Association between Tumor Response and Change in EQ5D-3L Quality of Life among Cancer Patients

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Abstract

Introduction: The primary aim in cancer treatment is to provide excellent tumor response while maintaining the most acceptable quality of life. The relationship of QoL to tumor response has not yet been well discussed. This study determines the association between the change in the QoL from baseline to one year follow-up and tumor response among patients enrolled in the ASEAN Cost in Oncology (ACTION) study.

Methods: Pooled data from the ACTION study was reviewed. Associations between demographics, cancer type, and tumor response were analyzed.

Results: Of the qualified profiles (412/ 742), breast cancer (42.2%), colorectal (21.8%), and head neck (10%) are still most common. Of these cases, 126 (30.6%) were metastatic on presentation. Demographic data showed female sex having better tumor response. More importantly, tumor response was significantly associated with improvement in QoL: complete or partial response was associated with improvement in QoL (p=.000) while progressive disease related to worse situations. The general pattern seen above was reflected in female breast cancer cases, colon and rectal cancer, and other malignant neoplasms.

Conclusion: Improvement in QoL was significantly associated with better tumor response. This trend was similar for breast cancer, colorectal cancer and other malignancies. The use of universal measures of health like the EQ5D-3L may be used to quantify improvements in QoL with several limitations: 1) Cultural differences should be established and 2) Limitations in quantifying precise changes in QoL. The utilization of more culturally adept QoL measures may address this problem. Similarly, the use of secondary data may limit the results in this study. Prospective studies specifically addressing the objectives may improve results.

Introduction

Before the beginning of any oncologic intervention, both the clinician and the patient anticipate two important aspects of treatment: tumor response and quality of life. Tumor response is evaluated as improvement, worsening or stability of the initial primary tumor upon initiation of treatment while quality of life is defined as changes from the daily activities of normality of the patient. In practice clinicians prioritize asking pertinent questions both with regards to tumor response and quality of life- how was the treatment, did the size of the lymph node change, are you still able to function normally? These questions are hard not to get noticed and eventually clinicians and patients occasionally gauge both tumor response and changes in quality of life hand-in-hand. The relationship of these two responses is the topic of discussion in this paper.

Quality of life (QoL) issues ensure that cancer patients are able to function as indistinguishable to normal as possible. Recording of self-reported evaluation of patients on their well-being and symptoms has been a practice since time immemorial. The goal of recording the quality of life is to identify important changes caused by any intervention. These changes are now called health-related quality of life (HRQOL) [1]. HRQOLs are important to guide clinicians in providing the most appropriate chemotherapy regimens and adjustments along the course of management.

On the other hand, tumor response has been used to guide clinicians in choosing the most appropriate intervention. Tumor response is always assessed after any cancer therapy. True enough, it is the most anticipated after a cancer intervention. Since creation of the RECIST in 2000, assessment of change in tumor burden has become an important factor in clinical evaluation of cancer therapeutics [2]. Tumor response is easily measured using before and after imaging studies that provide an almost instantaneous glimpse of an oncologic intervention. However, despite the routine use of tumor

response in assessing the best management, it is still not tantamount to survival [3].

In the recent past, both objective (tumor response) and subjective response (quality of life) is measured together to assess adequacy of management after an oncologic intervention. The association between health-related quality of life and tumor response is hard not to be noticed. In the clinical setting, clinicians rely on the quality of life reported and correlate it with tumor response even without the routine use of imaging studies. Patients themselves perceive tumor response similar to improvement in quality of life. This is highlighted by the different National Comprehensive Cancer Network (NCCN) guidelines [4], placing history and physical examination at the top of each follow-up regimen. Highlighting such not only guides treatment patterns but more importantly, may ascertain if HRQOL can predict tumor response as well.

The association between tumor response and baseline HRQOL has long been studied. Modi et al. has extrapolated data on tumor response, HRQOL and use of single agent Paclitaxel among stage IV breast patients. They noted that good tumor response is seen with improvement in HRQOL as well [5]. Similarly, gastrointestinal stromal tumor (GIST) patients on palliative chemotherapy showed improved clinical outcome with improvements in QOL [6]. A subgroup analysis in the IPASS study pointed out that deterioration of reported HRQOL was associated with progression of the disease [7].

Interestingly, several studies have earlier speculated on the predictive value of HRQOL and tumor response. A study by Keene, on adjuvant breast cancer patients, iterates that decrease in physical wellbeing is strongly related to recurrence [8]. Similarly, possibility of locoregional failure has been identified as closely associated with decrease in functional well-being among head and neck cancer patients [9].

