

Multiple Myeloma and Physical Activity

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Research note

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Abstract

Objective:

With improved survival in multiple myeloma, survivors face the challenge of maintaining their premorbid levels of physical and psychosocial wellbeing. Physical activity (PA) has been shown to improve quality of life (QoL) in cancer patients with some evidence in MM. Due to the high incidence of bone destruction, PA may be perceived as introducing risk of injury. This service evaluation study aimed to determine MM patients' exercise levels, their perception of PA, and to explore correlations with QoL.

Results:

MM outpatients were given a questionnaire to complete. Of the 65 respondents, 75% would like to increase PA level. Weakness, fatigue and pain were the most commonly perceived barriers to PA. 59% would like to receive PA advice. Only 25% were deemed active based on the Godin leisure-time exercise questionnaire score, with 39% deemed insufficiently active. Our respondents had lower mean FACT-G and FACIT-F scores compared to scores from general population, suggesting a lower QoL. Finally, there was a significant positive correlation between the GLTEQ score and the FACT-G score ($p < 0.001$). Results highlight an unmet exercise need in MM patients. Current practice should be reviewed to develop a more holistic care model that incorporates tailored exercise advice or programme.

Introduction

Multiple myeloma (MM) is an incurable bone marrow malignancy with multiple relapses and remission periods, followed by eventual treatment resistant disease. Recent novel therapies have dramatically improved patients' survival. MM survivors, who require lifelong follow up, now face the challenge of regaining premorbid psychosocial and physical wellbeing, whilst coping with disease symptoms and treatment side effects. With osteolytic bone destruction occurs in nearly 90% of patients [1], physical activity (PA) is often perceived as increasing risk of injury and is not actively promoted. The lack of PA, along with long term toxicity from complex treatment regimens and stem cell transplantation, can lead to muscle atrophy, fatigue and de-functioning, thus negatively impact on quality of life (QoL) [2].

PA has been shown to associate with less fatigue, improved QoL and physical functioning in cancer patients [3–5]. Previous studies conducted by our group confirmed that tailored exercise programme in MM patients was safe and feasible, with high attendance and adherence, and was associated with benefits in QoL, fatigue and muscle strength [6, 7]. Additional studies are required to further confirm the benefits of structured exercise programmes in these patients. Moreover, a better understanding of the prevailing attitudes toward PA in patients and clinical teams is needed if such programmes are to become part of survivorship care, and to be supported by healthcare workers.

PA is now recognised as an important aspect to the quality of cancer patients' survival. The U.K. Independent Cancer Taskforce published in 2015 recommended in its strategy that all cancer patients should receive tailored PA advice by 2020. In MM, such an initiative remains hampered by a lack of understanding and awareness of the benefits of PA, and how to promote safe exercise in the context of bone disease in MM patients. We sought to find out MM patients' attitude towards PA, and ascertain their levels of PA and QoL in order to better understand their survivorship needs.

Methods:

This is a service evaluation study conducted in the University College London Hospitals NHS Foundation Trust, a tertiary myeloma centre. Patients attending MM outpatient clinics were invited to complete a structured questionnaire, and implied consent were obtained when they returned the completed questionnaire. Patients were asked only to complete it once and their responses were anonymised. In line with Health Research Authority guidance, ethical approval was not required as no patient identifiable data was collected.

Demographic data including age group and gender were collected. Information on patients' MM status and treatment were extracted. PA questions include whether they would like to increase their exercise level, and their perceived barrier(s) to PA. They were also asked if they would like to receive PA advice from a health professional and the way(s) in which they would like to receive the information.

Physical activity level was assessed using the Godin leisure-time exercise questionnaire (GLTEQ) [8, 9]. A score of 24 or above represents physically active, 14 to 23 represents moderately active, and below 14 represents insufficiently active. The Functional Assessment of Cancer Therapy-General (FACT-G) questionnaire and the Functional Assessment of Chronic Illness Therapy- Fatigue (FACIT-F) questionnaire were used to assess QoL and fatigue respectively [10, 11].

Data were summarised descriptively, and using standard statistical methods. Quantitative parameters were presented as percentages, means and medians. Regression, ANOVA and Pearson's correlation coefficient were used to explore correlations between variables.

