Assessment of Vitamin D status deficiency in Albanian pregnant women

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Vitamin D Deficiency

- Vitamin D deficiency is a major public health problem worldwide today.

- In recent decades there have been many scientific studies which raise the concern of a high prevalence of vitamin D deficiency in the general population and at risk groups such as pregnant women, adolescents, third age in particular.

- There is no other study in our country so far on vitamin D levels in the population or in specific population groups such as pregnant women. Given the important role vitamin D plays in both the pregnant woman and the fetus, such a study is of interest and hopefully will be followed up by other studies in the future.

Purpose of the study

The purpose of this study is to evaluate:

- Prevalence of vitamin D deficiency in Albanian pregnant women
- Prevalence of Vitamin D insufficiency in Albanian pregnant women
- Some factors during pregnancy that may affect Vitamin D deficiency in the blood of pregnant women

This study was prompted by data from similar studies conducted in Europe and around the world where the presence of vitamin D deficiency in women in general and in pregnant women in particular has been identified.

Material and method

- Serum levels of 25-hydroxyvitamin D (25-OH-D) were evaluated in 185 Albanian healthy pregnant women aged 18-47 years old, which are presented at the National Blood Transfusion Centre during the period from July to December 2018. The gestational age of the participants was a 3-41 week.

- A general information form was completed for each pregnant woman included in the study. In this form, for every pregnant woman, were collected general demographic data (self-reported) regarding age (in years), weeks of pregnancy, place of residence, number of pregnancies, education level, use of multivitamins and/or vitamin D, smoking, alcohol etc. The residence of the subjects included in the study was with a non-stop duration > 1 year.

- All participants with a history of chronic diseases and subjects who reported receiving medication were excluded from the study.

Material and method

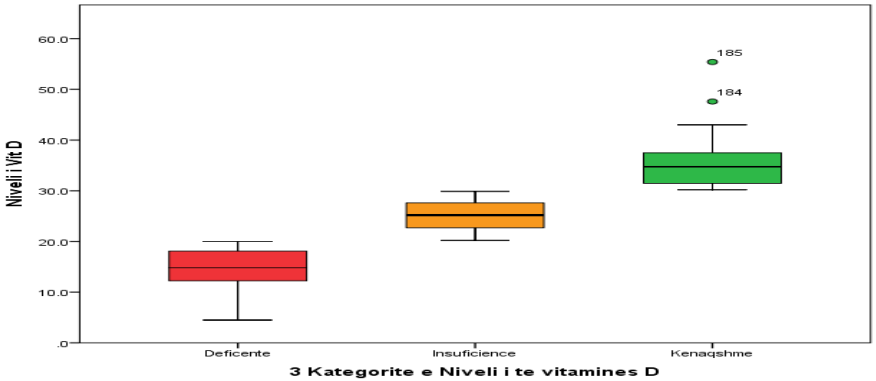
- 25-OH-D levels were evaluated on a blood sample obtained by venipuncture in a plain tube. Serum level of 25-OH-D was measured using the CMIA (Chemiluminiscent Microparticle Immunoassay) method in Abbott Architect i2000 platform.
- We used the Endocrine Society recommendation cut-off of 25-OH-D to define vitamin D status: <20 ng/mL deficiency; 20-30 ng/ml insufficiency; > 30ng/ml adequate Vitamin D status.

Evaluation of 25-OH Vitamin D	25-OH Vitamin D
Severe deficiency	< 10 ng/ml (25 nmol/L)
Deficiency	< 20ng/ml (50nmol/L)
Insufficiency	20-30 ng/ml (50-75 nmol/L)
Normal	> 30ng/ml (75 nmol/L)

Results

Vitamin D level in blood	Variable	Frequency of the variable	Values %
Insufficiency or deficiency	Vit D <30ng/ml	137	74.1
Normal	Vit D >30ng/ml	48	25.9
Total		185	100

Out of 185 Albanian pregnant women participating in our study we found that 137 (74%) of them had hypo-vitaminosis D and only 48 (26%) of them had optimal levels of vitamin D.



