Perceptions of the Intensity of Specific Physical Activities in Bangalore, South India: Implications for Exercise Prescription

M Vaz*, AV Bharathi*

Abstract
Objective: To assess perceptions of the intensity of specific physical activities in urban Indians and to determine whether these perceptions are dependent on age, gender, body mass index and actual physical patterns.

Method: A self-administered questionnaire in a convenience sample of 782 adults (441 women) aged 17 to 70 years in the city of Bangalore.

Results: Women rated the intensity of carpentry, jogging, manual labour and walking uphill significantly higher than men. These differences persisted when they were adjusted for total daily physical activity levels and levels of discretionary exercise. In contrast, while men rated household activities such as manual washing of clothes and sweeping at higher levels than women, these differences disappeared when they were adjusted for actual levels of daily activity related to household chores. There were clear age-related changes in the perception of intensity of physical activities and these persisted even after adjustment for overall physical activity patterns.

Conclusions: This study demonstrates clear age and gender-related differences in the perception of physical activities. This is important to know while motivating individuals to change physical activity patterns and assumes added importance given the recent evidence that perceived intensity of habitual activity is predictive of coronary heart disease, even at levels of activity that are below standard recommendations.

INTRODUCTION

There are several reasons why people’s perceptions of the intensity of physical activity should be documented. The first is that recommendations for physical activity usually refer to desirable levels of physical activity in terms of both duration and intensity.1 While the notion of duration is usually unambiguous, different people are likely to have different views about what constitutes “mild”, “moderate” or "vigorous" activity. In order to overcome this problem, recommendations for physical activity often qualify the terms with examples.1 These examples can be objectively arrived at by using the physical activity ratio (PAR) of the activity; a multiple of the energy cost of the activity in relation to the basal metabolic rate (BMR) of the individual.2 PARs are essentially similar to the widely used MET (metabolic equivalent) in clinical literature which is a multiple of the oxygen consumed during the specified activity to a standard oxygen consumption at rest. Despite the attempt at objectivity, however, it is conceivable that different individuals rate the intensity of a given activity differently. Indeed, perceived intensity of an activity is dependent on the physical fitness and age of the individual, among other factors.3 A second reason why it is important to ascertain people’s perceptions of physical activity is that some physical activity questionnaires attempt to rate the activity status of individuals by asking them to quantify the duration or frequency that they spend in activities of broad categories of intensity (e.g. ‘moderate’, ‘vigorous’, ‘strenuous’).4,5 Here, the individual must decide whether an activity falls into a given intensity category. The same issues that relate to the first reason also apply to the second. More recently, studies have indicated that there is an inverse association between an individual’s perceived level of exertion and the risk of coronary heart disease, even in people who do not meet recommendations for physical activity.6
There is no literature on how Indians perceive the intensity of various physical activities. Yet, especially in urban areas, Indians are relatively physically inactive and are prone to chronic diseases of aging, including coronary heart disease. Thus, advocacy of a more physically active lifestyle is becoming increasingly important. In order to be effective advocates of behavioral change, it is necessary to understand current perceptions about the particular behavior. In this study, we asked individuals of both genders and from a wide age range to score the intensity of a set of standard physical activities on a scale of 1 to 7 (least strenuous to most strenuous). We then determined whether there were age and gender differences in the way people rated these activities. We further determined whether the differences that arose could be explained by obesity and the actual physical activity patterns of the individuals.

**MATERIALS AND METHODS**

Data were collected from a convenience sample of 782 adults (441 women) spanning an age range of 17 to 70 years in the city of Bangalore, South India. The working population of this convenience sample was obtained from a number of sources including banks, public sector undertakings, employees of schools and colleges, software companies etc. and included educated factory employees, engineers, executives, teachers, and office staff among others. The students in this study were drawn from two colleges in the city while the older subjects (greater than 58 years) were largely drawn from recreational centres run for older citizens by a voluntary agency, Ashvasan, and consisted of individuals who were living in their own homes and who were active enough to attend the centres. Informed consent was obtained from all subjects and the study was approved by Research Ethics Sub-Committee of the institution.

All subjects were asked to rate the intensity of seven activities along a seven point scale (1 = least strenuous, 7 = most strenuous). These included walking, carpentry, jogging, sweeping the floor, manually washing clothes, performing manual physical labour, and walking uphill. This mix of activities was designed to provide a range of intensities; the PARs for these activities (a higher value indicating greater intensity) from a standard source, were 2.4 to 3.4 for strolling to walking at normal pace, 3.5 for carpentry, 6.3 to 6.6+ for jogging, 3.0 to 3.5 for sweeping, 3.0 for washing clothes, 4.6 to 5.7 for walking uphill slowly/ at normal pace, and 5.2 to 7.4 for manual labour, as for instance in the building industry or manually loading sacks onto a lorry.