Locally, baseline QOL and survival has already been explored. According to this study, baseline QOL is a predictor of survival independent of treatment, cancer site, and metastasis [10]. Despite this data, no local study has been conducted to evaluate change in QOL from baseline to end of treatment and tumor response.

This study focused on the association of change of the EQ-5D QoL from baseline to after treatment with tumor response among Filipino cancer patients seen at the medical oncology clinics of two tertiary hospitals in the Philippines.

Methodology

Study design and study population

This is a retrospective analysis of secondary data from the Philippine database of the ASEAN Costs in Oncology (ACTION) study [11]. Information used was collected until 31 December 2014; patients included in the analysis should have completed the whole treatment course, and have been able to answer the baseline and 1 year EQ5D-3L questionnaire. Any other patient not included in the ACTION study was likewise excluded. Patient records from the ACTION study indicating non-

completion of treatment due to drop out, death or loss to follow-up were also excluded.

The population in the ACTION study was newly diagnosed medical oncology patients from two tertiary hospitals last 2012-2014. All patients were more than 18 years old and were cognizant of their disease. Demographics were collected during the initial interview. A baseline QOL using EQ5D-3L questionnaire was answered. These patients were followed up to 1 year. Their EQ5D-3L score was also updated on the 3rd and 12th month. Tumor response was noted at the end of the treatment. Four hundred twelve (412) records of the ACTION study qualified as units of analysis.

Ethical considerations

The ACTION study was approved by the Ethics Board with ID number GCS IM 2011-009 (R-081TE). Informed consent from each subject was taken. Data confidentiality was observed. Permission to utilize secondary data from this study was obtained through the co-authors of the study.

Data collection from the ACTION study database

Newly diagnosed patients enrolled to the ACTION study from two tertiary hospitals were required to answer basic demographic questions including their age, sex, cancer site, presence or absence of metastasis and cancer treatment. Baseline EQ5D-3L scores were taken at the start of the study and were followed-up for 1 year.

The EQ 5D- 3L is a standardized measure of health status developed by the EuroQol Group in order to provide a simple, generic measure of health for clinical and economic appraisal [12]. This questionnaire was used in the ACTION study. It comprised of the five (5) domains relating to quality of life: 1) mobility, 2) self-care, 3) usual activities, 4) pain/discomfort, and 5) anxiety/depression. Each dimension has three (3) levels ranging from 1) no problems, 2) moderate problems, and 3) extreme problems. Each respondent was required to tick one box among each level per health dimension. The EQ 5D also contained Visual Analog Scale (VAS), similar to pain VAS. Each respondent was required to ask a numerical value for their present health state: 0 being the worst health you can imagine and 100 as the best health. Each score was recorded on baseline interview, 5th month interview and 12th month interview.

Tumor response was graded according to the latest RECIST guidelines (Version 1.1). Baseline imaging studies were reviewed and measurable disease status was noted. These data were then compared with post treatment imaging done four to six weeks after intervention. Tumor response was graded as follows:

1)   **Complete response:** Disappearance of all measurable disease, any pathological lymph node should show a decrease by 10 mm in its short axis

2) **Partial response:** Less than thirty percent change in the measurements of the measurable disease,

3) **Stable disease:** No change in measurement from baseline,

4) **Progressive disease:** At least twenty percent increase in the size of the total measurable disease from the study, or an absolute increase by 5 mm of the target lesion or presence of new lesions.

Data analysis

The data obtained from the ACTION Study was translated into MS Excel. Columns relevant for analysis were retained. Category levels the ACTION database were retained (i.e., no recoding of values were done). Important data for analysis were highlighted. The difference from baseline QoL was compared with the QOL at 12 months. Change in QoL was added as a new category level. Change of VAS score was also recorded and was added as a new category level. The change in QoL was measured by subtracting the score of each dimension from baseline with the 12th month score. The same procedure was done with the VAS scores.

Data was converted into an SPSS version 19 work file before proceeding to statistical treatment.

All statistical analysis was performed using SPSS version 19. Descriptive analysis was used to describe the demographic profile. Summary statistics such as mean, standard deviations, and proportions were utilized to describe the study population. Mean scores were taken for EQVAS.

