



Correlation of Body Mass Index and Laboratory Data of Patients Who Referred to Family Medicine in the Last Year

Kerem KAHYA
Dr. Zeyneb İrem SALDUZ
Bezmialem Vakif University
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PLANS

INTRODUCTION

Obesity and BMI

The correlation between vitamin D and vitamin B12 of BMI

Affect of laboratory values

Aim of the
Study

MATERIAL & METHOD

RESULTS

CONCLUSION

REFERENCES

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INTRODUCTION

INTRODUCTION

AIM

- Obesity and malnutrition have a correlation with each other. They are both concluded massive health problems for individuals.
- These health problems cause changes in laboratory values.
- Vitamin D and B12 are two essential vitamins and this study includes the relationship of two values with many parameters and its averages.

INTRODUCTION

VITAMIN B12

- Vitamin B12 (cobalamin) supports keep the body's blood and nerve cells healthy, provides creating a spiral of DNA, supports strengthen bone as well as hair, skin and nail health, and helps prevent megaloblastic anemia, which causes feeling tired or weak.
- In addition, vitamin B12, which plays an important role in myelin synthesis by working together with folic acid, strengthens the immune system and is involved in protein metabolism.

INTRODUCTION

VITAMIN D

- Having the right levels of vitamin D and enough calcium and phosphorus in the body is important for building and maintaining strong skeletal system. Vitamin D is used to treat and prevent bone disorders such as rickets. This vitamin is produced by the body when the skin receives sunlight.
- One of the two main forms of fat-soluble vitamin D is D3, also known as cholecalciferol. The other main form is vitamin D2, called ergocalciferol.

INTRODUCTION

VITAMIN DEFICIENCIES

Vitamin B12 Deficiency Symptoms

- Anemia
- Muscle weakness
- Fatigue
- Pale skin
- Shortness of breath
- Tachycardia

Vitamin D Deficiency Symptoms

- Depression
- Numbness
- Hair Loss
- Insomnia
- Headache
- Osteopenia, or fracture

