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Knowledge and Attitude of Elderly Patients about Vitamin D Deficiency at South Egypt Institute of Oncology

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Abstract
Vitamin D deficiency is relatively common among older adults. **Aim:** To assess the knowledge and attitude of elderly patients regarding vitamin D deficiency. **Design:** Descriptive research design. **Setting:** The study was conducted in outpatient clinics at South Egypt Institute of Oncology -Assiut- Egypt. **Sample:** The total sample size was 148 during six months. The elderly patients were selected by purposive sample. **Tools:** Tool I: interview questionnaire was used for data collection. Part A: Patient Demographic Characteristics. Part B: Medical assessment. Tool II: Knowledge assessment questionnaire: to assess the elderly 'knowledge about vitamin D deficiency among elderly. Tool III: Attitude assessment questionnaire: It was a Likert scale consisted of statements about the elderly patients. **Results:** it was observed that 68.2% of patients had poor score of knowledge, 23.6% had average score of knowledge and 8.1% had good knowledge score about vitamin D deficiency. Also, a positive correlation (r= 0.169) and highly significant difference (p. value = 0.017) between the elderly patient knowledge and attitude toward VitD deficiency. **Conclusion and Recommendations:** The present study answered the research questions that related to level of knowledge and attitude regarding vitamin D deficiency among elderly patients, and showed that there are some gaps in knowledge score about vitamin D. Further research can be conducted on larger sample involving control and experimental groups about vitamin D deficiency among elderly.

Keywords: Attitude, Elderly, knowledge & Vitamin Deficiency

Introduction
Ageing is a natural developmental process that alters social, psychological, and physical aspects of life in many ways. In terms of biology, aging is defined as the consistent alterations that mature, genetically representative organisms living in unfavorable environments undergo as they get older **(Kasinathan et al. 2021)**

According to the report of the Central Agency for Public Mobilization and Statistics of Egypt 2022, the percentage of elderly people age 60 or over in January 2022 was around 6.7 % from the total population. This percentage is expected to reach 20.8 % by 2050 **Central Agency for Public Mobilization & Statistics (2022).**

Both the mineralization of bones and the control of calcium levels in the blood are influenced by vitamin D. Increased production and release of parathyroid hormone (PTH) is the consequence of this vitamin deficiency. The accelerated bone turnover brought on by this secondary hyperparathyroidism raises the risk of fracture. Thirteen to thirty-three percent of patients with osteoporotic femoral neck fractures had histological evidence of vitamin D insufficiency. Vitamin D deficit develops when this process is acute and prolonged **Latic & Erben (2022).**

In most cases, assaying for 25-OH-vitamin D can be used to diagnose vitamin D insufficiency, which can be helpful for early diagnosis of the deficit. UV rays from the sun cause the skin to synthesise vitamin D 3, also known as cholecalciferol. It furthermore has to go through two hydroxylation processes in the kidneys and liver in order to become active. Vitamin D insufficiency can be caused by inadequate sun exposure, poor absorption, and low intake **Giustina et al. (2023).**

One modifiable pathologic factor for osteoporosis is a vitamin D deficiency. Osteomalacia is a condition that often goes undiagnosed and affects the elderly population Vitamin D deficiency is relatively common among older adults, particularly those who are homebound or have limited sun exposure. According to the Centers for Disease Control and Prevention (CDC), approximately 30-40% of older adults in the United States have low levels of vitamin D **Quatman, et al. (2020).**

The daily monitoring of the patient's condition, early detection of potential risks, and patient education regarding medication administration-including how to take medications, when to take them, potential side effects, and how to combine them-should be the primary responsibilities of the gerontological nurse. Giving 1,000–2,000 IU of vitamin D per day to

people who have been diagnosed with a vitamin D insufficiency. Information regarding dietary sources of vitamin D, such as fortified dairy products, fatty fish, and fish liver oils, should be included in education programs for the elderly. Because there is a higher risk of skin cancer, patients should be advised against obtaining their vitamin D via excessive or unprotected sun exposure **Pirushi, et al. (2022).**

Although it is uncommon, vitamin D toxicity can happen when blood levels above 150 mg/mL and can result in mortality, arrhythmias, and renal failure. The elderly should be advised not to take more supplements than is recommended and to keep them out of the reach of little ones. Elderly people should be taught to report signs of vitamin D poisoning right away, such as pain, nausea, weakness, disorientation, anorexia, excessive thirst, and frequent urination. Patients should also be informed about the possible interactions between other drugs, supplements, and vitamin D. lastly; seniors should be counseled to inform their healthcare physician about any new and current drugs **Cesari, et al. (2011).**

Significance of the study:

