

PLASMA 25-OH VITAMIN D AND PTH CONCENTRATIONS IN CORD BLOOD. RELATIONSHIP WITH ETHNIC GROUPS, NUTRITIONAL HABITS AND DEGREE OF MATERNAL SUN EXPOSURE

Sandra Ortigosa Gómez¹, Oscar Garcia Algar¹, Antonio Mur Sierra¹, Roser Ferrer Costa², Antonio Carrascosa Lezcano³, Diego Yeste Fernández³

¹ Department of Pediatrics. Hospital del Mar. Barcelona. Spain. ² Hormone Laboratory. Hospital Vall d'Hebron. Barcelona. Spain.

³ Department of Pediatrics. Hospital Vall d'Hebron. Barcelona. Spain. ⁴ Universitat Autònoma de Barcelona. Barcelona. Spain

BACKGROUND

Plasma vitamin D (25(OH)D) levels in the newborn are dependent on maternal stores, thus neonates of vitamin D-deficient mothers present a greater risk of hypocalcaemia, rickets and infections during the first year of life, particularly if exclusively breastfed. Several studies showing a high prevalence of vitamin D deficiency in pregnant women have been published recently. The aim of this study is to describe vitamin D status in pregnant women in our area by determination in umbilical cord blood and determine the factors associated with 25(OH)D concentrations.

SUBJECTS AND METHODS

Between March and May 2013, 99 pregnant women were recruited at the Hospital del Mar (Barcelona), in whom plasma 25(OH)D (LIAISON® 25 OH Vitamin D Total Assay) and PTH levels (LIAISON® N-TACT® PTH II Assay) were measured in cord blood at birth by chemiluminescence. Clinical history data were collected and a nutritional survey (Garabédian survey) was made on maternal vitamin D and calcium intake and sun exposure.

RESULTS

- The main results are shown in Table 1.
- Mean 25(OH)D level in cord blood was 10.4 ± 6.1 ng/ml (<4 – 44.1 ng/ml). There were statistically significant differences between ethnic groups ($p < 0.001$) (Figures 1 and 2).
- Mean PTH level in cord blood was 6.1 ± 2.5 pg/ml (<4 – 22.4 pg/ml). There were no statistically significant differences between ethnic groups nor correlation with 25(OH)D levels.
- Vitamin D and calcium intake were adequate in the majority of pregnant women. Differences between ethnic groups were found in the intake of calcium, with Indo-Pakistani having the lowest intake (Figures 3-6).
- Sun exposure was considered deficient in 47.5% of pregnant women. Differences between ethnic groups were found, with Caucasian being the most exposed and Indo-Pakistani the less exposed (Figure 7).
- 25(OH)D levels in cord blood were significantly associated with ethnic groups ($p < 0.001$), vitamin D intake ($p 0.033$), calcium intake ($p < 0.001$), sun exposure ($p < 0.001$), phototype ($p < 0.001$) and the covered dressing style ($p < 0.001$).
- 25(OH)D levels in cord blood were not associated with multivitamin supplement intake ($p 0.09$), toxic intake ($p 0.31$), chronic disease ($p 0.93$), pregnancy complications ($p 0.78$), type of delivery ($p 0.63$), fetal distress ($p 0.65$), anthropometric measurement at birth ($p 0.6$), gestational age ($p 0.9$), risk of infection ($p 0.86$). Lower 25(OH)D levels were found in multiparous women ($p < 0.001$) and women with previous miscarriages ($p = 0.006$).

Table 1. Mean and standard deviation of vitamin D intake, calcium intake, sun exposure, 25(OH)D and PTH levels in cord blood

