

Using Quality of Life Information in the Clinical Setting

A Randomised Controlled Trial of Using Subjective Quality of Life and Symptom Outcome Measures as a Clinical Tool in Patients with Advanced Cancer.

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DECLARATION

I hereby declare that this thesis is my own work, except where otherwise acknowledged and that it has not been submitted to any other institution or university.

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Abstract

There is wide variability in the definition of quality of life and its conceptualisation (Le Vasseur et al. (2005); Hunt (1997)). Depending on their preoccupation, each discipline often measures quality of life against a set of defined external criterion, for example, health economists measure quality of life in terms of quality adjusted life years (QALYS) and health service providers frequently measure quality of life in terms of health related quality of life outcomes.

Quality of life measurements in patients with cancer is traditionally measured using health related quality of life measurement tools which typically measure four dimensions in quality of life: functional, psychological, physical and social status. (Waldron et al. (1999) Mannion et al. (2003)). Many postulate that these functional attributes alone are not entirely synonymous with quality of life and articulate the view that quality of life is the “degree of overall life satisfaction influenced by the individuals’ perception of aspects of life important to them, including matters both related and unrelated to health” (Moons et al.2004).

In keeping with this thesis, quality of life may be deemed a multi-dimensional outcome that considers both the individual concerns *in addition* to the traditional health measures of mortality, morbidity and survival outcomes (Hunt 1997; Waldron et al 1999; Mannion et al 2003; Percy et al. 2008; Thompson et al 2012).

Individual quality of life measurement tools recognise the individual and his values (Stiggelbout et al. 2008). The Schedule of Evaluation for Individual Quality of Life (SEIQoL) and SEIQoL Direct Weighting (SEIQoL DW) allows the individual patient to define areas of life that are important to him/her and to demonstrate its measure of importance. SEIQoL

captures the multidimensionality and uniqueness of the individual and provides valuable information about his/her priorities and values.

Identification of the individual differences of patients by means of quality of life measures using SEIQoL, during routine clinical practice and presenting patient reported quality of life measurements in a concise, succinct way that is easily interpreted by the clinician, may serve as a bridge to bring together the views of clinicians and patients to improve quality of life outcomes.

In addition to patient individual values and priorities, patients often present with symptoms that are distressing or ‘bothersome’ and impinge on his/her quality of life (Waldron et al. 1999). The SEIQoL tool can capture the element of symptom bother on the patients’ quality of life.

It is hypothesised that routine assessment of patients’ quality of life in the clinical setting will provide clinicians with a greater awareness of patient values, functioning and symptoms bother which will lead to improving quality of life outcome for the individual patient.

To test this hypothesis, a randomised controlled trial was conducted to determine if individual quality of life and symptom bother assessment using the SEIQoL and SEIQoL DW tool at multiple time points in patients receiving chemotherapy for advanced cancer would lead to improved quality of life amongst patients.

The primary objective of the study was to compare quality of life outcome in a group of patients whose perception of their quality of life *was reported* to the multidisciplinary team (intervention group) to a group of patients whose perception of their quality of life was *not reported* to the multidisciplinary team (control group) and examine the differences in quality of life measurements between groups.

The secondary study incorporating symptom measurement was conducted in the same population. Its aim was to examine the impact of symptom bother on quality of life in patients with cancer and to measure differences in symptom bother on quality of life over time between groups.

Using the SEIQoL and SEIQoL DW tools, quality of life measurements along with information about symptoms and symptom bother was obtained at four time-points from participants receiving chemotherapy for advanced cancer. This information was presented visually on an info graph for review by the clinical team at each time-point for participants in the intervention group. Quality of life information from the control group was not shared with the clinical team.

Results demonstrated improvement in quality of life of all patients from baseline to timepoint 4. ($P > 0.05$). Closer examination of the discrete individual areas of importance to the patients (cues) showed interesting differences between the intervention and control group.

The top four cues nominated by patients receiving chemotherapy for advanced cancer were (1) health (2) social activity (3) keeping active and (4) family support. Results demonstrated a 51% improvement in the perception of health functioning of patients in the intervention group compared to 19% improvement in perception of health functioning in the control group ($p = 0.014$). Paradoxically and interestingly, there was a decline in patient perception of functioning in other cues (social activity, keeping active and family support) with no significant difference between groups.

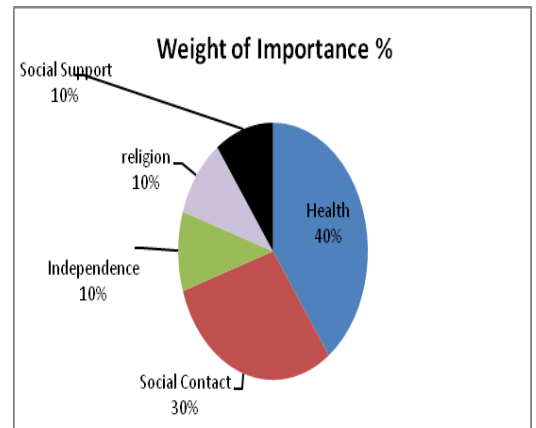
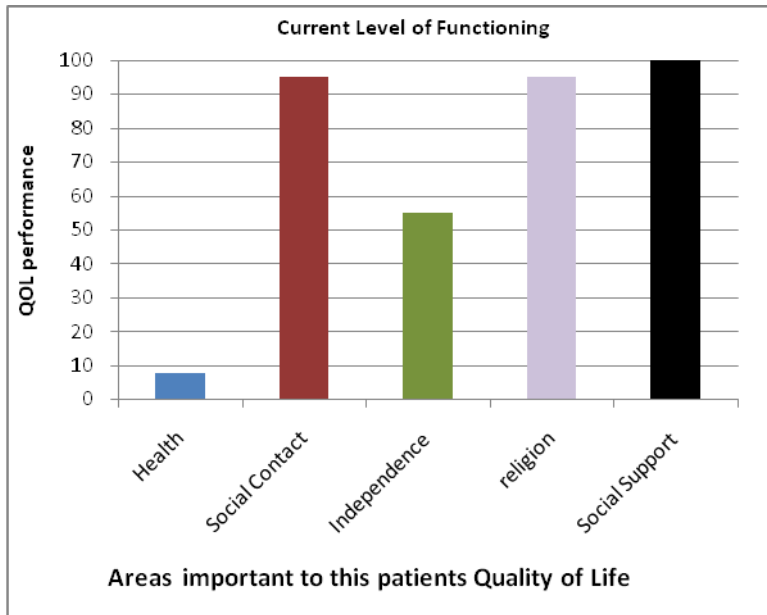
Analysis of symptom data demonstrated a significant number of patients experienced symptoms ($p = 0.07$) and of these, symptoms interfered greatly with their quality of life ($p = 0.000$). The most common symptoms presented were fatigue, pain, shortness of breath, weakness and nausea. Results demonstrated patients in the intervention group whose

symptom information was provided to the clinical team in graphical format experienced a 10% *reduction* in symptom interference in their quality of life from baseline to time point 4 compared to patients in the control group who experienced a 38% *increase* in symptom interference in their quality of life from baseline to time point 4 ($p=0.0000$).