Although severe vitamin D insufficiency is uncommon in the USA, most people do not get enough vitamin D via their food, supplements, or exposure to sunshine. Ninety percent of elderly persons (60–70 years of age) do not consume adequate vitamin D through food **Grant, et al. (2020).**

Evidence suggests that vitamin D insufficiency and rickets are more common in the Middle East than in Western countries; a major meta-analysis found that 20–80% of people who appeared healthy really had vitamin D deficiency **Ghazizadeh, et al. (2022).**

Ages 60 to 80 years old, lactose intolerance (avoid vitamin D-fortified milk), and insufficient sun exposure are risk factors for vitamin D insufficiency. The largest risk has been seen in those with low levels of sunshine exposure and insufficient vitamin D consumption from their diets. These people are frequently elderly patients who are hospitalized, housebound, or live in long-term care facilities **Uday & Högler (2020).** However, the status of vitamin D deficiency among elderly people in Egypt and its relation to other comorbidities has not been addressed yet. Thus, the present study focuses on assess the elderly patients' knowledge and attitude regarding vitamin D deficiency.

Aim of the study:

To assess knowledge and attitude of elderly patients regarding vitamin D deficiency.

Specific objectives:

- To assess knowledge score of elderly patients toward vitamin D deficiency.
- To assess attitude level of elderly patients toward vitamin D deficiency.

Research questions:

- What is the level of knowledge regarding vitamin D deficiency among elderly patients?
- What is the level of attitude regarding vitamin D deficiency among elderly patients?

Subjects and Method:

Research design:

Descriptive research design was used in this study

Study setting:

The study was conducted in outpatient clinics **(**Medical and Surgical) at South Egypt Institute of Oncology in Assiut.

Inclusion criteria:

1. Elderly patients aged 60 years and above.
2. All elderly patients with and without comorbidities.
3. All elderly patients attended at South Egypt Institute of Oncology outpatient clinics
4. Alert and able to communicate.

Exclusion Criteria:

- Patients who refuse to take part in the study.
- End stage chronic diseases admitted at South Egypt Institute of Oncology of ICU.

Sample:

Sample size calculates through using Epi/Info version 3 with confidence level 95% according to the prevalence rate for one year (1 January 2022 to 31 December 2022) the total number of elderly patients who had attended to out-patients clinic South Egypt Institute of Oncology were 1280 The total sample size found 148 during six months. The elderly patients were selected by purposive sample.

Epi-info program used to estimate the subject size; the minimal sample was based on the following parameters

N = Total Patient Population size 148

Z = confidence level 0.095 and is equal 1.96

D = The error ratio is 0.05

P = Property availability ratio and neutral =0.50

Tools of the study:

After reviewing related literature proper three tools were used for data collection:

Tool I: Interview questionnaire were used for data collection

A structured questionnaire was developed by the researchers, based on reviewing related literatures, written in English.

Part A: Patient Demographic Characteristics: It consisted of 6 items; age, gender, marital status, education, occupation, and number of people living in the household.

Part B: Medical assessment: It included these items; primary diagnosis, chronic diseases, past treatment

received and currently receiving treatment, disease complications (fall, fracture).

Tool II: Knowledge assessment questionnaire:

This tool developed by the researchers depending on the related review of literature and mainly based on the study of **Alamoudi, et al. (2019) & AlGarni, AlAmri et al. (2023)** to assess the elderly 'knowledge about vitamin D deficiency among elderly: such as (definition, resources, causes, risk factors, signs and symptoms, complications, management, nutritional support and prevention).

Scoring system:

Responses to each question were "correct," or "incorrect." A total score was calculated by the sum of correct answers and converted into a percent to be categorized into:

Poor knowledge <50%.

Average knowledge 50-70%.

Good knowledge >70%.

Tool III: Attitude assessment questionnaire:

It developed by the researchers depending on the related review of literature **Bouillon; Antonio (2020**) **& Arshad; Zaidi(2022).**

It was a Likert scale consisted of statements about the elderly patients concerned to explore their attitude toward vitamin D deficiency such as I like to expose myself to sunlight and never tried to avoid it, I prefer to expose myself to sunlight only during late afternoon, I like to expose myself to sunlight sometimes, but I tend to avoid the strong, hot sunlight, I do not like sunlight. I rarely get exposed to sun.

Scoring system:

Responses to each statement were (Totally agreed, Agree, fair, Disagree, totally disagreed) by score (4, 3, 2, 1, 0)

Total attitude score was summed up and converted into a percent to be considered:

Positive perception ≥60%

Negative perception <60%

Validity and reliability:

Validity:

The content validity of the tools was done by 3 expertise in the related field to examine the content validity of the tools. Every member was contact and ask to review the tool content and its structural design to ascertain competence and clarity of the items of questions. All comments and suggestions were considered and rewarding and sequence of some statement will be carried out accordingly.

