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ORIGINAL ARTICLE

# Quality of life and tolerance to mental pain scale in cancer patients subjected to bone scan

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## Summary

***Purpose:*** *To evaluate the impact of psychiatric co-morbidities on the quality of life-36 (QoL36) and tolerance to mental pain scale (TMPS) questionnaire of cancer patients administered in the Laboratory of Nuclear Medicine prior to a bone scan to rule out metastatic disease.*

***Methods:*** *A group of 40 consecutive cancer patients (24 prostate, 12 breast and 4 with other cancers) were subjected to bone scan (BS) to rule out metastatic disease. Each patient received QoL36 and TMPS questionnaire prior to BS.*

***Results:*** *There were low QoL and TMPS scores in all patient groups. The average QoL36 questionnaire score was 43,71 (23-70) (normal values considered >90). The average TMPS scores for prostate cancer patients was 55.42 (21-96), for breast cancer patients 63.42 (44-83) and for the other cancer patients 58.25 (48-68). Female patients with breast cancer had statistically higher tolerance to mental pain compared to patients with prostate cancer. Both tests were independently important for evaluation of the psychological status of the patients. There was no significant correlation of either QoL or TMPS with age, sex or disease duration.*

***Conclusions:*** *Cancer patients exhibited low QoL and TMPS, independent of sex, age, cancer type and disease duration. Multi-modality psychological support may be needed for these patients.*

***Key words:*** *bone scan, quality of life, QoL35, tolerance to mental pain, TMPS, cancer*

## Introduction

Patients with cancer (up to 50%) and their relatives (up to almost 30%) exhibit a high rate of depression and other emotional disturbances secondary to the cancer diagnosis [1]. These patients are at an increased risk of abnormal physical functioning and impaired quality of life (QoL), especially if they are lacking social support [2]. This appears to be a long lasting condition, since even one year after cancer diagnosis, half of the patients continue to exhibit moderate anxiety while 25% have depression. QoL may be worse with advanced cancer stage, higher age, and higher income status, presence of other illnesses and administration of chemotherapy [3]. In addition, young women on adjuvant chemotherapy for breast cancer experience significant dysfunction in their sexual relationships requiring specific support interventions [4]. On the contrary, older breast cancer survivors who have responded to treatment may be doing better and not requiring any psychological support [5]. The management of breast cancer patients needs a collaborative approach between oncologists, gy-

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necologists, psychologists and psychiatrists [6]. In all these patient groups, cognitive therapy may be of value to ameliorate the symptoms of their distress in order to be able to cope with the cancer and therapeutic interventions. Such a study in 16 cancer patient and 5 care givers employing 8-week mindfulness-based cognitive therapy demonstrated significant reduction in depression and mindfulness which lasted for at least 3-month period [7].

Skeletal scintigraphy plays a significant role in the diagnosis and management of patients with cancer and bony metastases [8,9]. Bone scans and computed tomography are required tests during diagnostic workup and chemotherapy courses to evaluate response to treatment and during treatment changes [10]. A preliminary study showed that cancer patients undergoing bone scan for evaluation of their disease status have anxiety before and during the examination at a rate of 64% [11].

The purpose of our study was to evaluate the QoL and tolerance to mental pain scale (TMPS) in patients with cancer while waiting in the Laboratory of Nuclear Medicine for bone scan imaging. The role of sex, age, disease duration and exam was also analyzed.

## Methods

*Ethical approval*

All procedures performed were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

We conducted an observational study in patients diagnosed with cancer who visited the Laboratory of Nuclear Medicine for evaluation for bone metastatic disease status with bone scintigraphy (BS) during the initial evaluation or during their treatment. Patients who were subjected to BS for reasons other than cancer (infection, heterotopic ossification, fractures etc) were excluded from the study. All patients who were fulfilling the criteria, after thorough explanation of the goals of the study were asked if they were willing to participate. Those who agreed to participate, following informed consent, were invited to complete the questionnaires assessing Quality of Life-36 (QoL-36) and Tolerance for Mental Pain Scale (TMPS). The protocol for this study was approved by the Hospital's Scientific Council and all studied individuals gave informed consent to the study, according to GDPR 2016 EU

*Questionnaires*

Quality of Life-36: The evaluation was achieved with the summed scores of the 36 questions in the questionnaire, provided from multiple choice answers that patients chose. The best score "considered as normal" was above 90 [12]. QoL was separated and evaluated according to 8 subgroups: (i) Physical functioning, (ii) Role functioning/physical, (iii) Role functioning/emotional, (iv) Energy/fatique, (v) Emotional well-being, (vi) Social functioning, (vii) Pain and (viii) General health. Tolerance for Mental Pain Scale questionnaire: This test contained 20 questions, with five answers given to choose for each question. The answers and the scoring were: (i) not true: 1 point, (ii) probably not true: 2 points, (iii) uncertain: 3 points, (iv) probably true: 4 points and (v) definitely true: 5 points. The points were summed and higher score indicated higher tolerance to mental pain [13-15]. The administration of these tests and their scores were evaluated by two psychiatrists and the final scores were statistically analyzed according to age, sex, type of cancer and the number of the examinations (repeatability of the results).