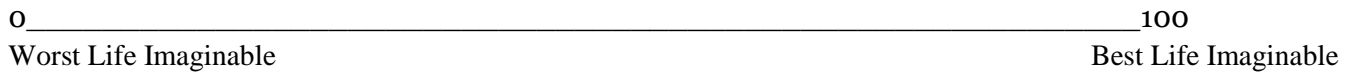
The results of this study conclude that clinician awareness of individual patient quality of life values and functioning, along with awareness of the impact of bothersome symptoms, results in significant improvements in some aspects the patients' quality of life. The practice of routine quality of life assessments and using this information in clinical practice can be successfully incorporated in an acute hospital setting and heralds a supplementary stratum to personalized medicine.

Quality of Life Information Graph at Three Time-points

Individual Quality of Life. SEIQOL

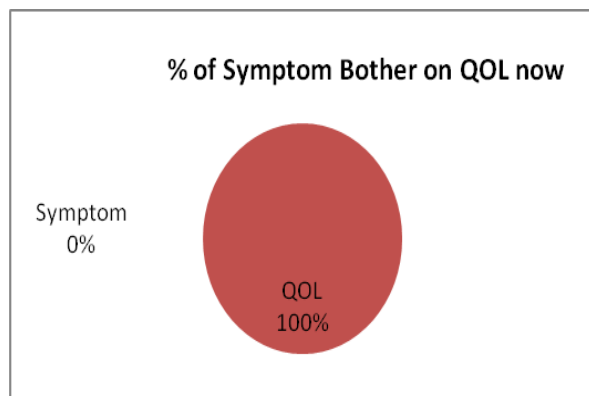


This Patients Overall Quality of Life Self Measurement = 50

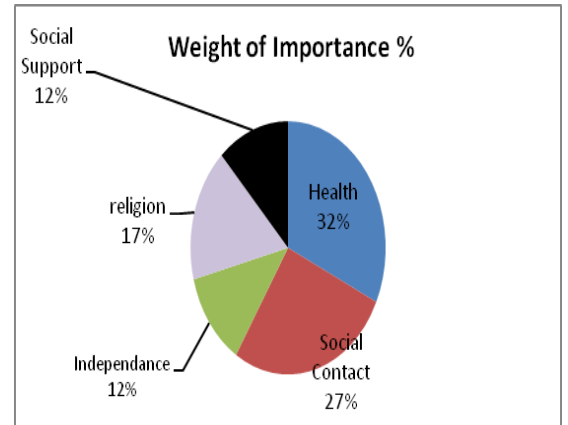
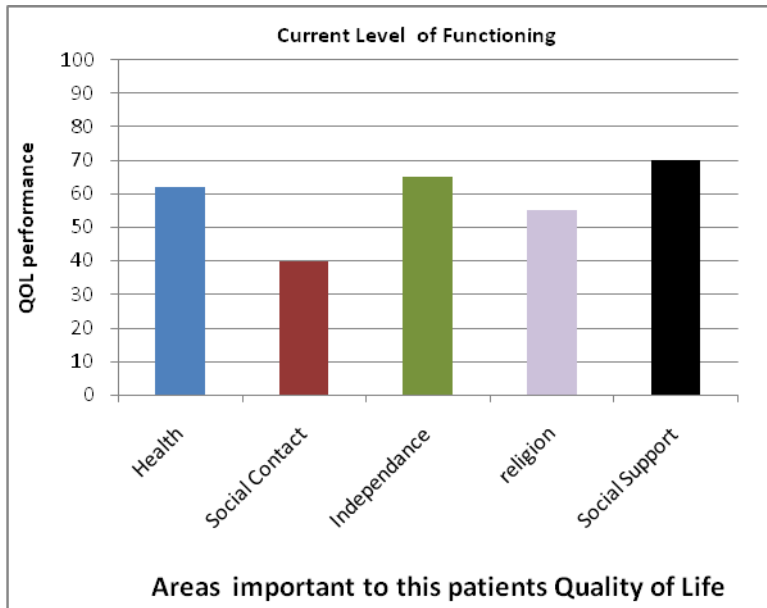


Existing Bothersome Symptoms

None



Individual Quality of Life. SEIQOL

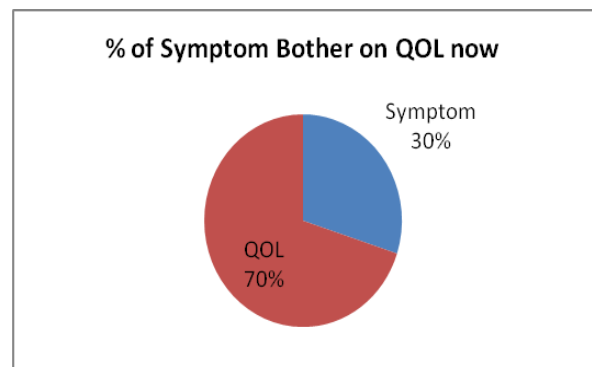


This Patients Overall Quality of Life Self Measurement = 80

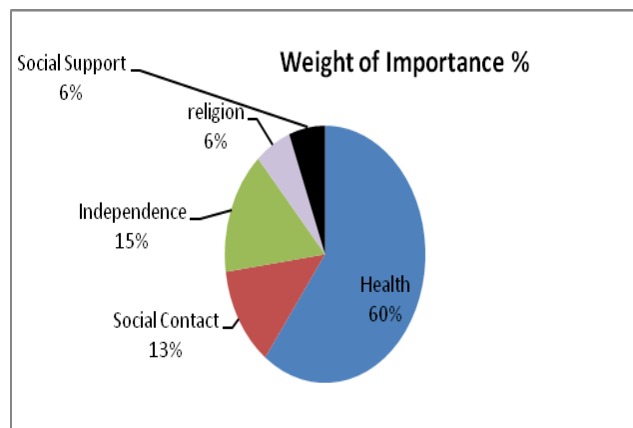
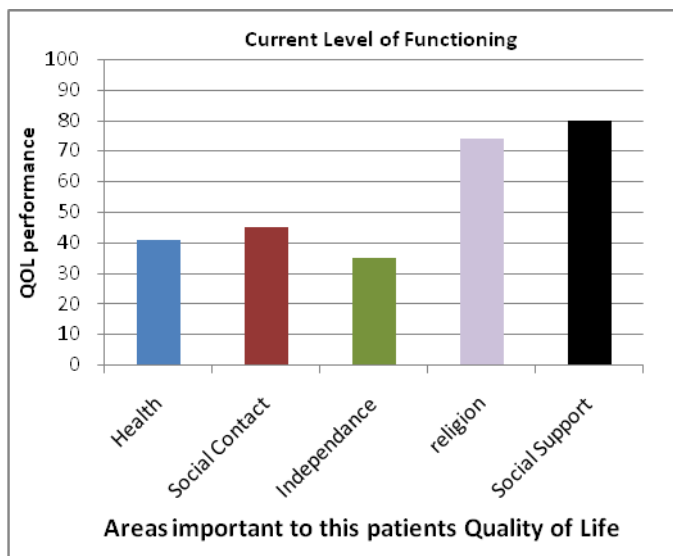
0 _____ 100
 Worst Life Imaginable _____ Best Life Imaginable