Patients (number of pregnant women)	Vitamin D intake (IU/day)	Calcium intake (mg/day)*	Sun exposure index*	25(OH)D (ng/ml)*	PTH (pg/ml)
Total (99)	201.1±94.6	783.2±328.6	4.2±2.7	10.4±6.1	6.1±2.5
Caucasian (44)	220.6±95.7	908.8±322.31	5.4±2.6	13.2±6.5	5.5±1.6
Indo-Pakistani (24)	181.5±105.4	568.6±301.9	1.9±1.5	7.2±5.9	6.4±1.9
South American (20)	200.5±91.5	765±260.7	4.5±2.5	9.1±3.7	7.2±4.3
Sub-Saharan (2)	189.3±106.1	951.2±424.3	3.5±3.5	9.8±7.6	6.9±1.6
Maghreb (3)	147.6±21.8	860±466.5	2±1	6.9±1.4	6.8±3.8
Gipsy (6)	169±58.1	687.1±189.2	4±2.8	8.7±2.4	6.1±1.2
	p 0.06	p 0.002	p < 0.001	p < 0.001	p 0.06

* statistically significant parameters, comparison by ethnicity ($p < 0.05$)

Figure 1. 25(OH)D levels in cord blood.

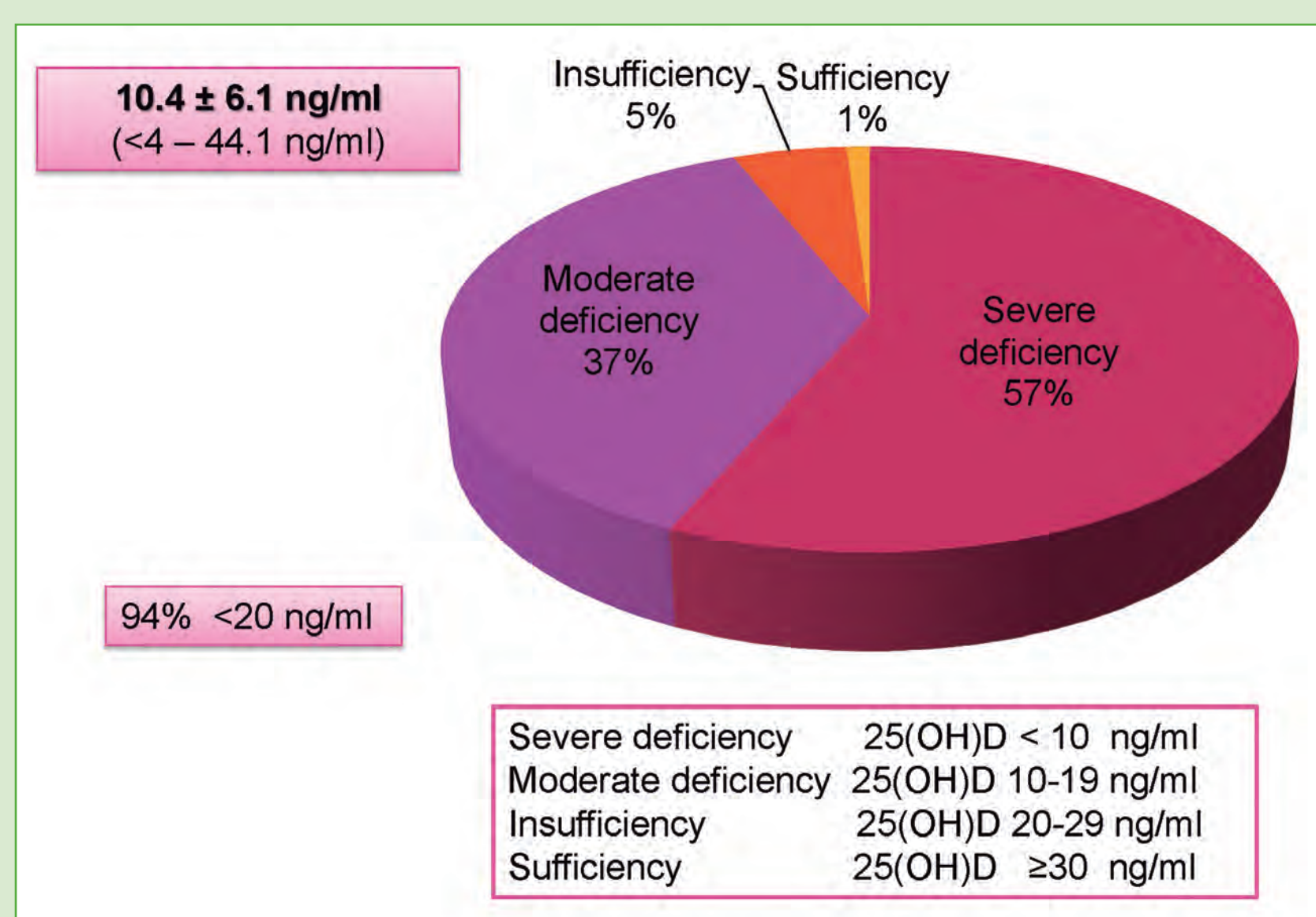


Figure 2. 25(OH)D levels in cord blood by ethnic group.