Reliability:

The internal consistency of a test or scale was measured using Cronbach's Alpha, knowledge assessment questionnaire 0.786, attitude assessment questionnaire 0.893.

Administrative phase:

An official letter was obtained from the dean of faculty of nursing of Assiut University to, South Egypt Institute of Oncology.

Pilot study:

Pilot study was conducted on 10% of elderly patients in order to assess the questionnaire's practicality, clarity, and time required to complete. Based on the findings of the pilot research, the appropriate adjustments were made.

Ethical considerations:

- The faculty of nursing's ethics committee authorized the research idea.
- The research subjects are not at danger while it is being applied.
- The investigation will adhere to standard ethical guidelines for clinical research.
- Anonymity and confidentiality will be guaranteed.
- Subjects were free to decline participation in the study or to leave at any moment, for any reason.
- Older adults gave their verbal agreement to participate in the study after being informed of its goal.

Field of work:

Following a review of literature and interviews with experts at various levels of the subject, all the data that could be useful in accomplishing the study's goals was gathered, examined, and codified so that it would be appropriate for the study. The researcher gathered information for three hours, two days a week, between 10 am to 1 pm. Depending on the patient's cooperation, filling out the questionnaire took fifteen to twenty minutes. The researcher visited the outpatient clinics that were chosen, made an introduction, provided official authorization, clarified the goal of the study, and requested cooperation. In order to gather the necessary data, the researcher gathered during 6 months starting from (first of October 2023 to end of March 2024).

Statistical analysis:

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by number and percent (N, %), where continuous variables described by mean and standard deviation (Mean,_+ SD). Chi-square test . person Correlation Used to Appear the Association between elderly knowledge about Vit D deficiency and elderly attitude about vit D deficiency. A two-tailed $p < 0.05$ was considered statistically significant all analyses were performed with the IBM SPSS 20.0 software

Results:

Table (1): Distribution of demographic characteristics of studied elderly patients' sample (n=148)

Demographic data	No	%
Age Group		
From 60-<65 years	62	41.9
From 65-70 years	45	30.4
More than 70 years	41	27.7
Mean±SD **(range)**	**67.99±6.68 (60-94)**	
Gender		
Male	63	42.6
Female	85	57.4
Marital		
Single	3	2.0
Married	93	62.8
Divorced	12	8.1
Widow	40	27.0
Residence		
Rural	89	60.1
Urban	59	39.9
Education		
Illiterate	39	26.4
Read and write	24	16.2
Primary	28	18.9
Secondary	20	13.5
University	37	25.0
Retirement		
Free business	39	26.4
Dose not work	109	73.6
Living		
with other	117	79.1
Alone	31	20.9