The association between change in score of the different EQ5D-3L dimensions from baseline to 1-year follow-up and tumor response was determined using logistic regression. Data was grouped to those between positive and negative change in each EQ5D-3L dimension. Significant changes in each EQ 5D 3L was analyzed with each category of tumor response. Association between each EQ-5D 3L dimension sub grouping and tumor response was also determined using logistic regression.

Study limitation

The patients were from the medical oncology clinics of two (2) tertiary hospitals, focusing on the lower income Filipino population. Selected secondary data from the ACTION study was used to establish associations.

Results

Baseline characteristics

Four hundred twelve (412) out of the 742 enrolled cases in the ACTION Database qualified for analysis. Of these, 226 (64.6%) were female while 146 (35%) male. Most patients (33.5%) were in the 50 to 59 age group, followed by those in their forties (24.5%) and then by the 60 to 69 age group (17%). Most patients (73.5%) were married. Some 41% were head of household. With respect to educational attainment, 37.9% had

at most secondary or high school education, 28.6% reached college/university while 24.3 reached at most elementary school education. Most (33.7%) were service and sales workers while 10% were professionals.

There was a variety of cancer sites in the database but the following four appeared most common: 174 (42.2%) female breast cancer cases, 90 (21.8%) for colon and rectal cancer, 51 (12.4%) for other malignant neoplasms and 41 (10%) mouth and pharynx cancer cases.

Of the total number of cases, one hundred twenty-six (30.6%) were metastatic cases **(Table 1)**.

Table 1 Baseline characteristics of patients from the ACTION study who qualified for analysis.

Demographic Profile		Frequency	Percent (n=412)
Sex	Male	266	64.6
	Female	146	35.4
Age Group	18 to 29	22	5.6
	30 to 39	55	13.3
	40 to 49	101	24.5
	50 to 59	138	33.5
	60 to 69	70	17
	70 to 79	25	6.1
Marital Status	Never Married	46	11.2
	Married	303	73.5
	Widow	46	11.2
	Separated	17	4.1
House Head	No	244	59.2
	Yes	168	40.8
Educational Level	No Schooling	1	0.2
	Primary (6 years)	100	24.3
	Secondary/High school (7-12 years)	156	37.9
	Technical/Vocational	37	9
	College/University	118	28.6
Occupation	Service and Scale Worker	139	33.7
	None (Employed)	62	15
	Professional	41	10
	Home Duties	40	9.7
	Agricultural, Forestry and Fishery Workers	37	9
	Factory Labourer	25	6.1

	Clerical Suppport Wokers	20	4.9
	Craftes and related trade worker	19	4.6
	Manager	10	2.4
	Technician	10	2.4
	Elementary occupation	8	1.9
	In military	1	0.2
Current Cancer site	Female Breast	174	42.2
	Colon and Rectum	90	21.8
	Other Malignant Neoplasm	51	12.4
	Mouth and Pharynx	41	10
	Lymphomas and Multiple Myeloma	29	7
	Trachea, Bronchus and Lung	16	3.9
	Prostate	4	1
	Stomach	2	0.5
	Melanoma	2	0.5
	Bladder	2	0.5
	Uterus	1	0.2
Metastasis	No	286	69.4
	Yes	126	30.6

Tumor response

Of the 412 cases, 181 (44%) had complete response, 22 (5%) had partial response, 98 (24%) had stable disease while 111 (27%) had progressive disease **(Figure 1)**.
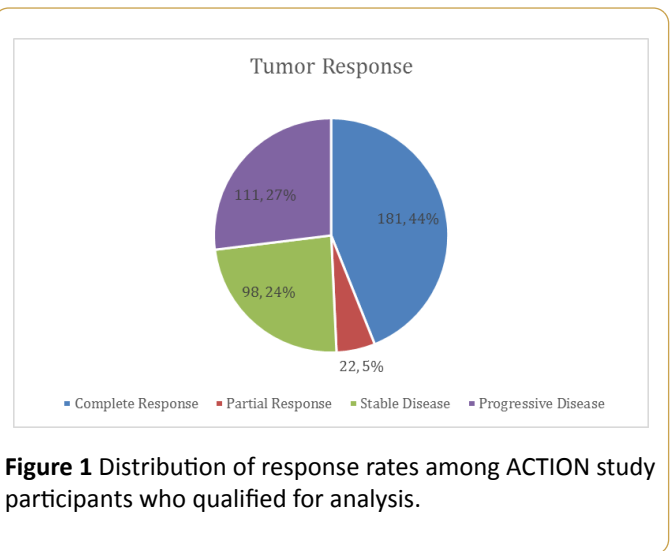

Figure 1 Distribution of response rates among ACTION study participants who qualified for analysis.

