

Pain management, activities of daily living and the assessment of the WHOQOL-OLD module: results of a cross-sectional analysis of a cohort of older men with oncological diagnoses

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Cancer represents a major public health problem worldwide, especially in the older adult population which is increasing rapidly. Previous studies show that the majority of older adults with cancer report poor health-related quality of life (QoL) and that up to 90% of patients with metastases or terminal stage disease complain of pain at some point. Nevertheless, the impact of pain and disability on highly important aspects of older adults' health, such as intimacy or the perception of autonomy, has been scarcely studied.

This cross-sectional study aimed to identify the association between poor pain management and disability for activities of daily living (ADL) and 6 aspects of older adults' health assessed by a short version of the WHOQOL-OLD module in 891 older male patients with a newly diagnosed malignant neoplasm. The mean age of the participants was 79.1 years (SD 3.2) and the most frequent tumor location was the prostate. In the adjusted analyses, the raw total score of the WHOQOL-OLD module decreased by 7.43 in patients with ADL disability and by 9.44 points in patients with poor pain management. Comprehensive and adequate diagnostic and therapeutic approaches to pain and disability are recommended in older adults with cancer to improve health-related QoL and impact aspects of health such as those assessed by the WHOQOL-OLD.

Key words: pain, pain management, quality of life, aged, cancer, Peru (Source: MeSH NLM)

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INTRODUCTION

Cancer represents a major public health problem worldwide, especially due to its social and personal costs ¹. The impact of cancer on health-related quality of life (QoL) has been largely studied and is demonstrated by physical signs associated with disease progression ²⁻⁵, the psychological consequences of symptoms ⁶⁻⁹, restriction of social life and social roles, and the high cost of current treatment strategies ¹⁰⁻¹³.

Nonetheless, QoL is not a simple concept to define or to quantify as it includes many aspects and at its core it is a subjective experience. The World Health Organization (WHO) defines QoL as an “individual’s perception of their position in life in the context of the culture and value systems in which they live in relation to their goals, expectations, standards and concerns”¹⁴. Other definitions conceptualize QoL as a deviation between the individual’s present experience and their expectations¹⁵. Since expectations are likely formed from previous experience, changes associated with a specific diagnosis, such as cancer, and its progression, such as incident disability, diminish QoL¹⁶. Additionally, tools for QoL assessment vary in terms of conceptual foundations, dimensions, indicators, and units of analysis. Nevertheless, most assessment tools include indicators that pertain to physical and mental health in an attempt to convey well-being, either through a composite index or through unaggregated dimensions and indicators. Globally, the number of older adults is increasing rapidly, with most of this increase taking place in developing countries¹⁷. Aging can be associated with a greater burden of comorbidity; for example, in many regions, older adults account for over half of all cancer cases, and a larger proportion of cancer mortality¹⁸. Previous studies have shown that the majority of older adults with cancer report poor QoL and that up to 90% of patients with metastases or terminal stage disease complain of pain at some point¹⁹. Cancer pain is associated with psychological disturbances, such as depression, emotional distress, anxiety, irritability, fear, and inattention, all of which may impact QoL^{20,21}. When uncontrolled or severe, pain has been described to lead to social isolation, fatigue, and physical and emotional distress²². However, the tools most frequently used for assessment of health-related QoL do not consider several domains that may be more relevant in the older adult population. Recently, specific tools such as the World Health Organization Quality of life – Age (WHOQOL-AGE) questionnaire²³, a composite index; and the WHOQOL-OLD scale^{24,25}, a tool assessing 6 aspects of older adults’ health, that completes the WHOQoL-100 and the WHOQoL-Bref, have been developed to better evaluate health-related QoL in older adults. Therefore, this study aimed to determine the association between self-reported poor pain management and disability for activities of daily living (ADL) and a short version of the WHOQOL-OLD module in older Peruvian men with cancer.

METHODS

DESIGN

Cross-sectional analysis of a prospective cohort²⁶.