Existing Bothersome Symptoms

Fatigue
 Pain



Individual Quality of Life. SEIQOL

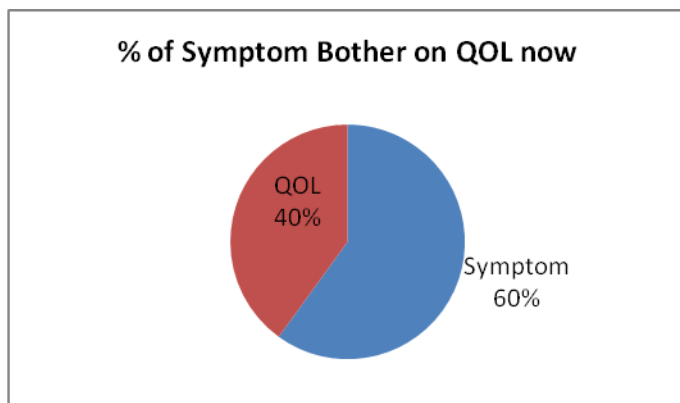


This Patients Overall Quality of Life Self Measurement = 40

0 _____ 100
 Worst Life Imaginable Best Life Imaginable

Existing Bothersome Symptoms

Dry Skin
 Weakness / falling



Acknowledgments

I wish to acknowledge and thank my supervisor and colleague, Dr Dympna Waldron who proposed this research. The support, encouragement and enthusiasm from Dr Waldron and my co-supervisor Dr Eileen Mannion is gratefully acknowledged and appreciated. Both are outstanding physicians in the field of palliative medicine and their knowledge and pursuit of improved quality of life for all patients is truly commendable.

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I am honored to have had the pleasure of meeting 65 strong people who participated in this research with enthusiasm with the knowledge that their contribution may aid in improving the quality of life of others. Many had a hard road of chemotherapy treatment but despite this were welcoming of me as a researcher at every visit. Some have since passed away and for those, god grant them peace.

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I dedicate this work to my father Tommie Concannon, who would also have been very proud of my achievement and who always appreciated the importance of good quality of life.

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CHAPTER 1

“And in the end, it’s not the years in your life that count; it’s the life in your years”.

Abraham Lincoln

1 Quality Of Life and Its Translation from Concept to Practice

1.1 Quality Of Life – What Is It?

Interest in quality of life is not new and its multi-dimensional nature often leads to general discord regarding its definition and conceptualization (Donnelly 2000), (LeVasseur et al. 2005):(Hunt 1997).

Calman (1984) defines quality of life as ‘the difference, or the gap, at a particular point in time, between the hopes and expectations of the individual and that individual's present experiences’. In fact it can be said that the multi-dimensionality of Quality of Life is proportionate to the complexity of living. Having no cultural boundaries, it is influenced by intrinsic and extrinsic factors such as hopes, expectations, disappointments and joys, social circumstances, disease, illness, ability to function whether incapacitated or not, employment status, financial security, interaction with other people and general wellbeing- the list is infinite. These influences are so unique and fluid within each person that one definitive definition and concept to Quality of Life cannot be isolated. The concept is as Armstrong, (1993) suggests ‘loose’.

Deconstructed to its most rudimentary, quality is defined in the Oxford English dictionary as ‘The standard of something as measured against other things of a similar kind’, while life is defined as ‘The existence of an individual human being or animal’. Application of this definition in its most elementary context, would suggest that quality of life must be measured against a predefined standard of quality of life of ‘other’ individuals. One of the main controversies of the quality of life discussion is not that standards should exist but rather who sets those standards- should they come from within the individual or are external values of others imposed.

The World Health Organisation places the individual firmly at the heart of this controversy and gives the individual the ownership of those standards by defining Quality of Life

“as an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationships, and their relationships to salient features of their environment’. (WHOQoL Group 1993).

The World Health Organisation was avant garde in setting the foundation stones which, in 1946, first permitted the concept of Quality of Life to be considered in the context of health when it defined health as *“a state of complete mental, physical and social wellbeing and not merely an absence of disease or infirmity”*(World Health Organization 1946)

This formal acknowledgement and inclusion of wellbeing, social and emotional status in its definition of health was watershed in the quality of life movement in the health care setting that has since taken place.

1.2 The Shift from Paternalism to the Patient Centred Model of Care

1.2.1 The Traditional Approach

Waldron et al. (1999) posit that improving the quality of life of the patient underpins the very essence of clinical care and medicine. Traditionally, patients relied heavily on the knowledge, values and expertise of the physician (Moulton & King 2010) (Addington-Hall & Kalra 2001). Furthermore, they often conferred an element of trustworthiness and reliance on the clinical profession in their decision making. Combined with this, the physician conventionally bore the responsibility of acting as an agent for the patient and assumed responsibility for determining the best interest for the patient with the singular objective of improving health, thereby, compelling the patient to adopt the physician choice and thus, by default, to adopt the physician’s values and preferences too. Although these decisions, may, in the opinion of the physician, be considered to be in the best interest of the patient, they may not be necessarily in line with what the patient truly wants.

1.2.2 Medical ethics

The emergence of medical ethics over the past 30 years arose in response to poor clinical practice in medicine and research. Respect for autonomy and beneficence are fundamental principles that govern medical ethics and as such, medical ethics have steered toward patient centeredness, with a move away from the medical model of the guiding physician.

The rise of the patient rights movement and legal doctrine regarding informed consent (Moulton & King 2010), along with other societal influences such as media, technology and globalisation have further contributed to greater prevalence of patient autonomy with patient centred care being increasingly recognised (Willke et al. 2004).

1.2.3 Patient empowerment

In 2001-2002, the UK white paper, 'shifting the balance of power' set out ways for both the service user and the clinical staff to become empowered and increase the patient centred approach. Collaborative engagement by both patients and clinicians will assist the patient identify any misconception and bias they might have. Similarly, clinical engagement with the patient will aid the clinician identify patient opinions that differ from his/her own.

