Physical fitness status among the students of a medical college in Kathmandu, Nepal

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حالة اللياقة البدنية بين طلاب كلية طب كتمندو، في نيبال

تاباس برامانيك وسانشيتا برامانيك

الخلاصة: أجري قياس اللياقة البدنية للطلاب النيباليين بكلية الطب في كتمندو، وكانت نسَبُ الطلاب السيئي اللياقة، والمتوسطي اللياقة، والجيدي اللياقة، والفائقي اللياقة 10.4% و23.6% و39.6% و8.5% على التوالي. ولم يلاحَظ وجود فرق بين الطلبة والطالبات من حيث درجات مَنْسَب اللياقة البدنية في أي من فئات اللياقة الأربع هذه.

ABSTRACT The physical fitness of Nepalese students at a medical college in Kathmandu was measured. The proportions of students with poor fitness, average fitness, good fitness, very good fitness and excellent fitness were 10.4%, 23.6%, 39.6%, 17.9% and 8.5% respectively. No significant difference between the male and female students in physical fitness index score was noticed in any of the fitness level groups.

Situation relative à la condition physique chez les étudiants d'une faculté de médecine à Katmandou (Népal)

RESUME On a procédé à la mesure de la condition physique chez des étudiants népalais dans une faculté de médecine à Katmandou. La proportion d'étudiants ayant une condition physique mauvaise, moyenne, bonne, très bonne et excellente était de 10,4 %, 23,6 %, 39,6 %, 17,9 % et 8,5 % respectivement. Aucune différence significative n'a été constatée entre les étudiants et les étudiantes en ce qui concerne le score de l'index de condition physique dans aucun des groupes de niveau de condition physique.

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Introduction

Health, which is defined by the World Health Organization as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, is a fundamental human right. The attainment of the highest possible level of health is an important worldwide social goal, the realization of which will require the action of many social and economic sectors in addition to the health sector [*1*]. In a healthy individual all the organs of the body are of normal size and function normally; all the special senses are intact; and the resting pulse rate, blood pressure and exercise tolerance are within the normal range for the individual's age and sex [*2*]. Regular physical activity is an important component of a healthy lifestyle and helps to keep the body fit. Physical activity is any bodily movement produced by skeletal muscle that results in energy expenditure. Physical fitness is required not only by athletes for better performance, but also by non-athletes for maintenance of a healthy body and healthy mind. Fitness is generally considered to have five components: aerobic capacity, muscle strength, muscular endurance, flexibility, and body composition [*3*].

A person is considered to be fit for a particular task or activity if he/she can accomplish it with a reasonable degree of efficiency, without being fatigued and with rapid recovery from the effects of that exertion. Physical fitness is thus a relative term that indicates degree of fitness [*4*]. In our study we measured the physical fitness of Nepalese students at our medical college using the Harvard step test [*5*].

Methods

Participants were asked to place one foot on a 10-inch high stool, step up, place both feet on the platform, straighten the legs and back, and immediately step down again, bringing down the same foot he/she first raised. This stepping up and down was continued at the rate of 20 steps per minute, following the rhythm of a metronome, for 3 minutes. Immediately after exercise the participant sat quietly on a chair and the heart rate (pulse) was measured for 30 seconds after exactly 1 minute and at the following time points: 1 to 1.5 minutes, 2 to 2.5 minutes and 3 to 3.5 minutes after the end of exercise. The physical fitness index (PFI) was calculated using the following equation:

$$\text{PFI} = \frac{\text{Duration of exercise (s)}}{2 \times \text{sum of three recovery pulse rates for 30 s periods (1–1.5, 2–2.5, 3–3.5 min)}} \times 100$$

The following grading of the scores was made: PFI score < 40, very poor fitness; 41–50, poor fitness; 51–60, average fitness; 61–70, good fitness; 71–80, very good fitness; 81–90, excellent fitness. In all, 62 male and 44 female students aged 18–19 years were randomly selected for this experiment and their PFI measured.