The physical activity pattern of each subject was assessed using a standard questionnaire, the construct, repeatability and relative validity of which has been described elsewhere. In brief, the questionnaire provides a measure of overall physical activity computed as the physical activity level (PAL; estimated 24 hour energy expenditure / predicted BMR) as well as activity related to specific physical activity domains e.g. discretionary exercise and household chores. In the analysis of the latter, activity within a domain is expressed as MET.minutes, the product of the intensity and duration of activities within the specific activity domain. Obesity was documented in each subject as the body mass index (BMI; kg/m²) from the reported height and weight.

All analyses were performed using SPSS, version 10.1. Data are presented as mean ± standard deviation (SD). The subjects were assigned to five age groups as indicated in Table 1. Differences in the perceptions of the intensity of the seven physical activities across age and gender were assessed using a two-way ANOVA. Wherever age x gender interactions were significant, the factors were considered together and not separately, since this implied that the effect of one factor on the response variable was dependent on the level of the second factor. Wherever significant differences were uncovered, this was followed with an analysis of covariance (ANCOVA), using in separate analyses, the overall physical activity level (PAL), household activity, discretionary exercise and BMI as covariates. The aim of these analyses were to determine if any of these factors could explain the differences that were uncovered in the earlier age and gender analysis. The null hypothesis was rejected at P < 0.05.

**RESULTS**

Table 1 summarises the physical activity patterns of the subjects, stratified for age and gender. There was a tendency for the BMI to increase with age but there was a significant age x gender interaction (P = 0.001). The BMI for males was significantly higher than for females in Groups 1 and 2 (up to 35 years) but was similar in the other age groups. Significant age and gender interactions were also observed for the overall physical activity (P =0.000), discretionary exercise (P=0.000) and household chores (P=0.000). Discretionary exercise was the highest in the youngest age group as compared to the other age groups (post hoc test : least significant difference P < 0.05). Women had significantly lower discretionary exercise than males in the lower two age groups. In contrast, barring the youngest age group, women had consistently higher levels of household chores than their male counterparts (P < 0.05). Overall, physical activity levels in the oldest group (> 58 yrs) was significantly lower than all the younger age groups (P < 0.05). There was no significant difference between men and women except in the youngest age groups where women had significantly lower overall physical activity levels than their male counterparts. Patterns of physical activity (household chores, discretionary exercise and physical activity levels) were not correlated with the BMI when the data were stratified according to data and adjust for age.

Table 2 summarises the perceptions of intensity of specific physical activities across different age groups in both men and women. Women consistently rated carpentry higher than men, and this gender difference increased with age. In contrast, there was no clear pattern of differences in perception of the intensity of walking across age or between genders. In the main, women reported higher perceptions of intensity for jogging than men, the exception being in the youngest age group. Generally higher perceptions of intensity were also reported by women for manual labour and walking uphill. In
contrast, men reported higher perceptions for intensity for household chores such as sweeping and manual washing of clothes. In order to ascertain whether the differences between genders and across age groups were true differences or could be explained by differences in BMI or patterns of physical activity (overall, discretionary exercise or household chores), the analyses were repeated using an ANCOVA using these factors as covariates. When the perceptions of intensity of household chores such as washing clothes and sweeping were adjusted for the actual levels of household chores, the gender differences disappeared (sweeping P=0.248, washing clothes P=0.80), indicating that these were not true gender differences. In contrast, the gender differences in perceptions of the intensity of carpentry, jogging, manual labour and walking uphill, persisted when they were adjusted for PAL and levels of discretionary exercise. The age related differences in perception of intensity of jogging, sweeping, washing clothes and uphill walking persisted even after adjusting for overall physical activity patterns, discretionary exercise and household chore activity. Body mass index did not alter any age or gender differences in perception of intensity.