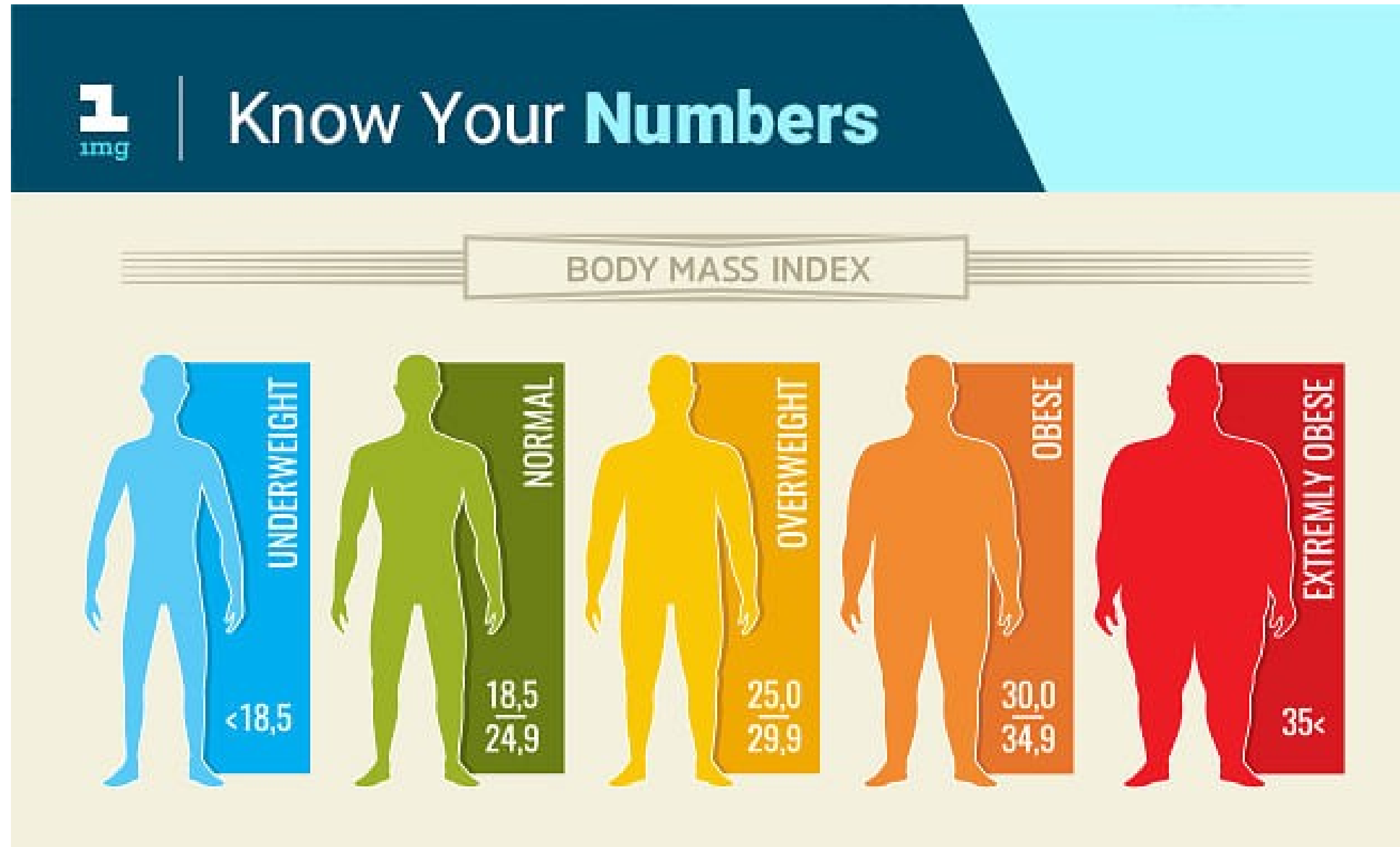
FORMULA

- **Body Mass Index (American):**
$$\frac{\text{Weight in Lbs} \times 703}{\text{Height in inch} \times \text{Height in inch}}$$

- **Body Mass Index (Europeen):**
$$\frac{\text{Weight in Kilogram}}{\text{Height in meters} \times \text{Height in meters}}$$

INTRODUCTION

BODY MASS INDEX



INTRODUCTION

OBESITY

- Obesity is known as abdominal and visceral fat. An unbalanced increase in body fat can lead to cardiovascular disease, which in turn can lead to atherosclerosis, stroke and cholesterol. Obesity or being overweight can also lead to shortness of breath.
- Obesity is a rapidly progressing disease in the world and in our country. Obesity rates are increasing day by day. Obesity is a disease that reduces the quality of life as life expectancy increases, reduces people's production capacity and must be treated.

MATERIAL & METHOD



METHOD

- Ethics Committee Approval (June, 2023)
- The research examined 10 different parameters that have a relation with BMI and age. Which are responsible for diabetes mellitus, kidney disease, and hematological problems.

METHOD

- These ten parameters include vitamin D, vitamin B12, eGFR, RDW-CV, glucose, hemoglobin, HbA1c, HOMA-IR, lipase, and sedimentation.
- This research mainly observed vitamin D and B12, and then looked at their relationship with BMI and age.
- 52 parameters are obtained by analyzing the patients applying to family doctors in BVU Hospital.

METHOD

- Proportions of Parameters

	Age	ALP	CRP	eGFR	RDW-CV	Glucose	Hemoglobin (HGB)	HbA1c	Lipase	Leukocyte	BMI
BMI	+	+	+	-	+	+	-	+	-	+	
SD - 25 Hydroxy Vitamin D	+	+	+	+	+	+	-	+	-	+	-
Vitamin B12	-	+	+	+	-	+	+	+	-	+	+

Blue color refers to routine laboratory tests and red color refers to main objective.

