Pergamon

Oral Oncol, Eur J Cancer, Vol. 31B, No. 5, pp. 340–345, 1995
Elsevier Science Ltd
Printed in Great Britain
0964–1955/95 $9.50+0.00

0964–1955(95)00039–9

Self-reported Satisfaction with Life and Physical Health in Long-term Cancer Survivors and a Matched Control Group

K. Bjordal, A. Mastekaasa and S. Kaasa

The response to two validated questions assessing self-reported satisfaction with life and physical health were compared between 204 long-term head and neck cancer survivors from a randomised radiotherapy trial and 766 matched controls. The control group, participants in a large population health survey in a county in the middle of Norway, was matched to the patients with regard to age, gender, marital status/family type and education. Compared with the controls, the patients reported significantly lower satisfaction with life and physical health. Sixty-four per cent of the patients were satisfied with life and 44% felt strong and healthy while the percentages of the controls were 82% and 52%, respectively. Clinical and sociodemographic variables were poor predictors of the patients' responses. Clinicians must be aware of the psychosocial morbidity in the growing population of cured cancer patients, and intervention studies are needed in patients at risk, in order to determine whether this morbidity can be prevented, reduced, or treated.

Keywords: head and neck cancer, quality of life, survivors, self-report questionnaires, matched controls, cross-sectional

Oral Oncol, Eur J Cancer, Vol. 31B, No. 5, pp. 340–345, 1995.

INTRODUCTION

WHEN STANDARD regimens for curative treatment are to be decided, the highest possible cure rate, and the highest possible quality of life are the main objectives. During the past few years, an increasing number of reports have been published about the quality of life of head and neck cancer patients during and after the first year of treatment, focusing on disease symptoms, adverse effects of treatment, psychological distress, communication problems and other quality of life issues [1–3]. Systematic studies of the quality of life in long-term cancer survivors are rare, especially in cancer diseases with a high mean age at onset, such as lung, colorectal, prostate, and head and neck cancer [4–9]. Even though most of these papers demonstrate reduced quality of life after treatment, particularly in domains related to treatment morbidity, some authors report similar or higher subjective well-being, or satisfaction with life in general, in cancer patients compared with different control groups [10–14]. Information about the long-term survivors' problems and needs is warranted, in order to refine the curative treatment regimens, and to offer them an optimal rehabilitation.

Very often, when data from psychosocial studies in cancer patients are presented, the clinicians ask about how much of this distress is related to the cancer disease and the treatment. Knowledge of the patients' quality of life before cancer is diagnosed is not available, but important information may be gained by comparisons between the cured cancer patients and the general population. Such comparisons can be difficult because of the different approaches often employed in quality of life assessments in population surveys and clinical research (e.g. generic versus disease-specific, global versus multidimensional). One way of dealing with this is to give the cancer patients some general questions previously used in population surveys, in addition to the more multidimensional health-related disease and treatment-specific questionnaires [5].

The current study was performed in order to compare head and neck cancer survivors' satisfaction with life and physical health with a matched sample of participants in a large Norwegian health survey.

PATIENTS AND METHODS

Study population

The cancer patients were survivors from a prospective randomised clinical trial performed at the Norwegian Radium Hospital in the period 1978–1984. 821 patients were randomised to two different radiotherapy fractionating regimens which were supposed to be radiobiologically equivalent; a

---

Correspondence to K. Bjordal at the Department of Medical Oncology and Radiotherapy, The Norwegian Radium Hospital, Montebello, N-0310 Oslo, Norway.
K. Bjordal is at the Department of Medical Oncology and Radiotherapy, Radium Hospital, Oslo; A. Mastekaasa is at the Department of Sociology, University of Oslo; and S. Kaasa is at the Palliative Medicine Unit, Department of Oncology, Trondheim University Hospital, Norway.
Received 1 June 1995; accepted 15 June 1995.

conventional standard regimen (2 Gy per fraction, 5 days a week), or a slightly hypofractionated regimen (2.35 Gy per fraction 4 days a week) [8]. Treatment duration was similar in the two groups; 7 weeks for radical treatment, and 5 weeks for microscopic disease or in combination with surgery. Both patient groups received surgery according to the department's usual standards. In a cross-sectional study, 247 patients who were alive in January 1991 (7–11 years after treatment), received a mailed questionnaire, together with a letter of introduction and a stamped return envelope. The questionnaire was returned by 209 patients (86%), but 5 had to be excluded because of incomplete answers. Thus, 204 patients (83%) were included in the present study (Table 1).

