The association between life satisfaction and adherence to treatment among patients with stage three gastric cancer

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Summary. *Background:* The association between subjective well-being (SWB) and adherence to treatment is understudied, especially in the context of cancer. The purpose of this study was to examine the association between various demographic, cancer-related, psychological and mental health factors with adherence to treatment among cancer patients. *Methods:* A sample of 95 consecutive Stage 3 gastric cancer patients were examined. Each patient filled a battery of questionnaires assessing demographics, mental health, SWB and adherence to treatment. Cancer-related information was obtained from the patients' medical records. *Results:* The main result revealed that SWB was significantly associated with adherence to treatment among these gastric cancer patients. SWB maintained its positive association with adherence even after controlling for demographics, cancer-related factors and depressive symptoms. *Discussion:* This finding presents practical implications for health and mental health professionals. SWB may be used as a fast screening for patients with a potential risk for low adherence. Promotion of SWB may be important in order to raise adherence rates in cancer patients.

Key words: adherence to treatment, depressive symptoms, gastric cancer, quality of life, subjective well-being

«L'ASSOCIAZIONE TRA QUALITÀ DI VITA E ADESIONE AL TRATTAMENTO IN PAZIENTI CON TUMORE GASTRICO DI LIVELLO TRE»

Riassunto. *Premessa:* L'associazione tra benessere soggettivo e adesione al trattamento è poco studiata, in particolare in riferimento al cancro. La finalità di questo studio era quella di prendere in esame, tra i pazienti affetti da tumore, l'associazione tra vari fattori demografici, tumore correlati, psicologici, salute mentale e adesione al trattamento. *Metodi:* Viene preso in esame un campione di 95 pazienti in sequenza affetti da tumore gastrico di livello 3. Ogni paziente ha compilato una serie di questionari volti a stabilire la demografia, la salute mentale, il benessere soggettivo e l'adesione al trattamento. Le informazioni relative al tumore sono state ottenute dalle cartelle cliniche dei pazienti. *Risultati:* Il risultato più importante ha rivelato che il benessere soggettivo era associato in maniera significativa all'adesione al trattamento in questi pazienti affetti da tumore gastrico. Il benessere soggettivo manteneva la sua associazione positiva all'adesione al trattamento anche successivamente al controllo eseguito per fattori demografici, cancro correlati e sintomi depressivi. *Discussione:* Questa scoperta ha delle implicazioni pratiche per chi si occupa, a livello professionale, di salute in generale e di salute mentale in particolare. Il benessere soggettivo potrebbe essere utilizzato come metodo di screening veloce per pazienti con rischio potenziale di scarsa adesione al trattamento. La promozione del benessere soggettivo potrebbe avere importanza al fine di aumentare i livelli di adesione al trattamento nei pazienti affetti da cancro.

Parole chiave: adesione al trattamento, sintomi depressivi, tumore gastrico, qualità della vita, benessere soggettivo

Introduction

Quality of life and subjective well-being

Quality of life (QOL) is a well-known multidimensional construct that taps into several domains such as physical, psychological and social domains (1, 2). One major aspect of QOL is subjective well-being (SWB) which reflects the psychological facet of QOL (1). Within SWB, life satisfaction is the cognitive component of one's life evaluation (3, 4).

Adherence to treatment

One issue that is understudied in the context of gastric cancer is adherence to treatment. Adherence was defined by the World Health Organization in 2003 as the "extent to which a person's behavior, taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from a healthcare provider" (5).

The relationship between SWB and adherence

The relationship between SWB and adherence to treatment is understudied. Most studies of adherence target SWB measures as outcomes (2, 6-8). The general view sees an unidirectional link between adherence and SWB as an outcome (2). However, evidence suggests that SWB may be an antecedent to functioning (9), and therefore, it is plausible to assume that SWB may influence adherence level.

The goal of this study is to examine the association between SWB and adherence when the latter is the outcome. Following this point, we can assume that fluctuations in SWB may influence adherence and *vice versa*. Thus, measuring the association of SWB with adherence as outcome may be with importance to clinical practice. Adherence assessment is difficult (10). The reasons are derived from the type of medical condition or illness, the availability of the patient, and the ability of the health professionals to control or observe adherence (10-12).

Studies that have measured the link between adherence and SWB as outcome tend to focus on various diseases and medical conditions such as acne (13), asthma (12), hypertension (8), psoriasis (14), but less on cancer, and especially gastric cancer which is one of the most common types of cancer (15). However, two studies have measured SWB as predictor of adherence and found that increased well-being will lead to increased adherence (16) and that interventions by medical and mental health professionals will be used in order to monitor, assess and increase adherence (17).

