

ORIGINAL RESEARCH

Symptom burden and quality of life in patients with malignant fungating wounds

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Abstract

Aim. This study describes the relationship between symptoms and quality of life in patients with malignant fungating wounds.

Background. Malignant fungating wounds are complex wounds that can bleed, become malodorous due to infection and are painful causing physical and psychological distress. However, there is a lack of literature on the impact that such wounds can have on quality of life.

Methods. This was a descriptive, cross-sectional multi-centre study of patients with malignant fungating wounds. Participants were recruited from the palliative care, hospice, outpatient clinic and oncology units of three medical centres in Taiwan. Data were collected from February 2008 to August 2009. A structured questionnaire obtained socio-demographic information, medical details, wound assessment information and the Taiwanese version of the McGill quality of life questionnaire was administered by interview.

Results. McGill quality of life scores indicated that the participants had the lowest quality of life. The participant's age, dressing change frequency, pain, wound dressing comfort, wound symptom, bleeding and malodour had statistically significant negative correlations with quality of life. Multiple regression analysis showed that age, malodour, pain issues and psychological issues explained 87% of the total variance in quality of life.

Conclusion. This study contributes to our understanding of the impact of malignant fungating wounds and how correct assessment and management is necessary to improve quality of life. Educational intervention research is needed for patients and caregivers in countries where this has not yet been performed. Further research should also identify whether nursing competence has a direct impact on quality of life.

Keywords: cancer, nurse roles, nursing assessment, quality of life, wound care

Introduction

There were approximately 12 million new cancer cases in 2007 globally (American Cancer Society 2009) and it is expected that this incidence double by 2050 to 27 million new cancer cases per year (Garcia *et al.* 2007). With advances in chemotherapy and/or radiotherapy cancer treatment, the survival of cancer patients has greatly improved globally. However, malignant fungating wounds (MFW) are uncommon, making up 5–10% of all cancers in the Western world (Naylor 2002) and create significant challenges for nurses involved in cancer care (Lo *et al.* 2006, 2008a).

Malignant fungating wounds are often associated with multiple symptoms, commonly malodour, exudates, bleeding and wound related pain (Naylor 2002, Alexander 2009a), slough/necrosis, infection and itching/irritation (Lo *et al.* 2008a, Selby 2009). In addition, because many MFW occur in the head and neck region, the wounds are often visible and create psychological and social problems for patients too (Lo *et al.* 2008a). Therefore, patients with MFW require palliative care and wound management not only for the control of physical wound symptoms but also for the resolution of physiological, psychological, spiritual and socio-economic problems (Lo *et al.* 2008a, Alexander 2009b). However, little has been done to assess the perceptions of cancer patients with MFW on their quality of life (QOL) and this study has been designed to address this to help improve understanding and enhance the care for this group of patients.

Background

Malignant fungating wounds typically present as either a cauliflower shaped lesion (proliferating) or an ulcerated area, presenting as a shallow crater – they may also expand further to form a sinus or fistula (Collier 1997, Haisfield-Wolfe & Baxendale-Cox 1999, Lo *et al.* 2008a, Alexander 2009b). These wounds present significant challenges to nurses and the International Palliative Wound Care Initiative (2004) highlights the importance of managing these wounds, especially as they become worse during terminal stages of illness (Haynes 2008). There have also been significant developments in managing the wounds themselves, particularly when infected (Lo *et al.* 2008b); however, there is clear evidence that these wounds have an impact on patients lives considerably, especially when patients enter the last months, weeks and days of their lives (Lo *et al.* 2008a). The adverse impacts on MFW patients are numerous and can typically include the physical, psychological and social. Lo *et al.* (2008a) in a qualitative study explored the experience of ten cancer

patients living with an MFW. Data revealed that patients frequently experienced pain, bleeding and were socially isolated because they were embarrassed by wound leakage and odour.