Association of demographic characteristics with tumor response

Interestingly, females tended to have better tumor response than males (p=0.000). Occupation seemed to associate significantly with tumor response (p=0.027) though this may simply be brought about by the wide variety of occupations seen from data.

There was no sufficient evidence found to associate tumor response with age (p=0.173), marital status (p=0.175) and education (p=0.782).

Cancer type was also associated with tumor response (p=0.000). Majority of patients who showed complete response were breast cancer patients (40.9%). Majority of partial responders were patients with colorectal disease (54.5%). For both stable disease and progressive disease, the dominating cancer type was breast cancer (38.8% and 54.1%, respectively) **(Table 2)**.

Table 2 Association of demographic data with tumor response among ACTION study patients who qualified for analysis.

Tumor Response									
Variables		Complete Response		Partial Response		Stable Disease		Progressive Disease	p-Value
		Count	%	Count	%	Count	%	Count	%	
Sex	Female	96	53%	22	100%	98	100%	50	45.00%	0
	Male	85	47.0%	0	0%	0	0%	61	55.00%	
Age group	18 to 29	14	7.7%	2	9.1%	7	7.1%	0	0%	0.173
	30 to 39	19	10.5%	3	13.6%	16	16.3%	17	15.30%	
	40 to 49	46	25.4%	5	22.7%	23	23.5%	27	24.30%	
	50 to 59	61	33.7%	11	50.0%	29	29.6%	37	33.30%	
	60 to 69	31	17.1%	1	4.5%	14	14.3%	24	21.60%	
	70 to 79	10	5.5%	0	0%	9	9.2%	6	5.40%	

	80 to 90	0	0%	0	0%	0	0%	0	0%	
	90 to 99	0	0%	0	0%	0	0%	0	0%	
Marital status	Never Married	25	13.8%	2	9.1%	14	14.3%	5	4.50%	0.175
	Married	127	70.2%	17	77.3%	68	69.4%	91	82.00%	
	Widow	20	11.0%	1	4.5%	14	14.3%	11	9.90%	
	Divorced	0	0%	0	0%	0	0.0%	0	0%	
	Separated	9	5.0%	2	9.1%	2	2.0%	4	3.60%	
House head	No	92	50.8%	22	100%	98	100%	32	28.80%	0
	Yes	89	49.2%	0	0%	0	0%	79	71.20%	
Educational level	No Schooling	1	0.6%	0	0%	0	0%	0	0%	0.782
	Primary (6 years)	47	26%	7	31.8%	23	23.5%	23	20.70%	
	Secondary/High school (7-12 years)	67	37.0%	9	40.9%	43	43.9%	37	33.30%	
	Technical/Vocational	16	8.8%	2	9.1%	8	8.2%	11	9.90%	
	College/University	50	27.6%	4	18.2%	24	24.5%	40	36.00%	
Occupation	Manager	5	2.8%	1	4.5%	2	2.0%	2	1.80%	0.027
	Professional	18	9.9%	2	9.1%	4	4.1%	17	15.30%	
	Technician	8	4.4%	0	0%	1	1.0%	1	0.90%	
	Clerical Suppport Wokers	6	3.3%	2	9.1%	3	3.1%	9	8.10%	
	Service and Scale Worker	61	33.7%	10	45.5%	38	38.8%	30	27.00%	
	Agricultural, Forestry and Fishery Workers	9	5.0%	3	13.6%	11	11.2%	14	12.60%	
	Craftes and related trade worker	10	5.5%	1	4.5%	5	5.1%	3	2.70%	
	Factory Labourer	17	9.4%	1	4.5%	5	5.1%	2	1.80%	
	In military	1	0.6%	0	0%	0	0%	0	0%	
	Elementary occupation	4	2.2%	0	0%	0	0%	4	3.60%	
	Home Duties	10	5.5%	1	4.5%	14	14.3%	15	13.50%	
	None	32	17.7%	1	4.5%	15	15.3%	14	12.60%	
Current cancer site	Mouth and Pharynx	8	4.4%	4	18.2%	21	21.4%	8	7.20%	0
	Oesophagus	0	0%	0	0%	0	0%	0	0%	
	Stomach	0	0%	0	0%	2	2.0%	0	0%	
	Colon and Rectum	32	17.7%	12	54.5%	22	22.4%	24	21.60%	
	Liver	0	0%	0	0%	0	0%	0	0%	
	Pancreas	0	0%	0	0%	0	0%	0	0%	
	Trachea, Bronchus and Lung	9	5.0%	1	4.5%	2	2.0%	4	3.6%	
	Melanoma	0	0%	1	4.5%	0	0%	1	0.9%	
	Female Breast	74	40.9%	2	9.1%	38	38.8%	60	54.1%	
	Cervix	0	0%	0	0%	0	0%	0	0%	
	Uterus	1	0.6%	0	0%	0	0%	0	0%	

