

Evaluation of associations between body mass index and serum vitamin D [25-(OH)-D] levels

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BACKGROUND

- Inadequate vitamin D levels may pre-dispose patients to numerous medical conditions including: hypertension, congestive heart failure, left ventricular hypertrophy, diabetes mellitus and other metabolic disorders.
- Obesity is a potential risk factor for inadequate vitamin D levels secondary to vitamin D accumulation in the adipose tissue.
- Vitamin D deficiency is defined as a 25-hydroxyvitamin level ([25-(OH)-D]) < 20 ng/ml.
- Vitamin D insufficiency is defined as a 25-hydroxyvitamin level ([25-(OH)-D]) < 30 ng/ml.

OBJECTIVES

- To identify associations between body mass index (BMI) and serum vitamin D levels.
- To determine the percentage of patients in a lipid-specialty clinic that are vitamin D deficient, vitamin D insufficient or of adequate vitamin D levels.

METHODS

- A retrospective chart review was conducted of patients who visited the lipid-specialty clinic at the University of Kansas Hospital between January 1, 2006 and August 31, 2010.
- Patients were identified through a randomization scheme of the charts available in the lipid-specialty clinic.
- Data collected included:
 - Patient demographics [age, gender, race].
 - Lab value and date of first recorded serum vitamin D level.
 - Height, weight, waist circumference.
 - Use of exogenous vitamin D supplementation before first recorded vitamin D level.
- Patients were categorized as having reported vitamin D supplements or no supplementation.
- Vitamin D supplements could be prescribed or over-the-counter.
- Patients were further sub-classified by BMI class and Vitamin D status.
- BMI was calculated using the English BMI formula.
- Patients who reported taking vitamin D supplements prior to first ([25-(OH)-D]) level were excluded in the vitamin D status versus BMI analysis.
- The review was approved by the Human Subjects Committee.

DEFINITIONS

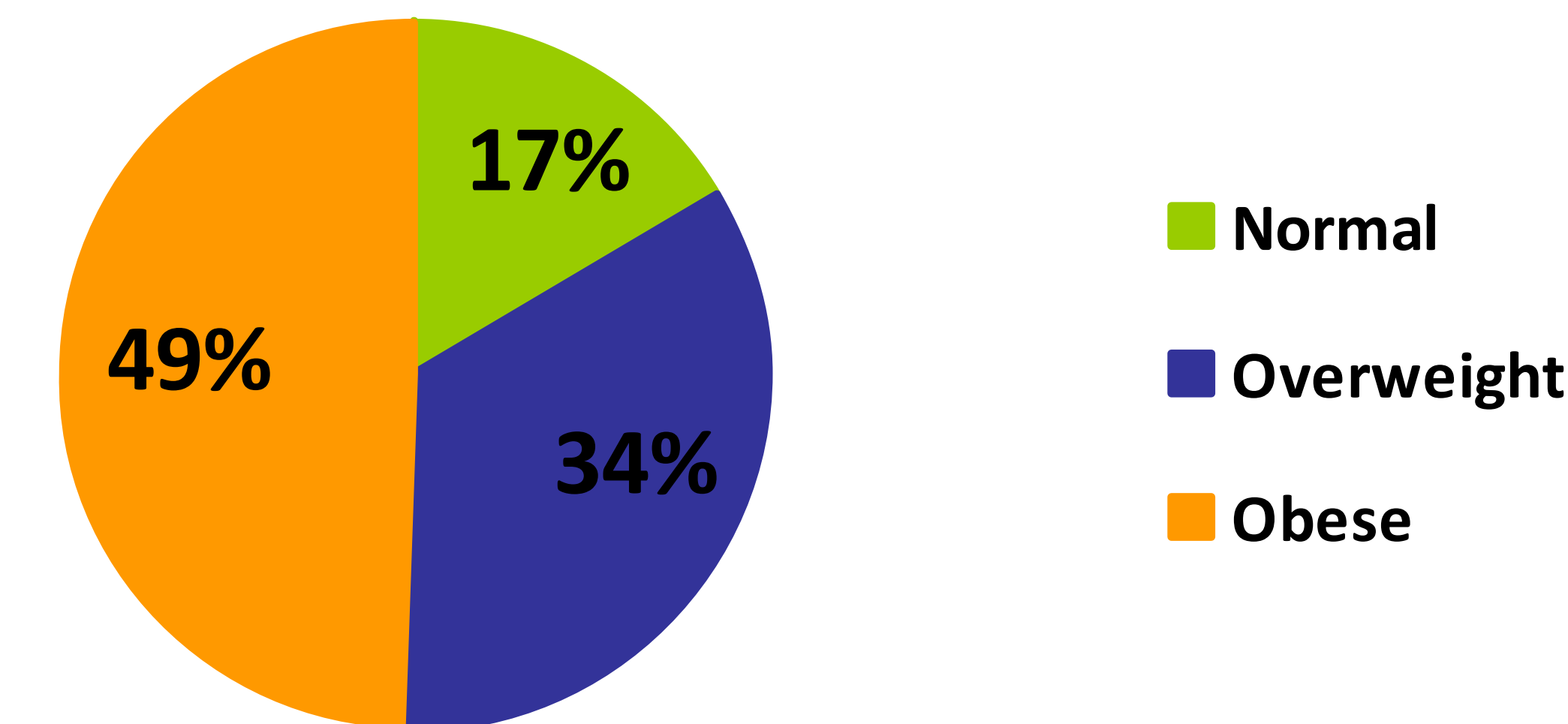
Per English BMI formula definitions:

