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**VITAMIN D STATUS IN THE WESTERN PART OF TURKEY**

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**BACKGROUND-AIM**

The aim of the study was to assess levels of vitamin D according to sex, age and seasonal groups. We also determined the relationship between serum levels of 25-hydroxyvitamin D [25(OH)D] and intact parathyroid hormone (iPTH).

**METHODS**

We evaluated laboratory data from our laboratory information system for serum levels of 25(OH)D and PTH among 9160 patients admitted Pamukkale University Hospital from Jan 2014 to Jan 2015. Serum 25(OH)D levels were categorized as <20 ng/mL (50 nmol/L) (vitamin D deficiency), as 20-30 ng/mL (50-75 nmol/L); (vitamin D insufficiency) and as ≥30 ng/mL (75 nmol/L) (vitamin D sufficiency), according to the Endocrine Society. 25(OH)D levels and D vitamin status were compared according to age and sex groups, and seasons. We determined the association between 25(OH)D and PTH with Spearman correlation test.

**RESULTS**

Mean 25(OH)D level was 24.48 ng/mL (95 %CI: 24,06-24,89 ng/mL); Median 20.0 ng/mL (1.quartile 11,2 ng/mL - 3.quartile 32,0 ng/mL) in all participants. During a one-year period, Vitamin D deficiency, insufficiency and sufficiency rates were 49.1%, 22.4%, 28.5% respectively. Vitamin D deficiency was found in 50.5% of females and 43.0% of males (p<0.001). According to age groups, Vitamin D deficiency rates was least prevalent in the age of 0-1 years (14.5%) and in the age of 1-4 years (17.2%), and most prevalent in the age of 15-24 years (59.3%), 25-44 years (56.9%) and >85 years (59.6%) (p<0.001). The rates of vitamin D deficiency were 60.8% during winter and 34.9% during summer (p<0.001). The number of combined test requests for 25(OH)D, iPTH and calcium was 2727. According to vitamin D deficiency, insufficiency and sufficiency groups, median iPTH concentrations were 56,0 (IQR:41,0 - 77,0) pg/ml, 47,0 (IQR: 35,0 - 64,0) pg/ml and 43,0 (IQR: 30,0 - 58,0) pg/ml, respectively. A negative correlation was found between 25(OH)D and iPTH levels (p<0.01).

**CONCLUSION**

Vitamin D deficiency is prevalent among our population. 25(OH)D levels were significantly lower in adults, female and in winter. In conclusion, vitamin D supplementation may be also required for adult subjects, as well as children, especially in winter.

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**COMPARISON OF DELTA CHECK METHODS FOR GLUCOSE IN THE CLINICAL LABORATORY**

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**BACKGROUND-AIM**

There is no one global standard for delta check in the clinical laboratory. We compared the methods of delta check for glucose.

**METHODS**

A total of 103,755 glucose tests performed in the St. Vincent's Hospital from July to December, 2014 were included. We analyzed the differences between today's test values and corresponding previous test values with the thresholds. The difference was expressed as a percent change, the difference divided by today's test value. We determined how many tests were checked in the delta check by using reference change value (RCV). We used RCV calculated as 2 tailed values at levels of probability of significant changed set at 0.999 RCV of glucose.

**RESULTS**

The mean analytical coefficient of variation of glucose in our lab was 2.1% and 0.999 RCV of glucose was 31.78%. The percentage of the total test number checked in the delta check with the 31.78% threshold was as the followings; 14.5% in July: 14.8% in August: 15.5% in September: 15.4% in October: 14.5% in November: 15.1% in December. The percent change of the difference in the two test values yielding 1% of the total test number checked in the delta check was as the followings; 129.9% in July: 127.5% in August: 125.4% in September: 133.2% in October: 121.1% in November: 129.3% in December. The percent change of the difference in the two test values yielding 0.1% of the total test number checked in the delta check was as the followings; 375.8% in July: 360.5% in August: 361.3% in September: 337.5% in October: 326.0% in November: 428.2% in December.

**CONCLUSION**

The threshold calculated by using RCV was ineffective in the delta check for glucose in our lab. Effective delta check in the glucose test would rely on each clinical estimate of an appropriate threshold to yield a manageable number of flagged results.

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## A NEW ROBUST STATISTICAL MODEL FOR INTERPRETATION OF DIFFERENCES IN SERIAL TEST RESULTS FROM AN INDIVIDUAL

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### BACKGROUND-AIM

Population-based reference intervals have very limited value for the interpretation of laboratory results when analytes display high biological individuality. In these cases, the longitudinal evaluation of individual results using the reference change value (RCV) is the recommended approach. However, the traditional model (M1) for RCV calculation requires a Gaussian distribution of data and risks to overestimate the parameter if a correlation between within-subject serial measurements is present. Here we propose and validate an alternative nonparametric statistical model (M2) for interpretation of differences in serial results from an individual, overcoming data distribution and correlation issues.

### METHODS

The M1 formula is RCV = $2^{1/2}$ x Z x $(CV_A^2 + CV_I^2)^{1/2}$, where $CV_A$ is the analytical variation, $CV_I$ is the within-subject biological variation and Z is the number of SD appropriate to the desired probability of the Gaussian distribution (1.96 for P <0.05). M2 consists in calculating the $\delta_{0.95}$ that derives from the square root of $\delta^2_{0.95}$, i.e., the empirical quantile of order (1-$\alpha$) with $\alpha$ = 0.05. We compared M1 and M2 by selecting 3 analytes, i.e., $HbA_{1c}$, chromogranin A (CgA) and C-reactive protein (CRP), showing a normal, bimodal and skewed distribution, respectively. For each analyte we derived by both models the first result being significantly lower/upper (P2) when compared with baseline value (P1). P2 was calculated as P1±P1*RCV/100 for M1 and P1+ (Pm±2 $\delta_{0.95}$) for M2, where Pm is the mean of differences among all samples in all subjects.

### RESULTS

At 37, 50 and 70 mmol/mol of $HbA_{1c}$ P2 results obtained by two methods overlapped. For CgA, P2 values obtained by M1 and M2 resulted quite similar at P1 of 50 μg/L, while for P1 of 90 and 200 μg/L the P2 estimate significantly differed. At 3, 10 and 20 mg/L of CRP, P2 values derived from two methods markedly differed, those obtained by M1 being unreliable and clinically impractical.

### CONCLUSION

When biological analyte concentrations follow a Gaussian distribution both evaluated methods can be used equally. However, if analyte concentrations present a bimodal or skewed distribution, the proposed statistical approach appears to be more appropriate in assessing difference between serial measurements.