The control group was a matched sample of participants in a large prospective Norwegian health survey conducted in the county of North-Trøndelag [15]. All residents in the county, aged 20 years and above in January 1984, were invited to participate in the health survey in the period 1984–1986 ($n = 85\,100$). Before they took part in the medical screening on hypertension, diabetes, tuberculosis, and chronic respiratory diseases, the participants filled in a one page questionnaire which was distributed by mail as part of the invitation to participate in the survey. The participation rate was excellent (88%), and non-response bias was not found in the baseline data. A second questionnaire was handed out to everyone when they left the screening, and returned by mail ($n = 64\,563$, 76%). Data from this questionnaire have been used in the present study. People with either very good self-reported health, e.g. students, or very poor self-reported health, e.g. very old people, were more likely to drop out of the study.

Table 1. *Clinical characteristics of the cancer patients* (n = 204)

	n (%)
Randomisation	
Conventional (2 Gy × 5)	103 (51)
Hypofractionated (2.35 Gy × 4)	101 (49)
Tumour site	
Oral cavity	44 (22)
Pharynx	14 (7)
Larynx	102 (50)
Nose/sinus	12 (6)
Others*	32 (16)
Stage of disease	
I	97 (48)
II	39 (19)
III	31 (15)
IV	34 (17)
No stage†	3 (1)
Radiotherapy	
Alone	97 (48)
Pre-operative‡	36 (18)
Postoperative‡	69 (34)
After chemotherapy§	2 (1)
Surgical treatment (primary tumour)	
None	106 (52)
Minor	54 (26)
Major	44 (22)
Secondary primary cancers	19 (9)

*ICD-7 140, 142, 191, 199; †Patients with unknown size of a primary parotic tumour, postoperative radiotherapy; ‡9 patients received only neck node dissection; §One of these patients also received major surgery.

Matching procedure

Because of the risk factors associated with head and neck cancer, and the indication of a small positive bias in the satisfaction ratings of the elderly and the less educated [16], each patient was matched with four controls on the basis of demographic variables. The matching variables were: gender, age (5 year intervals), family type (living alone, spouse/cohabiter with children, spouse/cohabiter without children, others), level of education (up to 7 years primary or continuation school, 8–10 year primary and lower secondary school, upper secondary school or higher) (Table 2). The final number of controls were fewer than four times the number of patients due to missing answers on the questions in focus.

The questionnaires

Overall satisfaction with life and rating of physical health were assessed by two single questions validated for a Norwegian population in the survey described above, and previously used in head and neck cancer patients [17]. They are adapted from questions developed and validated for use in general populations in large population surveys in the U.S.A. [18]. Each question has seven fixed response categories, ranging from positive (very satisfied/strong and healthy = 1) to negative (very dissatisfied/tired and worn out = 7). Results are reported both for each response category (Figs 1 and 2), and grouped into three categories; satisfied/so-so/dissatisfied, and strong and healthy/so-so/worn out (Table 3).

In addition, the cancer patients filled in a questionnaire consisting of the EORTC QLQ-C30 [19], a head and neck specific module [17], and the GHQ-20 [20]. Results from these questionnaires are reported elsewhere [8, 9]. The validity of the two questions in the present cancer population is supported by the correlation between the satisfaction question and the GHQ-20 ($r = 0.72$), and between the physical health question, and the physical function and fatigue subscales in the EORTC QLQ-C30 ($r = 0.60$ and 0.73, respectively). In order to be able to match the cancer patients with controls, the forms for sociodemographic data were the same for the two groups. All questionnaires were filled in at home; reminders were sent once.