*Statistics*

For the statistical analyses of the type of cancer in association of the QoL and TMPS, only male patients with prostate cancer and females with breast cancer were evaluated, due to the small number of the patients with other types of malignancies. The utilization and analysis of the two questionnaires data was performed via several methodologies. Initially, the questionnaires information was presented in meaningful graphs in order to extract the obvious differences and the tendency among them. The most significant charts have been presented in results. Additionally, a t-test assessment was performed in both prostate and breast cancer subjects to examine the questionnaire similarities that appeared in each case. Furthermore, following analogous t-test methodology, it was observed that when a patient had more than one tests, the mean values of TMPS and QoL questionnaire' scores did not differ significantly, indicating that the BS did not influence the patient's psychological condition.

## Results

Patients in our study included 28 males and 12 females (40 patients) that had BS for evaluation of secondary bone metastatic disease due to various cancers (Table 1). Among male patients, 24/28 (85.7%) had prostate cancer and the other four were diagnosed with lung cancer (2 patients), liver cancer (1 patient) and hip sarcoma (1 patient).

**Table 1.** Characteristics of the patients and information concerning their disease

| *Characteristics* | *Patients (Total 40)* |
|---|---|
| Mean age (years) | 49-96 |
| Gender | 28M (70%) / 12F (30%) |
| Type of cancer | PC: 24(60%) / BC:12 (30%) / OC:4 (10%) |
| Bone scan | First: 22 (55%) / Follow up: 18 (45%) |
| Known metastatic disease | Yes: 4 (10%) / No: 36 (90%) |

M: males, F: females, PC: prostate cancer, BC: breast cancer, OC: other cancer

Female patients who participated in the study were all evaluated for bone metastatic disease due to breast cancer. Among all patients, 22/40 (55.0%) patients were referred for BS for the first time, with 16/22 (72.7 %) being males and 6/22 (27.3%) females. Among the patients who had a follow up BS 11/18 (61%) were males and 7/18 (39%) females. The QoL36 questionnaire resulted in scores ranging from 23 (lowest) to 70 (highest). No patient had scored above 90, a cut off in QoL questionnaire that is considered as normal [12]. The average score of all patients was 43.71. Among them, the average score was 42.21 for male patients with prostate cancer (23 - 70), 44.33 for female patients with breast cancer (29-65) and 51.0 for patients with other cancers (44-58). Thirty-five (87.5%) patients had scores below 60 with an average score of 40.6. No statistical differences were found in any of the QoL36 scores between breast cancer and prostate cancer patients (Figure 1). Subgroups data are shown in Table 2. Patients had the worse scores for energy/fatigue, role functioning/physical and general health. The higher score was noted in social functioning. TMPS, representing the calculating scores for tolerance to mental pain, ranged from 21 up to 96. The average (range) scores for prostate cancer patients were 55.42 (21-96), for breast cancer patients 63.42 (44-83) and for the other cancer patients 58.25 (48-68). Female patients with breast cancer had statistically higher tolerance to mental pain compared to patients with prostate cancer (Figure 2). No statistical difference in TMPS scores was noted in any of the cancer groups in relation to age or sex.

Analysis of QoL36 and TMPS series in the whole patient dataset demonstrated a low correlation between the specific scores although a relative trend among the samples was visible (Figure 3). A paired t-test was performed computing the mean, the standard deviation and the standard error of the mean for TMPS and QoL series. The means were 58.1 and 43.7, the standard deviations were 16.3 and 12.0 and the errors were 2.6 and 1.9, respectively. The most meaningful outcome of the t-test

**Table 2.** QoL subgroup results in cancer patients

| *Scale* | *Items* | *Alpha* | *Mean* | *SD* |
|---|---|---|---|---|
| Physical functioning | 10 | 0.93 | 70.61 | 27.42 |
| Role functioning/physical | 4 | 0.84 | 52.97 | 40.78 |
| Role functioning/emotional | 3 | 0.83 | 65.78 | 40.71 |
| Energy/fatigue | 4 | 0.86 | 52.15 | 22.39 |
| Emotional well-being | 5 | 0.90 | 70.38 | 21.97 |
| Social functioning | 2 | 0.85 | 78.77 | 25.43 |
| Pain | 2 | 0.78 | 70.77 | 25.46 |
| General health | 5 | 0.78 | 56.99 | 21.11 |