The American College of Physicians requires physicians to "promote good and act in the best interest of the patient and the health of society". However as Moulton and King (2010) point out, beneficence without concern for patient autonomy results in paternalism. The support for patient centeredness in health care was also demonstrated in 2002 when the American Board of Internal Medicine urged all physicians to empower their patients and *mandated* involvement of all patients in the decision making process. This American Medical Association acknowledges that the patients "right to self decision can be effectively exercised only if the patient possesses enough information to make an informed decision". This standard obligates physicians to respect patient decisions. In the US there has also been a move toward patient centred primary care collaboration with the overarching principle to ensure that patient expectations are met.

1.2.4 Patient collaboration

The patient representative group 'Irish Platform by Patients Organisations Science and Industry' (IPPOSI) is a collaborative group, first established in 2001 with representatives from Patients' Organisations and Science and Industry in Ireland. The primary objective of this group is to place patient opinion firmly in the centre of health policy and decision making in Ireland. IPPOSI is supported by statutory bodies and is indicative of societal change and the support for patient involvement in health care.

These international endeavours demonstrate the growing momentum of the shift toward autonomy and patient participation in the health care process which compels the patient himself to adopt his treatment choice and make decisions based on the information presented to him, his values and personal preference and culture in combination with the experience of others close to them and their own values. This shift toward patient autonomy and patient centred practice and toward incorporating the views of patients in treatment planning, is now well represented in the literature (Slevin et al. 1988) (Joyce et al. 2003) (Percy et al. 2008) (Mannion et al. 2012).

1.3 The Extension From The Patient Centred Model Of Care To Include Quality Of Life Measures

Along with the emergence of the patient centered model of care, the topic of quality of life resonated amongst social science groups and nursing groups initially arising as a social debate in the 1970s, focusing on the aggressiveness of treatment and perhaps arguments for when not to treat. While at the same time, there was also an emergence of new goals in medicine toward improving quality of life, driven primarily by economists to measure disability and social functioning (Armstrong 1993).

1.3.1 The influence of industry

Another important contribution to the advances in quality of life which also began in the 1970s was that of researchers looking at the relationship of drugs on the wellbeing of patients (Joyce et al. 2003). To fully appreciate the side effects and the efficacy of drugs, there needs to be systematic collation of data on how the drug interacts with the body and as such many pharmaceutical companies, in the process of their clinical trials for testing new drugs,

include quality of life assessments. Quality of life measures are being increasingly used to supplement objective clinical or biological measures of disease (Carr 2001) and with this has come a significant increase in the incorporation of quality of life assessment in clinical trials. The results are collated and analysed in group format and are typically presented as patient reported outcomes.

The Food and Drug Administration (FDA) in the USA now review outcomes reported by clinical trial participants during the drug development process. In their evaluation of data when determining the licensing of a new drug, Willke et al. (2004) highlight that patient reported outcomes play a very important role in drug development. They conducted a retrospective analysis of the summary of product characteristics (SPC) of all drugs licensed between 1997 and 2002 in the USA. Of the two hundred and fifteen newly licensed drugs reviewed, twenty three drugs were approved using patient reported outcome data *alone* while patient reported outcomes appeared in 30% of the labels overall.

1.3.2 The requirement for measuring performance

The cost of drug development is reflected in the cost of the end product. The cost of drugs for the treatment of cancer is particularly high. In the current economic climate, there is increasing pressure on health care clinicians and health service organizations to demonstrate value for money and performance. Performance can only be measured in terms of outcomes. In most developed countries, two thirds of disease burden is physical, mental or social disability all of which impacts upon wellbeing.

Traditionally, outcome was measured in terms of mortality and clinical values such as laboratory values. These are indicators of disease status. For example, increasing protein levels in a patient with multiple myeloma is indicative of progressing disease and, if left untreated, is strongly associated with a poor clinical outcome. Performance of health care can also be gauged by evaluations and outcome measures such as waiting list times, speed of assessment, length of hospital stay and mortality. Evaluations of health service largely rest on these type of measurable outcomes that reflect clinician and professional concerns and are often a mechanism to aid in the justification for more resources or to demonstrate the reasons for poor outcomes. Tugwell & McGowan (2006) suggest that measurements such as these laboratory values are sometimes used as surrogate endpoints and accordingly there may

be a risk of clinicians focusing on these surrogate endpoints thereby losing sight of the patient as a whole.

With the growth of the patient centre model of care and with emerging supportive data to support the concept of standardizing quality of life there has been a move away from the singular model of performance measurement to a more eclectic approach to include quality of life as an outcomes measure and key performance indicator (Waldron et al. 1999).

Quality of life has now come to ‘dominate the thinking about healthcare outcomes’ and has done so by converting the idea into a measurement (Armstrong 1993).

1.4 Conclusion

This shift toward what is being measured and the best way to achieve it demonstrates that the quality of life as a concept is no longer a debate but rather is accepted in medicine. Quality of life can now join the paradigm of life, death and illness. As Armstrong (1993) suggests ‘the steps from conceptualization to implementation can take decades’. Wellbeing is a measurement option available and utilized by clinical researchers however this has not readily translated to the bedside where clinicians are now faced with both the challenge and the debate as to what (1) specifically should be measured (2) how best to measure it and (3) how to demonstrate its value in the clinical setting.

CHAPTER 2

“For one true measure of a nation is its success in fulfilling the promise of a better life for each of its members. Let this be the measure of our nation.”-

President John F Kennedy, 1962.

2 Quality Of Life Measurement Tools

2.1 What to Consider when Selecting the Appropriate Quality of Life Measurement Instrument

There are a number of components to remember prior to embarking on Quality of Life measurements and proper selection of the appropriate measurement instrument will determine the success and validity of the quality of life assessment .There are three main components to consider when measuring quality of life

1. What to measure
2. How to measure it.
3. Its relevance and application in the clinical setting.

2.1.1 Identify the scope of the measurement.

With the broad ranging diversity in the interpretation and understanding of the concept of quality of life, the variability in its measurement is equally diverse with no definitive agreement on approach. It is often measured against a set of predefined external criterion that is largely determined by the preoccupation of the person studying quality of life, Policy makers may measure quality of life in terms of Health Related Quality of Life Outcomes such as mental and physical functioning. Health economists usually measure quality of life in terms of Quality Adjusted Life Years while social scientists navigate toward to the social factors when dealing with the meaning of quality of life.