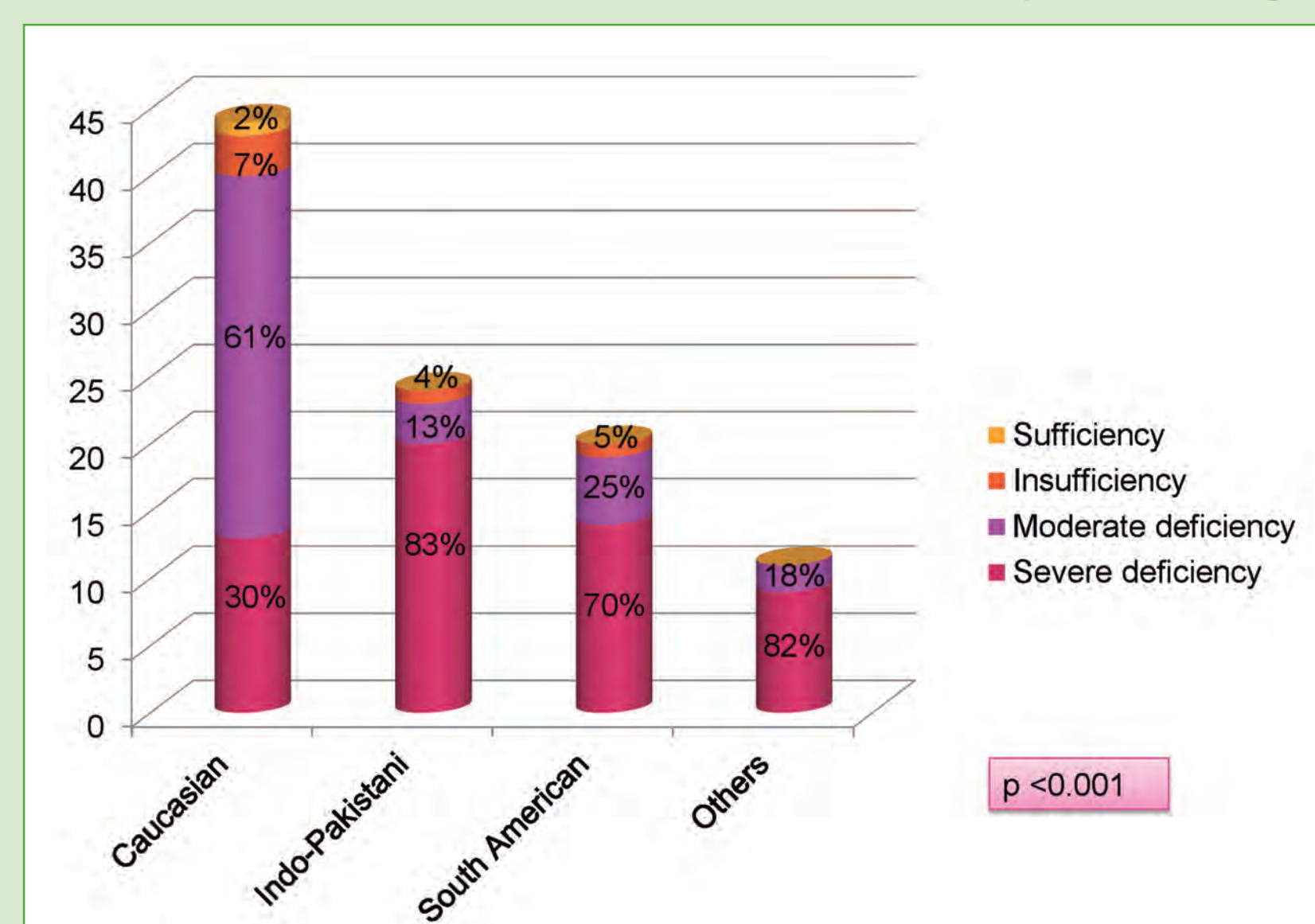


Figure 3. Vitamin D intake (Garabédian survey).