Piggin and Jones (2009), using the Heideggerian hermeneutic phenomenological approach, analysed the meaning and experience of five patients living with an MFW. This study also highlighted the difficulties patients with MFW can encounter that amassed around the themes: ‘living within a body that cannot be trusted’, a ‘changing relationship with the patient’s family and friends’ and a ‘loss of identity while continuously striving to be normal’. Lund-Nielsen *et al.* (2005) carried out a qualitative, exploratory study with 12 women with MFW and clearly demonstrate that the patients who had malodorous and oozing wounds had significant anxiety about seepage and were significantly affected by pain and wound odour and exudate. Chuang and Hsieh (2009) report similar results in a qualitative study identifying that the patients with an MFW faced chronic pain, sleep pattern disturbance, impaired tissue integrity and a disturbed body image. Harlin *et al.* (2009) reinforce this with the findings of a study into patients with chronic lower limb wounds reporting that patients frequently experience frustration, trouble sleeping, anxiety and impaired mobility and negatively affect patient QOL.

However, no studies have employed an approach to assess QOL in any quantitative manner in this field of cancer care, despite QOL being a significant factor in the care of patients with a malignancy. This is surprising given the extent to which MFW can have an impact on an individual’s physical, social and emotional world. Indeed, QOL in palliative care cancer patients has gained increasing attention during the past 20 years (Jordhoy *et al.* 2007) in part due to the information QOL measures can provide to expand our perception of the impact of both cancer and cancer treatment (King & Hinds 2003). The literature on QOL in cancer is extensive and is clear that cancer symptoms can have a direct and profound impact on all aspects of patient’s QOL (King & Hinds 2003, Jocham *et al.* 2006). Therefore, the purpose of this study is to explore QOL in patients with MFW to identify the future directions for research and clinical practice.

The study

Aims

The specific aims of this study were (i) to assess symptom burden and QOL of cancer patients with MFW, (ii) to determine if there was a statistically significant relationship

between their symptom burden and QOL and (iii) to identify the demographic and wound related status related their QOL.

Design

This study was part of a cross-sectional multi-centre survey of cancer patients who had MFW in Taiwan. Three inpatient hospital care centres in the rural and city area of Taiwan provided the target population for the study.

Participants

Convenience sampling was used to recruit seventy participants were obtained from three medical centres. The data were collected over a period of 19 months, from February 2008 to August 2009. Selection criteria included: (i) patients with cancer and an MFW, (ii) male or female over 18 years of age and (iii) possess reasonable capability for completing the questionnaire and be capable of reading and writing in Chinese. Patients were excluded if they incapable of completing the questionnaire due to illness or confusion or lack of understanding of study purposes, patients for whom administration of the questionnaire may be distressing and patients whose families did not approve of their relative being involved in the study. There was no restriction applied to patient selection in terms of histological tumour type.

The sample size was estimated using G^* power 3 (Faul *et al.* 2007). We then computed the required sample size based on α set at 0.05, power = 80% for a two-tailed multiple regression: special (R^2 increase). The estimated sample size was 55. In addition, participant recruitment was enlarged to 70 to allow for any dropout. Although the sample size in this study is small, it still satisfied the preconditions of the statistical analysis measures employed in the study.

Data collection

Data were collected using structured questionnaires completed by four researchers who were all nurses certificated in wound management training. The interviews were held in a quiet, private room to maintain privacy. The mean duration of the interviews was 31.0 minutes (SD 14.49) with a range of 15–45 minutes.

Ethical considerations

Permission to conduct the study was obtained from National Taiwan University Medical Center's and Tzu Chi Medical Center's Institutional Review Board. Medical services for the

patients were not influenced by whether they participated or did not participate in this study. Those who agreed to participate completed a consent form.

