Impact of applied progressive deep muscle relaxation training on the health related quality of life among prostate cancer patients — A quasi experimental trial

Mohamad-Rodi Isa a,b,⁎, Foong Ming Moy b, Azad-Hassan Abdul Razack c, Zulkifli Md. Zainuddin d, Nor-Zuraida Zainal e

a Population Health & Preventive Medicine, Faculty of Medicine, Universiti Teknologi MARA (UiTM) Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor Darul Ehsan, Malaysia
b Julius Centre University of Malaya, Department of Social & Preventive Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia
c Department of Surgery, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia
d Department of Surgery, Universiti Kebangsaan Malaysia Medical Centre (UKMMC), Jalan Yaacob Latif, 56000 Kuala Lumpur, Malaysia
e Department of Psychological Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia

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A B S T R A C T

Purpose. To determine the impact of applied progressive muscle relaxation training on health related quality of life among prostate cancer patients.

Method. A quasi-experimental study was conducted at the University Malaya Medical Centre (UMMC) and Universiti Kebangsaan Malaysia Medical Centre (UKMMC) over six months. Patients from UMMC received the intervention and patients from UKMMC as a comparison group. The general health related quality of life was measured using Short Form-36 (SF-36).

Results. A total of 77 patients from the intervention group and 78 patients from the comparison group participated in the study. At the end of the study, only 90.9% in intervention group and 87.2% in comparison group completed the study. There were significant differences between intervention and comparison groups for mental component summary (MCS) (p = 0.032) and overall health related quality of life (p = 0.042) scores. However, there was no significant difference between groups for physical component summary (PCS) (p = 0.965).

Conclusion. The improvement in MCS and overall QOL showed the potential of APMRT in the management of prostate cancer patients. Future studies should be carried out over a longer duration to provide stronger evidence for the introduction of relaxation therapy among prostate cancer patients as a coping strategy to improve their QOL.

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Introduction

Prostate cancer is the second most common cancer and the second leading cause of cancer death in men in the West (American Cancer Society, 2011; Cancer Research UK, 2010). In Malaysia, prostate cancer ranked fourth among cancers in men with an adjusted standardized rate of 6.2 per 100,000 populations (Omar and Ibrahim-Tamin, 2011).

Men with prostate cancer face challenges as they deal with the disease, treatment and their partners (Katz and Katz, 2008) that will affect their health related quality of life (HRQOL). Besides modern treatment, prostate cancer patients also chose to supplement conventional treatment with one or more forms of complementary and alternative medicine (CAM) (Bishop et al., 2011).

Progressive muscle relaxation is one of the CAM applied in the management of quality of life (QOL) (Boyle et al., 2003). It involved an alternate tensing and relaxing of sixteen different muscle groups (Joseph and Arnold, 1966). The lack of research in this aspect motivated us to determine the impact of this therapy on HRQOL among prostate cancer patients. We hope to provide information to the healthcare professionals in improving patients’ QOL. We hypothesized that by applying APMRT, the HRQOL among prostate cancer patients would improve.

Methodology

A quasi-experimental study was conducted at the University Malaya Medical Centre (UMMC) and Universiti Kebangsaan Malaysia Medical Centre (UKMMC) over a period of six months. UMMC and UKMMC are tertiary hospitals under the Ministry of Higher Education, Malaysia. Patients from UMMC
and UKMMC were selected as the intervention and comparison groups respectively. The inclusion criteria were patients diagnosed with prostate cancer aged 50 years and above. Patients with any cancers other than prostate cancer and with psychiatric diagnosis; current use of any psychiatric medication; having prior training or current use of relaxation therapy; presence of physical limitations for learning Progressive Muscle Relaxation Training (e.g.: bed-bound) were excluded.

The intervention was the Applied Progressive Muscle Relaxation Training (APMRT) Program. It was a two-hour therapy that consisted of six modules. A total of three therapies were conducted by the principal investigator over six weeks. In brief, the APMRT program involved the discussion of quality of life in prostate cancer, rational, description and demonstration of the therapy. In addition to that, abdominal breathing technique was taught to enhance relaxation through demonstration by the principle investigator. Patients were encouraged practicing the therapy on their own daily over the six month period.

At baseline, self-administered questionnaire was used to collect information on socio-demographic characteristics, cancer status and HRQOL. Information on medical history, including their past medical illnesses, was reviewed in the medical record to countercheck their past medical illnesses. Patients in the UKMMC participated. At the end of the study, 90.9% and 87.2% of patients from the UMMC and UKMMC groups completed the study respectively (Fig. 1).

The demographic characteristics and the cancer status of the participants are shown in Table 1. Both groups were comparable in all characteristics at baseline (p > 0.05).