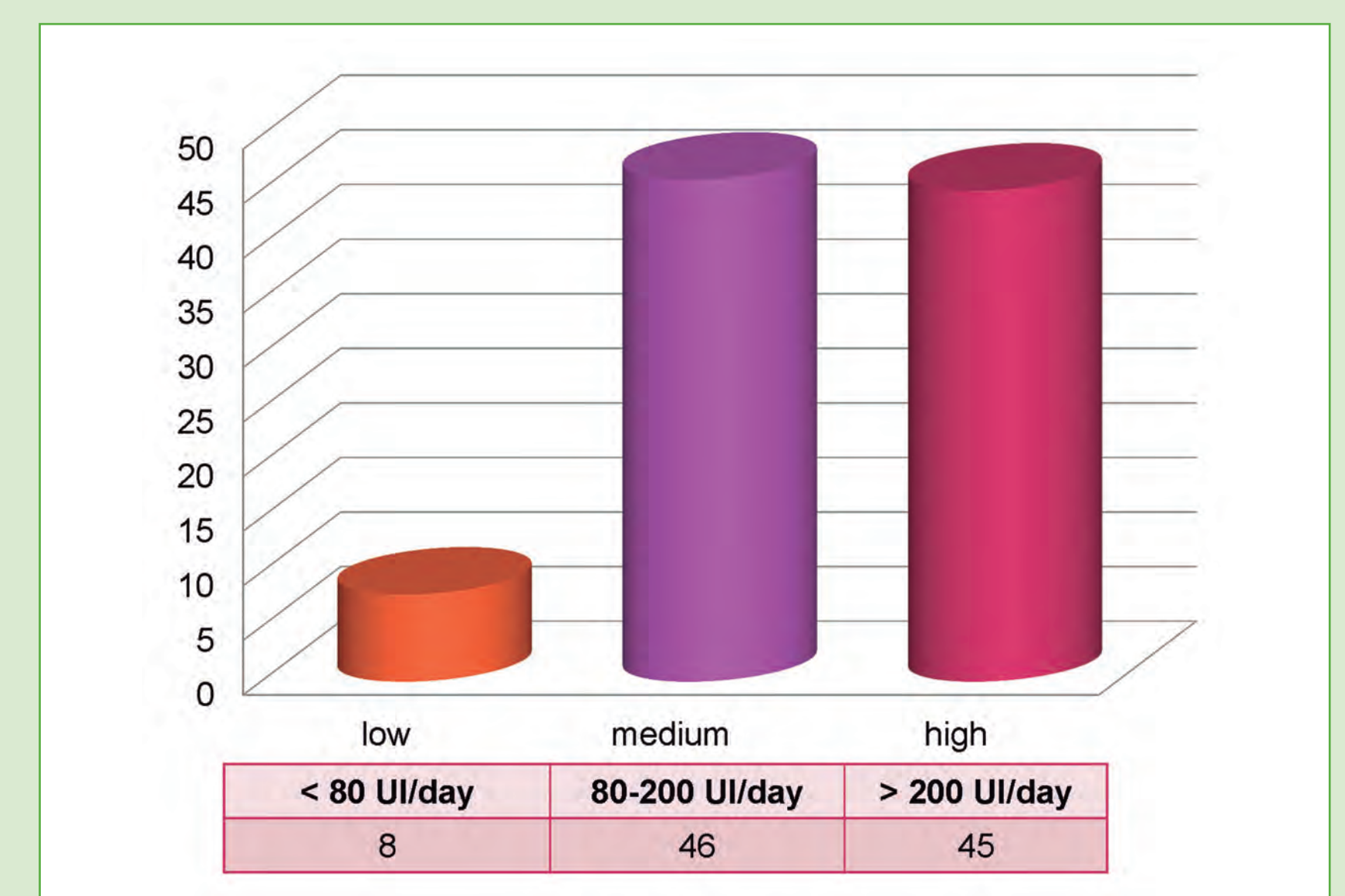


Figure 4. Vitamina D intake by ethnic group.