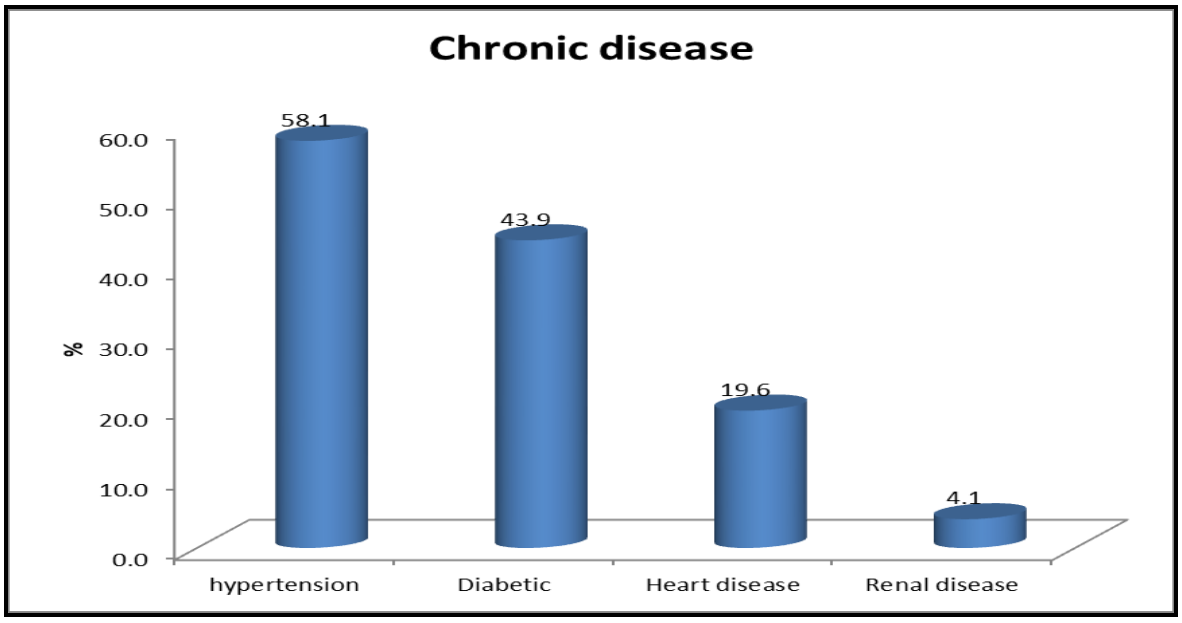

Figure (1): Distribution of study sample according to their medical assessment

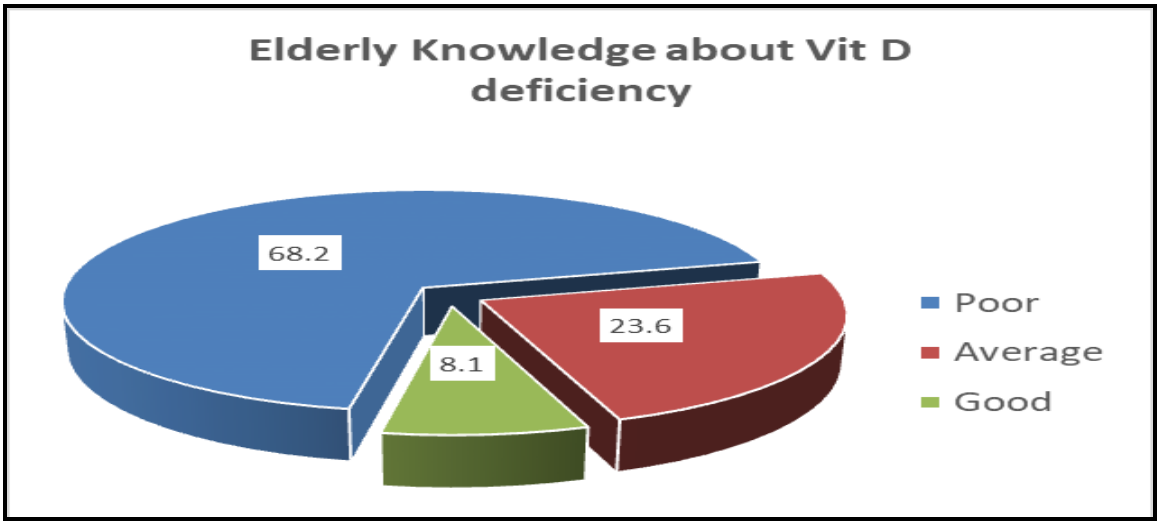

Figure (2): Knowledge score of about vitamin D deficiency.

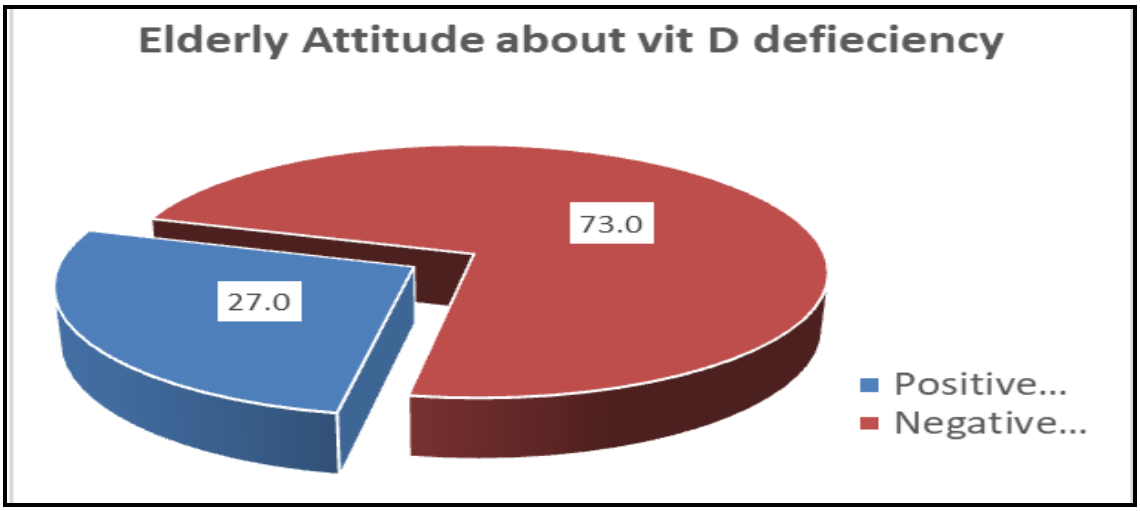

Figure (3): Attitude of patients about vitamin D deficiency.