Data analysis

Data were entered in to SPSS version 15.0 [Statistical Package for Social Scientists (SPSS Inc, Chicago, IL, USA)], searched for outliers and irregularities and checked for data entry reliability. Prior to analysis, data were checked for accuracy, missing values, distribution of scores and the internal consistency of multi-item measures. Descriptive statistics, including percentages, mean values, standard deviations and ranges, were used to summarize the information gathered from the survey. The relationship between mean total QOL and MFW scores was determined by Pearson's correlation coefficient. To examine the relationship between QOL, MFW and demographic variables further multiple regression analysis was performed. All statistical tests were evaluated using a P value of <0.05 as statistically significant and reported as mean \pm 1 SD unless otherwise stated.

Validity and reliability

Demographic and medical history characteristics

The questionnaire contained an initial section to collect demographic and medical history data from participants including age, gender, marital status, level of education, religion, analgesic, primary cancer diagnosis, cancer treatment and wound management history.

Quality of life

Quality of life was assessed using selected components of the Taiwanese version of the McGill Quality of Life Questionnaire (MQOL) (Hu *et al.* 2003). This section of the questionnaire consists of 16 items, global QOL questions and open-ended questions allowing patients to self-report life events that have influenced their QOL. The MQOL comprises four domains: physical symptoms (items 1–4), psychological well-being (items 5–8), existential well-being (items 9–14) and support issues (items 15 and 16); all of the response categories are based on a numerical scale of from 0 to 10, with verbal anchors at the beginning and end of the scale. The frame of reference for all questions is 'for the past 2 days' for inpatients and 'for the past 7 days' for outpatients and hospice patients. The total score is divided from the mean of all four domains. A high score indicates a better QOL. There is also a single-item rating scale (SIS) constructed to measure the overall QOL. In this study, Cronbach's alpha was 0.90 for the whole questionnaire while the internal

consistency coefficients were between 0.75 and 0.95 for the subscale.

Malignant Fungating Wound Assessment Tool (MFWAT)

The MFWAT is based on Grocott (1997), Schultz (2001), Naylor (2002) and earlier studies (Lo *et al.* 2006, 2008a) and consists of two domains: patient's subjective perception related to their MFW (MFWAT-P) and objective assessment of the MFW wound bed status (MFWAT-N). The scale measuring the patient's subjective perception of their MFW has five domains and 20 items. The frame of reference for all questions is 'Please indicate the average situation you have had in the past one week'. Participants then respond to items on: pain (four items), wound dressing comfort (four items), wound symptoms (four items), social issues (four items) and psychological issues (four items). All of the patients' subjective perception related MFW response categories are based on a numerical scale of from 0 to 10. The MFWAT-P has a range of possible scores from 0 to 200. The higher the score, the more serious the level of the patients' experience of wound-related problems.

The second part of the MFWAT-N involves an objective assessment of the MFW physical status by wound specialists including an assessment of: necrotic tissues type and amount, malodour, exudates amount and quality, bleeding, ulceration of the skin and oedema. It has five reference points labelled from 1 to 5. The MFWAT-N comprised nine items with total scores rating from 9 to 45. A higher score indicates a more severe wound. In this study, Cronbach's alpha was 0.82 for the whole questionnaire while the internal consistency coefficients were between 0.82 and 0.90 for the subscales.

Results

Participant demographics

Table 1 shows the participants' demographic characteristics. Over a 19-month period, a total of 75 patients underwent study eligibility screening. Of those, five (6.7%) were found to be ineligible for the following reasons: cognitive impairment (2) and refused to join this study (3). The remaining 70 individuals who met the study eligibility criteria agreed to participate. Participant's age ranged from 29 to 82 years old, with a mean age of 52.12 (SD = 11.20). The majority of patients' primary diagnosis was 71.7% head and neck cancer and 18.3% breast cancer. Of the total sample, a total of 66.7% were male and 33.3% were female. The religious preference of the sample included Buddhism (63.3%) and Taoism (18.3%).