2.1.2 Consider the qualities of the available tools

With the emergence and the recognition of the value of quality of life measurements, but with the diversity of opinions on measurement methodology, a vast amount of measurement tools have been created. There are now over 1000 different measurement instruments available for use, most being standardised questionnaires to obtain information on the patients functioning and self perception (Armstrong 1993). This presents a great challenge for researchers when trying to compare results of studies and it also presents a challenge for clinicians when trying to decide which tool to use- particularly in a multidisciplinary team setting where clinician preference exists and agreement on the use of a specific tool is necessary.

Due to the exaggerated number of Quality of Life assessment tools available, Hunt (1997) questioned the validity of some of these tools, noting that clinicians may find some questionnaires bear little relevance on quality of life and thus, they may have difficulty in the application of such tools in their clinical setting .They may also have difficulty in using Quality of Life as an outcome measure in clinical practice. It is therefore important to establish what is being asked, in the context of using the instrument, as other instruments may be useful more in answering the question (Prince & Gerber 2001).This is very important, not only from the perspective of the project to hand but also to ensure that other clinicians will recognize its applicability and benefits in the correct context.

Higginson & Carr (2001) suggest asking the following questions to help determine the benefit of the Quality of Life tool in clinical assessment:

1. Have existing tools already been used in the measurement of quality of life in that particular setting.
2. Does the tool control for the response shift phenomenon.
3. What measurement constitutes importance changes in quality of life?

Hunt (1997) suggests that when evaluating quality of life research studies, the description of the tool and the scientific criteria for selecting the specific instrument should be clearly described along with the rationale for selecting it, instructions on how to measure the scores and the interpretation of the scores or results. This may result in clinicians having more clarity about using quality of life in the clinical setting.

Basic criteria and standards exist for selecting measurement tools and these should be carefully considered before embarking on a project. It is important to ensure that the tool is fit for purpose and that the properties of the instrument are sufficiently robust to answer the question in a way that the results are exact and precise for the scientific community to hold value.

The tool itself should not be difficult for the respondent to understand and complete. Early measurement tools were rudimentary but tools need to be simple, easy to use and understand so that the concept can be accepted. Introductory questions should be easy to answer as this will instill confidence and encourage completion. Tugwell & McGowan (2006) highlight that generating unwanted questions on quality of life questionnaires leads to unwanted 'noise' and may result in failing to address the important questions or may result in getting a reduced response in the important questions .

2.1.3 Selection criteria for measurement tools

Quality of life measurement instruments, as with all health measurement instruments, must meet certain criteria which will demonstrate and add weight to the validity of the results. These properties are discussed in detail by many authors ((Higginson & Carr 2001), (Tugwell & McGowan 2006)(Goat et al 1993),(Smith et al. 2000), (Rees et al. 2003) and are summarised below.

1. **Validity** means that the tools measures what it purports to measure. The process of validation involves accumulating evidence to provide a sound scientific basis for the interpretation of test scores. The instrument should be valid for measuring quality of life. There are different aspects of validity:
 - Face Validity – at face value does it appear to be measuring what it is intended to measure – is it unambiguous and appropriate?
 - Content Validity – do the components of the scale/item cover all aspects of the attribute to be measured? Does the content of the variable match the name of which it has been given? Each item should fall into at least one of the content areas being examined. If it does not, then the item is not relevant to the scale's

objectives, or the list of scale objectives is not comprehensive. The number of items in each area should also reflect its importance to the attribute.

- Criterion Validity – can the variable be measured with accuracy? The traditional definition of criterion validity is the correlation of a scale with a gold-standard. It is usually divided into two types: concurrent and predictive validity. Concurrent validity refers to a scale's substitutability and involves the correlation of the new scale with the criterion measure. Predictive validity asks whether the measure predicts future differences.
- Construct Validity - underlying psychological or sociological factors are referred to as hypothetical constructs. A construct can be thought of as a 'mini-theory' to explain the relationships among various behaviours or attitudes. There is no one single study that can satisfy the criteria for establishing construct validity (or testing constructs) - it is an ongoing process, of learning more about the construct, making new predictions, and then-testing them.

Choosing the right tool for the right population is important. Validity and reliability of an instrument used in one population does not necessarily imply validity and reliability across all groups because as illness and health changes, objectives for assessment will differ (Donnelly 2000).

2. **Appropriateness and Acceptability.**

Appropriateness is the extent to which instrument content is appropriate to the particular application. Careful consideration should be given to the aims of the application, with reference to areas of health concern, i.e. which dimensions of health are important, the nature of the patient group and about the content of possible instruments.

Acceptability is the extent to which an instrument is acceptable to its users. Indicators of acceptability include administration time, response rates, and levels of missing data. There are a number of factors that can influence acceptability such as the mode of administration, questionnaire design, and the health status of respondents. The format of patient-reported instruments can also influence acceptability. General features of layout, appearance, and legibility are thought to be important influences on

acceptability. Guyatt et al. (1993) suggest it should be sensible in its use for purpose. The language should be sensible and plain and understandable. The questions should be specific and there should be a defined time period in which the respondent can answer the questions.

3. **Interpretability** concerns the degree to which one can assign meaning to the results. The instrument should produce results that are meaningful to the research question and measurable results should be accurately and easily interpreted.
4. **Reliability** concerns how well the instrument will provide consistent results. There should be internal consistency meaning the target that is being measured, is being done so consistently. Reliability also assesses the extent to which an instrument is free from error. The results should be reproducible –meaning that the instrument should measure the same thing repeatedly in the same population. To ensure consistency in the reliability of the instrument, comparing studies using different study designs- for example comparing a retrospective study versus prospective study would not be recommended. The instrument must also reliably reflect the patients experience (Rees et al. 2003).
5. **Sensitivity or Responsiveness** is concerned with the measurement of important changes in health and the ability of the instrument to detect a meaningful change or clinically important change correctly. This is perhaps the most important criterion for the selection of a measure to evaluate patient outcomes. Inadequate sensitivity may lead to a ‘false negative’ in which the intervention truly improves how the patient feels but the measure fails to detect that improvement. It is important to determine predisposing factors which might influence the sensitivity of the measurement tool such as a ceiling effect where, for example, a subscale indicates the complete absence of dysfunction and therefore one cannot show any further improvement. Sensitivity might also be negatively influenced if the sample size was too small. A sensitivity value of 0.2 is indicative of modest sensitivity of a measurement tool. Ring et al. (2005) in their study of edentulous patients who received dental implants versus participants, who received high quality dentures, detected a significant difference between groups in their overall quality of life score when they incorporated the

concept of response shift. This difference was not detected using real time scores. This is an example of the tool that was used, not being sensitive to detect real time change. Quality of life assessment tools also need to be ‘culturally sensitive’ to accurately detect changes amongst different cultural groups. For example Donnelly (2000) found that patients in Scotland had difficulty eliciting five cues when using the SEIQOL assessment tool compared to patients in Ireland using this tool- suggesting that this may be attributed to differences in spontaneity amongst cultural groups under study.