Table 1: Physical activity characteristics of the subjects

<table>
<thead>
<tr>
<th>Gender</th>
<th>Sample (782)</th>
<th>Body mass index (kg/m²)</th>
<th>Discretionary exercise (METS-min/d)</th>
<th>Household chores (METS-min/d)</th>
<th>Physical activity level</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/F</td>
<td>99/149</td>
<td>20.9 ± 2.9</td>
<td>395 ± 373</td>
<td>56 ± 83</td>
<td>Male 1.64 ± 0.21</td>
</tr>
<tr>
<td></td>
<td>83/124</td>
<td>23.2 ± 3.3</td>
<td>164 ± 209</td>
<td>52 ± 80</td>
<td>Female 1.49 ± 0.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23.5 ± 2.5</td>
<td>47 ± 85</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23.2 ± 3.0</td>
<td>55 ± 92</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23.2 ± 4.1</td>
<td>50 ± 70</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24.2 ± 2.6</td>
<td>50 ± 70</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>24.5 ± 3.7</td>
<td>50 ± 70</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Perceptions of the intensity of specific physical activities: age and gender effects

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age Groups</th>
<th>Age effect</th>
<th>Gender effect</th>
<th>Age x Gender interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 (17-24 y)</td>
<td>2 (25-35 y)</td>
<td>3 (36-45 y)</td>
<td>4 (46-58 y)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Carpenter</td>
<td>4.14 ± 1.75</td>
<td>5.03 ± 1.79</td>
<td>1.54 ± 1.02</td>
<td>1.33 ± 0.87</td>
</tr>
<tr>
<td>Walking</td>
<td>4.20 ± 1.89</td>
<td>5.09 ± 1.87</td>
<td>1.46 ± 0.85</td>
<td>1.28 ± 0.71</td>
</tr>
<tr>
<td>Jogging</td>
<td>4.44 ± 1.97</td>
<td>5.13 ± 1.75</td>
<td>1.13 ± 0.39</td>
<td>1.45 ± 0.99</td>
</tr>
<tr>
<td>Sweeping</td>
<td>3.78 ± 2.17</td>
<td>5.67 ± 1.58</td>
<td>1.22 ± 0.74</td>
<td>1.44 ± 0.76</td>
</tr>
<tr>
<td>Washing clothes</td>
<td>4.78 ± 2.1</td>
<td>6.20 ± 1.08</td>
<td>1.77 ± 1.42</td>
<td>1.42 ± 0.84</td>
</tr>
<tr>
<td>Manual labour</td>
<td>3.88 ± 2.38</td>
<td>3.54 ± 2.38</td>
<td>3.64 ± 2.36</td>
<td>3.26 ± 2.26</td>
</tr>
</tbody>
</table>

DISCUSSION

Our data indicate that there are important differences in actual physical activity pattern and in the way men and women across different ages perceive the intensity of physical activities.

Young adult males had levels of discretionary exercise that were significantly higher than women in the same age category as well as in older adults, irrespective of gender. In contrast, physical activity within the household chore domain was significantly higher in women in all age categories, barring the youngest age group, a finding we have documented earlier. Overall physical activity levels declined in the oldest age group. Body mass index was not a determinant of actual physical activity or of the perception of the intensity of physical activity.

Within a socio-cultural context, household chores are often perceived to be the domain of women. Our data indicate, however, that the gender differences in the perception of intensity of specific household tasks can be explained by the extent to which housework is performed and is not a “true” gender difference. In contrast, gender differences in the perception of jogging, carpentry, manual labour and...
walking uphill persisted even after adjusting for actual physical activity patterns, suggesting that at least for our sample, these were ‘true’ gender differences. However, these activities were reported seldom or not at all within our sample and it is conceivable that different results would be obtained in a group that engaged in these activities to a greater extent. Nevertheless, these data are illuminating because physical activity recommendations range from advocacy of moderate (such as walking) to more strenuous levels of physical activity (such as jogging) (reviewed by Shephard). None of the age related differences in the perception of the intensity of physical activity were affected by adjusting for actual physical activity patterns, indicating that older people do view physical activity differently and independent of their physical activity levels. Body mass index was not a determinant of perception of the intensity of physical activity in our sample.

Prescriptions of exercise are often stated in broad terms for entire populations. At an individual level, however, there is a need to understand how people perceive physical activity. Despite the availability of guidelines, participation in physical activity even in developing and developed countries remains low. This has prompted special programmes for women. Often, however, women may feel guilty at not being able to achieve perceived cultural norms regarding exercise intensity and duration, and this can be a barrier to the development of more physically active behaviour. What is encouraging from this study is the lack of an age and gender effect in the perception of intensity of walking. This is important because guidelines for exercise have moved away from more strenuous forms of exercise promoting fitness to simple prescriptions of lower intensity exercise promoting health. Thus, even brisk walking is effective in reducing the risk of coronary heart disease and osteoporosis, among others.

In conclusion, there appear to be clear gender and age determinants of the perceived intensity of specific activities. We do not suggest that our data can be generalised to all populations. However, it is important that we develop a clearer understanding of how people perceive physical activity if we aim to promote effectively changes in this health behaviour.

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References