Gastric cancer

In 2000, gastric cancer was the second most frequent cause of cancer death worldwide and the fourth most common cancer, with an estimated 650,000 deaths and 880,000 new cases per year (15). Generally, the impact of being diagnosed with cancer leads to poorer adjustment, lower QOL, and lower mental health (18). The aftermath of being diagnosed with cancer has a drastic impact on the patient's life both physically and mentally (19). From a psychiatric point of view, depression is common among cancer patients (20). Moreover, depression is negatively associated with adherence to treatment (21, 22). Coyne and his colleagues (23, 24) showed that SWB does not predict longer life span among cancer patients. Moreover, a different approach may also be viewed that does not contradict their claim. If SWB enhances adherence to treatment, then it shows an important contribution in increasing the use of surgery, chemotherapy and radiation treatment, contrary to patients who do not adhere to treatment and have an elevated risk for exacerbation in their condition.

The conceptual model of this study was based on the QOL model (2). This model presents the complex relationships between treatment related factors and how they are associated with patient's related factors and outcomes. This model is health based and its main limitation is by neglecting psychosocial factors. However, we have added two supporting components to this model. Firstly, findings from meta-analysis show that social support was found to be positively associated with adherence (25). Second, findings from a recently published review show that depression is negatively associated with

adherence (26). To the best of our knowledge, no study to date has examined the association between SWB and adherence to treatment among gastric cancer patients. Based on previous research (21, 22), we have formulated the following hypothesis: SWB would be positively associated with adherence to treatment among gastric cancer patient and *vice versa*.

Method

Design

This study used a cross-sectional descriptive design. This study was a part of a larger study of 123 gastric cancer patients in stages 1-4. For more information about the study, see 27, 28.

Participants and setting

Participants were 95 consecutive patients with Stage 3 gastric cancer - mean age 56.33 (SD=12.91); 54 men (56.8%); 76 married (80%); time since diagnosis was 11.62 months (SD=11.56) with no history of psychiatric disorders. All the participants with Stage 3 cancer are receiving adjuvant therapy in order to reduce the risk of cancer recurrence. The most common adjuvant therapy for Stage 3 gastric cancer involves chemotherapy or in combination with radiation therapy. Each participant signed an informed consent. Data were collected during January-March, 2008. The study was approved by the IRB at Tel Aviv Sourasky Medical Center. Background information included age, gender (0=men; 1=women), and marital status (0=married/cohabitation; 1=not married/cohabitation). For more information of the initial sample and response rate, see 27, 28.

Measurements

Perceived social support was measured by the statement "I get the emotional help and support I need from my family and friends" and was coded as (0=yes; 1=no). In the current sample 85.1% (n=80) perceived themselves as receiving social support and 14.9% perceived themselves as not receiving social support (n=14). The use of a single item measure for perceived social support is common in the literature (29-32).

Depressive symptoms were measured by the Short Center for Epidemiological Studies - Depression scale (SCESD) (33, 34). Respondents rated the frequency with which they had experienced 10 depressive symptoms in the past month on a scale of 0 (not at all), 1 (sometimes), 2 (most of the time), and 3 (almost every day). A total score of 10 and above is considered to reflect an elevated risk for clinical depression (34). The Cronbach's alpha coefficient in this sample was 0.841. In the current sample 44.2% (n=42) had a low risk for clinical depression (SCESD < 10) and 55.8% (n=53) had a high risk for clinical depression (SCESD ≥ 10). This questionnaire is widely used in the literature (35-38).

Subjective well-being was assessed by the present Self Anchoring Scale (SAS) (39), on which the participants rated their current satisfaction with life and well-being on an 11-point scale (0-10) using the following question: "Here is a picture of a ladder. Suppose we say that the top of the ladder represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?". The mean score of the SAS present was 5.50 (SD= 2.56) and the median value was 6. The use of single item measure for SWB is common in the literature (40), in the context of psychological trauma (31, 41), and most importantly, in the context of cancer (42). For the purpose of this study we used the median and created two groups low SWB (value ≤=6) vs. high SWB (value > 6).