	Ovary	0	0%	0	0%	0	0%	0	0%	
	Prostate	2	1.1%	0	0%	2	2.0%	0	0%	
	Bladder	0	0%	1	4.5%	0	0%	1	0.9%	
	Lymphomas and Multiple Myeloma	29	16.0%	0	0%	0	0%	0	0%	
	Leukemia	0	0%	0	0%	0	0%	0	0%	
	Other Malignant Neoplasm	26	14.4%	1	4.5%	11	11.2%	13	11.7%	
Is the cancer metastasis?	No	55	30.4%	22	100%	98	100%	111	100%	0
	Yes	126	69.6%	0	0%	0	0%	0	0%	

Change in quality of life from month 1 to month 12 of treatment

The modal response was "no change" for mobility (64.3%), self-care (64.6%), usual activities (45.1%), pain (100%) and anxiety/depression (43.9%). For patients who indicated change in quality of life, responses signified worse in mobility (21.4%), worse in self-care (27.7%), better in usual activities (33%), and better QOL in terms of anxiety and depression (32.3%).

Most patients (62.6%) reported worse VAS while 29.4% signified better VAS. Only 8% reported no change (Table 3).

Table 3 Actual count and percentages of patients and their corresponding change in each dimension of the EQ5D-3L questionnaire.

Change in Quality of Life in Month		Count	%
Mobility	Better	59	14.30%
	No change	265	64.30%
	Worse	88	21.40%
Self-Care	Better	32	7.80%
	No change	266	64.60%
	Worse	144	27.70%
Usual Activities	Better	136	33.00%
	No change	186	45.10%

	Worse	90	21.80%
Pain	Better	0	0%
	No change	412	100%
	Worse	0	0%
Anxiety/Depression	Better	133	32.30%
	No change	181	43.90%
	Worse	98	23.80%
VAS	Better	121	29.40%
	No change	33	8.00%
	Worse	258	62.60%

Association of change in quality of life with tumor response

Improvement in quality of life was significantly associated with tumor response. Data showed that complete or partial response tended to relate with better QOL while progressive disease related to worse situations with respect to mobility (p=0.000), self-care (p=0.000), usual activities (p=0.000) and anxiety/depression (p=0.000). On the other hand, both anxiety and usual care dimensions showed improvement in approximately 50% of the patients (among complete responders). No statistical test was done for pain since all patients reported no change (Table 4).

Table 4 Association of tumor response to change in in each dimension of the EQ5D-3L questionnaire among all patients in the ACTION study who qualified for analysis.

Tumor Response (All Cases)										
Change in Quality of Life from Month 1 to 12		Complete Response		Partial Response		Stable Disease		Progressive Disease		p-Value
		Count	%	Count	%	Count	%	Count	%	
Mobility	Better	29	16.0%	3	13.6%	21	21.4%	6	5.4%	0
	No change	148	81.8%	16	72.7%	65	66.3%	36	32.4%	
	Worse	4	2.2%	3	13.6%	12	12.2%	69	62.2%	
Self-care	Better	20	11.0%	2	9.1%	7	7.1%	3	2.7%	0

		Count	%	Count	%	Count	%	Count	%	
	No change	154	85.1%	13	59.1%	74	75.5%	25	22.5%	
	Worse	7	3.9%	7	31.8%	17	17.3%	83	74.8%	
Usual activities	Better	90	49.7%	3	13.6%	32	32.7%	11	9.9%	0
	No change	86	47.5%	11	50.0%	54	55.1%	35	31.5%	
	Worse	5	2.8%	8	36.4%	12	12.2%	65	58.6%	
Pain	Better	0	0%	0	0%	0	0%	0	0%	No Test
	No change	181	100%	22	100%	98	100%	111	100%	
	Worse	0	0%	0	0%	0	0%	0	0%	
Anxiety/Depression	Better	85	47.0%	6	27.3%	29	29.6%	13	11.7%	0
	No change	89	49.2%	12	54.5%	53	54.1%	27	24.3%	
	Worse	7	3.9%	4	18.2%	16	16.3%	71	64.0%	
VAS	Better	17	9.4%	5	22.7%	20	20.4%	79	71.2%	0
	No change	14	7.7%	1	4.5%	10	10.2%	8	7.2%	
	Worse	150	82.9%	16	72.7%	68	69.4%	24	21.6%	

Association of change in QOL with tumor response among cancer types

Focusing on the four most frequent cases in the database, the general pattern seen above was reflected in female breast cancer cases, colon and rectal cancer, and other malignant neoplasms.