Results

Vitamin D level in blood	Variable	Frequency of the variable	Values %
Deficiency	Vit D < 20ng/ml	76	41.1
Insufficiency	Vit D 20-30 ng/ml	61	33.0
Normal	Vit D >30ng/ml	48	25.9
Total		185	100

Vitamin D level in blood	Variable	Frequency of the variable	Values %
Severe deficiency	Vit D <10ng/mL	9	4.9
Moderate deficiency	Vit D < 20ng/mL	67	36.2
Insufficiency	Vit D 20-30 ng/mL	61	33.0
Normal	Vit D >30ng/mL	48	25.9
Total		185	100

Results

Categorization	Participants (Nr, %)	Vitamin D <30ng/ml (n3 &%)	p-Value
Age			
Age < 20 years	11 (5.9%)	10 (90.9 %)	
Age 20 - 30 years	113 (61.1%)	86 (76.1 %)	
Age 30 - 40 years	59 (31.9%)	41 (69.9 %)	
Age 40 - 50 years	2 (1.1%)	0 (0 %)	0.042
Season			
Summer	52 (28.1%)	32 (61.5%)	
Autumn	111 (60.0%)	83 (74.8%)	
Winter	22 (11.9%)	22 (100 %)	0.003

➢It turns out that age represents statistically significant differences between the groups of women included in the study (p <0.05*). With age increase the prevalence of vitamin D deficiency decreases.*

➢ The season of sampling affects the level of vitamin D in the blood; *the prevalence of Vitamin D deficiency is higher during the winter season (100%) and decreases towards the summer season (62%).*

Results

Categorization	Participants (Nr, %)	Vitamin D <30ng/ml (n3 &%)	p-Value
Number of pregnancies			
Primipare	78 (42.2%)	59 (75.6 %)	
Pluripare	107 (57.8%)	78 (72.9 %)	0.674
Pregnancy trimester			
First trimester	65 (35.5%)	53 (65 %)	
Second trimester	49 (26.8%)	41 (83.6 %)	
Third trimester	71 (37.7%)	43 (60.5 %)	**0.04**

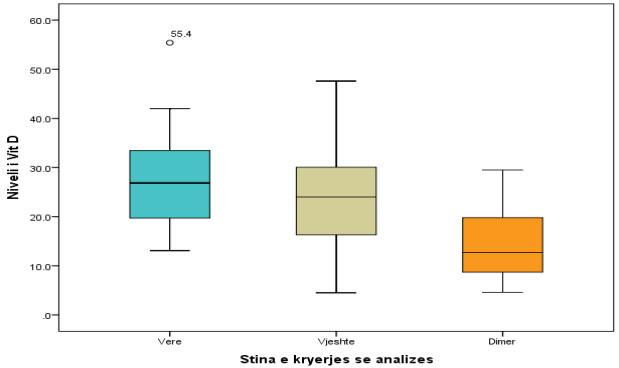
➢Pregnancy trimester significantly affects the prevalence of vitamin D deficiency in the blood of women included in the study ($p < 0.05$); the prevalence of vitamin D deficiency is lower in the third trimester of pregnancy.

Results

Categorization	Participants (Nr, %)	Vitamin D <30ng/ml (n3 &%)	p-Value
Educational level			
Elementary	60 (32.4%)	48 (80 %)	
High School	49 (26.5%)	33 (67.3 %)	
University	74 (40.0%)	56 (75.6 %)	0.311
Region of residence			
North Alb.	26 (14.1%)	16 (61.5 %)	
Middle part	151 (81.6%)	113 (74.8 %)	
South Alb.	8 (4.3%)	8 (100%)	0.083
Engagement at work			
Not employed	83 (44.9%)	59 (71 %)	
Employed	102 (55.1%)	78 (76.4 1%)	0.406

From the table, It appears that education, region of residence and work engagement did not significantly (statistically) affect vitamin D levels in the groups included in the study.

Results



Assessment of the association of vitamin D levels in blood with factors that may affect it in pregnant women

- Evaluation of the correlation between Vitamin D level and the season of analysis: *Vitamin D level decreases as the season of analysis is changed from summer to winter.*

Table 20: Correlation between Vitamin D level and the season of sampling

		Level of Vitamin D	Season
Level of Vitamin D	Pearson Correlation	1	**-.356****
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	16033.307	-374.986
	Covariance	87.138	-2.038
	N	185	185
The season of sampling	Pearson Correlation	-.356**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	-374.986	69.135
	Covariance	-2.038	.376
	N	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

Results

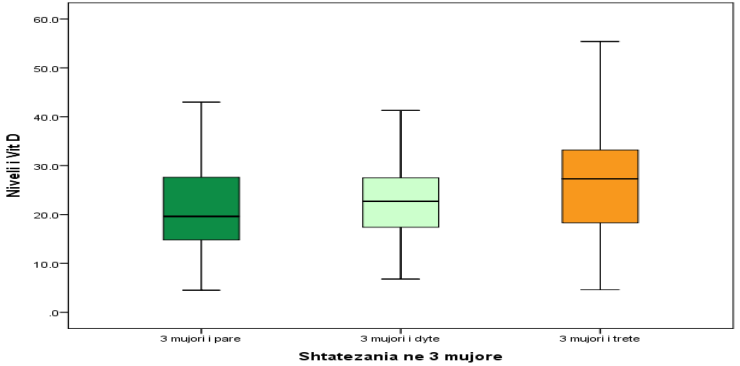
- Correlation between Vitamin D Level and Age Categorization: *Vitamin D levels increase with increasing age of pregnant woman*