Results

The results show that none of the students in the sample had very poor fitness; 10.4% had poor fitness; 23.6% average fitness; 39.6% good fitness; 17.9% very good fitness; and 8.5% excellent fitness. Among the male students, the distribution of poor, average, good, very good and excellent was 14.5%, 25.8%, 29.0%, 21.0% and 9.7% respectively. Among the female students the distribution was 4.5%, 20.5%, 54.5%, 13.6% and 6.8% respectively (Table 1). No significant difference was ob-

served between the PFI scores of the male and female students in the poor, average, good, very good and excellent fitness level groups (Table 2).

Discussion

Today's medical students are the physicians of tomorrow, and a good physician must be physically fit and mentally alert. Regular physical activity and physical fitness are positively associated with good mental health and well-being. People who take regular physical exercise report less anxiety and depression and lower levels of stress than do sedentary people [3].

All the components of physical fitness (aerobic capacity, muscle strength, muscular endurance, flexibility and body composition) can be achieved by appropriate physical training which increases the number of mitochondria and enzymes involved in oxidative metabolism in the skeletal muscle. It also increases the number of capillaries, resulting in better distribution of blood to muscle fibre. The net effect is more complete extraction of oxygen and consequently, for a given workload, a

Table 1 **Grading of physical fitness among medical students by sex**

Physical fitness	Total (n = 106)		Males (n = 62)		Females (n = 44)	
	No.	%	No.	%	No.	%
Poor	11	10.4	9	14.5	2	4.5
Average	25	23.6	16	25.8	9	20.5
Good	42	39.6	18	29.0	24	54.5
Very good	19	17.9	13	21.0	6	13.6
Excellent	9	8.5	6	9.7	3	6.8

Table 2 **PFI scores among the male and female students in different fitness groups**

Fitness level	Males		Females		Level of significance
	No. of students	Mean PFI	No. of students	Mean PFI	
Poor	9	46.99	2	49.55	$P > 0.1$
Average	16	55.38	9	57.62	$P > 0.05$
Good	18	65.72	24	64.20	$P > 0.1$
Very good	13	74.40	6	73.15	$P > 0.1$
Excellent	6	86.66	3	92.33	$P > 0.1$

PFI – physical fitness index.

smaller rise in lactate production [6]. Exercise produces adaptations favouring aerobic metabolism and endurance, and lowers resting and active heart rates, which may in part relate to downregulation of cardiac β-adrenergic receptors secondary to repeated and prolonged episodes of sympathetic stimulation during exercise [7]. Numerous studies have now shown that people who maintain appropriate body fitness, using judicious exercise regimens, also benefit from prolonged life. Regular physical exercise helps to maintain moderately low blood pressure and reduce blood cholesterol and low density lipoprotein, along with increasing high density lipoprotein. These changes are all associated with a reduction in the number of heart attacks and strokes [8].

We showed that the largest percentage of the medical students (39.6%) had good fitness, 10.4% had poor physical fitness and 23.6% average fitness. Only a minority had excellent or very good fitness (8.5% and 17.9% respectively). Medical students who are under constant mental pressure because of their demanding course can keep themselves physically fit and mentally alert and improve their fitness through regular physical training in their leisure time.

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References

1. *Primary health care report of the International Conference on Primary Health Care, Alma-Ata, USSR, 6–12 September 1978 jointly sponsored by the World Health Organization and the United Nations Children's Fund.* Geneva, World Health Organization, 1978.
2. Park K. *Park's textbook of preventive and social medicine*, 15th ed. Jabalpur, M/S Banarsidas Bhanot Publishers, 1997.
3. Bennett JC, Plum F. *Cecil textbook of medicine, 20th ed*, Vol. 1. London, WB Saunders Company, 1996.
4. Mookerjee SM. Total fitness. In: *Chakrabarti Ghosh Sahana's human physiology*, 2nd ed. Calcutta, The New Bookstall, 1984.
5. Gallagher J, Brouha L. A simple method of testing the physical fitness of boys. *Yale journal of biology and medicine*, 1943, 15:657–77.
6. Ganong WF. *Review of medical physiology*, 18th ed. Stamford, Appleton and Lange, 1997.
7. West JB, ed. *Best and Taylor's physiological basis of medical practice*, 12th ed. New Delhi, BI Waverly Pvt. Limited, 1996.
8. Guyton AC, Hall JE. *Textbook of medical physiology*, 9th ed. London, WB Saunders Company, 1996.