Table (2): Relationship between elderly total score of knowledge about Vit D deficiency with their demographic data for Study Sample (n=148)

demographic data	Poor knowledge N=101		Average knowledge N=35		Good knowledge N=12		X2	P. value
	No	%	No	%	No	%		
Age group								
From 60-65 y	40	39.6	18	51.4	4	33.3	4.49	0.344
From 65-70 y	32	31.7	7	20.0	6	50.0		
More than 70 years	29	28.7	10	28.6	2	16.7		
Gender								
Male	43	42.6	14	40.0	6	50.0	0.37	0.833
Female	58	57.4	21	60.0	6	50.0		
Marital								
Single	0	0.0	3	8.6	0	0.0	20.01	0.003
Married	57	56.4	26	74.3	10	83.3		
Divorced	12	11.9	0	0.0	0	0.0		
Widow	32	31.7	6	17.1	2	16.7		

demographic data	Poor knowledge N=101		Average knowledge N=35		Good knowledge N=12		X2	P. value
	No	%	No	%	No	%		
Residence								
Rural	57	56.4	22	62.9	10	83.3	3.38	0.185
Urban	44	43.6	13	37.1	2	16.7		
Education								
Illiterate	37	36.6	2	5.7	0	0.0	60.74	0.000
Read and write	18	17.8	6	17.1	0	0.0		
Primary	24	23.8	0	0.0	4	33.3		
Secondary	12	11.9	4	11.4	4	33.3		
University	10	9.9	23	65.7	4	33.3		
Free business	15	14.9	18	51.4	6	50.0	21.68	0.000
Dose not work	86	85.1	17	48.6	6	50.0		
Living								
With other	76	75.2	31	88.6	10	83.3	2.93	0.231
Alone	25	24.8	4	11.4	2	16.7		

X2-means Chi test **Means there is statistically Significant difference*

Table (3): Relationship between elderly attitude about vit D deficiency with their demographic data for Study Sample (n=148)

demographic data	Positive attitude N=40		Negative attitude N=108		X2	P.value
	No	%	No	%		
Age group						
From 60-65 years	17	42.5	45	41.7	0.23	0.892
From 65-70 years	13	32.5	32	29.6		
More than 70 years	10	25.0	31	28.7		
Gender						
Male	10	25.0	53	49.1	6.92	0.009
Female	30	75.0	55	50.9		
Marital						
Single	3	7.5	0	0.0	14.08	0.003
Married	23	57.5	70	64.8		
Divorced	0	0.0	12	11.1		
Widow	14	35.0	26	24.1		
Residence						
Rural	29	72.5	60	55.6	3.50	0.062
Urban	11	27.5	48	44.4		
Education						
Illiterate	10	25.0	29	26.9	8.41	0.078
Read and write	6	15.0	18	16.7		
Primary	6	15.0	22	20.4		
Secondary	2	5.0	18	16.7		
University	16	40.0	21	19.4		
retirement						
Free business	13	32.5	26	24.1	1.07	0.301
Dose not work	27	67.5	82	75.9		
Living						
with other	34	85.0	83	76.9	1.17	0.279
Alone	6	15.0	25	23.1		

X2-means Chi test **Means their is statistical Significant difference*

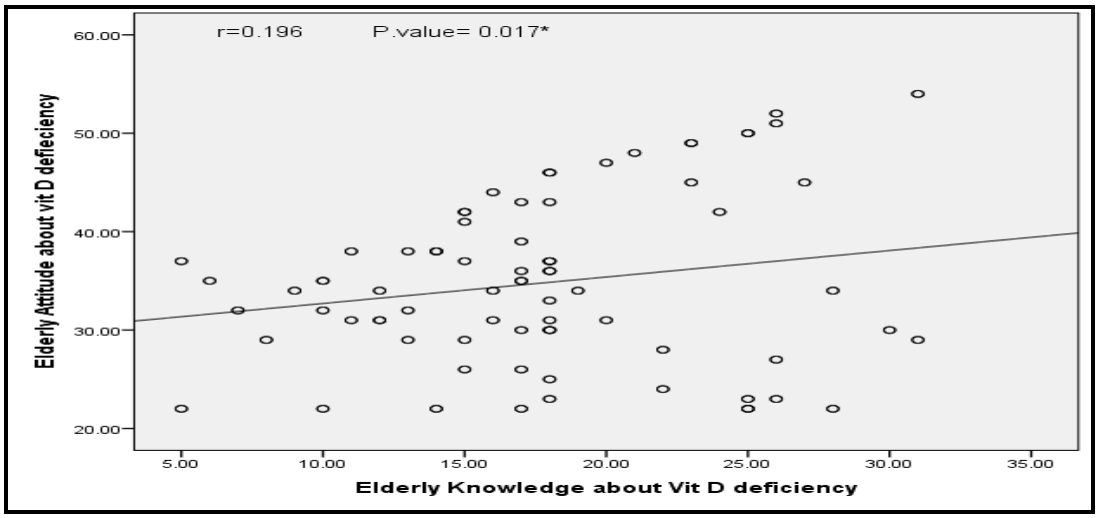

Figure (4): Scatterplot illustrating a positive correlation hypothetical data for the relationship between elderly knowledge about Vit D deficiency and elderly attitude about vit D deficiency (r=0.198*).