The average length of time with an MFW was 8.49 months (SD = 11.60) with a range of 1.30–45.53 months; 53.3% had previously received chemotherapy and 85% had not received any advanced treatment such as radiotherapy. The majority of wounds were management by normal a saline wet dressing (53.3%), 16.7% by a modern dressing and 8.3% by herbal medicine. A total of 85.0% had several dressing changes per day with the average frequency of dressing change being 3.58 (SD = 1.03) per day. In terms of participants wound related nutrition indicators, the average haemoglobin level was 9.89 (SD = 1.98), albumin level was 2.83 (SD = 0.75) and WBC was 11,966 (SD = 8988.4).

Descriptive analysis

Table 2 presents a descriptive analysis of the QOL and MFW scores. Total scores for QOL ranged from 41 to 119. The mean score was 77.00 (SD = 31.39). The average score of QOL, as represented by the mean of the SIS, was 6.00 (SD = 2.63). To calculate a single score analysis for each domain, the researchers calculated the difference values, converted these values into scores on a full range of 100. The lowest score was the physical symptoms domain (converted score 38.40). The highest score was attained for the support issues domain (converted score 77.20).

Table 3 shows the descriptive statistics for patients' subjective perception of problems related to their MFW and the clinical indicators of the MFWAT-P. Total scores for MFWAT-P ranged from 28 to 168. The mean score was 102.98 (SD = 37.66). The lowest score was in relation to the wound dressing comfort (average score was 12.98). The highest score was in relation to the psychological issues domain (average score was 25.71). Overall, the average MFWAT-N was 29.70 (SD = 5.69) with a range of 18–40 and the average wound area length (cm) × width (cm) × depth (cm) was 8.75 × 9.00 × 2.56 (Table 4).

Relationship between characteristics, MFWAT and QOL

Pearson's correlation coefficients were calculated between continuous-level demographic, treatment-related variables, MFWAT and QOL measures. Albumin was the only variable that showed a statically significant positive correlation with QOL ($r = 0.542$, $P < 0.001$). The participant's age ($r = -0.256$, $P = 0.046$), MFWAT-P ($r = -0.277$, $P = 0.039$), MFWAT-N ($r = -0.321$, $P = 0.015$), dressing change frequency ($r = -0.274$, $P = 0.043$), pain issues ($r = -0.265$, $P = 0.046$), wound dressing comfortable ($r = -0.479$, $P < 0.001$), wound symptom ($r = -0.275$, $P = 0.038$), social issues ($r = -0.268$, $P = 0.044$), bleeding ($r = -0.280$,

Table 1 Demographic characteristics of patients ($n = 70$).

Characteristic	Number (%)	Mean (SD)	Range
Age (years)		52.12 (11.20)	29–82
Time present MFW (month)		8.49 (11.60)	1–30–45–53
Frequency of change dressing		3.58 (1.03)	1–4
Haemoglobin (Hb)		9.89 (1.98)	2.90–14.10
Albumin		2.83 (0.75)	1.40–4.50
WBC		11,966.0 (8988.40)	1504–60,620
Primary cancer diagnosis			
Head and neck	50 (71.7)		
Breast	13 (18.3)		
Other	7 (10.0)		
Type of ward			
Oncology	48 (68.3)		
Palliative/Hospice	2 (3.3)		
ENT	11 (15.0)		
Other	9 (13.3)		
Gender			
Male	47 (66.7)		
Female	23 (33.3)		
Marital status (%)			
Single	16 (23.3)		
Married	45 (65.0)		
Divorced	5 (6.7)		
Widowed	4 (5.0)		
Religious belief			
None	11 (15.0)		
Buddhism	44 (63.3)		
Taoism	13 (18.3)		
Christian	2 (3.3)		
Education level			
Elementary school and below	24 (35.0)		
Junior high school	16 (23.3)		
Senior high school	18 (25.0)		
College and above	12 (16.7)		
Chemotherapy			
No	33 (46.7)		
Yes	37 (53.3)		
Radiotherapy			
No	51 (85.0)		
Yes	9 (15.0)		
Wound management			
Modern dressing	12 (16.7)		
Wet to dry	37 (53.3)		
Herbal medicine	6 (8.3)		
Others	15 (21.7)		
Carry out change dressing			
Primary nurse	29 (41.7)		
Wound specialist and doctors	11 (15.0)		
Family/friends	27 (38.3)		
Others	3 (5.0)		
Analgesic			
No	17 (25.0)		
Yes	53 (75.0)		

MFW, malignant fungating wounds.

