Dietary calcium intake and bone health in post-menopausal women in Nahaqi, North West Frontier Province, Pakistan

Nicola Lowe[1], Qudsia Bano[2], Sonia Ali Bangash[2], Basma Ellahi[3] and Mukhtiar Zaman[2]

[1]*University of Central Lancashire, Preston, UK,* [2]*Emergency Satellite Hospital, Nahaqi, NWFP, Pakistan and* [3]*University of Chester, Chester, UK*

The prevalence of osteoporosis in Pakistan is high, with 97% of women of aged 75–84 years and 55% of women aged 45–54 years predisposed to osteoporosis[1]. Such women can present with back pain, loss of height and stooped posture before fracture occurs. Adequate dietary Ca is essential for maintaining optimal bone mineral density. The purpose of the present study was to undertake an evaluation of dietary Ca intake and bone health in a rural population in Nahaqi, North West Frontier Province, Pakistan (latitude 34° 6′ 11′ N, altitude 284 m).

Post-menopausal women (*n* 140) were recruited from villages serviced by the Emergency Satellite Hospital in Nahaqi. The women gave verbal informed consent (100% of them were uneducated). Exclusion criteria included use of steroid medication, Ca and/or vitamin D supplementation, hormone-replacement therapy, renal diseases, diuretic use and gastrointestinal disorders. All participants fulfilled the criteria and none were excluded.

Food intake was recorded using an interviewer-administered 24 h-recall questionnaire, conducted on two or three separate occasions in each season. Cooking utensils were used to calculate portion size. Nutrient intake was calculated using food composition tables[2]. Bone mineral density was estimated using broadband ultrasound attenuation and speed of sound measurements of the calcaneus (SAHARA; Hologic Inc., Bedford, MA, USA) combined to give the quantitative ultrasound index (QUI). However, the calibration was based on a Caucasian dataset.

The mean age of the participants was 52 (range 40–65) years, with a mean BMI of 28.0 (range 18–30) kg/m^2. The mean dietary intakes of macronutrients plus Ca and Zn are shown in the Table.

	Summer (Jun–Aug)		Autumn (Sept–Nov)		Winter (Dec–Feb)	
	Mean	SD	Mean	SD	Mean	SD
n	140		129		119	
Energy intake (kJ)	6887	117	7548	92	8008	88
% Energy from:						
Carbohydrate	61.9	0.5	59.5	7.7	57.3	4.9
Protein	11.4	0.1	11.3	1.8	13.7	2.6
Fat	26.1	5.7	27.3	5.9	26.8	3.1
Ca (mg)	317***	8.0	351***	12.0	551	186
Zn (mg)	10.1	0.2	12	0.2	13.7	0.4

Values were significantly below the UK reference nutrient intake for Ca (700 mg/d): ***$P < 0.0001$.

QUI was measured for 107 participants. The results were reported as the T-score and revealed that thirty-one (29%) of the participants had T-scores within the normal range, forty-five (42%) were in the osteopenic range and thirty-one (29%) had T-scores indicative of osteoporosis.

Low dietary Ca intake is a key factor that is contributing to poor bone health in this population. Further research is required to establish the contribution of other potential risk factors before an appropriate intervention strategy can be designed.

1. Habiba U, Ahmad S & Hassan L (2002) *J Coll Physicians Surg Pak* **12**, 297–301.
2. Gopalan C, Rama Sastri BV & Balasubramanian SC (1984) *Nutritive Value of Indian Foods*. Hyderabad, India: National Institute of Nutrition, Indian Council of Medical Research.