Statistical analyses

Descriptive statistics were used to characterise the patient/control samples, and to compare the groups; χ^2 statistics were performed on categorical data and Student's t-test for continuous variables. Stepwise multiple regression analyses were used to explore the relationship between the two continuous dependent variables, and the clinical and sociodemographic independent variables; 10 of the variables listed in Tables 1 and 2 in the cancer patients. Logistic regression analyses with dichotomised dependent variables (cut-off point between "satisfied/strong and healthy" and "so-so"), yield similar results (results not shown). Using the SPSS statistical package, variables were entered in the regression analyses at a P value < 0.05 and removed from the model at a P value > 0.10.

RESULTS

Characteristics of the study population

Because of the matching procedure, most of the demographic characteristics of the cancer patients and control

Table 2. Characteristics of the study population

	Cancer patients n (%)	Matched control group n (%)	Statistical significance
Gender			
Male	153 (75)	569 (74)	$\chi^2=0.04$ (DF = 1)
Female	51 (25)	197 (26)	$P=0.8$
Mean age (range in years)	67.6 (32–92)	67.0 (30–93)	
Family type			
Living alone	45 (22)	144 (19)	
Spouse/cohabiter with child(ren)	33 (16)	137 (18)	$\chi^2=4.60$ (DF = 3)
Spouse/cohabiter without child(ren)	109 (53)	410 (54)	$P=0.2$
Living with others	11 (5)	75 (10)	
Missing	6 (3)		
Educational background			
7 year primary or continuation school, or less	87 (43)	350 (46)	
8–10 year primary and lower secondary school	69 (34)	271 (35)	$\chi^2=18.23$ (DF = 2)
Upper secondary school or higher	38 (19)	59 (8)	$P<0.001$
Missing	10 (5)	86 (11)	
Smoking habits*			
Daily smokers	70 (35)	167 (22)	
Previous smokers	96 (47)	218 (29)	$\chi^2=54.93$ (DF = 2)
Never smoked	37 (18)	343 (45)	$P<0.001$
Missing	1 (<1)	38 (5)	
Total number	204 (100)	766 (100)	

*Not included as an independent variable in the regression analyses.

Table 3. Satisfaction with life and physical health in patients and controls (grouped response categories)

	Patients ($n=204$)	Controls ($n=766$)	χ^2 (DF)	P value
Satisfaction*				
Satisfied	128 (64)	626 (82)		
So-so	55 (27)	122 (16)		
Dissatisfied	18 (9)	16 (2)	39.313 (2)	<0.001
Mean	2.92	2.58		
95% confidence interval	2.73–3.11	2.57–2.59		
Physical health†				
Strong and healthy	88 (44)	393 (52)		
So-so	61 (20)	282 (37)		
Worn out	53 (26)	69 (12)	27.147 (2)	<0.001
Mean	3.70	3.47		
95% confidence interval	3.50–3.90	3.46–3.48		

Figures are percentage values.

*1 of the cancer patients, and 2 of the controls did not fill in this question; †2 of the cancer patients, and 2 of the controls did not fill in this question.

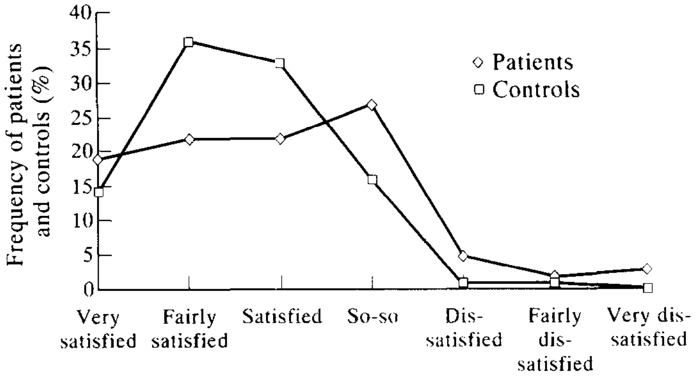
groups are similar (Table 2). Smoking is a risk factor for head and neck cancer and, as expected, the cancer patients were more often daily smokers or previous smokers compared with the controls.