STUDY POPULATION

We performed a cross-sectional analysis of a prospective cohort of male navy veterans ≥ 60 years with a newly confirmed cancer diagnosis, treated in a third level, university-affiliated hospital in Callao (Peru) between January 2013 and January 2015.

ELIGIBILITY

Men ≥ 60 years with a new cancer diagnosis and full coverage of health insurance for the treatment of oncological diseases were eligible for inclusion. We only included men since treatments could differ from women’s because men from Navy had total health coverage. The exclusion criteria were as follows: a past medical history of dementia; Mini-Mental State Examination (MMSE) score < 24 , planned oncological treatment with no curative intent, untaken or suspended oncological treatment, and missing data.

A total of 1178 potentially eligible patients were approached to participate in the study and provide informed consent during a scheduled oncology visit; 287 patients were excluded, and 891 participated in the study. All the patients invited accepted to participate and signed informed consent. Recruitment took place between September 2012 and February 2013. The mean follow-up was 10.25 months. The research protocol was approved by the Institutional Committee of Research Ethics of the *Universidad Científica del Sur* (Lima, Peru, register code: 027-2019-PRO99).

PROCEDURES

One month after recruitment, clinical assessment was carried out by two geriatricians. The evaluation included sociodemographic characteristics, functional and frailty status, vulnerability, cognitive status, anthropometry, and oncological clinical evolution. Thereafter, every 8 weeks, clinical files were reviewed to establish the presence of treatment-related adverse effects.

MEASURES

Dependent variables

Older adults’ health: short version of the WHOQOL-OLD

Six facets of older adults’ health were assessed using a brief version of the WHOQOL-OLD, previously validated for use in Spanish. This tool has shown good internal consistency and criterion validity as a whole²⁵. It is composed of six questions (Tab. I), assessing future activities, death and dying, autonomy, past activities, sensory abilities, and intimacy. Questions were answered using a 5-point Likert scale with a total raw score ranging from 0-30. There is no established cut-off, however, the higher the score the better the health-status associated with the aspects investigated.

Table 1. Descriptive analysis of the WHOQOL-OLD domains of quality of life.

Items	Questions	Domains	Mean \pm SD ¹
1	<i>To what extent do you feel that you have control over your future?</i>	Future activities	4.06 \pm 0.81
2	<i>How worried are you about the way you will die?</i>	Death and dying	4.68 \pm 0.21
3	<i>To what extent are you satisfied with your level of activity?</i>	Autonomy	3.31 \pm 0.9
4	<i>If you look back on your life, how happy are you with the facts you remember?</i>	Past activities	3.32 \pm 1.1
5	<i>How would you evaluate the functioning of your senses (for example, hearing, vision, taste, smell, touch)?</i>	Sensory abilities	3.11 \pm 1.2
6	<i>To what extent do you have opportunities to be loved?</i>	Intimacy	2.98 \pm 0.75

¹ SD: standard deviation

Independent variables

Self-reported poorly managed pain

A negative answer to the question “Currently, is your pain well-controlled?” defined poorly controlled pain ²⁷.

ADL disability

ADL disability was evaluated using the Barthel Index. This index assesses the ability to independently perform the following activities: feeding, bathing, grooming, dressing, bowel control, bladder control, toilet use, transfers (bed to chair and back), mobility on level surfaces, and stairs. The total score ranges from 0 to 100. A score of 100 defines independence for ADL; 60-95, mild disability; 40-55, moderate disability; and 20-35, severe disability ^{28,29}. For the bivariate analysis, ADL disability was defined as a score \leq 95 in the Barthel index.

