

To the Editors:

Physical activity and bone mineral density

The positive influence of physical activity on bone mineral density has been well documented. These benefits have been observed in different age groups [1, 2] and in both sexes [3]. Physical activity is also known to improve muscle strength, particularly in the lower limbs and walking stability, both of which are determinants of fractures [4]. Although the benefits of physical activity in preventing fractures are proven in many studies, data from Asian countries are sparse. We report the results of a large community survey in 7 provinces in Sri Lanka, involving 3422 community dwelling men and women.

1486 men and 1936 women who participated in the Community Osteoporosis Survey done from October 2004 to October 2005 in 7 provinces, except the North and East, were included in the analysis. At least one urban and one rural area were selected from the each province. The classification of urban and rural areas used by the Department of Census and Statistics during the last census was used in selecting these areas [5]. Men and women aged 20 years or more were invited to undergo the measurement of phalangeal bone mineral density (PBMD) in the non-dominant hand, using AccuDXA scanner (Schick Technologists Inc, USA) and asked to fill a brief health related questionnaire.

Participants were asked to describe their general physical activity, past and current, to the best of their knowledge, into one of the three categories: very active (152 women and 280 men), moderately active (1581 women and 1104 men) or less active (203 women and 102 men). Mean PBMDs in the 3 categories of physical activity were compared using ANOVA, unadjusted and then adjusted

for age, weight, and milk consumption. Data of men and women were analysed separately and are given as mean (SD). The level of statistical significance was set at P (two tailed) below 0.05.

Mean age and weight of women were 41.1 (13.3) years and 54.7 (10.8) kg and the corresponding values of men were 39.1 (12.8) years and 62.3 (11.1) kg respectively. Most active men and women had the highest PBMD and the less active men and women had the lowest PBMD values. Further, there was a continuous trend in PBMD across the three categories. When adjusted for age, weight and milk consumption, these values did not change materially and the differences between categories persisted (table).

Our results showed the positive effect of physical activity on BMD in both men and women in the study group. Most physically active men had 8.9% higher PBMD when compared with less active men. Similarly most physically active women had 15% higher PBMD when compared with less active women. Further, there was a gradient across the three categories to indicate a dose-effect relationship. These differences were independent of age, body weight and milk consumption and were seen in both sexes.

Positive effect of exercise on BMD has been observed previously. Increased physical activity in children and adolescents was associated with a higher BMD [1] whereas postmenopausal women were able to either maintain or marginally improve their BMD with regular exercises [2]. These groups should be targeted when interventions based on physical activities are recommended at the community level.

Table. **Phalangeal BMD of three categories of physical activity in men and women**

	<i>Most active</i>	<i>Moderately active</i>	<i>Less active</i>	<i>p value</i>
Women				
Unadjusted	0.508 (0.073)	0.489 (0.067)	0.440 (0.086)	<0.001
Adjusted*	0.500 (0.073)	0.493 (0.068)	0.463 (0.085)	0.004
Men				
Unadjusted	0.607 (0.067)	0.599 (0.066)	0.557 (0.074)	<0.001
Adjusted*	0.610 (0.068)	0.599 (0.066)	0.560 (0.073)	<0.001

* adjusted for age, weight, milk consumption

Although physical inactivity was associated with risk of falling and hip fracture, higher level of physical activities at leisure time and during household chores significantly reduced the relative risk for hip fracture [6].

Although all types of physical activities have health benefits, weight-bearing, and high impact exercises such as running, jumping and skipping are the most desirable exercises associated with bone health. These exercises are more appropriate for young and middle aged people, they can cause fractures in old people. Slow and rhythmic exercises which are targeted to improve balance and posture are more suitable in old age.

Acknowledgement

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Conflicts of Interest

The AccuDXA scanner used in this project was provided by the Fonterra Limited in Sri Lanka, which promotes a high calcium milk product in the country. They also paid the salaries of the two technicians. Planning and conducting of the study and data analysis

were done by authors. Authors worked entirely on voluntary basis.

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