Table (1): The demographic characteristics of study population of the elderly patients of age group 60 - 65 years were 41.9 %, 30.4% belonged to 65 - 70 years group and above 70 years old represent 27.7% of all cases. In our study, we found that female elderly were more than males with 57.4 % and 42.6 % respectively. Elderly belonging to rural areas formed 60.1 % while those belonging to urban areas formed 39.9 % of the study population. The results of the study showed the majority of elderly were well educated which represents 73.6 % and 26.4 % poor educated.

Figure (1): We evaluate medical status of our cases and found that about 73.6 % of cases suffering of chronic diseases with 58.1 % suffering from hypertension, 43.9 % of Diabetes, 19.6 % of heart diseases and 4.1 % of renal diseases.

Figure (2): Every question in all sections takes 2 points, to calculate level of knowledge of the elderly in form of 10 points to vitamin D importance, 18 points to The group most vulnerable to vitamin D deficiency section and 10 points to vitamin D source section, we found that mean score of the elderly in 1st section was 44.70% with Mean±SD (4.47±2.22) which represent poor level of knowledge, mean score of the elderly in 2nd section was 44.61% with Mean±SD (8.03±3.13) which represent poor level of knowledge, while mean score of 3rd section was 52.00% with Mean±SD (5.2±2.02) which represent average level of knowledge. By collection all scores of the elderly it turns out that 68.2% have poor knowledge level, 23.6% have average level of knowledge and 8.1% have good knowledge of vitamin D deficiency.

Figure (3): This figure shows Attitude of patients about vitamin D deficiency. That illustrates a positive correlation (73.0) and highly significant difference between the elderly patient knowledge and attitude toward Vit D deficiency.

Table (2): We compared between level of the elderly knowledge about Vit D deficiency and their attitude according to demographic data. Our results illustrates that the age group of 60 – 65 years old have average level of knowledge which represent 51.4%, while have a positive attitude which represent 42.5%. Results also showed that 60% of female elderly had higher level of knowledge than males (40%), while have a positive attitude which represent 75%. Also, we found that rural elderly had higher level of knowledge (83%) in compare to urban elderly (16.7%) with positive attitude 72.5%. High and med education level showed average and good level of vitamin D deficiency knowledge than low and illiterate elderly with 65.7%, 33.3% and 5.7% respectively, with high positive attitude in high and med education level group (40%) that low and illiterate group (26.9%).

Table (3): This table illustrates Relationship between elderly attitude about vit D deficiency with their demographic data that shows Our results illustrates that the age group of 60 – 65 years old have average level of knowledge which represent, 42.5 while have a positive attitude which represent 42.5%. Results also showed that 60% of female elderly had higher level of knowledge than males (40%), while have a positive attitude which represent 75%. Also, we found that rural elderly had higher level of knowledge (83%) in compare to urban elderly (16.7%) with positive attitude 72.5%. High and med education

level showed average and good level of vitamin D deficiency knowledge than low and illiterate elderly with 65.7%, 33.3% and 5.7% respectively, with high positive attitude in high and med education level group (40%) that low and illiterate group (26.9%).

Figure (4): This figure illustrates a positive correlation (r= 0.169) and highly significant difference (p. value = 0.017) between the elderly patient knowledge and attitude toward Vit D deficiency.

Discussion:

The discussion will based on the result. This study explored the knowledge and attitude of elderly patients who had attended to out-patients Clinic South Egypt Institute of Oncology, Assiut, Egypt... Low levels of education and awareness of vitamin D exist globally, which may be a contributing cause to the high rates of vitamin D insufficiency observed there. In a UK survey, less than two-thirds of senior citizens knew little about the most typical signs of vitamin D insufficiency **Alamoudi, et al. (2019).**

Another study in Pakistan **reported by Tariq, et al. (2020)** showed that Only 9% elderly were able to identify the appropriate food sources of vitamin D, 33% understood the advantages of vitamin D for bone health and calcium absorption, and 36% said that exposure to sunshine affected the synthesis of vitamin D. in contrast with other study reported by **O'Connor, et al. (2018).** The findings show that, while 87% of respondents properly identified supplements, 84% identified food sources, and 99% correctly identified the sun, the UK population's precise understanding of dietary food sources was lacking. There was a mixed sentiment on vitamin D, with just 50% of people being concerned about their 25-OH-D levels