Table 21: Correlation between Vitamin D Level and Age

		Level of Vitamin D	Age categorization
Level of Vitamin D	Pearson Correlation	1	**.202****
	Sig. (2-tailed)		.006
	Sum of Squares and Cross-products	16033.307	203.203
	Covariance	87.138	1.104
	N	185	185
Age categorization	Pearson Correlation	.202**	1
	Sig. (2-tailed)	.006	
	Sum of Squares and Cross-products	203.203	63.384
	Covariance	1.104	.344
	N	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

Results



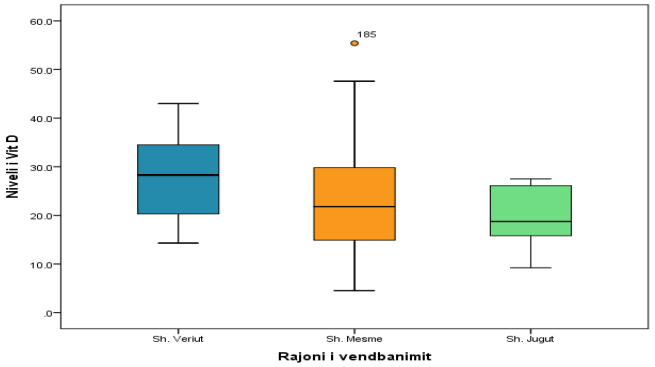
- Correlation between Vitamin D Level and Pregnancy Trimesters : *Vitamin D levels increase with increasing pregnancy months from the first trimester to the second and to the third trimester.*

Table 23: Correlation between Vitamin D Level and Pregnancy Trimester

		Level of Vitamin D	Pregnancy Trimester
Level of Vitamin D	Pearson Correlation	1	.231**
	Sig. (2-tailed)		.002
	Sum of Squares and Cross-products	16033.307	340.777
	Covariance	87.138	1.852
	N	185	185
Pregnancy Trimester	Pearson Correlation	.231**	1
	Sig. (2-tailed)	.002	
	Sum of Squares and Cross-products	340.777	135.805
	Covariance	1.852	.738
	N	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

Results



- Correlation between vitamin D level and the region of residence for pregnant women: *Vitamin D level decreases with change of residence from North to South of Albania.*

Table 26: Correlation between vitamin D level and region of residence		Level of Vit D	Region of residence
Level of Vitamin D	Pearson Correlation	1	**-.194****
	Sig. (2-tailed)		.008
	Sum of Squares and Cross-products	16033.307	-139.432
	Covariance	87.138	-.758
	N	185	185
Region of residence	Pearson Correlation	-.194**	1
	Sig. (2-tailed)	.008	
	Sum of Squares and Cross-products	-139.432	32.249
	Covariance	-.758	.175
	N	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

Results

Multiple linear regression estimation

Provides data on the association between the variable vitamin D level and the independent variables obtained in this study.

It turns out that the statistically significant variables for the regression ranked by their significance are:

- Season of analysis
- Residence region.
- Trimester of pregnancy.
- Age categorization.

Whereas the statistically insignificant variables are:

- Work engagement
- Education level.
- Number of pregnancies.

Conclusions

From the assessment of vitamin D levels in the blood of pregnant women included in the study resulted in a higher prevalence of Vitamin D deficiency.

- **74% of pregnant women had vitamin D levels ≤30 ng/ml (75nmol / L)**
  41% of pregnant women result with vitamin D deficiency <20ng/ml (50nmol/L)
  33% of pregnant women result with vitamin D insufficiency 20-30ng/ml (50-75nmol/L).

- **26% had normal levels >30ng / ml (75nmol / L).**

  Vitamin D levels in our study are influenced by factors such as the season of analysis, their age, trimester of pregnancy.
  While the least important factors resulted: engagement at work, education level, number of pregnancies.

Recommendations

The prevalence of Vitamin D deficiency in Albanian pregnant women is quite high and disturbing. This is a serious problem with a direct impact on the health of the mother and child.

- For this reason we recommend setting up a working group of specialists to build a strategy of screening, vitamin D supplementation and monitoring of vitamin D levels in pregnant women as an at-risk group.

- Promote projects to study the prevalence of vitamin D in the Albanian population and in the larger risk groups in order to develop national recommendations for the Albanian population and its at-risk groups.

Thank you!