Covariates

Covariates included age (in years) and comorbidity. The presence of 10 chronic pathologic entities was summed up in a score ranging from 0 to 10, in which higher scores indicated more chronic disease [hypertension, chronic obstructive pulmonary disease, type 2 diabetes mellitus, history of another cancer, hypoalbuminemia (albumin \leq 3.5 g/dl), depressive symptoms (\geq 3 in the 5-item Geriatric Depression Scale) ³⁰, self-reported urinary incontinence assessed with one item of the Edmonton Frail Scale (EFS) ³¹, overweight (body mass index, BMI, \geq 25 kg/m²) or obesity (BMI \geq 30 kg/m²), self-reported hearing impairment and visual impairment]. Smoking history, history of \geq 1 fall in the previous year, and polypharmacy (\geq 3 drugs) ³² were also registered.

Frailty was assessed using a modified version of the phenotype described by Fried et al. ²⁶, maintaining the original five components but varying the metrics slightly. Shrinking was present if the answer to the following question from the EFS was positive: have you recently lost weight such that your clothing has become looser? Grip strength $<$ 27 kg (Camry Dynamometer, series 120,286) identified the presence of weakness.

Exhaustion was defined as a positive answer to either of the following first two statements from the Center for Epidemiologic Studies Depression Scale ³³: “I felt that everything I did was an effort”, “I could not get going”, or a negative response to the question “Do you feel full of energy?” from the 15-item Geriatric Depression Scale ³⁴. Patients were also asked, “How often in the last week did you feel this way?”, and the available responses were: 0 = rarely or none of the time ($<$ 1 day), 1 = some or a little of the time (1-2 days), 2 = a moderate amount of the time (3-4 days), or 3 = most of the time. Participants that answered “2” or “3” to either of the questions were categorized as “frail” according to the exhaustion criterion. Slowness was defined as a 4-meter gait speed test $<$ 0.8 m/s as proposed by the revised European consensus on definition and diagnosis of sarcopenia ³⁵. Lastly, participants in the lowest 20% of the Physical Activity Scale for the Elderly were considered frail for the low activity criterion ³⁶. Participants were classified as frail if they had \geq 3 of the above-described components.

Pain severity was assessed using the numeric pain rating scale (NPRS), which ranges from 0 (no pain) to 10 (worst possible pain) ³⁷.

Cognitive impairment was identified with a cut-off score of 26 in the Montreal Cognitive Assessment test (MoCA) ³⁸. This screening tool is composed of 30 items with a total score ranging from 0-30; a score of 25 or less indicates impairment. The MoCA has shown good sensitivity and specificity for dementia ³⁹.

The Lawton-Brody scale was used to identify disability for instrumental ADL (IADL). This scale assesses the ability of the individual to independently use the telephone, go shopping, prepare food, do housekeeping, do the laundry, use transportation, handle medications, and manage finances. Scores range from 0 to 8; the lower the score, the greater the disability for IADL ⁴⁰. Two screening tools were used to identify vulnerability: The Vulnerable Elders Survey-13 (VES-13) and the G8 tool ^{41,42}. The VES-13 includes 13 items assessing physical and functional status, age, and self-perceived

health; a score ≥ 3 defined vulnerability. The G8 assesses weight loss, food consumption, mobility, and polypharmacy, among other domains; a score ≤ 14 also defined vulnerability.

STATISTICAL ANALYSIS

Variables are described using frequencies and proportions, means, and standard deviations (SD) or medians and interquartile ranges (IQR) when appropriate. For comparisons between groups, Chi-square tests, Student's T-tests, or their non-parametric counterparts were used depending on the nature of the variable. To determine the association between poor pain management and ADL disability with the short form of the WHOQOL-OLD module, a stepwise linear regression analysis was conducted. Variables that were significant in correlational analyses with a p-value $< .05$ were entered into the models. Only the variables significantly associated with the WHOQOL-OLD score at the 0.05 level were retained. We did not consider the Lawton index and other variables in the multivariate analysis in order to avoid over-adjustment because the VES-13 confounder has similar items. Data was analyzed using STATA v.15.0 (College Station, TX: StataCorp LLC).