Adherence to treatment was measured by a single item self-report statement "I adhere to the hospital personnel treatment." Participants rated their answer on a three point Likert scale: 1 (a little bit), 2 (moderately) or 3 (very much). This scale was dichotomized as (0=low adherence [categories 1 and 2 were merged]; 1=high adherence). In the current sample 29.5% were in the low adherence group (n=28) and 70.5% in the high adherence group (n=67). The use of a single item measure for adherence is common in the literature (13). The aggregation was used in order to perform logistic regression (43).

Procedure

The study was approved by the ethical committee at Tel Aviv Sourasky Medical Center. The patients were recruited during January-March 2008. Potential subjects were approached by the social workers working along with the nurses and physicians during their post treatment follow-up checks. Data were collected by face-to-face interviews followed by administration of self-rated questionnaires. Medical records were reviewed by the research team for the purpose of recording clinical variables.

Statistical analysis

Chi-square tests and t-tests were carried out in order to examine differences in the low adherence vs. high adherence for the following variables: age, gender, marital status, length of cancer (in months), perceived social support, depressive symptoms, and SWB.

Following the basic analyses, a hierarchical logistic regression model analysis was carried out in order to examine the association between adherence to treatment and age, gender, marital status, length of cancer (in months), perceived social support, depressive symptoms (SCESD), and SWB (SAS). The logistic regression had three blocks. In the first block, sociodemographic factors along with length of cancer and perceived social support were entered to the equation. The second block added depression and the third block added SWB (SAS). We have performed another logistic regression that was the same in every aspect

except that the outcome variable was SWB. Additionally, adherence to treatment was inserted in the third block instead of SWB.

This dual model approach was performed in order to show the relationship beyond the classic approach that views SWB as the outcome of adherence (2). The sample was sufficient for carrying out the logistic regression and no violations were detected (34). The data were analyzed using SPSS 19 statistical software (SPSS Inc, Chicago, Illinois).

Results

The basic analyses showed that the high adherence group was older (t=-2.189; p=0.031), had a lower proportion of patients with elevated risk for depression (χ^2=2.424; p=0.015), and reported higher SWB (t=-2.159; p=0.033). For more information, see Table 1.

Within the context of SWB and adherence, the correlation matrix revealed that being at younger age (r=-0.344; p <0.001), a man (r=-0.355; p 0<0.001), married (r=-0.383; p <0.001), and having lower risk for clinical depression (r=-0.589; p <0.001) were negatively associated with SWB. Being older (r=0.221; p <0.005), having lower risk for clinical depression (r=-0.250; p <0.005), and having higher level of SWB and having lower risk for clinical depression (r=0.220; p <0.005) was positively associated with higher adherence to treatment. For more information, see Table 2.

Table 3 presents the results of the hierarchical logistic regression looking at the association between various variables and adherence to treatment. Age was

Table 1. Participants' characteristics according to adherence to treatment (*n*=95)

	Low Adherence (n=28)	High Adherence (n=67)	Test statistics	p value
Age, y, Mean (S.D)	51.93 (11.63)	58.16 (13.06)	t= -2.189	0.031*
Gender, men, n (%)	14 (50.0)	40 (59.7)	χ^2= 0.866	0.387
Marital status, married, n (%)	20 (71.4)	56 (83.6)	χ^2= 1.343	0.179
Length of cancer (months), Mean (S.D)	10.54 (14.03)	12.07 (10.45)	T= -0.589	0.557
Perceived social support, yes, n (%)	24 (85.7)	56 (83.6)	χ^2= 0.107	0.915
SCESD =≥ 10, n (%)	21 (75.0)	32 (47.8)	χ^2= 2.424	0.015
SWB, Mean (S.D)	4.64 (1.68)	5.86 (2.78)	T= -2.159	0.033*

SCESD = Short Center for Epidemiologic Studies Depression; SWB = Subjective Well-Being
* p<0.05

Table 2. Intercorrelations among the study variables

Variable	1	2	3	4	5	6	7	8
1. Age	−	0.026	-0.066	-0.128	0.106	0.003	-0.344***	0.221*
2. Gender[a]		−	0.149	0.073	0.235*	0.262*	-0.355***	-0.089
3. Marital status[b]			−	0.076	0.024	0.445***	-0.383***	-0.139
4. Length of cancer since diagnosis (months)				−	0.078	-0.024	0.079	0.061
5. Perceived social support[c]					−	0.196	-0.119	0.011
6. Elevated risk for clinical depression (SCESD) > 10						−	-0.589***	-0.250*
7. Subjective well-being (SAS) > 6							−	0.220*
8. Adherence to Treatment								−