Table 2 The mean and standard deviation of the MQOL-TW total scale and each domain ($n = 70$).

Domain (items)	Mean	SD	Convert mean	Minimum	Maximum	Rank
Total QOL (16)	77.00	31.39	48.13	41	119	
Support issues (3)	23.16	5.79	77.20	6	30	1
Existential well-being (6)	26.08	13.74	43.47	0	60	2
Psychological well-being (4)	16.88	12.71	42.20	0	40	3
Physical symptoms (3)	11.52	9.43	38.40	0	30	4
SIS	6.00	2.63	60.00	1	10	

The maximum sub-scores of the physical symptoms, physical well-being, psychological well-being, existential well-being scales and support issues are 30, 40, 60 and 20, respectively. The raw scores were multiplied by 100/30, 100/40, 100/60 and 100/30, respectively, to convert them into new scores in a full range of 100. For example, the mean scores in physical symptoms are 11.52. Therefore, the mean scores in physical symptoms in a full range of 100 are 38.40 [=11.52 × 100/30].

MQOL, McGill Quality of Life Questionnaire; QOL, quality of life; SIS, single-item rating scale.

Table 3 The mean and standard deviation of the MFWAT-P total scale and each domain ($n = 70$).

Domain/items	Mean	SD	Minimum	Maximum	Rank
Total MFWAT-P (20)	102.98	37.66	28	168	
Psychological issues (4)	25.71	11.16	0	40	1
Wound symptoms (4)	22.73	11.40	4	40	2
Social issues (4)	21.91	9.48	10	40	3
Pain (4)	19.70	10.92	0	40	4
Wound dressing comfort (4)	12.98	10.55	0	35	5

MFWAT, Malignant Fungating Wound Assessment Tool.

Table 4 The clinical indicators of the MFWAT-N ($n = 70$).

Domain/items	Mean	SD	Minimum	Maximum
MFWAT-N	29.70	5.69	18.00	40.00
Wound area (cm)	116.70	39.30	1.50	3000.00
Length	8.75	4.08	3.00	15.00
Width	9.00	8.23	2.00	30.00
Depth	2.56	3.84	0.00	10.00
Class of wound bed	4.05	1.18	1	5
Type of necrosis tissues	3.28	0.86	2	5
Amount of necrosis tissues	3.68	1.38	2	5
Odour	3.30	1.39	1	5
Amount of exudates	4.08	1.04	1	5
Quality of exudates	3.98	0.91	1	5
Bleeding	2.20	1.03	1	4
Wound bed edge	2.21	0.86	1	5
Oedema	2.90	1.44	1	5

MFWAT-N Score = sum of wound related pain, odour, exudates, exudates quality, bleeding and peri-ulceration skin.

MFWAT, Malignant Fungating Wound Assessment Tool.

$P = 0.035$) and malodour ($r = -0.293$, $P = 0.027$) had statistically significant negative correlations with QOL.

Effect of the different variables on QOL

As shown in Table 5, multiple regression analyses were conducted to analyse all of the independent variables based on the statistical significance of the result from Pearson's correlation analysis. The discontinuous variables were transferred into dummy variables prior to analysis. Moreover, we used the regression analysis by a stepwise method and carried out variance inflation factor, the Durbin–Watson test and the Eigen value and condition index to ensure regression was appropriate. The results showed that the regression model was statistically significant ($F = 3.71$, $P = 0.001$). For the dependent variable QOL aspects, the age ($F = 9.58$, $P = 0.038$), MFWAT-P ($F = 18.99$, $P = 0.049$), malodour ($F = 8.27$, $P = 0.014$), pain issues ($F = 13.09$, $P < 0.001$) and psychological issues ($F = 25.04$, $P < 0.001$) were statistically significant variables for QOL and accounted for 87% of total variance.