However for mouth and pharynx cancer cases, tumor response did not relate significantly with change in quality of life for mobility (p=0.576), self-care (p=0.709), usual activities (p=0.209), anxiety/depression (p=0.732) and VAS (p=0.140). There was no test done for pain due to the common reply of "No Change" among patients regardless of tumor response **(Tables 5-8)**.

Table 5 Association of tumor response to change in in each dimension of the EQ5D-3L questionnaire among all breast cancer patients in the ACTION study who qualified for analysis.

Tumor Response (Female Breast Cancer)										
Change in Quality of Life from Month 1 to 12		Complete Response		Partial Response		Stable Disease		Progressive Disease		p-Value
		Count	%	Count	%	Count	%	Count	%	
Mobility	Better	16	21.6%	1	50.0%	5	13.2%	1	1.7%	0
	No change	57	77%	1	50.0%	28	73.7%	14	23.3%	
	Worse	1	1.4%	0	0.0%	5	13.2%	45	75.0%	
Self-Care	Better	9	12.2%	0	0.0%	3	7.9%	1	1.7%	0
	No change	64	86.5%	1	50.0%	28	73.7%	9	15.0%	
	Worse	1	1.4%	1	50.0%	7	18.4%	50	83.3%	
Usual Activities	Better	39	52.7%	0	0.0%	14	36.8%	6	10.0%	0
	No change	34	45.9%	2	100.0%	19	50.0%	13	21.7%	
	Worse	1	1.4%	0	0.0%	5	13.2%	41	68.3%	
Pain	Better	0	0%	0	0.0%	0	0.0%	0	0.0%	No Test
	No change	74	100%	2	100.0%	38	100.0%	60	100.0%	

	Worse	0	0%	0	0.0%	0	0.0%	0	0.0%	
Anxiety/Depression	Better	37	50.0%	0	0.0%	9	23.7%	3	5.0%	0
	No change	36	48.6%	1	50.0%	24	63.2%	15	25.0%	
	Worse	1	1.4%	1	50.0%	5	13.2%	42	70.0%	
VAS	Better	6	8.1%	0	0.0%	7	18.4%	50	83.3%	0
	No change	2	2.7%	0	0.0%	5	13.2%	3	5.0%	
	Worse	66	89.2%	2	50.0%	26	68.4%	7	11.7%	

Table 6 Association of tumor response to change in in each dimension of the EQ 5D 3L questionnaire among all colorectal cancer patients in the ACTION study who qualified for analysis.

Tumor Response (Colon and Rectal Cancer)										
Change in Quality of Life from Month 1 to 12		Complete Response		Partial Response		Stable Disease		Progressive Disease		p-Value
		Count	%	Count	%	Count	%	Count	%	
Mobility	Better	5	15.6%	0	0.0%	7	31.8%	1	4.2%	0
	No change	27	84.4%	9	75.0%	12	54.5%	7	29.2%	
	Worse	0	0.0%	3	25.0%	3	13.6%	16	66.7%	
Self-Care	Better	3	9.4%	1	8.3%	2	9.1%	0	0.0%	0
	No change	29	90.6%	6	50.0%	16	72.7%	3	12.5%	
	Worse	0	0.0%	5	41.7%	4	18.2%	21	87.5%	
Usual Activities	Better	14	43.8%	2	16.7%	4	18.2%	1	4.2%	0
	No change	18	56.3%	4	33.3%	15	68.2%	9	37.5%	
	Worse	0	0.0%	6	50.0%	3	13.6%	14	58.3%	
Pain	Better	0	0%	0	0%	0	0%	0	0%	No Test
	No change	32	100%	12	100%	22	100%	24	100%	
	Worse	0	0%	0	0%	0	0%	0	0%	
Anxiety/Depression	Better	15	46.9%	4	33.3%	8	36.4%	3	12.5%	0
	No change	16	50.0%	6	50.0%	10	45.5%	4	16.7%	
	Worse	1	3.1%	2	16.7%	4	18.2%	17	70.8%	
VAS	Better	1	3.1%	3	25.0%	5	22.7%	16	66.7%	0
	No change	4	12.5%	1	8.3%	1	4.5%	2	8.3%	
	Worse	27	84.4%	8	66.7%	16	72.7%	6	25.0%	

Table 7 Association of tumor response to change in in each dimension of the EQ5D-3L questionnaire among all cancer patients with other malignancies in the ACTION study who qualified for analysis.