[a]Coded 0 = man, 1 = woman. [b]Coded 0 = married, 1 = unmarried. [c]Coded 0 = Yes, 1 = No.
* = 0.05; ** = 0.01; *** <0.001

Table 3. Hierarchical logistic regression analysis of variables associated with adherence to treatment in patients with stage three gastric cancer (n=95)

Predictors	First step		Second step		Third step	
	β	OR (95.0% CI)	β	OR (95.0% CI)	β	OR (95.0% CI)
Age	0.041*	1.041 (1.002-1.082)	0.042*	1.042 (1.003-1.083)	0.053*	1.054 (1.012-1.098)
Gender	-0.402	0.669 (0.247-0.1808)	-0.206	0.814 (0.287-2.307)	0.221	1.247 (0.396-3.924)
Marital status	-0.798	0.450 (0.143-1.420)	-0.259	0.772 (0.224-2.661)	-0.235	0.791 (0.218-2.873)
Length of cancer since diagnosis (months)	0.020	1.020 (0.979-1.063)	0.017	1.017 (0.975-1.061)	0.017	1.017 (0.973-1.063)
Perceived social support	0.153	1.165 (0.280-4.851)	0.332	1.394 (0.337-5.768)	0.398	1.488 (0.318-6.972)
Elevated risk for clinical depression (SCESD) > 10			-1.182*	0.307 (0.099-0.954)	-0.522	0.593 (0.170-2.077)
Subjective well-being (SAS) > 6					1.799**	6.041 (1.588-22.978)

*p < 0.05; ** p < 0.01

positively associated with adherence to treatment in step1 Odds Ratio, 1.041 [95% confidence interval, 1.002-1.082]; p<0.05), step 2 Odds Ratio, 1.042 [95% confidence interval, 1.003-1.083]; p<0.05), and step 3 Odds Ratio, 1.054 [95% confidence interval, 1.012-1.098]; p<0.05). Depressive symptoms were negatively associated with lower adherence to treatment after controlling for sociodemographic factors along with length of cancer and perceived social support (Odds Ratio, 0.307 [95% confidence interval, 0.099-0.954]; p<0.05). However, with the insertion of SWB, depressive symptoms lost their association with adherence to treatment (Odds Ratio, 0.593 [95% confidence interval, 0.170-2.077]; p=n.s). As predicted by our hypothesis, a higher level of SWB was positively associated with higher adherence to treatment after controlling for sociodemographic factors, length of cancer, perceived social support and depressive symp-

toms (Odds Ratio, 6.041 [95% confidence interval, 1.588-22.978]; p<0.01).

Table 4 presents the results of the hierarchical logistic regression looking at the association between various variables and subjective well-being. Being a man was positively associated with higher SWB in step 1 (Odds Ratio, 0.178 [95% confidence interval, 0.065-0.488]; p<0.01), step 2 (Odds Ratio, 0.192 [95% confidence interval, 0.063-0.583]; p<0.01), and step 3 (Odds Ratio, 0.167 [95% confidence interval, 0.050-0.554]; p<0.01). In step 2, depressive symptoms were negatively associated with higher SWB after controlling for sociodemographic factors along with length of cancer and perceived social support (Odds Ratio, 0.104 [95% confidence interval, 0.032-0.344]; p<0.01). The same result was found in step 3, (Odds Ratio, 0.136 [95% confidence interval, 0.039-0.470]; p<0.01). As predicted by our hypothesis, higher

Table 4. Hierarchical logistic regression analysis of variables associated with subjective well-being patients with stage three gastric cancer (n=95)

Predictors	First step		Second step		Third step	
	β	OR (95.0% CI)	β	OR (95.0% CI)	β	OR (95.0% CI)
Age	-0.021	0.979 (0.942-1.017)	-0.029	0.971 (0.929-1.015)	-0.046	0.955 (0.910-1.002)
Gender	-1.728**	0.178 (0.065-0.488)	-1.652**	0.192 (0.063-0.583)	-1.789**	0.167 (0.050-0.554)
Marital status	-1.382	0.251 (0.062-1.020)	-0.076	0.926 (0.191-4.484)	0.066	1.069 (0.214-5.333)
Length of cancer since diagnosis (months)	0.017	1.017 (0.976-1.059)	0.009	1.009 (0.964-1.056)	0.008	1.008 (0.960-1.058)
Perceived social support	-0.207	0.813 (0.196-3.380)	0.339	1.403 (0.275-7.165)	0.113	1.119 (0.200-6.275)
Elevated risk for clinical depression (SCESD) > 10			-2.261**	0.104 (0.032-0.344)	-1.998**	0.136 (0.039-0.470)
Adherence to Treatment					1.785*	5.961 (1.464-24.277)

*p < 0.05; ** p < 0.01

adherence to treatment was positively associated with higher level of SWB after controlling for sociodemographic factors, length of cancer, perceived social support and depressive symptoms (Odds Ratio, 5.961 [95% confidence interval, 1.464-24.277]; p<0.05).