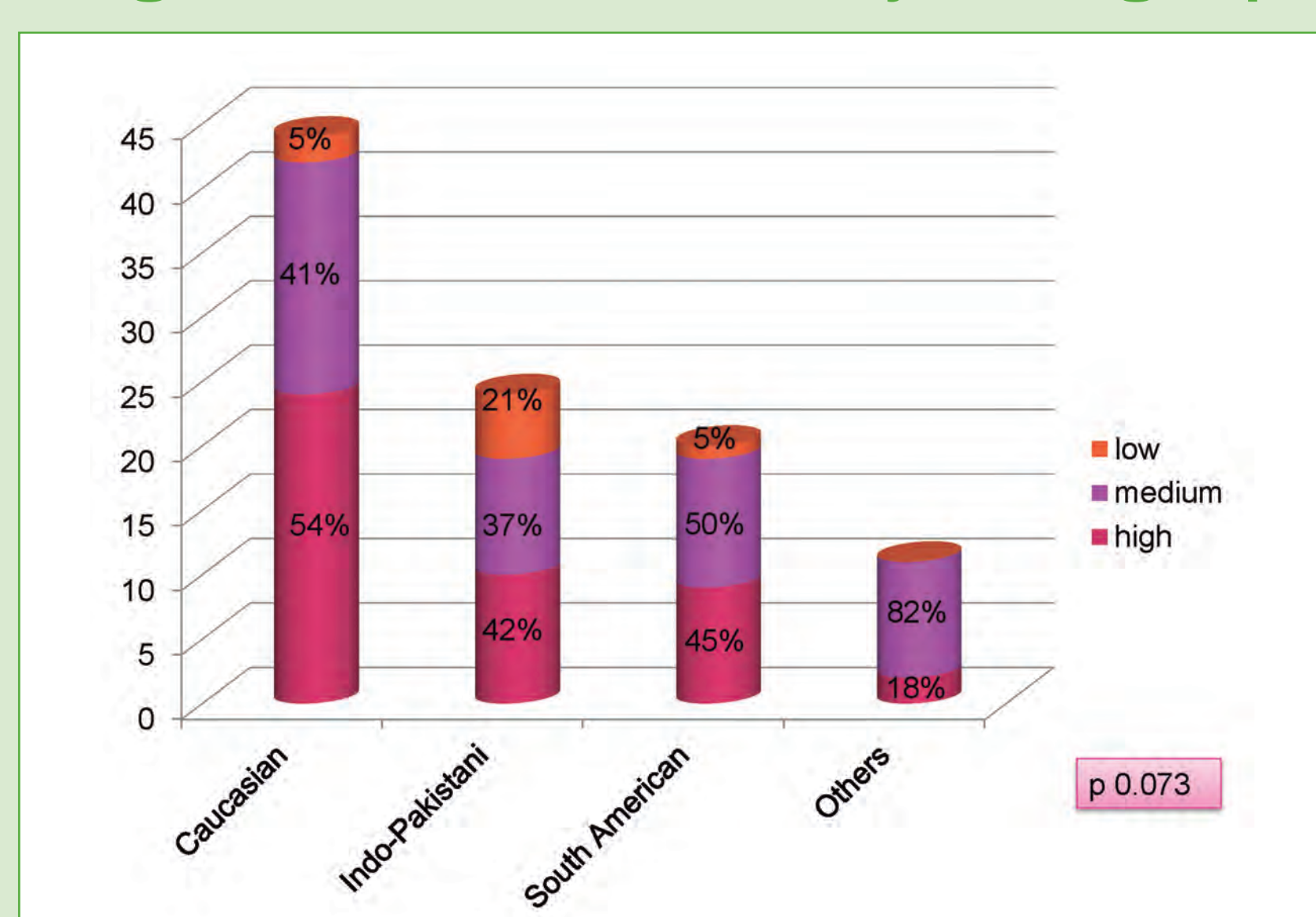


Figure 5. Calcium intake (Garabédian survey).

