherapy. In our study, it was observed that the rates of using Vitamin B complex and folic acid in the patients with gastric cancer were more than in other types of cancer. Vitamin B12 deficiency may occur due to the impaired Vitamin B12 absorption from the terminal ileum and the impaired intrinsic factor secretion due to gastric carcinoma.^[33]

Table 8: Logistic regression analysis for the independent predictive factors of using vitamin and mineral supplements in all patients

Variables of cancer patients	OR	95% CI	P
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

Table 9: Logistic regression analysis for the independent predictive factors of using vitamin and mineral supplements in cancer patients

Variables of cancer patients	OR	95% CI	P
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, residence were included in this regression analysis. OR: Odds ratio, CI: Confidence interval

The use of VMS is also recommended by physicians to reduce the side effects associated with treatments. VMS should be recommended to the patients with a diagnosis or an indication of deficiency. It was reported in the literature that overusing VMS was harmful to health.^[34,35] Due to the potential of VMS to interact with antineoplastic agents or cause toxicity, patients should be well informed in this regard at the beginning of the treatment and VMS should be used under a physician’s control.

One of the limitations of our study is that it was carried out in a single center. In addition, the indications and the rate of VMS use were not known, and we were not able to evaluate the side effects, toxicity, and laboratory changes to occur due to their use.

Conclusion

The VMS use was higher in the cancer patients compared to the control group. In cancer patients, living in a city center and having an advanced-stage cancer were found to be the predictive factors for the VMS use. It was observed that the use of Vitamin B complex and folic acid in the patients with gastric cancer and the use of Vitamin D and calcium in the patients with breast cancer were higher than in other types of cancer. The rate of using VMS, especially Vitamin B12, in the patients with advanced-stage cancer was found to be higher than in those with early-stage cancer. It was observed that the cancer patients used VMS frequently because their physician recommended them, and they experienced a positive effect after using VMS. On the other hand, the individuals in the control group obtained the information about VMS from the media, and they reported less positive

effects than the cancer group. It is possible to obtain more positive results when VMS is used under a physician's control and indication.

Informed consent

All patients signed the consent form.

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Conflicts of interest

There are no conflict of interests.

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