Knowledge, Motivation Behavior and Level of Physical Activity for Medical Students

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Abstract

Introduction: Intense therapeutic ultrasound (ITU) is a newly established ultrasound-based, non-invasive therapy in which sound waves are concentrated and focused on musculoskeletal tissue for the purpose of pain reduction. This technology produces selective thermal coagulative changes over a small controlled area while leaving the surrounding tissue unaffected and without impacting the integrity of the dermis.

Methods: A clinical study evaluating 29 patients (Age: 39 – 60, Male: 59%, Female 41%) for the effectiveness, safety and patient tolerance of Intense Therapeutic Ultrasound (ITU) for treatment of chronic (average length of symptoms prior to treatment: 12.9 Months), subcutaneous lateral Epicondylitis musculoskeletal tissue pain reduction was conducted. All patients enrolled in this IRB approved study had been previously diagnosed with Chronic Lateral Epicondylitis and had failed previous Standard-of-Care treatment regimen. Two ITU treatments were administered every four weeks apart. Self-reported lateral elbow Universal Visual Analog pain scores and Patient-Rated Tennis Elbow Evaluation pain scores while performing normal daily tasks, were recorded pre-treatment (baseline measurement) and again at each follow-up time point - 4, 8, 12, and 26 weeks - after initial treatment. The goal for all subjects was to reduce overall pain and pain while performing everyday tasks by at least 25% on the average and more than 25% individually. While arbitrary, such criteria appear to be rigorous to reduce standard error and individual self-assessment variability.

Results: Successful reduction of overall pain scores at 12 and 26 weeks following the first treatment are 88% and 82% of patients meeting the pain reduction criteria respectively. Also, at the same follow-up time points, patients reported an average VAS Pain Score reduction of 59% (Week 12) and 57% (Week 26) from a pre-treatment average of 5.08 down to an average of 2.2 at week 26. Additionally, patients reported an average pain reduction while performing everyday tasks of 58% and 61% respectively. Patient satisfaction remained over 80% for all follow-up dates.

Conclusion: ITU is a promising non-invasive pain relief treatment for cases of chronic lateral epicondylitis.

Keywords: Physical activity; Medical students; Knowledge; Obesity

Introduction

World Health Organization recommends a physical activity of at least 150 minutes a week, yet globally only one in five people achieved this level [1]. Physical inactivity is closely linked with obesity, a common risk factor for many medical conditions. It was estimated that in 2014, more than 1.9 billion adults older than 18 years old were overweight [2]. In Malaysia, the prevalence of obesity has increased from 1 in 7 in 2006 to 1 in 4 five years later [3].

Lack of active lifestyles during university is likely to lead to poor activity levels in later years. University students have limited time toward active lifestyles due to lack of time and tight study schedules [4]. This is particularly the case for medical schools, where the high intensity training and packed schedules place medical students at greater risk of adopting sedentary lifestyles and being physically inactive.

Encouraging adequate physical activities during undergraduate medical training is important to produce future clinicians who will then be more likely to counsel patients to adopt physically active lifestyles [5]. Clinicians with positive attitudes towards exercise are more likely to give exercise counseling in clinical practice [6]. It has also been shown that clinicians with normal body build were more likely to discuss issues regarding weight loss with patients at lower levels of BMI compared to clinicians who were overweight or obese [7]. In addition, patients were more likely to mistrust weight loss advice given by obese doctors [8]. Thus, we aimed to study the knowledge, motivation behavior, anthropometric measurements and physical activity levels of medical students in a university located in Kuala Lumpur, Malaysia.

Methodology

A cross-sectional quantitative study was conducted from October to December 2014 in the Faculty of Medicine, University of Malaya. This...
university is a public university that provides a five-year medical undergraduate degree. Pre-clinical medical students in the first two years of study were included. Universal sampling was used. Exclusion criterion was physical impairment which limits participation in physical activity. A 61-item self-administered questionnaire was used, consisting of (i) 6 items on demography (ii) 20 items on knowledge (iii) a 19-item Behavioral Regulation in Exercise Questionnaire (BREQ2) [9] and (iv) 16-item Global Physical Activity Questionnaire (GPAQ) [10]. Face validation was conducted by an expert panel consisting of a primary care physician, a sports medicine specialist, a sports medicine doctor and a postgraduate student in primary care medicine. The knowledge questionnaire, adapted from a study done in the United States [11], assesses knowledge on traditional activities, lifestyle activities and guidelines on physical activity. BREQ2 was a validated questionnaire measuring exercise motivation behavior that is freely available on the internet [9]. This section contained 19 questions that were given a Likert scale of 0 (not true) to 4 (very true). GPAQ is a 16-items questionnaire developed by WHO and is a popular validated tool to assess activity at work, traveling to and from places and recreational activities [10]. Written informed consent was obtained from each participant. Questionnaires were distributed during lecture breaks in the lecture halls and anthropometric measurements were taken when participants handed in the questionnaires. Participation was voluntary and anonymity was assured. The questionnaire was self-administered and took approximately ten minutes to complete.