RESULTS

The mean age of the participants was 79.1 ± 3.2 years. ADL disability and poor pain management were present in 51.18 and 26.82%, respectively. The mean number of comorbidities was 6.2 ± 1.3 , and the most frequent tumor location and treatment were prostate and radiation therapy, respectively. About half of the patients (51.74%) had fallen 1 time during the previous year; other geriatric issues were also frequent: polypharmacy (54.77%), frailty (53.65%), and vulnerability (VES-13 = 49.49%, G8 = 48.26%). For participants with ADL disability, the mean raw WHOQOL-OLD module score was 9.8 ± 5.7 while the VAS score was 7.7 ± 1.1 . For those with poor pain management, the mean raw WHOQOL-OLD score was 7.9 ± 6.4 while the VAS score was 7.4 ± 1.3 .

Table I shows a descriptive analysis of the six domains assessed by the short version of the WHOQOL-OLD. The domains with the highest mean scores were: *To what extent do you feel that you have control over your future?* (4.06 ± 0.81) and *How worried are you about the way you will die?* (4.68 ± 0.21).

Participants with ADL disabilities were more likely to be older while those with poor pain management were younger. Comorbidity was greater in participants with ADL disability and poor pain management. Also, all the investigated geriatric issues were more frequent in participants with ADL disability and those with poor

pain management. Moreover, the IADL score and the WHOQOL-OLD module total raw score were more likely to be lower in participants with ADL disability and poor pain management (Tab. II).

Multiple linear regression models showed that the short version WHOQOL-OLD module total raw score decreased by a mean of 7.43 points in participants with ADL disability and by 9.44 points in participants with poor pain management (Tab. III). Figure 1 shows the WHOQOL-OLD module total raw score according to different levels of ADL disability.

DISCUSSION

Although previous studies have shown that older adults with cancer have greater ADL disability and poorer QoL (EuroQoLGroup EQ-5D)⁴³ compared with the general older adult population⁴⁴ and that the absence of disability is associated with better functioning on QoL scales (The European Organization for Research and Treatment of Cancer Quality of Life Questionnaires, EORTC QLQ-C30)⁴⁵ and lower symptom scores⁴⁶, to our knowledge, there is no study aimed at demonstrating that these associations extend to matters of health which are especially important for older adults, such as those assessed by the WHOQOL-OLD module.

Our results show that uncontrolled pain and ADL disability are independently associated with the WHOQOL-OLD raw total score in older men with cancer and highlight possible unmet needs in this population. The WHOQOL-OLD module domains with the highest mean scores (better perception of health-related QoL) in the present study were those regarding death and dying, and future activities. Although qualitative research suggests that most palliative care patients with

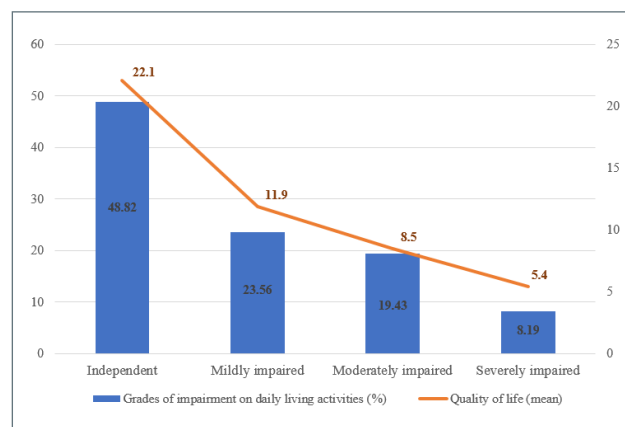


Figure 1. Score of quality of life (WHOQOL-OLD) according to level of impairment in activities of daily living (Barthel Index).

Table II. Characteristics of the population and bivariate analysis (n = 891).