INTRODUCTION

RESEARCHED PARAMETERS

- ALP: Alkaline phosphatase
- eGFR: Estimated glomerular filtration rate
- CRP: C-reactive protein
- HbA1c: Hemoglobin A1C
- **(BMI): Body Mass Index**

METHOD

- Varies (Within 1 year standard request or disease-related request)
 - ▶ Mainly investigated parameters (ALP, eGFR, HbA1c)
 - ▶ Body Mass Index (BMI)
 - ▶ Vitamin D and B12
 - ▶ Age

METHOD

- IBM SPSS Statistics 22.0 (SPSS® Inc.)
- Kolmogorov-Smirnov test
- Lilliefors Significance Correction (Nonparametric Correlations)
- Spearman's rank correlation test
- Significance threshold is $p < 0.05$.

RESULTS



RESULTS

- As an observation, a total of 294 patients, 26 extremely obese (8.9%), 60 obese (20.4%), 105 overweight (35.7%), 85 normal (28.9%), and 18 underweight (6.12%) were included.
- The average BMI is 28.07, which is considered overweight according to numerous health societies.
- Vitamin D has a correlation with age, BUN, eGFR, HbA1c, creatinine, and urea; these results are likely to occur as a result of kidney disease. Vitamin B12 has a correlation with AST and protein, These values are also related to malnutrition and eating habits.

RESULTS

Significant Affect of The Body Mass Index to Varies

Variations	BMI	p value
Vitamin B12	398.72 ± 187.13	<0,001
	12(11.43-12.68)	
Vitamin D	23.04 ± 11.66	<0,001
	21,03 (5.49-89.73)	
BMI	27.25 ± 7.03	<0,001
	49(17-87)	
HbA1c	6.51 ± 1.48	<0,001
	362(187-1998)	

Each line divided into two sections as 'mean±SD' and 'median(Q1-Q3)'.

RESULTS

Correlation Coefficients

- The correlation between BMI and Age, ALP, eGFR, CRP and HbA1c were also observed as statistically significant ($p < 0.01$).

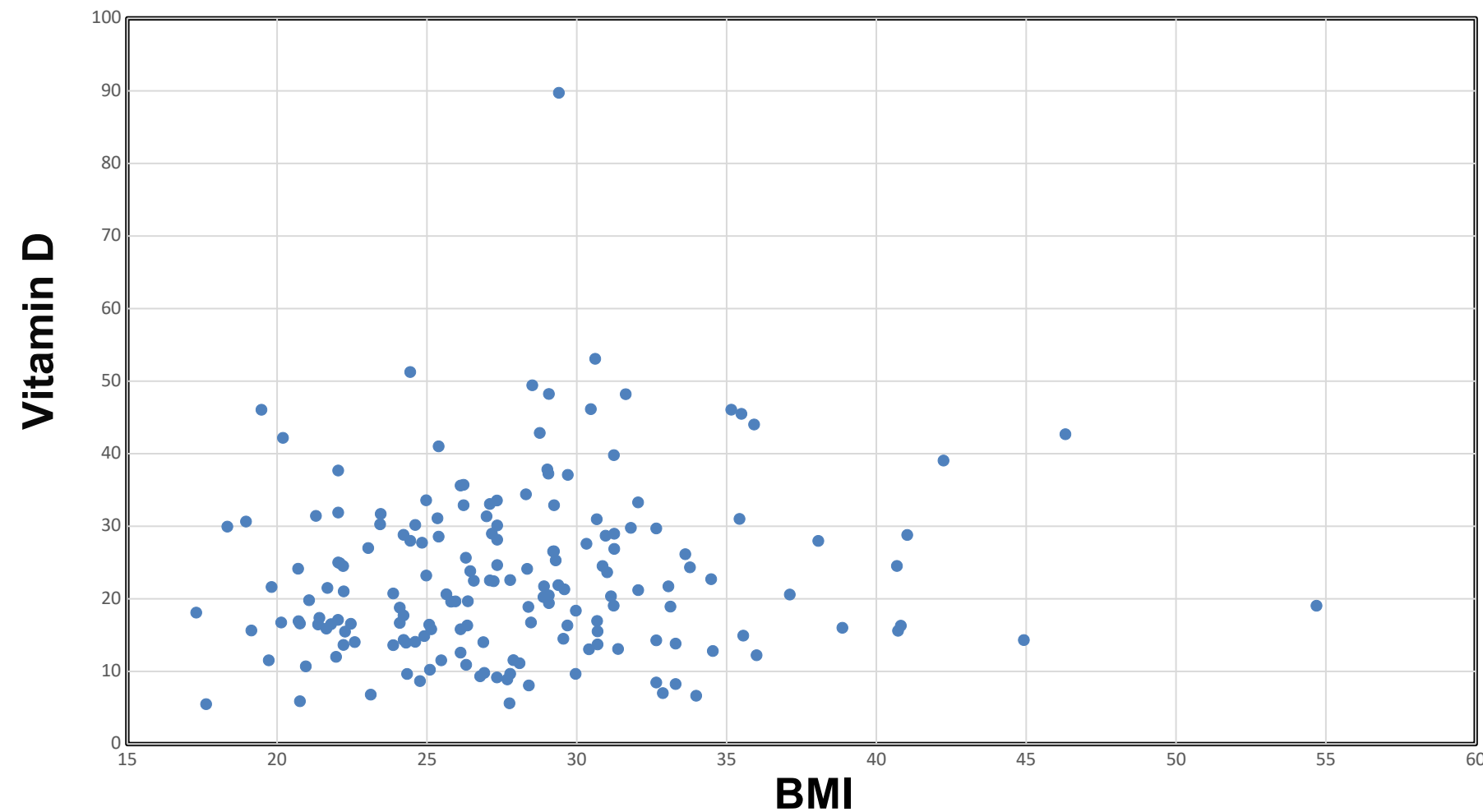
The correlation coefficient according to the comparison with Body Mass Index