Tumor Response (Other Malignant Neoplasm)					
Change in Quality of Life from Month 1 to 12		Complete Response	Partial Response	Stable Disease	Progressive Disease	p-Value

		Count	%	Count	%	Count	%	Count	%	
Mobility	Better	2	7.7%	1	100.0%	1	9.1%	0	0.0%	0.001
	No change	21	80.8%	0	0.0%	8	72.7%	5	38.5%	
	Worse	3	11.5%	0	0.0%	2	18.2%	8	61.5%	
Self-care	Better	2	7.7%	0	0.0%	0	0.0%	0	0.0%	0.001
	No change	22	84.6%	1	100.0%	8	72.7%	3	23.1%	
	Worse	2	7.7%	0	0.0%	3	27.3%	10	76.9%	
Usual activities	Better	13	50.0%	0	0.0%	2	18.2%	2	15.4%	0.002
	No change	11	42.3%	1	100.0%	8	72.7%	3	23.1%	
	Worse	2	7.7%	0	0.0%	1	9.1%	8	61.5%	
Pain	Better	0	0%	0	0.0%	0	0.0%	0	0.0%	No Test
	No change	26	100%	1	100.0%	11	100.0%	1	100.0%	
	Worse	0	0%	0	0.0%	0	0.0%	0	0.0%	
Anxiety/Depression	Better	11	42.3%	0	0.0%	1	9.1%	2	15.4%	0.002
	No change	12	46.2%	1	100.0%	8	72.7%	2	15.4%	
	Worse	3	11.5%	0	0.0%	2	18.2%	9	69.2%	
VAS	Better	3	11.5%	0	0.0%	6	54.5%	10	76.9%	0.002
	No change	2	7.7%	0	0.0%	2	18.2%	0	0.0%	
	Worse	21	80.8%	1	100.0%	3	27.3%	3	23.1%	

Table 8 Association of tumor response to change in in each dimension of the EQ5D-3L questionnaire among all head and neck cancer patients in the ACTION study who qualified for analysis.

Tumor Response (Mouth and Pharynx Cancer)										
Change in Quality of Life from Month 1 to 12		Complete Response		Partial Response		Stable Disease		Progressive Disease		p-Value
		Count	%	Count	%	Count	%	Count	%	
Mobility	Better	0	0.0%	1	25.0%	7	33.3%	2	25.0%	0.576
	No change	8	100%	3	75.0%	13	61.9%	6	75.0%	
	Worse	0	0.0%	0	0.0%	1	4.8%	0	0.0%	
Self-care	Better	2	25.0%	1	25.0%	2	9.5%	1	12.5%	0.709
	No change	6	75.0%	2	50.0%	16	76.2%	5	62.5%	
	Worse	0	0.0%	1	25.0%	3	14.3%	2	25.0%	
Usual activities	Better	5	62.5%	1	25.0%	10	47.6%	1	12.5%	0.209
	No change	3	37.5%	1	25.0%	8	38.1%	5	62.5%	
	Worse	0	0.0%	2	50.0%	3	14.3%	2	25.0%	
Pain	Better	0	0.0%	0	0.0%	0	0.0%	0	0.0%	No Test

	No change	8	100.0%	4	100.0%	21	100.0%	8	100.0%	
	Worse	0	0.0%	0	0.0%	0	0.0%	0	0.0%	
Anxiety/Depression	Better	5	62.5%	2	50.0%	7	33.3%	3	37.5%	0.732
	No change	3	37.5%	1	25.0%	10	47.6%	4	50.0%	
	Worse	0	0%	1	25.0%	4	19.0%	1	12.5%	
VAS	Better	0	0.0%	1	25.0%	1	4.8%	2	25.0%	0.14
	No change	2	25.0%	0	0.0%	2	9.5%	3	37.5%	
	Worse	6	75.0%	3	75.0%	18	85.7%	3	37.5%	

Discussion

The only demographic data in this analysis showing correlation with tumor response in published articles was sex [13]. Neither age, marital status nor education was associated with tumor response. Specific cancer types are strongly correlated with tumor response. 40% of patients who had breast cancer showed complete response. This is probably because of the sheer number of patients (statistical) or the improved management options provided by the latest advancements in breast cancer management [14].