Variables	N	%	Impairment in daily living activities		P-value	Poor pain management		P-value
			Yes	No		Yes	No	
			n = 456	n = 435		n = 239	n = 652	
Age in years (mean \pm SD) ¹	79.1 \pm 3.2		88.1 \pm 5.3	76.4 \pm 6.4	0.01²	79.3 \pm 4.4	80.1 \pm 4.9	0.1 ²
Comorbidities (mean \pm SD) ¹	6.2 \pm 1.3		8.7 \pm 1.2	4.4 \pm 1.4	0.01²	7.4 \pm 1.2	5.7 \pm 1.4	0.01²
History of tobacco consumption					0.1 ³			
Yes	109	12.23	50	59	13.56	24	85	13.04
No	782	87.77	406	376	86.44	215	567	86.96
Falls in the last year					0.01³		0.01³	
Yes	461	51.74	287	174	40.00	225	236	3620
No	430	48.26	169	261	60.00	14	416	63.8
Polypharmacy					0.01³		0.01³	
Yes	488	54.77	301	187	42.99	201	287	44.02
No	403	45.23	155	248	57.01	38	365	55.98
Fried's frailty phenotype					0.01³		0.01³	
Frail	478	53.65	291	187	42.99	209	269	41.26
Non-frail	413	46.35	165	248	57.01	30	383	58.74
VES-13					0.01³		0.01³	
Vulnerable	441	49.49	250	191	43.91	178	263	40.34
Non-vulnerable	450	50.51	206	244	56.09	61	389	59.66
G8					0.23 ³		0.02³	
Vulnerable	430	48.26	229	201	46.21	166	264	40.49
Non-vulnerable	461	51.74	227	234	53.79	73	388	59.51
VAS score (mean \pm SD) ¹	4.2 \pm 0.5		7.7 \pm 1.1	3.9 \pm 1.6	0.01²	7.4 \pm 1.3	4.1 \pm 1.6	0.01²
MoCA score (mean \pm SD) ¹	26.4 \pm 1.1		26.03 \pm 2.3	26.7 \pm 1.7	0.5 ²	26.7 \pm 2.3	26.7 \pm 1.9	0.1 ²
Lawton IADL scale (mean \pm SD) ¹	4.4 \pm 0.7		2.7 \pm 1.4	5.7 \pm 1.4	0.01²	2.4 \pm 1.9	6.4 \pm 0.9	0.01²
WHOQOL-OLD (six questions)								
Mean \pm SD ¹	16.4 \pm 5.5		9.8 \pm 5.7	22.1 \pm 4.6	0.01²	7.9 \pm 6.4	19.8 \pm 9.9	0.01²
Median (interquartile range)	15.1 (7.0)		9.2 (6.0)	24.0 (3.0)	0.01⁴	9.7 (7.0)	23.0 (2.0)	0.01⁴
Minimum-maximum score	7 - 27		-	-	-	-	-	-

VES-13: Vulnerable Elders Survey-13; VAS: Visual Analogue Scale; MoCA: Montreal Cognitive Assessment; IADL: Instrumental Activities of Daily Living; WHOQOL: World Health Organization Quality of Life-Old. ¹Standard deviation; ²Analyzed by Student's T-test; ³Analyzed by Chi-square test; ⁴Analyzed by Mann-Whitney U test.

Table III. Multiple linear regressions to determine the association between quality of life (WHOQOL-OLD), impairment of daily living activities (Barthel Index) and poor pain management (n = 891).

Variable	Model 1 ¹		Model 2 ²		Model 3 ³		Model 4 ⁴	
	β	Standard error	P-value	β	Standard error	P-value	β	Standard error
Quality of life	-7.01	6.35	0.001	-7.43	6.42	0.001	-9.44	6.12

¹Crude model to determine the association with impaired activities of daily living; ²Model to determine the association with impaired activities of daily living. It was adjusted for age, comorbidities, falls, polypharmacy, frailty and vulnerability (VES-13 and G8); ³Crude model to determine the association with poor pain management; ⁴Model to determine the association with poor pain management. It was adjusted for comorbidities, falls, polypharmacy, frailty, vulnerability (VES-13 and G8), VAS and Lawton index.