Discussion

SWB was positively associated with adherence to treatment and *vice versa*. Our results are in line with the QOL model (2) suggesting that SWB is a potent component related to adherence. However, although our hypothesis was affirmed, there is need to expand Testa and Simonson's QOL model in order to engulf more psycho-social factors that may be associated with adherence to treatment and SWB. This will render the model as more bio-psycho-social oriented and will broaden its perspective of the association between adherence and SWB. These results reflect an earlier study that found a similar association between SWB and adherence to treatment among schizophrenic outpatients (16). The results are in line with a previous research showing a negative association between depression and adherence to treatment (21, 22). The co-occurrence of cancer and depression is known in the literature and reflects the mental burden of this illness (18). Moreover, the positive association between SWB and adherence to treatment remained even after controlling for depressive symptoms. Our results may suggest that from a clinical point of view a

short screening for SWB may be used as a part of the strengths assessment of the patient and his/her inclination to adhere to treatment. This is important as it is a complimentary measure to that proposed by an early study suggesting the creation of adherence groups (17). From a nursing care point of view it seems that implementation of an individualized care plan is needed in order to promote SWB. This might be gained through positive nurse-patient communication, oriented to the patients bio-psycho-social needs and not to nurses' perceptions (44). Moreover, since positive nurse-patient communication was found to be crucial to QOL and well-being of patients (45), it seems that also adherence to treatment may be raised by acknowledging the role of communication in health behavior (46).

A broader can be viewed via problem-focused coping that may have an indirect effect on subjective well-being through growth experiences (47). Similarly, the assumption that growth may also be seen as coping, positive reappraisal or positive reinterpretation of the stressful event is evident (48, 49). Therefore, when performing psychotherapy interventions, healthcare professionals should focus on SWB as it is related to increase in adherence to treatment. This might be gained either by tailoring individual therapy or through psycho-educational groups.

Findings also show that SWB has a significant association with adherence to treatment among Stage 3 gastric cancer patients, beyond that of background demographics, length of cancer, perceived social

support and depressive symptoms. These results have two main implications. Firstly, SWB is an important factor to be used in prospective studies examining adherence to treatment. Second, our findings allude to the importance of designing environmental and psycho-social interventions that would elevate SWB. An elevation in SWB may increase the likelihood of adherence to treatment which in turn may elevate the chance for prospective improvement in the physical condition due to the use of surgery, chemotherapy, or radiation therapy although it would not necessarily increase survival rates (23, 24).

Limitations

This study performed a cross-sectional examination and therefore excluded causal inference. Future studies should include longitudinal designs. Yet researchers should be aware that a longitudinal examination might be hampered in the current study by the fact that among gastric cancer patients the mean time since diagnosis was about one year, meaning that the prospective one-year survival was grim, expected to be less than 20% (50). Current evidence suggests that the relationship between SWB and functioning is bi-directional (9). Therefore, adherence to treatment may increase SWB which in turn may increase further adherence to treatment. A second limitation of the current study is its use of self-reported single-item measures for assessing adherence to treatment and SWB. However, a recent study showed that both objective (automatic dose counter) and subjective (self report) measurements of adherence to treatment had a similar prediction among asthma patients (12). Moreover, a review of the literature showed that both direct and indirect measurements of adherence have benefits and detriments. The use of convergent methods for adherence (objective and subjective) will be more suitable when studying adherence to various treatments and illnesses (51), and should be used in future studies. The use of a single item for SWB is also widely used in the literature and found to be an important factor (40).

Future studies should explore the association between SWB and adherence to treatment. These replications will enable to formulate a better climate in terms of well-being for cancer patients in order to facilitate treatment that elicits both irrational fear and stigma along with potentially severe side effects. This may impede cancer patients from taking a different set of treatments in case of cancer non-response for the initial treatment.

In conclusion, SWB is an important marker of adherence to treatment and should be assessed in its own right in patients with cancer. Practitioners can design programs that promote SWB, not only in order to improve one's mental state, and decrease depression symptoms, but also to improve adherence to treatment.

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