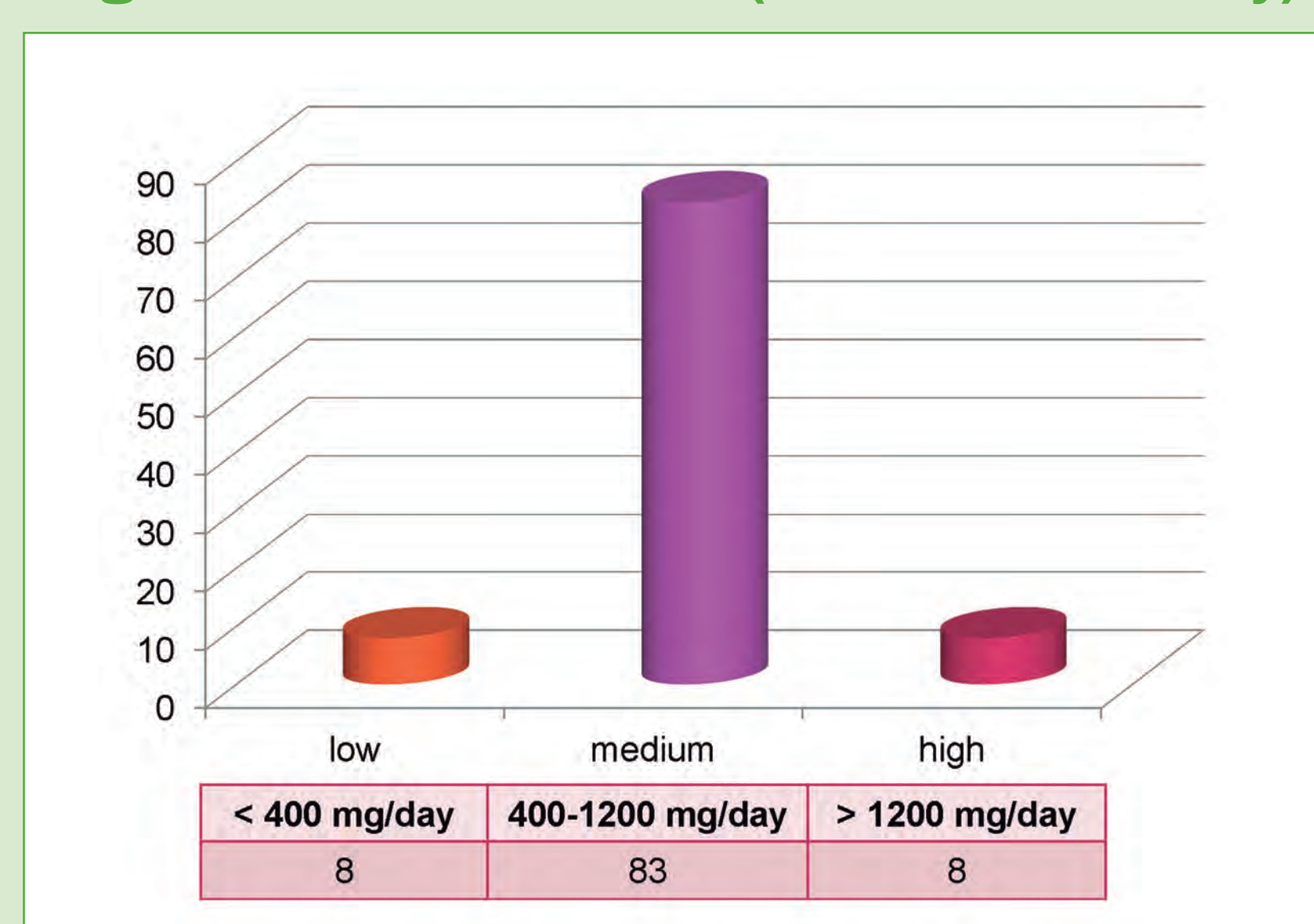


Figure 6. Calcium intake by ethnic group.