oncological diagnoses experience fear ⁴⁷, and about half show denial, more detailed studies on the perception of dying propose that spiritual health efficacy and instrumental efficacy are potent predictors of death fears in older adults ⁴⁸, leading to a highly individualized perception which may explain our results. The better perception in these domains may also be explained by cultural traits in men in Latin America. In contrast, the lowest mean facet score was for intimacy. In a mixed comparative analysis of groups on end of life needs in terminally ill patients with cancer and older adults > 85 years, Chikhladze et al. ⁴⁹ described that frequently alluded themes included social relation (belonging), love, esteem, and transcendence, underscoring the importance of promoting the fulfillment of psychological needs, which are higher in the Maslow's hierarchy ⁵⁰, in older patients with cancer.

The association between poor pain management and poor health-related QoL has been reported elsewhere ⁵¹. Imagama et al. showed that chronic non-cancer pain, such as low back and shoulder pain, significantly decreases health-related QoL assessed by the short form 36 (SF36) ⁵². Also, Ulas et al. ⁵³ found that oncological patients with neuropathic pain reported significantly higher scores of depression, anxiety, fatigue, and pain intensity in comparison with patients without pain, all of which are related to health-related QoL. In the present study, the WHOQOL-OLD module total raw score decreased by a mean of 9.44 points in men with poor pain management. The effect of poor pain management on the WHOQOL-OLD was independent of geriatric syndromes and comorbidities. These results align with the previously described associations between pain and poor quality of life and extend into the facets assessed by the WHOQOL-OLD module, affecting domains such as future activities, perceptions about death and dying, autonomy, past activities, sensory abilities, and intimacy. Pain is one of the most common and troublesome symptoms affecting patients with cancer ⁵⁴. However, despite the availability of effective treatments, cancer-related pain is inadequately controlled in up to 50% of patients ^{55,56}. Achieving adequate pain control implies treatment goals such as improving patient comfort, functionality and safety ⁵⁷, and may lead to improvement of ADL disability and mobility disability as well.

A statistically significant association was also found between ADL disability and the WHOQOL-OLD, with the WHOQOL-OLD total raw score decreasing by a mean of 7.43 points in participants with ADL disability independently of comorbidity and geriatric syndromes. Previous work has shown a relationship between ADL disability and QoL ^{58,59}. In older patients with ADL disability in the context of hip fracture, improvement in functioning, mobility, and social participation through occupational

therapy (OT) has demonstrated to improve health-related QoL ⁶⁰. Whether this phenomenon extends to the facets of the WHOQOL-OLD module is unknown; however, it is likely that at least one of the WHOQOL-OLD domains, autonomy, would benefit from OT.

The association between WHOQOL-OLD, pain and ADL disability may be mediated by the relationship between uncontrolled pain and disability. Chronic pain impacts physical and physiological activities, leading to disability over time. Persistence of pain is what mediates the increase of disability-adjusted life years regarding non-transmittable diseases. In this study, both aging and cancer cause chronic pain, and thus, it is plausible to hypothesize that the latter is a determinant of disability.

LIMITATIONS AND STRENGTHS

This study has several limitations. The population is composed of only male naval veterans, most of whom were receiving treatment for prostatic cancer, and therefore, the conclusions cannot be generalized to other populations or clinical contexts. Also, the only available measurement regarding QoL is the WHOQOL-OLD module, which does not translate into a complete assessment of health-related QoL. Moreover, this was a cross-sectional analysis, which precludes establishing the direction of the associations. However, the sample size is considerable, and the study reports scarcely studied, although potentially modifiable, outcomes in this population.

CONCLUSIONS

Poor pain management and ADL disability are independently associated with the WHOQOL-OLD module in older men with cancer. A dynamic and comprehensive diagnostic and therapeutic approach to pain and disability is recommended since their adequate management has proven to improve different measures of health-related QoL in older adults with and without oncological diagnoses.

Ethical consideration

None.

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Conflict of interest

The Authors declare no conflict of interest.

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