Majority of the patients were more than 70 years old with more than 50% were more than 70 years old. About 52.6% of the patients were more than 70 years old. Majority of the patients were more than 70 years old with more than 70% of them had other comorbidities besides prostate cancer and about 50% of them had other comorbidities besides prostate cancer and about 50% of them had other comorbidities besides prostate cancer.

The Gleason score is a score based on the architectural appearance of the prostate gland (Epstein, 2006) where the higher the score the poorer the prognosis (Bracarda et al., 2005). Life in prostate cancer was estimated from the date of diagnosis (Bracarda et al., 2005). Life in prostate cancer was estimated from the date of interview. The metastases status was determined by a combination of clinical examinations, blood tests and radiological investigations (Mackie and Rai, 2008). Prostatic Specific Antigen (PSA) was used to monitor the prostate cancer progression (Katz and Katz, 2008). The HRQOL was assessed using Short Form Health Survey with 36 items (SF-36) in English and Malay languages. The Malay version of SF-36 is reliable and valid and used in other study (Abu Bakar et al., 2003). Patients’ medical records were reviewed to countercheck their past medical illnesses. Patients in both groups were required to complete the SF-36 at fourth month (post-test 1) and at sixth-month (post-test 2). SF-36 assesses physical component summary (PCS), mental component summary (MCS) and overall health related quality of life. The higher the mean score of HRQOL meant the better quality of life.

The sample size was calculated using PS sample size calculation (Dupont and Plummer, 1990). Based on the study by Bastani et al. (2006), with a mean difference of 13.39 points and a standard deviation of 5 points between intervention and comparison groups, using a significant level of 5% with a power of 0.80 (Cohen, 1992), a minimum sample of 56 for each group was required. Patients from both centers were recruited from August 2010 to June 2011 using universal sampling until the required sample size was achieved.

The data were analyzed using SPSS version 20.0. The significant level was preset at α = 0.05. Repeated measures ANOVA procedure was used in the analysis and per-protocol analysis was applied.

Ethical approval was obtained from the UMMC Ethics Committee and UKMMC Ethics Committee. The trial was registered at the Iranian Registry of Clinical Trial (IRCT201103176085N1). The patients were given verbal and written explanation to clearly understand the principles and procedures of the study. Informed consent was obtained from all participants.

### Result

A total of 77 patients from the UMMC and 78 patients from the UKMMC participated. At the end of the study, 90.9% and 87.2% of patients from the UMMC and UKMMC groups completed the study respectively (Fig. 1).

The demographic characteristics and the cancer status of the participants are shown in Table 1. Both groups were comparable in all characteristics at baseline (p > 0.05).

Majority of the patients were more than 70 years old with more than 50% of them had other comorbidities besides prostate cancer and about 50% of them had other comorbidities besides prostate cancer.

![Flow diagram of the progress to the various phases on intervention and comparison groups.](image)

40% had metastases status. The median (inter-quartile range) life in prostate cancer in both groups was 2.73 (3.85) years. The mean (standard deviation) Gleason score was 6.60 (1.64). All patients had adenocarcinoma.

The impact of APMRT on participants’ HRQOL is shown in Table 2. Overall, there were significant changes over time in MCS (p = 0.032) and overall QOL (p = 0.042) scores between UMMC and UKMMC groups. However, there was no significant change over time for PCS (p = 0.965) (Table 2). The effect sizes for MCS and overall QOL were low.

For MCS score in UMMC group, there were significant differences in mean between baseline and at 4-month [paired difference: 4.17 (95% CI: 2.00, 6.35)]; baseline and at 6-month [paired difference: 1.65 (95% CI: 0.65, 2.64)]; however, there was no significant difference at 4-month and at 6-month [paired difference: 0.36 (95% CI: 0.00, 0.74)]. Study by Smith et al. (2007) found that yoga was more effective in improving mental health at short and long terms and suggested the recommendation of a combination of yoga and relaxation therapy to the patients for better mental health outcome. For overall QOL, our results also concurred with studies among patients with irritable bowel disease (Boyce et al., 2003), and multiple sclerosis (Ghafari et al., 2009), the progressive muscle relaxation also found to be cost-effective with minimal training (Cheung et al., 2003).

The improvement of MCS and overall QOL observed in our study could be due to the stimulation of the relaxation response. APMRT counteracted with the sympathetic activity by promoting the action of the parasympathetic activity (Widmaier et al., 2006). This resulted in the decreased of blood pressure, heart rate, muscle tension and rate of breathing which indirectly improved the MCS and overall QOL.

Although our results on MCS and overall QOL were statistically significant, the effect sizes obtained were small. This could be due to the short term intervention of six months duration only.

Our result contradicted the findings of other studies. Cheung et al. (2003) found a significant improvement in PCS among colorectal patients and Boyce et al. (2003) found similar improvement among irritable bowel syndrome patients. The non-significant findings in our study could be due to the increased physical disability among our patients who were all elderly.