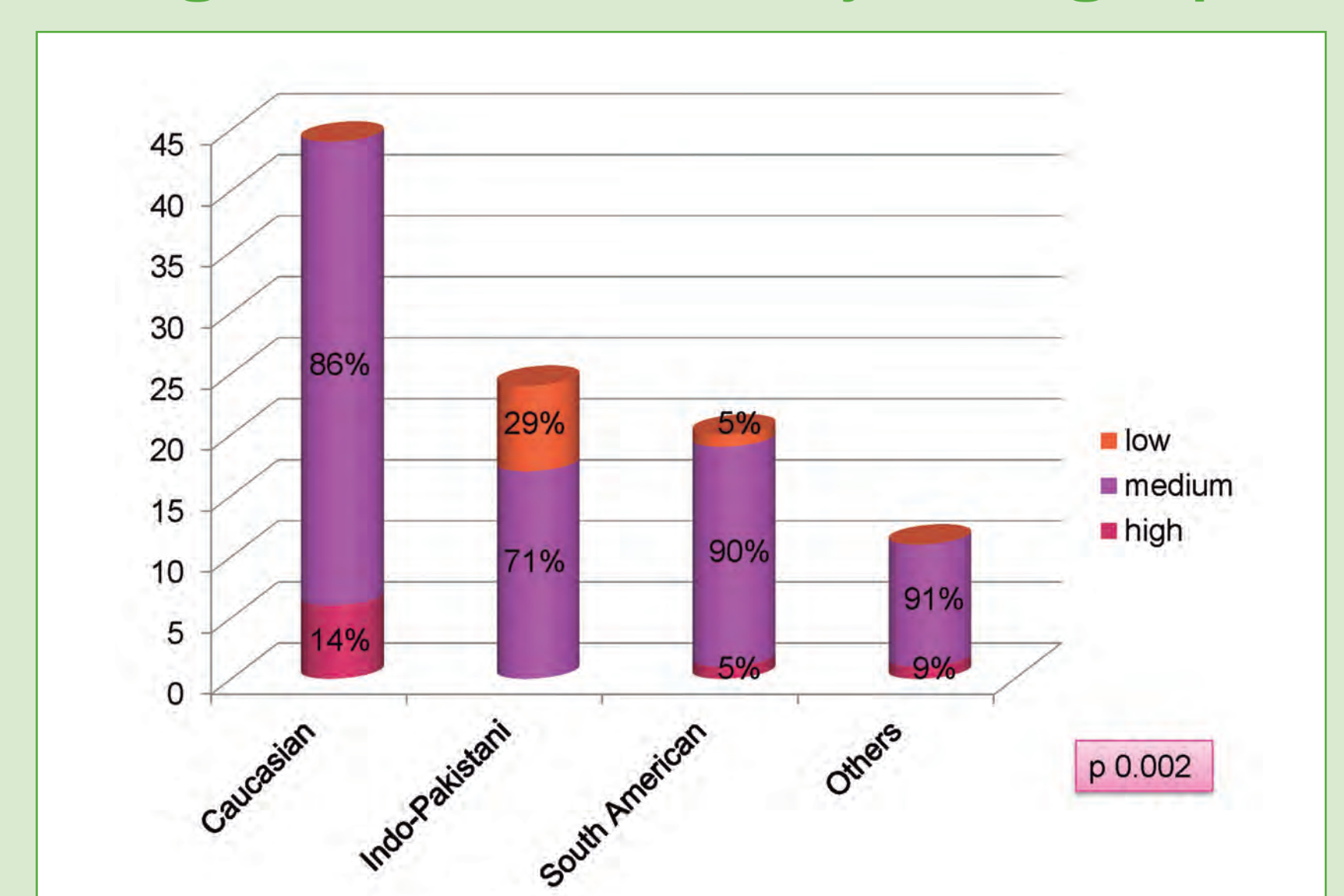
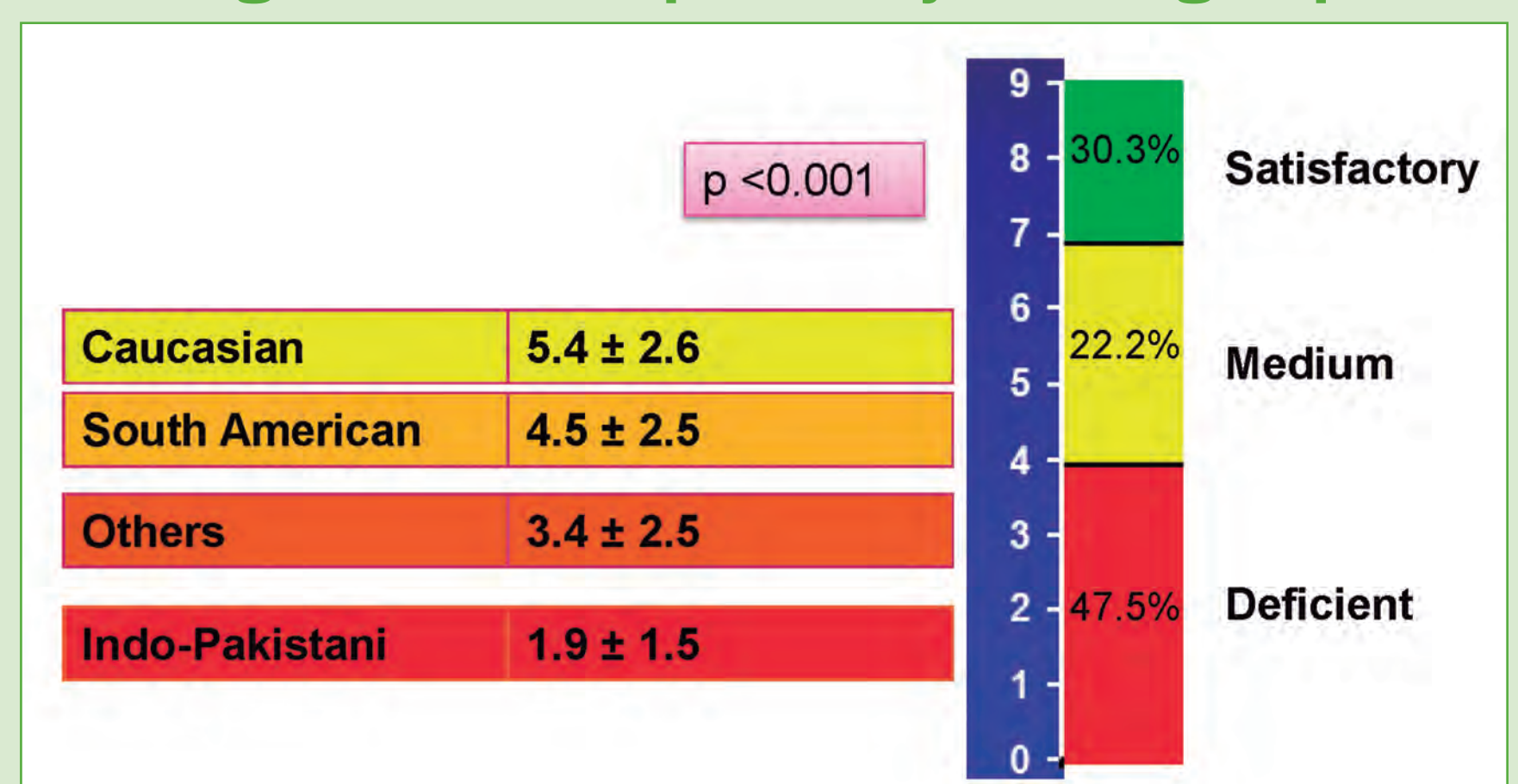


Figure 7. Sun exposure by ethnic group.



CONCLUSIONS

- The high prevalence of vitamin D deficiency at the end of gestation after winter months suggests that much more effective vitamin D prophylaxis programmes should be implemented for pregnant women.
- There are risk groups (deficient sun exposure, Indo-Pakistani ethnicity, dark skin) in which an exhaustive control should be practised.