A standard plastic meter measuring tape was used to measure the waist circumference to the nearest 0.5 cm. Waist circumference was measured at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest [11,12]. Weight was measured using a portable Hanson H60 Mechanical scale with a capacity of 120kg and was recorded to the nearest 100 grams. Students were allowed to wear light clothing during measurement. Height was measured by using a measuring tape which was taped to the wall. Height was recorded to the nearest 0.1 cm.

SPSS 22 for windows was used for the statistical analysis. Demographic data, knowledge, motivation and level of physical activity were described in means and standard deviation. Pearson Chi-square was used for categorical variables (gender, BMI, waist circumference, year of study, student's perception) and simple linear regression was used to determine independent factors associated with physical activity.

Ethical clearance was approved by the Medical Ethics Committee of the University Malaya Medical Centre (20148-480) and permission to use the questionnaire was obtained from the respective authors. Faculty permission was obtained prior to carrying out the study.

Results

A total of 301 students participated in the study with a response rate of 100%. The mean age was 19 years and almost two thirds were female (61%) (Table 1). Male participants had higher BMI, were more likely to be obese or overweight compared to female participants.

### Table 1: Socio-demographic and physical profiles of participants.

<table>
<thead>
<tr>
<th>Demographic factors and anthropometric measurements</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=301</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[n (%)]</td>
<td>[n (%)]</td>
<td>[n (%)]</td>
<td>(p)</td>
<td></td>
</tr>
<tr>
<td>Age (years) (Mean ± SD)</td>
<td>19.6 ± 0.5</td>
<td>19.6 ± 0.6</td>
<td>19.6 ± 0.5</td>
<td>(0.701) *</td>
</tr>
<tr>
<td>Year of medical programme</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>131 (43.5)</td>
<td>55 (47.0)</td>
<td>76 (41.3)</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>170 (56.5)</td>
<td>62 (53.0)</td>
<td>108 (58.7)</td>
<td>-0.331</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>146 (48.5)</td>
<td>46 (39.3)</td>
<td>100 (54.3)</td>
<td>12</td>
</tr>
<tr>
<td>Chinese</td>
<td>117 (38.9)</td>
<td>57 (48.7)</td>
<td>60 (32.6)</td>
<td>-0.007</td>
</tr>
<tr>
<td>Indian</td>
<td>25 (8.3)</td>
<td>12 (10.3)</td>
<td>13 (7.1)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13 (4.3)</td>
<td>2 (1.7)</td>
<td>11 (6.0)</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 18.5</td>
<td>59 (19.6)</td>
<td>17 (14.5)</td>
<td>42 (22.8)</td>
<td>6.32</td>
</tr>
<tr>
<td>18.5 - 22.9</td>
<td>165 (54.8)</td>
<td>62 (53.0)</td>
<td>103 (56.0)</td>
<td>-0.097</td>
</tr>
<tr>
<td>23 - 27.4</td>
<td>64 (21.2)</td>
<td>31 (26.5)</td>
<td>33 (18.0)</td>
<td></td>
</tr>
<tr>
<td>≥ 27.5</td>
<td>13 (4.4)</td>
<td>7 (6.0)</td>
<td>6 (3.2)</td>
<td></td>
</tr>
<tr>
<td>Waist circumference (cm) #n [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>256 (85)</td>
<td>100 (85.5)</td>
<td>156 (84.8)</td>
<td>0.027</td>
</tr>
<tr>
<td>Above cut-off</td>
<td>45 (15)</td>
<td>17 (14.5)</td>
<td>28 (15.2)</td>
<td>-0.87</td>
</tr>
</tbody>
</table>

Note: * Independent T-test; # Male – waist circumference <80=normal; ≥ 80=above cut-off; Female – waist circumference <80=normal; ≥ 80=above cut-off.

The mean knowledge score was 14.8 ± 2.3 and the median was 14.5. The percentage for correctly answered items in the knowledge questionnaire ranged from 27.2% to 99.7% (Figure 1). The highest score was on the traditional activity where students were able to identify swimming as a beneficial activity that will provide health benefits. The lowest score was on the physical activity guidelines that suggested ten minutes of physical activity in three sessions is equally beneficial as single session of 30 minutes activity. Only 27.2% of the students were aware of the change in recommendations. The majority of students have more knowledge about traditional physical activities compared with knowledge on guideline recommendations and lifestyle physical activities.
Majority of students had a positive BREQ2 RAI suggestive of positive motivation toward physical activity. The highest index for BREQ2 RAI among students was 76 whereas the lowest index was -17 with a mean of 38 ± 19 (Figure 2). Mean BREQ2 RAI for students who perceived they were physically active (46.6 ± 15.9) were almost double than those who perceived themselves to be inactive (29.3 ± 18.7) (p<0.05).