2.1.4 Challenges with selecting a measurement tool

One Size ‘Does Not’ Fit All

In addition to the criteria mentioned above to assist in the appropriate selection of the appropriate tool, it is important to highlight potential challenges with some quality of life measurement tools. Problems immediately recognisable with the standardised tool ‘one size fits all’ approach is that these tools have been created by someone with a given agenda or a certain perspective which (1) therefore cannot be representative of the general population and (2) may not address areas in life that are important to the individual (3) there may be a focus on items of which, absence of a negative response will presume good quality of life. This may consequently result in a false positive result. In fact, Moons et al. (2004) found that almost 95% of patients in their study of patients with heart disease nominated positive issues which the authors suggest would indicate that patients are keener to emphasise things that contribute to a better quality of life.

Extrapolating the Influence of Co-variables

The human being is complex. Dempster et al. (2010) observe that due to the complexity of the human being, it is challenging to appreciate the true impact and cost of treatment to the patient and as such it is difficult to find a measurement tool that will accurately discriminate between, and measure the influence of co-variables in their entirety.

As there are many social, personal and environmental determinants of quality of life that reach beyond the influence of any one intervention, in order to measure change, it is important to capture a base line measurement and then measure longitudinally over the

course of time. This poses a challenge in terms of resource and also in recognizing a time period that will be sufficient for change to occur and for it to be observed (Chan et al. 2011)

Another challenge encountered with quality of life measures is that many are developed in the English language. With a growing multi-cultural society, this may mean amending the instrument. It must be recognized that translating these tools into another language may be potentially unsuccessful because of incongruent colloquial interpretation due to cultural differences. Guillemin et al. (1993) propose a set of standardized guidelines to assist with the cross cultural adaptation of Quality of Life Questionnaires. The guidelines suggest several translations from a number of qualified translators should be obtained, produce back translations (translate back from new language to original source for comparison), have an independent committee review the final documents, use structured approach to resolve discrepancies and to pre-test the new questionnaire before general use.

2.1.5 Approaches in measuring quality of life

Keeping in mind the criteria /standards required for measurement tools as outlined above, Hunt (1997) suggests that there are two fundamental groups of quality of life researchers :(1) those who agree on the functional components of questionnaires and use of instruments tailored to measure the area of interest to reflect the researchers preoccupation and (2) Those researchers who do not agree on any one customary measurement tool nor that there a decisive factor upon which quality of life can be measured as it is conceptual in nature and not definitive or static in behavior. This group professes that there is no mean or average measurement as each individual presents with a innumerable factors which influence quality of life , those factors being experienced only by that individual and influenced by both intrinsic conditions such as emotional stability, moods, feelings, perceptions and extrinsic factors such as health and supports available to him.

In line with the disciplines of thought, measurement tools can further be subdivided into ‘*generic*’ or ‘*disease specific*’ and ‘*Individual*’ many studies now compromise when assessing quality of life, by selecting a combination of approaches.

(1) Generic Quality of Life Measures

Generic Quality of Life measures are designed for use with any group of illness or any population to assess the extent to which an intervention affected the patient's overall life and they have a wide application across patients with different characteristics. Generic measures are necessary to compare outcomes across different populations and interventions, particularly for cost-effectiveness studies.

An example of a generic quality of life tool and possibly the best known of these is the Short Form-36 (SF-36). This was developed in the United States and covers eight dimensions:

- Physical functioning
- Social functioning
- Role limitations due to physical problems
- Role limitations due to emotional problems
- Mental health
- Energy / vitality
- Pain
- General health perception

The SF-36 is rapidly becoming the generic health status measure of choice. It is frequently recommended as the generic core in disease specific questionnaires. However it is not necessarily the 'gold standard' appropriate to all studies in all instances, and other longer established instruments may still be preferable in certain circumstances. A 12-item version (SF-12) has also been developed, with initial results suggesting SF-12 summary scores to be very similar to the longer SF-36 summary scores.

(2) Disease-Specific Quality of Life Measures

Different symptoms and unwanted treatment effects may be important in relation to different diseases and treatments. Disease specific measures focus on complaints attributable to the specific disease, diagnosis or population or group of patients (Smith et al 2000). Disease-specific measures have theoretical advantages. Weibe et al (2003) suggest that specific instruments are more responsive than generic tools and completion of the questionnaire is facilitated by only including dimensions relevant to the disease of interest. These health related quality of life measurements can provide new insights into relationships between quality of life and risk factors and can lend itself significantly to determining the burden of disability and chronic disease and aide in public policy planning.

There is however disadvantages associated with disease-specific measure. For example results cannot be compared with those from other disease groups, and effects may be missed in dimensions or domains important to the patient which are not included for measurement in the questionnaire

In assessing cancer patients, disease-specific measures can be further divided into ‘cancer-specific measures’ and ‘cancer site-specific measures’. There are several cancer-specific health related measures available. One of the most popular used has been developed by the European Organisation for Research and Treatment of Cancer (EORTC) .This is a developed a 30-item questionnaire for assessing cancer patient known as the EORTC **QLQ C-30** (Aronson et al 1993). This is a core questionnaire, incorporating a range of physical, emotional and social health issues relevant to a broad spectrum of cancer patients, irrespective of specific site of their disease or type of cancer. This core questionnaire is then supplemented by diagnosis-specific and/or treatment-specific questionnaires. The QLQ-C30 consists of 5 functional scales (physical function, role function, emotional function, cognitive function and social function) nine symptom scales (Fatigue, nausea, vomiting, pain, constipation, diarrhea, dyspnea, sleep disturbance, appetite loss) and a global assessment which combines two questions on the overall quality of life and general health status which is rated on a visual analogue scale from 1-7 (7 being ‘excellent’, 1 being ‘very poor’).

The EORTC QLQ-C30 is a well validated instrument demonstrating content validity and internal consistency (Albers 2010) that has rapidly become the gold-standard QoL tool in

cancer trials – to date more than 3,500 studies using the questionnaire had been registered with the EORTC.