Self-reported life satisfaction and physical health

The cancer patients reported significantly lower satisfaction with life compared with the controls; the distribution of scores is shown in Fig. 1. Sixty-four per cent of the cancer patients were in the satisfied group and 9% were in the dissatisfied group, compared with 82% and 2% within the controls (Table 3). Similar results were found for physical health with lower self-reported health in the cancer patients (Fig. 2). Forty-four per cent of the patients were in the strong and healthy group and 26% were in the tired and worn out group, compared with 52% and 12% in the controls (Table 3).

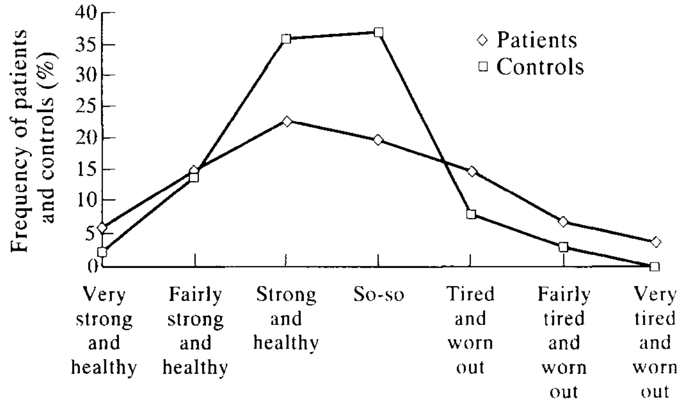
Associations between satisfaction with life and physical health, and independent clinical and sociodemographic variables in the cancer patients

In a stepwise multiple regression analysis, disease site and level of education were statistically significantly associated



	Very satisfied	Fairly satisfied	Satisfied	So-so	Dis-satisfied	Fairly dis-satisfied	Very dis-satisfied
Patients *n* (%)	38 (19)	45 (22)	45 (22)	55 (27)	10 (5)	3 (2)	5 (3)
Controls *n* (%)	106 (14)	272 (36)	248 (33)	122 (16)	9 (1)	4 (1)	3 (<1)

Fig. 1. Frequency of responses on the satisfaction with life question in the study population: "When you think about your life at the moment, would you say that by and large you are satisfied with life or are you mostly dissatisfied?".



	Very strong and healthy	Fairly strong and healthy	Strong and healthy	So-so	Tired and worn out	Fairly tired and worn out	Very tired and worn out
Patients *n* (%)	12 (6)	30 (15)	46 (23)	61 (20)	31 (15)	15 (7)	7 (4)
Controls *n* (%)	15 (2)	104 (14)	274 (33)	282 (37)	60 (8)	26 (3)	8 (<1)

Fig. 2. Frequency of responses on the physical health question in the study population: "At present do you feel mostly strong and healthy, or tired and worn out?".

Table 4. Stepwise multiple regression analyses with satisfaction with life and physical health as the dependent variables

Dependent variable Independent variable*	Regression coefficient	Standard error	r^2	*P* value
Satisfaction with life				
Pharyngeal cancer	1.12	0.37		0.003
High level of education	−0.68	0.25		0.007
Constant	2.91	0.11	0.09	
Physical health				
High level of education	−0.52	0.26		0.044
Pharyngeal cancer	0.82	0.38		0.032
Pre-operative radiotherapy	0.54	0.26		0.039
Constant	3.60	0.13	0.07	

*Ten clinical/demographic variables in the analyses.

with satisfaction with life (Table 4). The small group of patients with pharyngeal cancer ($n=14$) reported lower satisfaction with life than patients with other disease sites, and patients with a high level of education ($n=38$) were more satisfied than those with a low or medium level of education. However, these two variables explained only 9% of the variance. Similar results were found in the regression analyses with physical health as the dependent variable. In addition to disease site and level of education, the timing of radiotherapy was also a significant variable in the model ($r^2=0.07$), with reduced physical health in those with a medium or low level of education, pharyngeal cancer and those who received pre-operative radiotherapy ($n = 36$) (Table 4). 79 patients had at least one of these three attributes.