In this study, improvement in quality of life was significantly associated with tumor response. Complete or partial responders answered improvement in their QoL while progressive disease related to worse situations. Breaking down the EQ 5D 3L into domains further strengthen the impact of tumor response to QoL. Improvement in mobility, self-care, usual activities and anxiety/depression was statistically correlated with complete and partial responders. More importantly, both anxiety and usual care dimensions showed improvement in approximately 50% of the patients (among complete responders). This is reflective of the previous study by Ngelangel that improvement in the anxiety and depression, and usual activity dimensions should be seen post chemotherapy in the Filipino population [15]. Despite different cancer types, the general trend of improving anxiety and depression and usual activities dimensions is reflective for breast cancer, colorectal and other cancer types among patients who respond completely to treatment. Further strengthening the observation in the previous study.

However, in this study it was noted that for domains mobility and self-care, majority of complete responders showed no change (81% and 85%, respectively). The explanation maybe cultural in nature, Tchen et al., noted that different cultures tend to respond differently to different aspects of the QoL [16]. Majority of the patients in this study belong to the working class and working age group (92%). These patients tend to negate the negative effects of the oncologic intervention (i.e., still mention that they are still in best of health) as assurance of their capability as financial providers. The overwhelming importance of the ability to provide food for the family surpasses all aspects of the quality of life questionnaire. This may be partly reflective of the modal response "no change" which becomes acceptable among this group of patients.

The question of acceptability of use of universally accepted questionnaires is also challenged in this study. Despite the wide use of the EQ 5D 3L, the main limitation of this scale is the limited range it covers: positive, neutral, negative. More importantly, a similar study locally has established the role of cultural differences which might also affect the results of these questionnaires. The UP-DOH QoL scale is an excellent example of a culturally centered questionnaire [17]. This QoL scale was established using 5 domains with a range of 1 to 7, higher scores showed better QoL. Unlike the EQ 5D3L, the UP-DOH QoL scale is culturally centered and validated among Filipinos which may better reflect the changes in QoL.

Another important finding seen in this study is the use of secondary data in assuming relationships needing more careful attention. It should be speculated that since a different objective was proposed in the previous trial, the results in the quality of life might change as well. If so, the differences in the objectives of both studies may hinder the formation of realistic associations. However, despite this, the use of secondary data should still offer insights which may strengthen previous facts. In general, caution should be exercised in using these data and its interpretations.

Conclusion

Quality of life does correlate to tumor response. In the clinics, we see patients with good response and also mentioning of their improved QOL. However, this is not similar among all cancer types.

The use of EQ5D-3L is limited to placing the post chemotherapeutic experience a range of three (3). This may limit the descriptive power as a whole especially when comparing pre and post chemotherapy QoL. This may be reflective of the results in our study. However, cultural trends might have also greatly influence the decision of patients in answering the EQ5D-3L questionnaire. Filipino resilience and coping mechanism to the 5 dimensions is reflective of the results in this study. In general, majority of Filipinos tend to disregard mobility, self-care, usual activities, pain and anxiety/

depression as long as cancer therapeutics is continued without delay.

True enough, cancer patients may benefit greatly, despite cancer therapy, if their normal functioning is preserved. Although no current molecular explanation is available, it is always best to consider QoL in determining the most appropriate cancer therapy.

Glossary

EQ5D-3L standardised measure of health status developed by the EuroQol Group in order to provide a simple, generic measure of health for clinical and economic appraisal Invalid Source Specified.

Complete Response (CR) – Disappearance of all extranodal target lesions. All pathological lymph nodes must have decreased to <10mm in short axis

Partial Response (PR) – At least a 30% decrease in the sum of diameters of target lesions, taking as reference the baseline sum of diameters

Progressive Disease (PD) – Sum of diameters increased by at least 20% from the smallest value on study (including baseline, if that is the smallest). The sum of diameters must also demonstrate an absolute increase of at least 5mm.

Stable Disease (SD) – Neither sufficient shrinkage to qualify for PR nor sufficient increase to qualify for PD.

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