(3) Individual Quality of Life Measures

Another approach in quality of life assessment that is becoming more prevalent in use is the Individual Approach that measures quality of life from the individuals' perspective. Traditional quality of life assessment tools measured four dimensions in quality of life: functional, psychological, physical and social status. Many would postulate that these attributes alone are not entirely synonymous with quality of life (Hunt 1997)(Waldron et al. 1999)(Pearcy et al. 2008) The dynamic and individual nature of QoL is difficult to capture when using (nomothetic) questionnaires based on grouped data, in which the questions asked, the response format provided ,and , the relative weights applied to the answers, have all been predetermined(O'Boyle 1994). While such measures, generally referred to as Health Related Quality of Life measures (HRQoL), provide important information regarding health status, their promulgation as measures of QoL is more questionable (Waldron et al. 1999),(Mannion and Gilmartin 2012). Quality of life is not just about health, it is more all encompassing and incorporates the degree of overall life satisfaction that is both positively and negatively influenced by the individuals perception of certain aspects of life that are important to him (Hickey et al.1996, Waldron et al 1999, Moons et al 2004, Thomson et al.2012). Hunt(1997) supports this view, suggesting that Health Related Quality of Life isolates the person from the social and material conditions in which they exist .

There is accumulating evidence to support the individuality of quality of life and therefore, it should be measured with a tool to assess that of the individual .A valid quality of life measure for patients should permit one to assess quality of life from the unique perspective of the individual without imposing a predetermined external value system (O'Boyle 1996)(O'Boyle & Waldron 1997) The SEIQOL Instrument is a tool designed to do just this.

CHAPTER 3

3 The Schedule for the Evaluation of Individual Quality of Life Measurement Tools (SEIQoL and SEIQoL DW)

3.1 SEIQOL

The SEIQoL is a generic quality of life scale, developed for use in the context of health and illness. The working definition underlying the development of the SEIQoL was based on the individual's personal view of life and its quality. Quality of life was thus defined as 'what the individual determines it to be' (Joyce (1988), O'Boyle et al. (1992), Boyle et al.(1993)). There are three main features proposed with this definition:

1. QoL is individual in nature, the only valid means of QoL assessment, therefore, is by self report.
2. QoL is dynamic in nature, an individual judges their overall QoL from an assessment of level of functioning in discrete domains of life which they consider important.
3. In judging QoL, an individual evaluates each important aspect of their life in terms of its relationship to worst and best possible states. This will be specific to each individual, resulting from the influences of a variety of factors, including experience and expectations.

Based on these propositions, the SEIQoL methodology was developed by adapting a technique known as Judgement Analysis (JA) to the task of measuring quality of life. Judgement analysis is a research method based on multiple regression analysis that statistically derives an algebraic model of the process by which a given individual makes a judgement. This process is elucidated by quantifying the extent to which the individual utilises certain 'bits' of information to make a judgment. Theoretically, judgment analysis derives from Brunswick's Lens model (Brunswick 1956) and from Social Judgment Theory (Hammond et al .1975), both of which seek to divide the judgment process into its' component parts looking specifically at the relative contribution of each of these parts to the ultimate judgment. Judgment analysis is the technique that facilitates this process by

mathematically modelling individual judgments (Stewart, 1988) . JA has been used extensively in examining expert decision making in areas as diverse as the US police force and the treatment of marital conflict (Dhir & Markman 1984). In the medical arena, it has been used to look at the expert decision making of consultant physicians and general practitioners (Kirwan et al. 1983). The area of quality of life represented a novel application of judgment analysis. Before describing its' application in this context, it is necessary to understand a number of commonly used terms integral to the technique:

Cue: A factor or item of information used as a basis for judgment;

Case/cue profile: A set of cue values presented for judgment;

Judgment task: A set of cases presented to a judge in order to obtain a sample of his / her judgements;

Judgment policy: a quantitative representation of the basis for an individual's judgment derived from calculating the relative weight attributed to each cue.

(Derived from McGee et al, 1991).

The application of JA to quality of life is referred to as the SEIQoL. The SEIQoL is administered in a standardised semi – structured interview format as follows :

3.1.1 **Cue elicitation: Step one**

The first step involves asking the individual to name the 5 areas of life considered to be central to the quality of his / her life. The reason for selecting 5 as the number of cues required is for statistical purposes. Respondents appear to have difficulty making judgments on combinations of greater than 5 cues reflected in diminished validity and reliability figures (Stewart, 1988). Using less than 5 cues may be too limiting, thus yielding too little information. The cues nominated by the individual are referred to as elicited cues.

3.1.2 Determining current status on each cue: Step two

The second step of the procedure is to determine the individual's current status or functioning on each of their elicited cues. In this case, respondents' rate current status against a vertical visual analogue scale labelled at the upper and lower extremities by the terms "as good as could possibly be" and "as bad as could possibly be", respectively. These ratings are recorded by the interviewer in the form of a bar chart (see figure 1), each bar representing current status on a single cue. The possible score range for each bar is 0.0 - 100.0.

A horizontal visual analogue scale, labelled in the same way as the vertical, is presented beneath the bar chart for the individual to make a rating of current overall quality of life. This horizontal VAS scores is not included in the overall scoring of QoL.