Results

Between March and May 2019, 65 myeloma patients completed the questionnaire. Patient characteristics are shown in Table 1. This age distribution is consistent with a MM cohort attending a tertiary practice, where many are referred for stem cell transplantation. Two-third (66%) of these 65 patients were on myeloma treatment, with 26% on third line treatment or beyond. The median time from MM diagnosis was 3.8 years (range 0.1–15). 12% of the 65 patients had been diagnosed for over 10 years. When asked about whether or not they would like to increase their level of PA, 75% answered yes, 9% answered no, and the rest were either neutral or did not specify. The most commonly perceived barrier to improving PA was weakness (43%) followed by fatigue (40%) and pain (26%). Other barriers include neuropathy from myeloma treatment (20%), myeloma bone disease (15%), arthritis (9%) and previous surgery limiting

mobility (8%). Parkinsonism and previous nerve injury were stated as barriers for two of the respondents. 71% reported that a combination of these factors, rather than a single factor, prevented them from improving their PA (Table 2).

Fifty-nine percent would like to receive PA advice from a health professional. The three most selected options to receive such advice were written leaflets (29%), a face-to-face session with a health professional (28%) and verbal advice in clinic consultation (23%). Other chosen methods include a phone call from a health professional (14%), mobile application (12%) and internet website (11%). None of the respondents chose group seminar as an option.

Our respondents had a median GLTEQ score of 15 (range 0–66). The GLTEQ scores did not differ between the different age groups (One way ANOVA, $p = 0.14$). According to their scores, 25% of the respondents were deemed physically active, 17% were deemed moderately active and 39% inactive. Thirteen of them did not specify their level of PA. The median FACT-G score was 73.1 (range 31.2–108, mean 75.1 ± 21.1), and the median FACIT-F score of 32.5 (range 3–52, mean 30.3 ± 14.6 , maximum score 52). Using a cut off FACIT-F score of 34 for clinical fatigue [12], 49% of the patients would be classified as clinically fatigued. These clinically fatigued patients had a lower median GLTEQ score compared to those who were not ($p < 0.001$).

Our respondents had lower mean FACT-G and FACIT-F scores than the general population reference scores (mean FACT-G score 75.1 in study versus 80.1 in general population, mean FACIT-F score 32.5 in study versus 43.6 in general population) [13]. Finally, there was a significant positive correlation between the GLTEQ score and the FACT-G score (Pearson's $r = 0.59$, $n = 52$, $p < 0.001$), and also between the GLTEQ score and the FACIT-F score (Pearson's $r = 0.58$, $n = 52$, $p < 0.001$) as shown in Fig. 1.

Discussion

One of the key findings is the low PA level in our cohort of real-world MM patients. Although a different measure of self-reported PA was used, our figure of 25 is much lower than the 67% of U.K. general population who were considered active (ages 75–84–53%, age 85+ – 31% active) [14]. These low levels of PA are hardly surprising; in addition to the fear of injury, related to their bone disease, MM patients suffer with a considerable symptom burden, related to their older age and co-morbidities, as well as treatment related toxicities that include peripheral neuropathy. Barriers to exercise are usually multifactorial, but neuropathy was featured in 20% of our participants, alongside more common cancer-related symptoms such as fatigue and pain. Peripheral neuropathy is a common and often painful side effect of some of the commonest agents used to treat MM, bortezomib and thalidomide. Similar to our findings, Craike et al [15] reported that most barriers were related to symptoms of MM and side effects of treatment. The high burden from disease symptoms and long-term side effects from repeated therapies inevitably have a negative impact on patients' QoL, which is reflected by the lower mean QoL scores in our cohort compared to reference scores from the general population.

It is also noteworthy that while most patients had low levels of PA, the majority indicated they would like to increase their PA levels. This suggests an awareness of the possible benefits of exercise, and an unmet survivorship need. Over half of patients wished to receive PA advice from a health care professional, suggesting that one of the barriers to exercising may be lack of confidence that it was safe to do so. This echoes themes reported by Groeneveldt et al and Koutoukidis et al [6, 7], where patients were more confident to exercise under supervision by a physiotherapist experienced in working in myeloma, and reflects the need for development of specialist physiotherapy workforce for this complex patient group. Oncology health professionals have reported lack of clear guidelines and not being the right person to give advice regarding lifestyle behaviours including PA [16].