One of studies in Malaysia to assess awareness, knowledge and attitude of vitamin D among the general public showed that Ninety-five percent of senior citizens are aware of vitamin D. Merely 78.0% exhibited restricted understanding of several facets of Vitamin D (mean ± SD = 1.78 ± 0.894). There was also a disapproval of vitamin D and exposure to sunshine **Blebil, et al. (2019).**

In this study showed that 50.0% of female elderly had higher level of knowledge and positive attitude which represent 50.0% than males (40%). In consistent with other study was conducted in Jeddah, Saudi Arabia included of the 257 female participants, 99% had heard of vitamin D and 91% recognized that exposure to sunshine is the main source of the nutrient. However, they also stated feeling that their understanding of vitamin D sources was lacking. Additionally, the majority of senior citizens expressed unfavorable opinions about exposure to the sun **Zareef & Jackson (2021).**

Another study on 114 females was conducted at the administration building in Helwan University, Egypt. Showed there was a positive correlation but no statistically significant differences between the total knowledge and the total reported practice of females regarding sunlight exposure. 46.5% of females had an average level of knowledge regarding vitamin D deficiency, with high statistically significant differences. 96.5% of females had adequate practices regarding sunlight exposure **Nabi, et al. (2020).**

This study showed that rural elderly had higher level of knowledge (83%) in compare to urban elderly (16.7%) with positive attitude 72.5% in contrast with other study results illustrated that rural elderly have average and poor level of knowledge (83.3%) in compare to urban elderly had average and good level of knowledge (76.5%) **Nabi, et al. (2020).**

The current study's findings about the marital status of the elderly showed that 62.8% of them were married. This result was consistent with research by Alotaibi et al. from Saudi Arabia, which indicated that most participants were married. The study was titled "Knowledge and Practice of Vitamin D Deficiency and Risk of Hair Loss Among Adult Population in Marjah City, Saudi Arabia." **Alotaibi, et al. (2019).**

Regarding level of education, the present study delineated that high and intermediate education level showed average and good level of vitamin D deficiency knowledge than low and Illiterate elderly respectively, with high positive attitude in high and mid education level group "Knowledge and practice of vitamin D deficiency among people lives in Riyadh, Saudi Arabia-A cross-sectional study," conducted in Saudi Arabia and discovered that half of the elderly (50.4%) had a university degree, which corroborated this finding**. Babelghaith, et al. (2019).**

The current study found a positive relationship between the elderly's total knowledge score regarding vitamin D deficiency and their demographic characteristics, but there were no statistically significant differences in any of the items except place of residence and educational attainment. This relationship was based on the elderly's total knowledge score regarding nutrition and vitamin D deficiency. This finding was consistent with the study, which found that there was a positive relationship between the demographic features of females and their overall knowledge score about vitamin D insufficiency **Nabi, et al. (2020).** According to different research conducted in Saudi Arabia, the public knew a lot about vitamin D deficiency and its effects, and there was a good correlation between this knowledge and the demographics of the elderly **Aziz, et al. (2019).**

Conclusion:

The present study answered the research questions that related to level of knowledge and attitude regarding vitamin D deficiency among elderly patients, and showed that there are some gaps in knowledge score about vitamin D. Further research can be conducted on larger sample involving control and experimental groups about vitamin D deficiency among elderly,

Recommendations:

In the light of the study finding, the investigator is recommended that:

- Applying training program for the elderly to enhance their knowledge and attitude about vitamin D deficiency.
- Establish an educational program focused on vitamin D deficiency among the elderly.
- Creating further research on a larger sample, involving control and experimental groups, to study vitamin D deficiency among the elderly.

References:

