

9 girls were reported. All activity was categorised as being of moderate, heavy or very heavy intensity. Light activity was deliberately excluded as it was felt that such exercise would not produce any measurable physical benefits.

10 Results revealed that 13-15 year old boys spent 29 minutes per day in heavy physical activity and 12 minutes a day in very heavy activity. The corresponding figures for 13-15 year old girls were 10 minutes in heavy activity and three minutes in very heavy activity. The figures only indicate however, the total amount of time spent in heavy and very heavy activity each day. No mention is made of either the duration of each separate period of activity or the frequency of the activity periods over the week.

11 Bradfield, Chan, Bradfield & Payne (1971) conducted a study to measure energy expenditure and physical activity patterns in English primary school children using an older model telemetry device to record heart rate (the Socially Accepted Monitoring Instrument or SAMI). Heart rate was recorded for 54 boys over three school days during the winter term. The results revealed the level of participation throughout the study to be higher than had been anticipated.

12 Hendry (1978) found low levels of activity in adolescents when he studied a group of 15 to 16 year olds in Scotland. From a sample of 3,000, more than 50% of the boys and 66% of the girls were classified as non-participants.

13 Another study conducted in Scotland revealed differing results. McKusker (1985) studied the involvement of 15 to 19 year old young people in sport and physical activity in Stirling. Two hundred young people were interviewed over a three month period. Results showed that more than 90% of boys and girls took part in 'recreational sport', suggesting that activity levels in youngsters are relatively high. No information concerning the frequency, duration and intensity of the activities reported was available, however, and no clear cut definition of the term 'recreational sport' was applied or clarified in the study.

14 A study by The Sports Council for Wales (1986), entitled 'Participation in and

attitudes towards sport by eleven to sixteen year olds', similarly indicated that there were high levels of participation in sports, especially 'sport for fun'. Ninety percent of the studied sample claimed active involvement in recreational activities outside of school. There was a gradual and progressive lessening of interest in activity with increasing age and activity levels decreased in schools from the first to fifth forms, but the overall recorded participation remained high. However, there was no categorisation in this study of the sorts of activities included under the heading 'sport for fun' and no indication of the duration, frequency or intensity of the sports the children reported engaged in.

15 Dickenson (1987) collected activity data on 31 English children aged between 11 and 16. In his study, physical activity was assessed via interviews and questionnaires. Results revealed very low activity levels in most children. Across the 11-16 age range, 38.16% of the boys and 62.16% of the girls were found to be totally inactive during the week. When the figures for children engaging in less than 30 minutes of activity during the week were analysed, 63.75% of boys and 84.25% of girls were found to be classified in this category (indeed at the age of 15, 80% of girls were found to be inactive and 98% were reported to engage in less than 30 minutes activity during the week. In terms of vigorous physical activity, results indicated that, over the study week, between 80 and 85% of the children did less than five minutes vigorous activity on any day. The questionnaire results were verified by the interviews which showed that 83.1% of the sample were inactive during the week and 82% were inactive at weekends. Inactivity increased with age, and generally boys did more vigorous exercise than girls.

16 In another study conducted by The Sports Council for Wales (1987), insufficient levels of physical activity this time became evident. Subjects were asked to complete a questionnaire reporting the amount of time they spent in activities which made them breathless or sweaty. The amount of activity considered to confer health benefits was taken to be twenty minutes of vigorous activity three

times a week. Male teenagers were found to be the most active members of the Welsh population, but it was revealed that less than half of them participated in 'sufficient' vigorous exercise. Again there was a marked difference between the activity levels of males and females, with females showing lower activity levels. Only 19% of 12 to 17 year old females were classified as very active, or as performing sufficient amounts of 'appropriate' activity. For both males and females there was also a significant decrease in activity levels with age.

17 Williams (1988) examined the physical activity of English adolescents outside of school. Over 900 fourth year pupils from six different schools completed a questionnaire. The results showed that just over half the sample (52%), claimed to take part in some form of physical activity outside school. Of these, 26.2% claimed to take part more than once a week and 26% claimed to take part once a week or once a fortnight. In agreement with the results of previous studies, it was found that more boys than girls participated in physical activity outside school and boys tended to be more frequent participants than girls.

18 Williams concluded from her results that in terms of outside school activity, the majority of pupils do not exercise frequently enough to contribute to the maintenance or enhancement of health, with only 26% taking part in physical activity more than once a week.

19 The Northern Ireland Fitness Survey (1989) represents perhaps the most comprehensive data currently available on British youth. The survey measured the fitness, physical activity levels, attitudes and lifestyle of 3211 post-primary school children. Physical activity levels were measured by means of a lifestyle questionnaire.

20 To summarise the results, 32.7% of boys and 34.4% of girls reported that they had done no exercise outside of school during the preceding seven days. Approximately 8% of boys and 12% of girls had not done any exercise at all during the preceding seven days. Exercise was defined as any activity that caused a degree of breathlessness. At all ages, boys were more active than girls and there was

21 a marked decline in activity levels after the age of 13-14 years. The rate of decline was similar in both sexes but with regard to vigorous activity, the decline was greater in girls than boys. Indeed it was found that by the age of 17-18 years, the vigorous exercise of the boys was similar to the total exercise of the girls.

22 In 1989, a study of the fitness and activity levels of English school children was produced as part of the Coronary Prevention in Children Project (Armstrong 1989). The Project determined the cardio-respiratory fitness and physical activity levels of over 200 children aged 11-15. Armstrong used heart rate measures to estimate the physical activity levels of the children. The instrument used to record heart rate was a self-contained, computerised telemetry system (Sport Tester 3000). Children were monitored for a minimum of three weekdays and a Saturday. The threshold for appropriate exercise chosen by Armstrong was as recommended in a review by Simons-Morton et al., (1988), who described appropriate physical activity for children as involving large muscle groups in dynamic movement, for periods of 20 minutes or longer, three or more times per week, at an intensity producing a heart rate of at least 140 beats per minute (about 70% of maximum heart rate).

23 The results produced by Armstrong similarly showed children to be inactive. Fewer than 15% of the girls and 30% of the boys achieved a single 20 minute session with their heart rates over 139 beats per minute (bpm) over the three days. Fifty percent of the girls and over 25% of the boys did not even manage a single ten minute period of appropriate activity. Boys were again found to be significantly more active than the girls. Armstrong concluded from his results that children have surprisingly low levels of physical activity. He stated 'many children seldom experience the intensity and duration of physical activity associated with a low CHD in adults.'

24 Armstrong et al., (1990a) conducted a study to investigate whether children and adolescents regularly experience the levels of exercise associated with the improvement of peak VO₂ and studied the