Fatigue is a ubiquitous problem in cancer patients, but in MM, it is compounded by the use of steroids in almost every treatment line, bone pain and fractures, and the autonomic neuropathy that accompanies many anti-myeloma drug classes such as the proteasome inhibitors and the immunomodulatory drugs. Almost half of our surveyed patients (49%) were classified as clinically fatigued according to their FACIT-F scores and unsurprisingly, these patients had significantly lower GLTEQ scores than those who were not clinically fatigued ($p < 0.001$). Patients with fatigue are often advised to, or believe it is best, to rest to conserve energy. Excessive rest and reduction in PA results in loss of functional capacity through deconditioning. Deconditioning and increasing effort to undertake daily activities, further exacerbates fatigue. Disrupting this cycle through exercise is key to its management [17]. The well documented beneficial effects of exercise on cancer-related fatigue, and on bone health, further highlights this unmet need in MM patients.

We observed that higher levels of PA were associated with better QoL, in accordance with other previous studies [3–5]. Because MM is incurable, patients have lifelong follow up in outpatient clinics, where emphasis is often placed on the results of myeloma biochemical markers rather than patients' survivorship needs. The results of this service evaluation study highlight an unmet need to develop a more holistic model of care, in which PA is assessed and promoted appropriately, with professional support from physiotherapists as appropriate. It is also important to identify perceived barriers to improving PA and address them proactively, such as pain and neuropathy management. This is in line with MM supportive care guideline [18], which states that regular PA should be encouraged from the start of diagnosis to ensure that prehabilitation and rehabilitation are an integral part of every line of treatment. To achieve this, it is key that both the patient and the clinical team are educated on the individual benefits and risks of exercise. To promote survivorship and self-management, our team designed and currently runs a pilot multidisciplinary team (MDT) MM clinic involving a doctor, a nurse specialist and a physiotherapist, with wider support from other MDT members if needed. Tailored PA advice is given in each consultation and patients are encouraged to set achievable goals, which will be reviewed in the next visit. They are also signposted to various survivorship tools to help maintain their physical and psychosocial well-being. Data on patient reported outcomes and patient experience are being collected as part of a research project (IRAS: 262599) to evaluate this alternative model of care.

A more formal way to promote PA in MM patients is to deliver supervised exercise programmes, which, when administered with appropriate screening procedures and by specialist personnel, have been shown to be safe and feasible [6]. Specialists should be involved so that MM related symptoms and treatment toxicities are taken into account in the prescription of individualised programmes. With limited literatures on MM and PA available, more high-quality, large randomised studies are needed to evaluate the impact of PA on different health parameters of MM patients. Research protocols such as the PREeMPT study [19] and the PERCEPT myeloma [20], which look at prehabilitation for patients undergoing autologous haematopoietic stem cell transplantation, will provide information to support for the use of tailored exercise intervention in the future. Although such programmes may be a positive way to influence PA, less than a third of our surveyed patients (28%) preferred a face-to-face session with a healthcare professional to receive PA advice. This suggests that formal exercise classes may not suit all MM patients and therefore the clinical team needs to devise more flexible ways to promote PA depending on patients' preference, especially when digital healthcare technologies are now becoming more available and increasingly used.

Limitations

- Results are limited by the cross-sectional nature of the study, and by small sample size in a single site.
- Self-report data is easy and quick to obtain, but is subjected to bias and limitations such as introspective ability and interpretation of questions.

Declarations

Ethics approval and consent to participate

In line with Health Research Authority guidance, ethical approval was not required as no patient identifiable data was collected.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

Competing interests

The authors declare no competing interests.

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Author's contributions

CL performed the study, all authors designed the study, CL analysed the data, CL and KY wrote the paper. All authors read and approved the final version.