DISCUSSION

In the present study, long-term surviving head and neck cancer patients reported reduced satisfaction with life and physical health compared with matched control groups from a general population. This is not surprising; we have previously demonstrated a high level of distress and side effects after treatment in these patients [8, 9]. In an Israeli study, satisfaction with life in 55 head and neck cancer survivors was similar to matched control groups of temporarily disabled persons and healthy individuals [14]. Yet, within the small group of patients surviving more than 5 years ($n = 13$) [6], the satisfaction with life was lower than the controls, which is consistent with our findings. A strength of our study is that the cancer population is large and homogeneous with regard to disease site; we are not aware of any other studies of long-term head and neck cancer survivors (> 3 years) with 100 patients or more. Furthermore, the matched control group is taken from a very large population survey with an excellent participation rate. One might argue that we should have used a more extensive generic (general) questionnaire for this comparison. However, we had to consider the total number of questions included in order to achieve a high compliance rate within the cancer patients.

Similar or higher satisfaction with life/subjective well-being in cancer groups compared with gender and age matched population means, has been shown in other studies [10–14]. In all these papers, the authors explain the surprising results by an adjustment to the new situation, re-appraisal of their lives, and less concern with trivia in the cancer patients. Such explanations may not be applicable for a population with considerable side effects, including physical limitations and changes of appearance after treatment, which are constant reminders of their disease. Even though head and neck cancer patients surviving 5 years or more are considered to be cured, this may be a source of chronic stress in the long-term survivors.

These patients may have an increased risk of developing psychosocial problems due to the association with alcohol abuse and low social class. In the long-term survivors, age itself may affect the patients' functional abilities, their quality of life, and increase the likelihood of other chronic and acute illnesses occurring. In the population survey, age was associated with satisfaction with life/physical health [15]. Yet, in the cancer patients, the only independent clinical and sociodemographic variables that were statistically significantly associated with satisfaction with life (disease site and education) or physical health (disease site, education, and timing of radiotherapy) explained only 7–9% of the variance, and the associations are probably of little clinical relevance. However, satisfaction with life is highly correlated with psychological distress as assessed by the GHQ-20, which as we have previously shown is highly associated with side effects after treatment [9].

CONCLUSION

Head and neck cancer survivors report significantly reduced satisfaction with life and physical health compared with a matched control group, and this cannot be explained by clinical or sociodemographic variables. A reduction of side effects of treatment might be the best way of reducing this late psychosocial morbidity in the long-term survivors; clinicians should bear this in mind when decisions about treatments and follow-up are made. A history of psychiatric disorders, comorbidity of other chronic illnesses, the patients' networks and support, and socio-economic status have been shown to be risk factors for psychological and behavioral morbidity in other cancer groups [21]. Whether this is true in head and neck cancer patients also, has to be decided by prospective studies which may identify prognostic factors for such problems in the cured patients. Research has demonstrated that psychological interventions result in significant improvements in quality of life [22, 23], and such intervention studies are warranted in patients with a high risk of long-term psychosocial morbidity.