The quasi-experimental design in our study restricted the adjustment of confounders. However, the comparability of baseline characteristics and at 6-month [paired difference: 0.47 (95% CI: −0.83, −0.11)]. However, there was no significant difference between 4-month and 6-month [paired difference: −0.01 (95% CI: −0.04, 1.04)].

For overall QOL in UMMC group, there were significant differences in mean between baseline and at 4-month [paired difference: 1.29 (95% CI: 0.20, 2.37)]; baseline and at 6-month [paired difference: 1.65 (95% CI: 0.65, 2.64)]; however, there was no significant difference at 4-month and at 6-month [paired difference: 0.36 (95% CI: −0.62, 1.35), p = 0.462]. In UKMMC group, there were no significant differences in mean between baseline and 4-month [mean difference: −0.02 (95% CI: −0.49, 0.52)], baseline and 6-month [paired difference: 0.13 (95% CI: −0.05, 0.31)], and 4-month and 6-month [paired difference: 0.15 (95% CI: −0.32, 0.62)].

Discussion

Currently, the quality of life has become an important element for clinical care in prostate cancer patients (James and Jack, 1998). We found APMRT significantly increased the score of MCS and QOL among prostate cancer patients.

Our results supported the findings of similar studies on MCS improvement among multiple sclerosis patients (Ghafari et al., 2009; Mackereth et al., 2009). Study by Smith et al. (2007) found that yoga was more effective in improving mental health at short and long terms and suggested the recommendation of a combination of yoga and relaxation therapy to the patients for better mental health outcome. For overall QOL, our results also concurred with studies among patients with irritable bowel disease (Boyce et al., 2003), advanced cancer (Sloman, 2002) and multiple sclerosis (Ghafari et al., 2009). The progressive muscle relaxation also found to be cost-effective with minimal training (Cheung et al., 2003).

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The quasi-experimental design in our study restricted the adjustment of confounders. However, the comparability of baseline characteristics

Table 1

<table>
<thead>
<tr>
<th>Age: (mean ± SD)</th>
<th>UMMC, n = 77, n(%)</th>
<th>UKMMC, n = 78, n(%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.16 ± 7.11</td>
<td>73.44 ± 7.42</td>
<td>0.053</td>
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</table>

Table 2

<table>
<thead>
<tr>
<th>HRQOL</th>
<th>Time</th>
<th>UMMC (n = 70) (mean ± SD)</th>
<th>UKMMC (n = 68) (mean ± SD)</th>
<th>F-stat between-subject (df)</th>
<th>p-value</th>
<th>Partial effect size (partial η²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS</td>
<td>Baseline</td>
<td>70.0 ± 17.9</td>
<td>66.9 ± 17.8</td>
<td>0.002 (1,136)</td>
<td>0.965</td>
<td>0.001</td>
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<td></td>
<td>At 4-month</td>
<td>67.9 ± 17.9</td>
<td>67.4 ± 16.4</td>
<td>4.670 (1,136)</td>
<td>0.032</td>
<td>0.256</td>
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<tr>
<td></td>
<td>At 6-month</td>
<td>66.9 ± 17.8</td>
<td>66.6 ± 14.0</td>
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<tr>
<td></td>
<td>Baseline</td>
<td>72.5 ± 14.7</td>
<td>72.3 ± 11.1</td>
<td></td>
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<tr>
<td>MCS</td>
<td>At 4-month</td>
<td>76.6 ± 13.1</td>
<td>71.8 ± 10.7</td>
<td>4.322 (1,136)</td>
<td>0.042</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>At 6-month</td>
<td>79.5 ± 11.4</td>
<td>71.8 ± 10.7</td>
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<tr>
<td></td>
<td>Baseline</td>
<td>69.7 ± 15.7</td>
<td>69.6 ± 11.6</td>
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<tr>
<td>Overall QOL</td>
<td>At 4-month</td>
<td>70.9 ± 14.4</td>
<td>69.6 ± 11.6</td>
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<tr>
<td></td>
<td>At 6-month</td>
<td>71.3 ± 13.9</td>
<td>69.8 ± 11.3</td>
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</table>

* Denotes significant different at α = 0.05.
for both intervention and comparison groups assured us that the observed improvement was due to the intervention itself. The good follow up rate of our study also assured us of less bias.

**Conclusion**

The improvement in MCS and overall QOL showed the potential of APMRT in the management of prostate cancer patients. Future studies should be carried out over a longer duration to provide stronger evidence for the introduction of relaxation therapy among prostate cancer patients as a coping strategy to improve their QOL.

**Conflict of interest statement**

The authors declare that there are no conflicts of interests.

**Acknowledgment**

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**References**