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Tables

Table 1

Patient characteristics (n = 65)	Frequency (%)	
<i>Gender</i>	Male	38 (58)
	Female	26 (40)
	Not specified	1 (2)
<i>Age group</i>	Less than 45	1 (2)
	45–54	7 (11)
	55–64	18 (28)
	65–75	27 (42)
	Over 75	12 (18)
<i>Years since MM diagnosis</i>	Less than 1	9 (14)
	1 to 5	28 (43)
	6 to 10	14 (22)
	Over 10	8 (12)
	Not specified	6 (9)
<i>On myeloma treatment</i>	Yes	43 (66)
	No	21 (32)
	Not specified	1 (2)
<i>Line of myeloma treatment</i>	None	7 (11)
	Radiotherapy alone	3 (5)
	1st	17 (26)
	2nd	9 (14)
	3rd or beyond	17 (26)
	Not specified	12 (18)

Table 2

Perceived barriers preventing patients from improving their PA	Frequency (%)
<i>None</i>	16 (25)
<i>Weakness</i>	28 (43)
<i>Fatigue</i>	26 (40)
<i>Pain</i>	17 (26)
<i>Neuropathy from myeloma treatment</i>	13 (20)
<i>Known myeloma bone disease</i>	10 (15)
<i>Known arthritis</i>	6 (9)
<i>Previous surgery limiting mobility</i>	5 (8)
<i>Others</i>	2 (3)

*Patients were allowed to choose more than one options. 71% of those who indicated barriers to PA reported that a combination of these factors, rather than a single factor, prevented them from improving their PA.

Figures

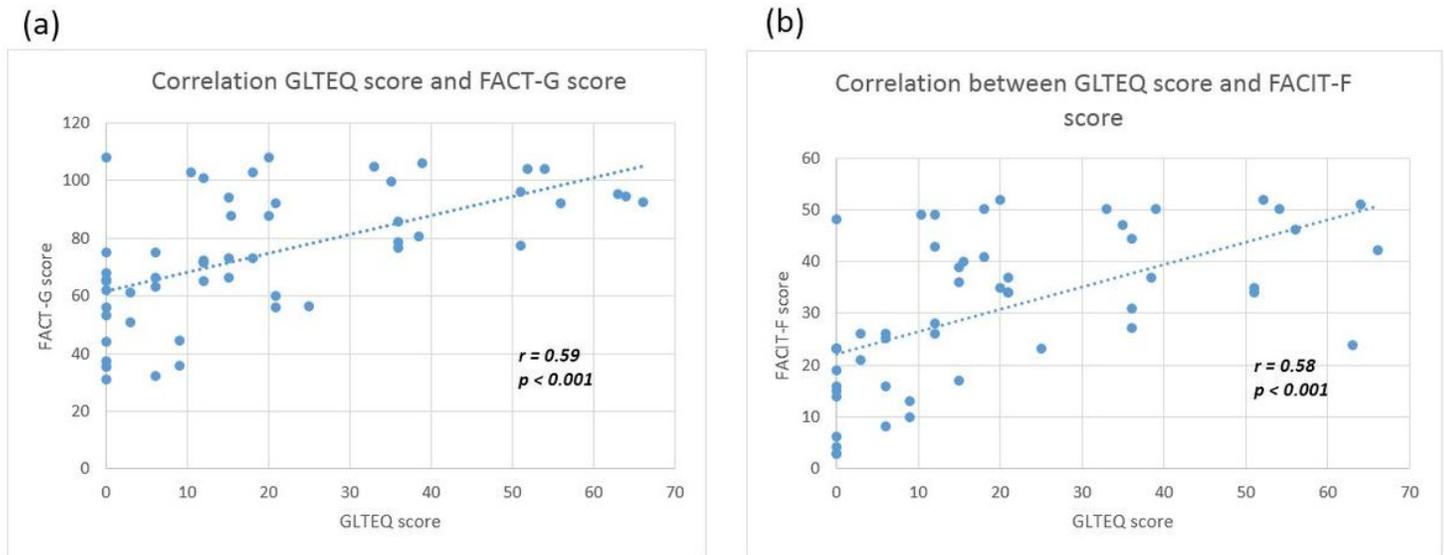


Figure 1

(a) Scatterplot showing a positive correlation between the GLTEQ score and the FACT-G score (Pearson's $r = 0.59$, $n = 52$, $p < 0.001$). This suggests that a higher physical activity level correlates to better quality of life. (b) Similarly, there was a positive correlation between the GLTEQ score and the FACIT-F score

(Pearson's $r = 0.58$, $n = 52$, $p < 0.001$) shown in this scatterplot, suggesting that a higher physical activity is associated with a lower level of fatigue.