- **Alamoudi, L., Almuteeri, R., Al-Otaibi, M., Alshaer, D., Fatani, S., & Alghamdi, M., (2019):** Awareness of vitamin D deficiency among the general population in Jeddah, Saudi Arabia. Journal of nutrition and metabolism22(1), 2040.
- **AlGarni, A., AlAmri, R., AlZahrani, M., AlHarthi, A., AlGarni, M., & AlZahrani, K., (2023):** Awareness of Vitamin D Deficiency among the General Population in Taif City, Saudi Arabia. Archives of Pharmacy Practice, 14(1-2023), 29-34.
- **Alotaibi, A., Alsalhi, W., Almutiri, A., Alzahrani, A., Alsaab, A., & Alhassan, M., (2019):** Knowledge and practice of vitamin D deficiency and risk of hair loss among adult population in Majmaah city, Saudi Arabia. International Journal of Medicine in Developing Countries, 3(2), 001-006.
- **Arshad, S., & Zaidi, S. (2022):** Vitamin D levels among children, adolescents, adults, and elders in Pakistani population: a cross-sectional study. BMC Public Health, 22(1), 2040.
- **Aziz, S., Alamri, F., Alzyedy, M., Ahmad, A., Alqahtani, I., & Alasmari, A. (2019):** Vitamin D deficiency awareness and behavior of the general population in Abha city: an Internet-based survey. Int J Med Dev Countries, 3, 179-184.
- **Babelghaith, S., Wajid, S., Al-Zaaqi, M., Al-Malki, A., Al-Amri, F., &Alfadly, S., (2017):** Knowledge and practice of vitamin D deficiency among people lives in Riyadh, Saudi Arabia-A cross-sectional study. Biomedical Research, 28(7), 3114-3118.
- **Blebil, A., Dujaili, J., Teoh, E., Wong, P., & Bhuvan, K. (2019):** Assessment of awareness, knowledge, attitude, and the practice of vitamin D among the general public in Malaysia. Journal of Karnali Academy of Health Sciences, 2(3), 171-180.
- **Bouillon, R., & Antonio, L. (2020):** Nutritional rickets: Historic overview and plan for worldwide eradication. The Journal of steroid biochemistry and molecular biology, 198, 105563.
- **Central Agency for Public Mobilization & Statistics, E. (2022):** https://www.masrawy.com/news/news_economy/details/2021/ 9 / 30 / 209.
- **Cesari, M., Incalzi, R., Zamboni, V., & Pahor, M. (2011):** Vitamin D hormone: a multitude of actions potentially influencing the physical function decline in older persons. Geriatrics & gerontology international, 11(2), 133-142.
- **Ghazizadeh, H., Rezayi, M., Emadzadeh, M., Tayefi, M., Abdollahi, Z., & Timar, A., (2022):** Prevalence of Vitamin D Deficiency in Iran: A Systematic Review and Meta-Analysis. Journal of Cardio-Thoracic Medicine, 10(2).
- **Giustina, A., Bouillon, R., Dawson-Hughes, B., Ebeling, P., Lazaretti-Castro, M., &Lips, P., (2023):** Vitamin D in the older population: a consensus statement. Endocrine, 79(1), 31-44.
- **Grant, W., Al Anouti, F., & Moukayed, M. (2020):** Targeted 25-hydroxyvitamin D concentration measurements and vitamin D3 supplementation can have important patient and public health benefits. European journal of clinical nutrition, 74(3), 366-376.
- **Kasinathan, S., Venkatachalam, R., & Krishnamoorthy, S. (2021):** Correlation between Stress and Anxiety onGeriatric Population Geriatric Population LivingIn Pondicherry. Annals of the Romanian Society for Cell Biology, 855-861.
- **Latic, N., & Erben, R. G. (2022):** Interaction of vitamin D with peptide hormones with emphasis on parathyroid hormone, FGF23, and the renin-angiotensin-aldosterone system. Nutrients, 14(23), 5186.
- **Nabi, E., Shafik, S., & Abdel, A. (2020):** "Female Awareness Regarding Vitamin D Deficiency. (Jan - Feb. 2020), PP 05-15" IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 9, Issue 1 Ser. II.
- **O'Connor, C., Glatt, D., White, L., & Revuelta Iniesta, R. (2018):** Knowledge, attitudes and perceptions towards vitamin D in a UK adult population: a cross-sectional study. International journal of environmental research and public health, 15(11), 2387.

- **Pirushi, R., Imeraj, Z., Veseli, D., & Bilali, V. (2022):** The Most Common Cardiovascular, Orthopedic, and Neurological Problems in the Elderly and Nursing Care. Open Access Macedonian Journal of Medical Sciences, 10(B), 691-696.
- **Quatman, C., Gray, M., & Phieffer, L. (2020):** Insufficiency fractures. Stress Fractures in Athletes: Diagnosis and Management, 77-88.
- **Tariq, A., Khan, S., & Basharat, A. (2020):** Assessment of knowledge, attitudes and practice towards Vitamin D among university students in Pakistan. BMC public health, 20, 1-10.
- **Uday, S., & Högler, W. (2020):** Nutritional rickets & osteomalacia: A practical approach to management. Indian Journal of Medical Research, 152(4), 356-367.
- **Zareef, T., & Jackson, R. (2021):** Knowledge and attitudes about vitamin D and sunlight exposure in premenopausal women living in Jeddah, and their relationship with serum vitamin D levels. Journal of Health, Population and Nutrition, 40(1), 38.