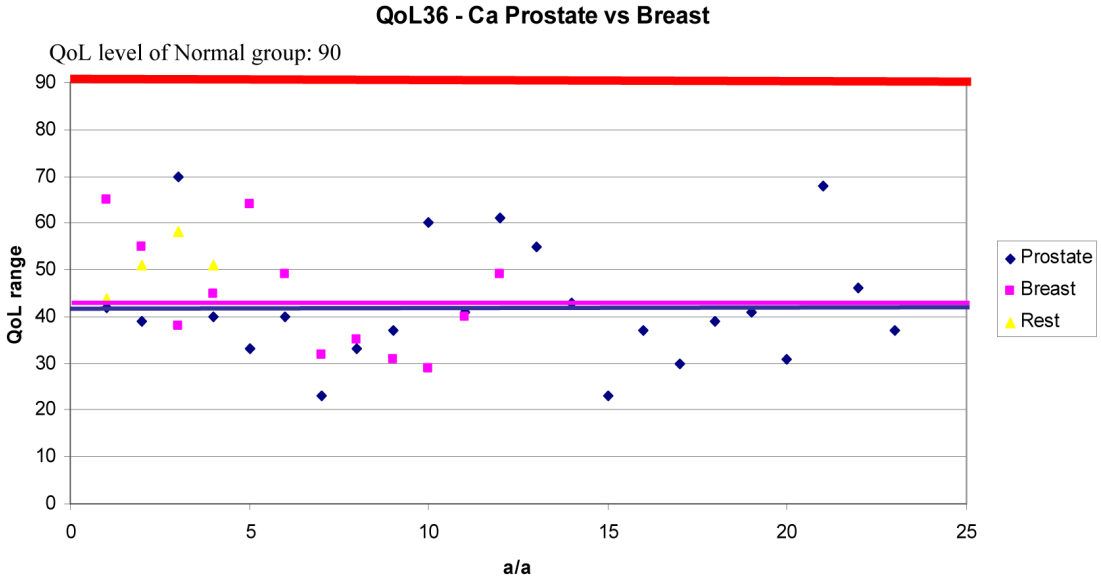


**Figure 1.** Female breast cancer patients demonstrate similar QoL36 values compared with prostate cancer patients.

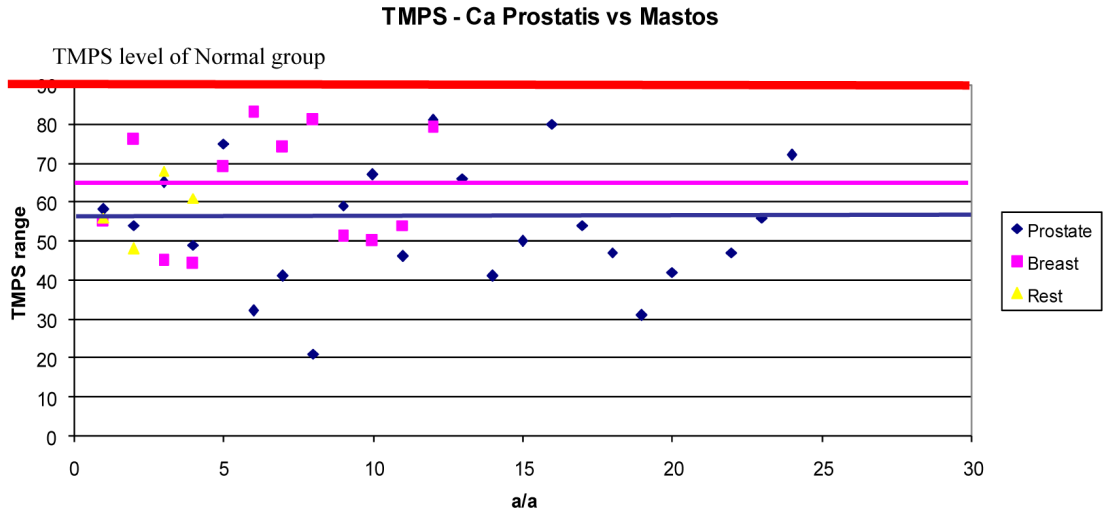


**Figure 2.** Female breast cancer patients exhibit significantly higher TMPS values than male prostate cancer patients.

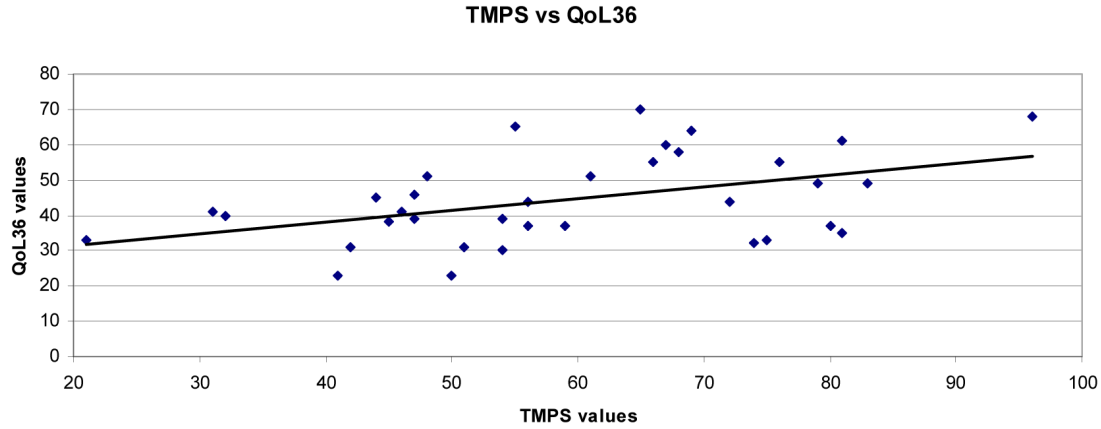


**Figure 3.** QoL36 and TMPS values were associated through low degree in most levels.

evaluation was the identification about the statistically significant difference between the two means ($p<0.0001$), suggesting the importance of the utilization of both questionnaires. Finally, there were no statistical differences of the results of either test when the patients had the BS repeated for follow up in any of the patient groups. The average values in TMPS outcome were 58.1 and 60.1 for the patient group at the first and the group at the second (follow up) study, respectively. Similarly, the average values of QoL outcome appeared similar with 45.9 and 43.6, respectively.

## Discussion

In the present study, we investigated whether QoL and TMPS are affected in cancer patients subjected to BS for evaluation of their disease status, and the role of age, sex and type of cancer. We found low scores in both QoL and TMP in all of the patients, independent of age, sex or type of cancer. In our cases, 35 (87.5%) patients had scores below 60 QoL, with average score 40.6. Furthermore, the scores we found in our patient group were even lower from the scores of patients with chronic diseases that are mostly seen in a range of 60 to 87 score [12]. In a previous prospective study, evaluated was the psychological status of 28 men who underwent prostate biopsy, after they were diagnosed with cancer and were going to have radical prostatectomy. The study showed that emotional distress was higher prior to biopsy and after that it was continuously decreased to the last point checked, prior to radical prostatectomy. Depression and anxiety started rising after the definite cancer diagnosis [16]. In fact, although mastectomy does not cause significant loss of function, there is so much psychological burden that results in distortion of body image of these patients that is perceived even as shocking as limb amputation, resulting in negative consequences in quality of life and mood [17]. Thus, after mastectomy ample