Discussion

Study limitations

The cross-sectional design of this study provided information about symptom disturbance of the participant's only one point in time. Thus, a longitudinal study is necessary to understand and compare changes in pattern, consistency, and intensity of the symptom and QOL of patients having MFW. On the other hand, the limitations to this study included the small sample size. Because of this, the results cannot be generalized to cancer patients with MFW. Replication using a large sample from a number of sites with a longitudinal design and better control for extraneous variables is recommended.

Table 5 Regression analysis for symptomatic variables predicting QOL total scores ($n = 70$).

Independent variables	<i>B</i>	SE	β	R^2	95% CI for <i>B</i>
(Constant)	155.01	15.08	–		124.71 to 185.41
MFWAT-P	0.85	0.19	0.95	0.39*	0.11 to 1.68
Age	–0.57	0.27	–0.19	0.17*	–1.10 to –0.33
Malodour	–7.22	2.84	–0.31	0.12*	–12.94 to –0.51
Pain issues	–1.50	0.36	–0.48	0.10**	–0.23 to –0.77
Psychological issues	–1.97	0.34	–0.72	0.09**	–2.66 to –1.28

* $P < 0.05$; ** $P < 0.001$ significant (two-tailed).

B, regression coefficient; β , standardized coefficient; CI, confidence interval; QOL, quality of life; MFWAT, Malignant Fungating Wound Assessment Tool.

The MFWAT scale used to measure participant subjective perception of MFW and wound bed indicators were specially designed for this study and therefore require further testing. In addition, this reduces the ability to generalize from this study and participants' QOL may have been influenced by variations in hospital environment and wound management of wound specialist or ward nurses. In addition, further investigation is needed to confirm our results, identify other factors that may have an impact on QOL.

Discussion of findings

The goal of palliative wound care is to achieve the highest QOL of patients (Haynes 2008). This study examined relationship between self-reported symptom burden and four domains of QOL in cancer patients with MFW. Symptom control is not only important for physical health – it improves an individual's self-esteem and restores some sense of purpose (Herth & Cutcliffe 2002). Patients with advanced disease may experience a number of unpleasant and distressing symptoms, for example, an MFW may bleed easily, be malodorous and also painful (White & Harding 2009). In this investigation one of the most common syndromes reported were wound pain, bleeding, exudates, malodour and sleep disturbance – issues that have been reported in similar studies (Lund-Nielsen *et al.* 2005, Lo *et al.* 2008a, Piggitt & Jones 2009, Probst *et al.* 2009). Using an appropriate wound dressing product in reducing MFW symptoms has been suggested as a key factor in symptom control (Probst *et al.* 2009). However, in this study, only 16.7% participant used modern dressing to manage their wound and only 15.0% had a wound specialist nurse involved in their wound care. This clearly indicates the need for wound specialist nurse involvement in such cases.

Overall QOL scores and scores for three of the four QOL domains were significantly lower for the cancer patients with an MFW. And also, negative correlations between the number symptoms and the QOL scores for the participants

were also consistently found. The results confirm the suggestion that symptoms burden is the most important cause of a decreased QOL for individuals living with MFW. Malignant fungating wound management is a complex area of clinical practice owing to the many relevant dimensions that are often present in the wound aetiology, change granular tissues, bacteria loading and fragile wound edge (Naylor 2002, Alexander 2009a). The patient's experience of non-healing and complex wound is unique and directly influences his or her individual's perception of the life and well-being in general (Teare & Barrett 2002, King & Hinds 2003). Nurses should put an emphasis on a comprehensive approach to wound assessment, planning, management and evaluation of wounds in the context of their life-threatening illness (Teare & Barrett 2002, Hughes 2005). In addition, there is a need to develop new MFW guideline which can help to enhance the well-being and QOL of people with MFW.