A total of 87.4% students fulfilled WHO's recommendation for physical activity (GPAQ ≥ 600 MET-min/week). Students who perceived themselves as active were about four times more likely to be physically active than those who perceived themselves as inactive (Table 2). There was no significant association between BMI and waist circumference with level of physical activity.

**Discussion**

**Physical activity levels of medical students**

The majority of the participants 263 (87.4%) were physically active based on WHO's recommendations. The level of physical activity in this group of participants was much higher compared to that found in the National Health and Morbidity Survey 2011, which was 64.3% [13]. Medical students are more health conscious compared to the general population. An Australian study also showed that medical students
and health professionals were more physically active compared to the general population [14]. However, higher level of physical activity is expected among medical students as studies show that activity level drop significantly throughout the training years in medical school [15]. Similar study found that both muscular endurance and aerobic capacity had decline throughout the four years of medical training.

The knowledge

Our results showed that knowledge for guideline is relatively lower compared to types of physical activities. This similar pattern was also noted in a study done in India [16]. There is no evidence that higher knowledge will translate into better physical activities and health. A study done in the United States also showed no direct relationship between knowledge and exercise behavior [11]. However, adequate knowledge plays an important role during patients’ education, counseling and health promotion.

Motivation behavior was found to be significantly associated with physical activity. Positive motivation enables an individual to have strong self-determination for physical activity. In our study, motivation behavior also strongly associated with students’ perception of their physical activity level. This group of participants have interest in physical activity and is aware of its benefits. Enjoyment and satisfaction that they experienced during the activity further encourage them to continue the activities. Positive link between motivations had been noted in other study conducted among medical students [16].

Anthropometric measurements

In this study, BMI and waist circumference has no significant relationship with level of physical activity. This could be due to change in their lifestyle especially among the first year medical students as majority of them are staying in the hostel. Staying at the hostels provides the advantage of always being with their friends and colleagues. Peer influence and encouragement was proven to be a positive influence on the level of physical activity [17].

On top of that, exercise alone cannot provide sustained weight lost. An acute change in body weight only appears at initial stage and subsequent weight loss is balance by the conversion of fatty tissues to muscles. Higher duration of activity is also needed to maintain weight and physical activity of at least 250 minutes per week is needed for weight reduction.

The American College of Sport Medicine recommends that 150 to 250 minutes per week of moderate physical activity is needed to prevent weight gain and produce modest weight loss [18]. Significant weight reduction requires greater amount of physical activity which is more than 250 minutes of moderate physical activity per week [18]. Thus, despite the majority of study participants achieving adequate physical activity for health, a quarter was still overweight or obese. A study assessed the medical students’ personal health behaviors noted that their health practice during training was their usual practice before joining medical school rather than a healthy behavior that cultivate during their training. Thus we recommend that health promotion program should be emphasized during the training [19]. This is not only important to improve the knowledge of our future doctor but further improve their health practice and more importantly enhance their health promotion counseling.

We recommend that intervention to reduce obesity in medical students and health practitioners should include strategies that will improve motivation. Enjoyable activities were found to enhance positive affects towards exercise and thus may promote students’ adherence and future exercise behavior [20]. Many students are obese even before they join the university. Education on overweight and obesity should be started as early as in that secondary or even in primary school. The introduction of physical activity programs were found more effective during the child and adolescent period and positive effects are more likely to be sustainable [14].

Strength and Limitations

This study had a good response rate and validated questionnaires were used. Furthermore, the BMI and waist circumference were measured during the study and are therefore likely to be more reliable than by recall. However, this was a cross sectional study and therefore the causal effect of variables and physical activity could not be determined.

The percentage of students that were physically active might be overestimated as the data were self-reported. Physical activity can be more objectively measure through body fitness. Future studies can consider using parameter such as basal resting heart rate which will provide more reliable data. A prospective study that follows the students throughout their training would be able to generate more useful information.

Conclusion

Future studies should also attempt to include both clinical and pre-clinical medical students, multiple institutions and involve a bigger sample size. Since a significant number of students were overweight or obese, factors affecting their lifestyle behaviour should be further studied and interventions taken to curb and reduce the number of obese and overweight future doctors.

Conflict of Interest

None declared.

References