Spearman's rho (BMI)	Correlation Coefficient
Vitamin D	0,0296
Vitamin B12	-0,0768
ALP	0,1490
CRP	0,1796
eGFR	-0,1239
Erythrocyte Distribution Width (RDW-CV)	0,1429
Glucose	0,1712
Hemoglobin (HGB)	-0,1096
Hemoglobin a1c (HbA1c)	0,3113
HOMA-IR index	0,2402
Insuline	0,2112
Lipase	-0,1372
Leukocytes (WBC)	0,1186
Triglyceride	0,1850
Trombocyte (PLT)	0,1114
Sedimentation	0,1578

RESULTS

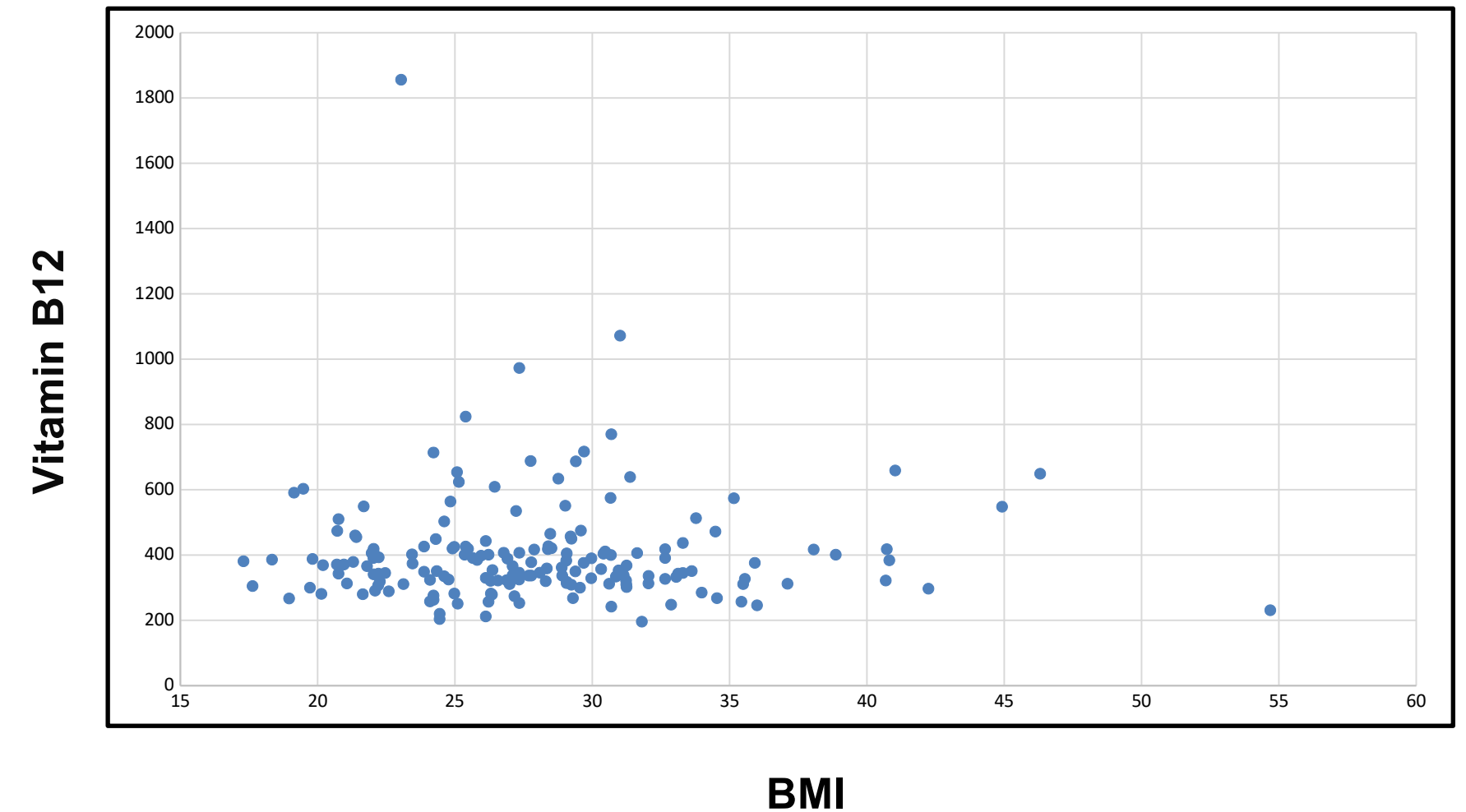
- The correlation between Vitamin D and BMI was found significant ($r=0.296$, $p=0.69$). (*Graphic 1*)

Graphic 1



- The correlation between Vitamin B12 and BMI was found significant ($r=0.303$, $p=0.023$). (*Graphic 2*)

Graphic 2



- The correlation between BMI and Age, ALP, eGFR, CRP and HbA1c were also observed as statistically significant ($p<0.01$).

CONCLUSION



CONCLUSION

- The correlation of Vitamin D with other parameters is considered and within these values ALP, eGFR, GGT, and HbA1c are inversely proportional with the average of 23.04 ng/mL.
- The correlation of B12 with other parameters is researched and according to the comparison of parameters, both are directly proportional with the average 405.29 pg/mL,
- This value indicates both parameters are borderline high.

CONCLUSION

- In conclusion, we confirmed that Body Mass Index between Vitamin D and Vitamin B12 have a significant correlation.
- Thus, Body Mass Index might be a precursor to other parameters because the body mass index is also associated with many other laboratory results. However, further studies are needed to elucidate to reveal the relationship between body mass index and vital diseases .
- **Limitations:**
 - ▶ Retrospective single center study
 - ▶ Co-diseases of the patients
- To the best of our knowledge, this is the first study analyzed the evaluation applicants to Bezmialem Hospital family medicine in the last year.

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**THANK YOU FOR
YOUR
ATTENTION**

ANY QUESTIONS?

**Kerem KAHYA &
Dr. Zeyneb İrem SALDUZ**