The factors of age, malodour, pain issues, and psychological issues together with covariance explained 87% of the variance associated with QOL. It can be speculated that the remaining variance in QOL may be related to other factors such as the secondary consequences of cancer in patients with an MFW. People with MFW also have emotional and psychological distress associated with an often unsightly wound and have been shown to withdraw from society (Parkes & Markus 1998, Lo *et al.* 2008a). Linked to this the stigma and discrimination can further contribute to social adversity (Lo *et al.* 2008a). Although research (including the present study) generally focuses on MFW variables, a broader research approach with increased attention to social and psychological factors may enable us to identify other targets for intervention that may improve QOL in this population.

Implications for practice and research

As normative goals of palliative wound care include alleviating symptom distress and enhancing QOL. The findings of

What is already known about this topic

- Cancer can have a significant effect on quality of life.
- There is some evidence that patients with a malignant fungating wound experience significant physical and social problems.
- Qualitative research with patients reveals some quality of life issues, but the precise nature and effects of this using quality of life measures is lacking.

What this paper adds

- The lowest quality of life score was the physical symptoms domain. The highest score was attained for the support issues domain.
- Multiple regression analysis showed that Malignant Fungating Wounds Assessment Tool-Perception, malodour, pain issues and psychological issues tended to have a lower quality of life score.
- Other demographic variables, such as age, dressing change frequency had statistically significant negative correlations with quality of life.

Implications for practice and/or policy

- Early involvement of wound care specialists in the management of malignant fungating wound is important.
- Nurses need to be aware of the potential impact of patients living with a malignant fungating wound can have on quality of life.
- More longitudinal research is required to further explore the quality of life effects of malignant fungating wound.

this study may have implications for the delivery of palliative care services and for healthcare professionals because they shed light on aspects of care that should be emphasized to improve the QOL of cancer patients with MFW. We hope that our findings can enlighten nurses about the unique challenge MFW symptoms by cancer patients, so as to develop evidence base MFW management guideline and to develop reliable instruments to assess the efficacy of those interventions. A first step would be to replicate this study with a larger sample of cancer patients with MFW, including patients from different ethnic groups and geographical regions. The results could then be more appropriately generalized to MFW of cancer patients. Nurses are responsible for

providing care and support for patients diagnosed with MFW. Therefore, they should be more aware of the physical burden of the cancer patients with MFW and offer adequate modern wound material to management MFW symptom. Further studies should be conducted to test whether level of competence of nurses has a direct impact on QOL. Patients and caregivers were worried about the progression of the patients' wound and were stressed. Educational interventions about the courses of MFW and its management could help patients to have better QOL. Educating caregivers in how to care for patients at home can improve the QOL of patients with MFW, thereby allowing patients to live at home longer and lowering medical healthcare costs.

Conclusion

To sum up, these results provide for the first time a reliable exploration of the QOL in cancer patients with an MFW using a well-validated method. Our findings showed that the participant's age, malodour, wound-related wound pain and wound-related psychological issues were related to the mean total QOL. Although the study was conducted in Taiwan, the findings are relevant to the care of palliative ill cancer patients with MFW worldwide and implications for the delivery of palliative care services and for nurses.

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Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

SFL, MH and WH were responsible for the study conception and design. SFL, CYT, MYH and YFL performed the data collection. SFL and CYT performed the data analysis. SFL, MH, WH were responsible for the drafting of the manuscript.

SFL, MH, WH, MYH and YFL made critical revisions to the paper for important intellectual content. SFL and WH provided statistical expertise. SFL obtained funding. MH and WH supervised the study.

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