supportive support should be provided to the patients [18].

In our study, female breast carcinoma patients were more tolerant to mental pain compared to male prostatic carcinoma patients. In a controlled study of 25 prostatic carcinoma men and 68 breast carcinoma women a self-hypnosis/self-care group intervention was employed to evaluate its effect on emotional distress and QoL. Before the intervention, breast carcinoma patients were the group with the most abnormal emotional status. After the intervention, although the breast cancer group showed improvement in all aspects such as anxiety, depression, sleep and fatigue, no effect was noted in the prostate carcinoma group. Thus, these patient groups showed differential response to the same self hypnosis method [19]. Even though in our study of the breast carcinoma patients no association of TMP or QoL with age was noted, in another study it was reported that the majority of older survivors of breast cancer are doing relatively well psychologically [5]. However, these differences in our studies could be due to the fact that in general, cancer-free long-term survivors of breast cancer had good HR QoL [20].

In addition, pain and QoL may significantly improve even after 3 months of usual care [21]. In general, men undergoing active surveillance may experience moderate anxiety that declines over time [22]. Although patients that are subjected to BS have anxiety for the results and a small percent for the radioactivity [11], there was no association of the BS results with the QoL or TMP in the present study. However, it may be wise to manage the anxiety of the patients who are subjected to BS during the initial examination for evaluation of the extent of their disease.

## Conclusions

In the present study we found low scores in both QoL and TMP in all of the patients, independent of age, sex or type of cancer. However, female breast carcinoma patients were more tolerant to mental pain compared to male prostate carcinoma patients. The actual results of the BS or fear of radioactivity because of the test did not affect the QoL or TMP results. Due to our findings we suggest that the treating physician in association with a psychologist should approach these patients to provide enough emotional support and proper information.

## Conflict of interests

The authors declare no conflict of interests.

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