- Underweight: BMI < 18.5
- Normal: 18.5 ≤ BMI < 25
- Overweight: 25 ≤ BMI ≤ 30
- Obese: BMI > 30

BMI = [Weight in Pounds / (Height in Inches)²] x 703

RESULTS

Figure 1. Body Mass Index: All Patients



*note: no patients identified were underweight

Table 1. Patient Data (n = 300)

Age (years)	
Mean	57 ± 13
Range	19 - 83
Gender- male (%)	51
Ethnicity- Caucasian (%)	79
Self-reported Vitamin D use	
Yes (Vitamin D supplements)	33.7 %
No (No supplements)	66.3 %

Figure 2. Vitamin D status in all patients (n=300)

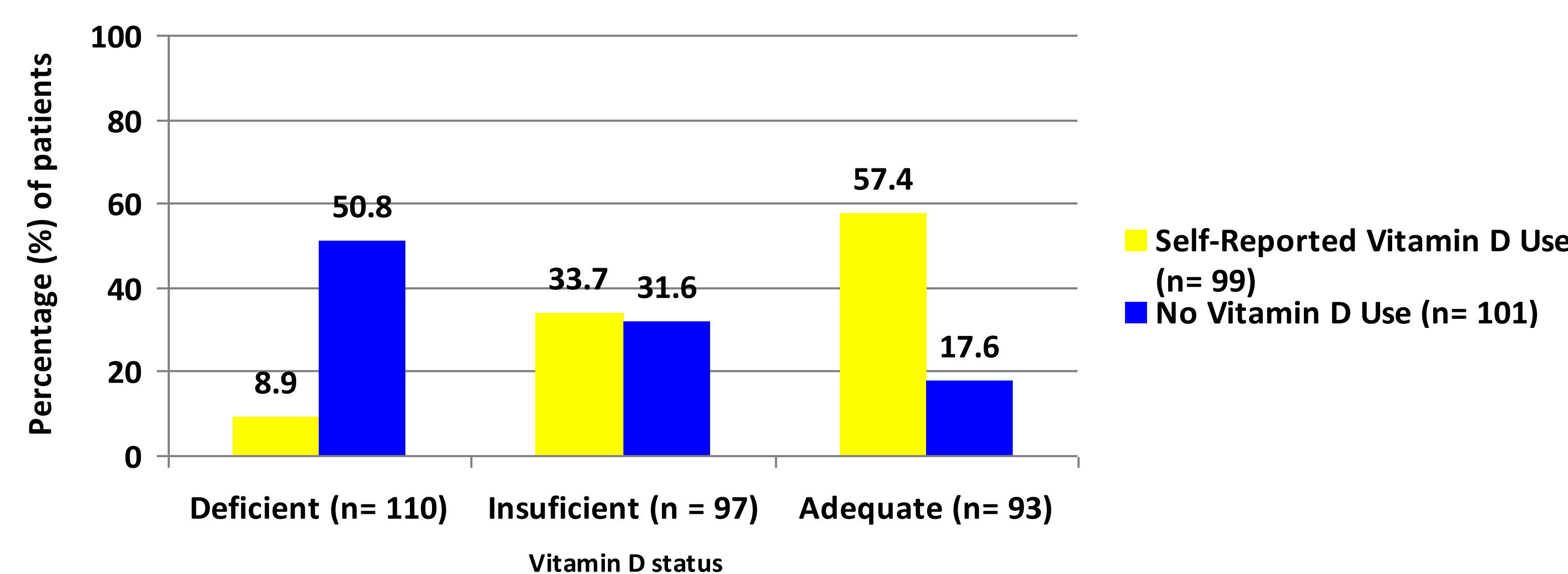


Figure 3. Relationship between overweight BMI and vitamin D level

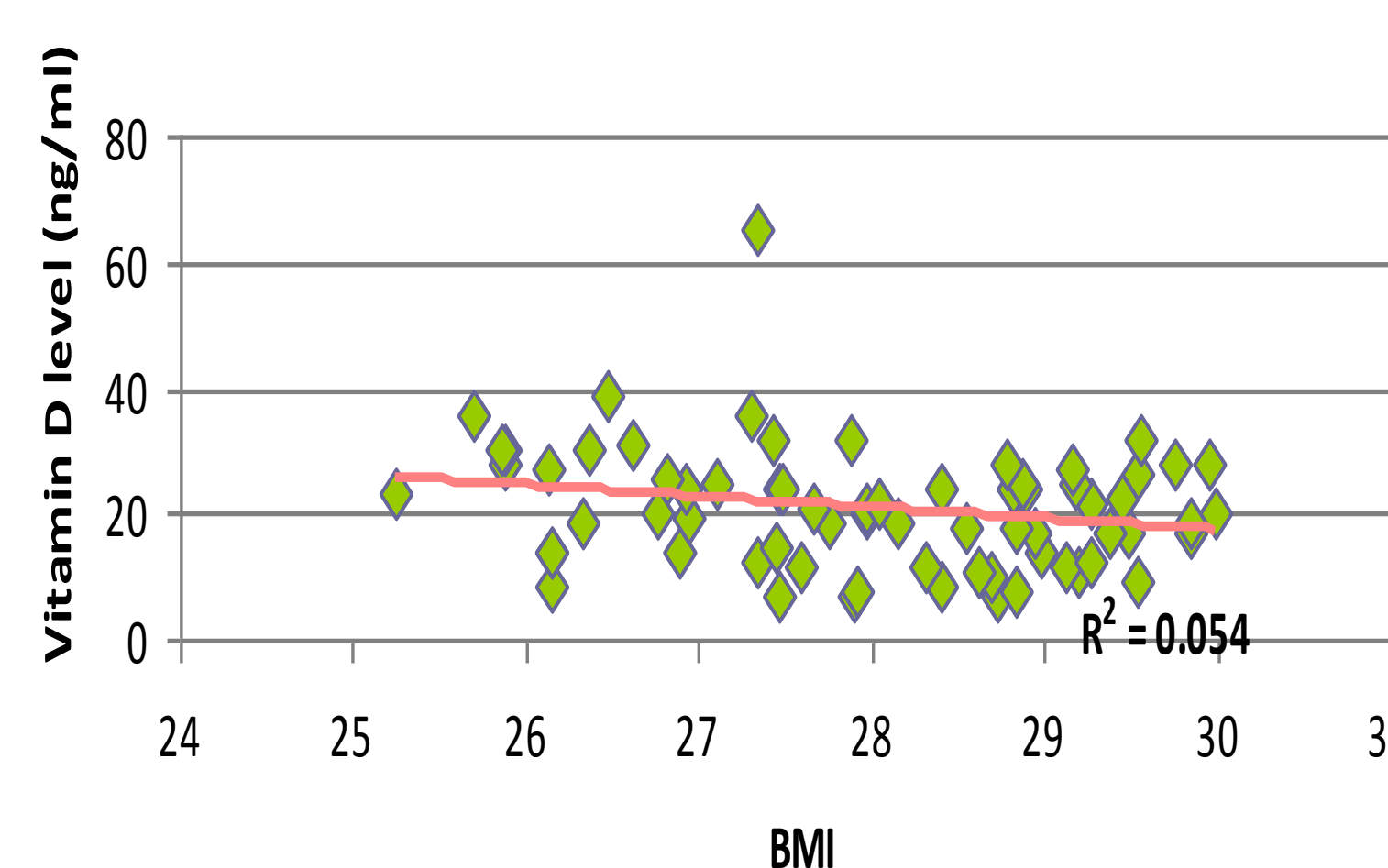
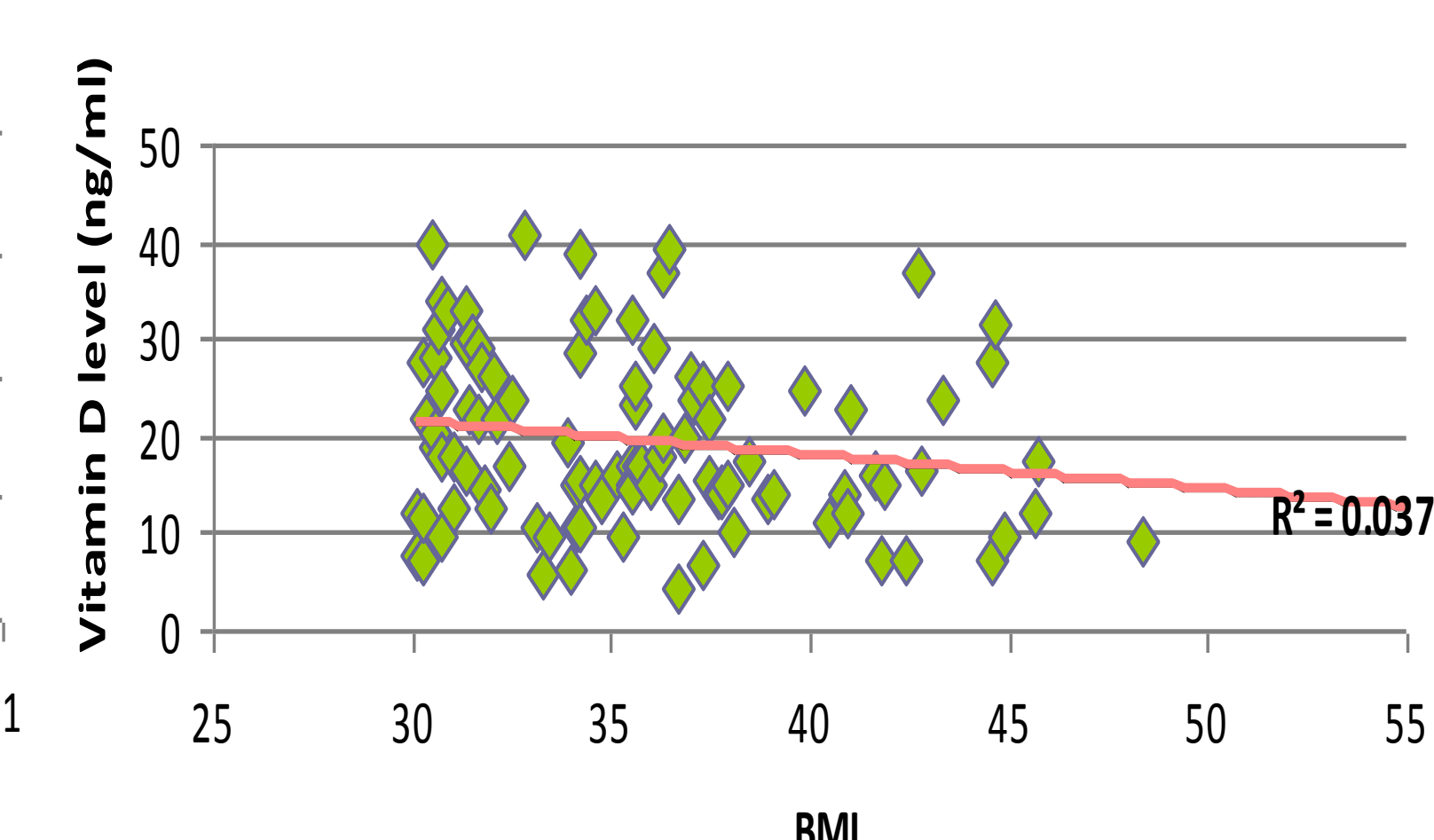
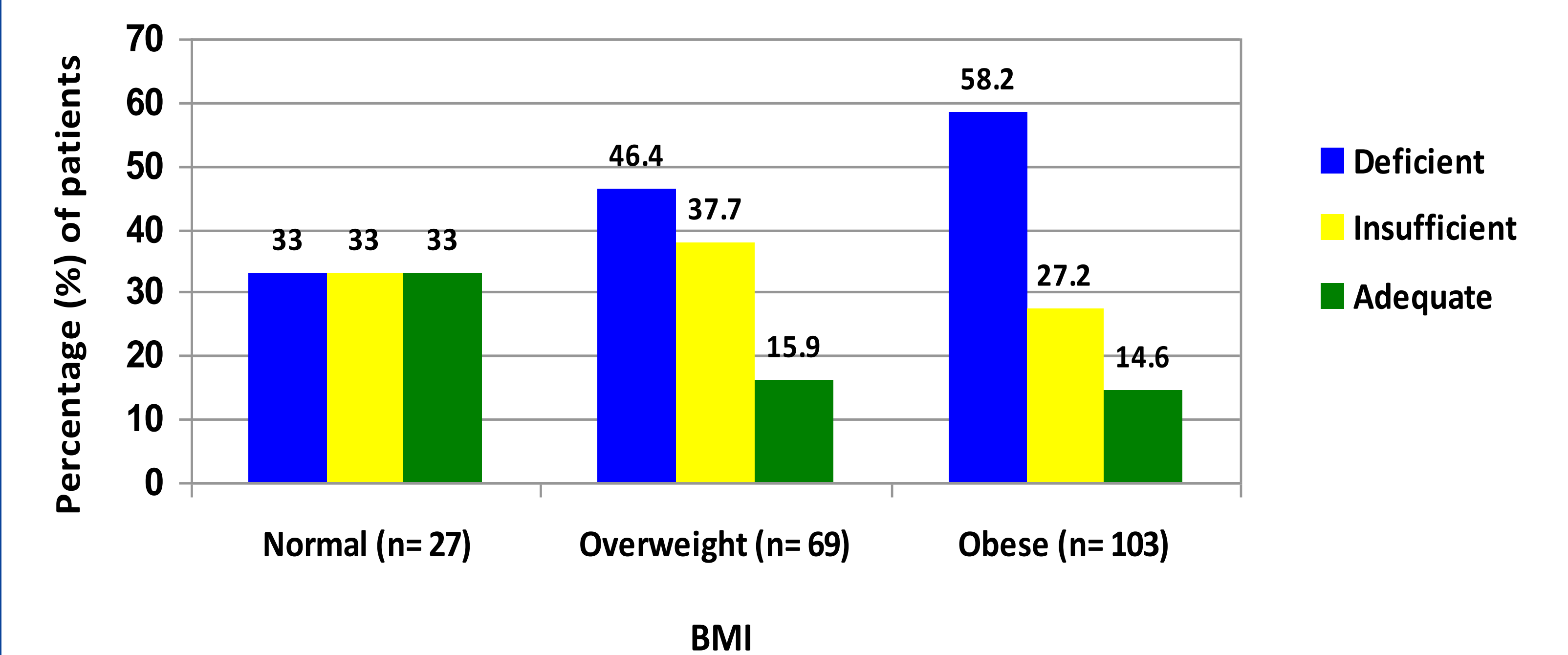


Figure 4. Relationship between obese BMI and vitamin D level



RESULTS

Figure 5. Vitamin D status by weight classification in patients with no Vitamin D supplementation (n=199)



CONCLUSIONS

- The majority of patients reporting to a lipid-specific clinic are overweight or obese.
- More than half of the patients reporting to a lipid-specific clinic do not report a history of Vitamin D supplement use.
- About half of the patients who reported no use of a vitamin D supplement before the first lab draw were classified as deficient.
- A slight majority of patients who reported taking a vitamin D supplement before first lab draw had serum Vitamin D > 30 ng/dl.
- Obese patients were more likely to be deficient in Vitamin D.
- For future studies, overweight and obese patients might require different amounts of vitamin D replacement than normal patients.

STUDY LIMITATIONS

- Retrospective study design.
- Time of year (spring, summer, fall, winter) that vitamin D level was drawn.
- Lack of standard dosing for vitamin D supplement use prior to first lab draw.
- Self-reporting of vitamin D supplement use by patients.

Authors of this study have no disclosures to report.

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