---

1. Harwood AR, Rawlinson E. The quality of life of patients following treatment for laryngeal cancer. *J Radiat Oncol Biol Phys* 1983, **9**, 335–338.
2. Morton RP, Davies ADM, Baker J, Baker GA, Stell PM. Quality of life in treated head and neck cancer patients: a preliminary report. *Clin Otoloryngol* 1984, **9**, 181–185.
3. Teichgraber J, Bowman J, Goepfert H. Functional analysis of treatment of oral cavity cancer. *Arch Otolaryngol Head Neck Surg* 1986, **112**, 959–965.
4. Fobair P, Hoppe RT, Bloom J, Cox R, Varghese A, Spiegel D. Psychosocial problems among survivors of Hodgkin's disease. *J Clin Oncol* 1986, **4**, 805–814.
5. Greaves-Otte JGW, Greaves J, Kruyt PM, Leeuwen O van, Wouden JC van der, Does E van der. Problems at social re-integration of long-term cancer survivors. *Eur J Cancer* 1991, **27**, 178–181.
6. Rapoport Y, Kreitler S, Chaitchik S, Algor R, Weissler K. Psychosocial problems in head-and-neck cancer patients and their change with time since diagnosis. *Ann Oncol* 1993, **4**, 69–73.
7. Shag CAC, Ganz PA, Wing DS, Sim MS, Lee JJ. Quality of life in adult survivors of lung, colon and prostate cancer. *Qual Life Res* 1994, **3**, 127–141.
8. Bjordal K, Kaasa S, Mastekaasa A. Quality of life in patients treated for head and neck cancer. A follow-up study 7–11 years after radiotherapy. *J Radiat Oncol Biol Phys* 1994, **28**(4), 847–856.
9. Bjordal K, Kaasa, S. Psychological distress in head and neck cancer patients seven to 11 years after curative treatment. *Br J Cancer* 1995, **71**, 592–597.
10. Danoff B, Kramer S, Irwin P, Gottlieb A. Assessment of the quality of life in long-term survivors after definitive radiotherapy. *Am J Clin Oncol* 1983, **6**, 339–345.
11. Drettner B, Ahlbom A. Quality of life and state of health for patients with cancer in the head and neck. *Acta Otolaryngol* 1983, **96**, 307–314.
12. Kaasa S, Aass N, Mastekaasa A, Lund E, Fosså SD. Psychosocial well-being in testicular cancer patients. *Eur J Cancer* 1991, **27**, 1091–1095.
13. Olweny CLM, Juttner CA, Rofe P, *et al.* Long-term effects of cancer treatment and consequences of cure: cancer survivors enjoy quality of life similar to their neighbours. *Eur J Cancer* 1993, **29A**(6), 826–830.
14. Kreitler S, Chaitchik S, Rapoport Y, Kreitler H, Algor R. Life satisfaction and health in cancer patients, orthopaedic patients and healthy controls. *Soc Sci Med* 1993, **36**(4), 547–556.
15. Holmen J, Midthjell K, Bjartveit K, *et al.* The North-Trøndelag Health Survey 1984–1986. Purpose, background and methods. Participation, non-participation and frequency distributions. National Institute of Public Health, Unit for Health Services Research, Oslo, Norway; National Institute of Public Health, Community Medicine Research Center, Verdal, Norway; Report no. 4; 1990.
16. Moum T. Yea-saying and mood-of-the-day effects in self-reported quality of life. *Soc Indicat Res* 1988, **20**, 117–139.
17. Bjordal K, Kaasa S. Psychometric validation of the EORTC Core

Quality of Life Questionnaire, 30-item version and a diagnosis-specific module for head and neck cancer patients. *Acta Oncol* 1992, **31**, 311–321.

18. Andrews FM, Withey SB. *Social Indicators of Well-being: Americans' Perception of Life Quality*. New York, Plenum Press, 1976.
19. Aaronson NK, Ahmedzai S, Bergman B, *et al.* For the European Organization for Research and Treatment of Cancer, Study Group on Quality of Life. The EORTC QLQ-C30: a quality of life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993, **85**, 365–376.
20. Goldberg D, Williams P. *A User's Guide to the General Health Questionnaire*. Windsor, Berkshire, U.K., NFER-NELSON, 1988.
21. Andersen BL. Surviving cancer. *Cancer* 1994, 74, 1484–1495.
22. Andersen BL. Psychological interventions for cancer patients to enhance quality of life. *J Consult Clin Psychol* 1992, **60**, 552–568.
23. Telch CF, Telch MJ. Group coping skills instruction and supportive group therapy for cancer patients: a comparison of strategies. *J Consult Clin Psychol* 1986, **54**, 802–808.

Acknowledgements—This work was supported by the Norwegian Cancer Society Project No. 88283/002. The data from the control group were collected through a medical screening carried out by the Norwegian National Health Surveys Organization (Statens Helseundersøkelser). Principal investigators for the psychosocial part of the study were Torbjørn Moum, Siri Næss, and Tom Sørensen. We are grateful to the National Health Surveys and to the original investigators for allowing us to use the data in the present analyses.