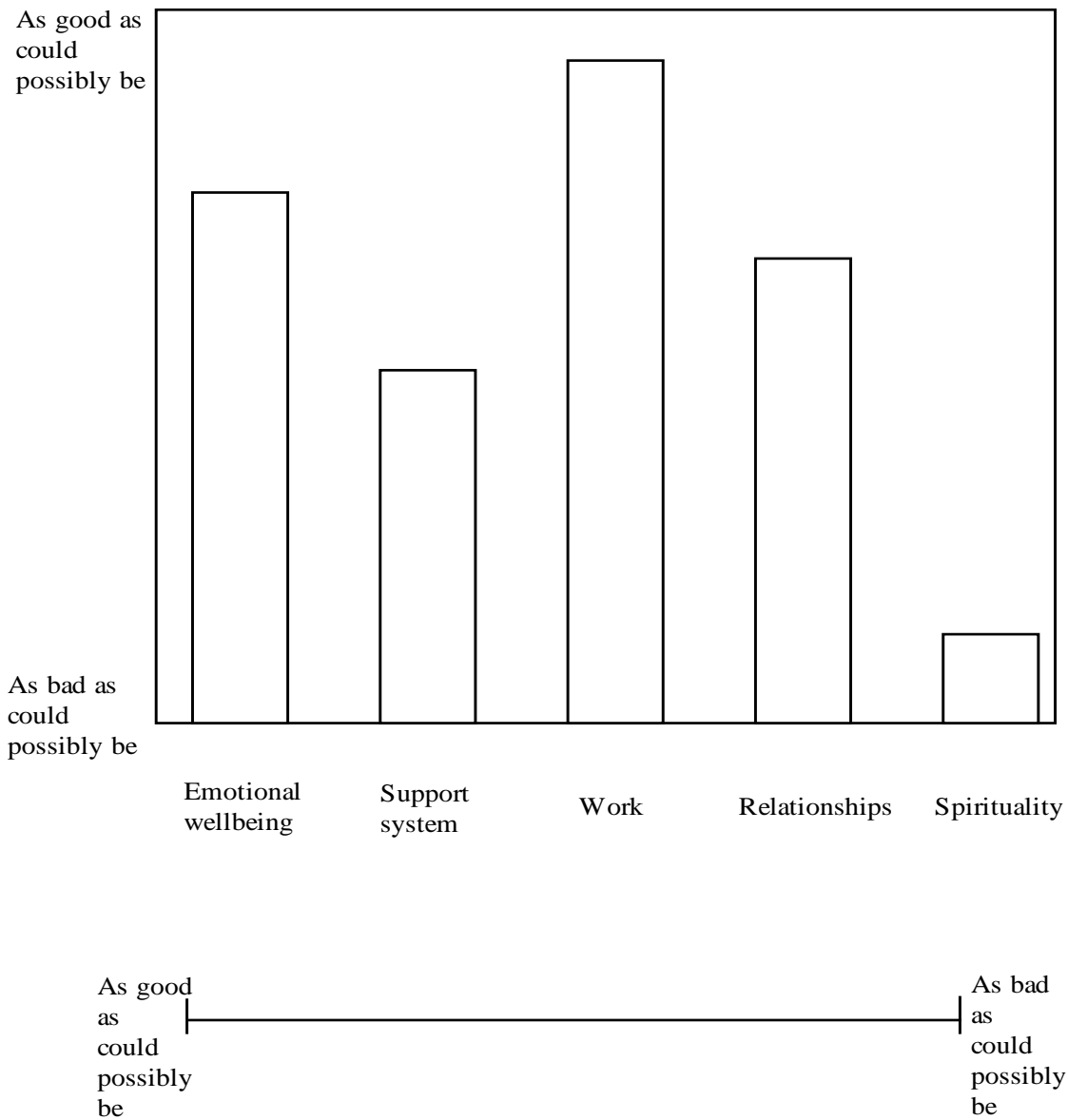


Figure 1 Step 2 of the SEIQoL procedure: determining current status on each cue. This chart represents one hypothetical individual's current cue profile.

3.1.3 Quantification of relative weighting of each cue: Step three

This final step quantifies the relative contribution of each elicited cue to the judgment of overall quality of life for that individual. For this purpose, a series of hypothetical cases are presented for judgment. These cases are randomly generated in advance and are identical for each respondent. Each case is labelled using the 5 cues previously nominated by the individual. For each case, the respondent indicates on a horizontal visual analogue scale (figure 1.2 above) how he / she would rate their own overall quality of life given that particular hypothetical scenario. A total of 30 cases are presented. Figure 1.2 and 1.3 represent 2 hypothetical scenarios as presented to the patient with the patient's elicited cues applied to each scenario weighting. Thirty cases are the estimated requirement when 5 cues are being considered based on statistical evidence that 10 cases are required to derive a judgment policy when three cues are involved, with a further 5 cases needed for each additional cue (Policy PC 1986; Stewart 1988; O'Boyle et al 1993). Thus, a total of 20 cases are required when 5 cues are being considered. The additional 10 cases are repeat cases randomly included to allow estimation of internal reliability.

The relative weight assigned by the individual to each cue is calculated with multiple regression analysis using a statistics package developed for the purpose (Policy PC 1986). This package also computes an R^2 statistic which indicates the amount of variance in overall quality of life judgments explained by the 5 cues used (interval validity). R^2 values of 0.7 or greater are considered acceptable in the context of psychosocial measurement (Stewart 1988). The R^2 statistic provides an estimate of the internal validity of the JA task. Internal reliability is calculated by correlating repeat case judgments (Pearson's R). Thus, it is possible to assess how well the particular judgment policy models the individual's assessment of quality of life (R^2) and how reliably the individual uses this policy (r).

The SEIQoL thus allows measurement of quality of life to be completely individualised. The individual determines the life areas of importance for consideration, indicates current status on each of these nominated areas and determines the relative weighting attributed to each area. There are situations, when it is desirable to be able to present information as grouped data, particularly in the case of making group comparisons. In this case it is possible to derive a single index from the SEIQoL data referred to as a global quality of life score. This is

calculated by multiplying each cue weight by the corresponding current self-rating on that particular cue and summing the products across the 5 cues:

$$\text{QoL} = \sum (\text{levels} \times \text{weights})$$

The global quality of life score can thus range from 0 to 100. As it is a continuous measure, it can be analysed using parametric statistical analyses.

The following provides examples of some of the applications of the SEIQoL in healthy and unhealthy patient groups.

3.2 Examples of SEIQoL in different populations

3.2.1 Individual QoL in a healthy adult population.

This was the first study carried out using the SEIQoL and comprised 42 healthy adults (20 male; 22 female) attending an immunisation clinic for appropriate vaccination and / or inoculation prior to travelling abroad (H. M. McGee et al. 1991). Respondents were asked both to nominate the life areas (cues) currently of importance to them (referred to as *elicited cues*) and to complete the SEIQoL task using life areas provided to them by the research team (*provided cues*). Provided cues were derived from those frequently contained in standard QoL questionnaires, as follows: physical, emotional and social functioning, living conditions and general health. Many cues were unique and not typically assessed by standardised instruments, such as education and religion. Cues unique to a single individual included aesthetics, politics and the environment. There was considerable variation in the percentage weighting assigned to both the nominated and provided cues.

Mean reliability figures for replicate profiles contained within the SEIQoL task were satisfactory for both the elicited and provided cues (Pearson $r=0.74$ and 0.69 , respectively). In addition, the judgment policies derived from the SEIQoL task accounted for a high percentage of the variability in overall QoL scores for both elicited and provided cues ($R^2=0.75$ and 0.79 , respectively).

Conclusions: This first use of judgment analysis in the measurement of QoL proved it to be both acceptable and feasible in a healthy adult population. Both internal consistency and validity of the information obtained was found to be high. This was a cross-sectional study,

the aim of which was to inform the research team about the feasibility and acceptability of the judgment analysis task in the assessment of QoL.

3.2.2 Comparative assessment of individual qol in a patient group with irritable bowel syndrome (IBS) and peptic ulcer disease (PUD)

Application of SEIQoL in the context of this study aimed to elucidate similarities and differences in QoL of these two gastroenterology populations and also to compare results of the SEIQoL methodology with those of health and functional status measures. This was a cross-sectional study, involving a once-off interview with a group of consecutive attendees to an out-patient gastroenterology clinic. The sample consisted of 28 patients with IBS (16 female, 12 male; mean age: 33.2 (range 17-64)) and 28 patients with PUD (12 female, 16 male; mean age: 35.9 (range 19-72)). All patients were able to complete the SEIQoL.

The SEIQoL methodology was administered using elicited cues only. Other measures used were: (i) The Gastrointestinal Symptom Rating Scale (Svedlund et al. 1988): This is a 15 item symptom scale which is completed by the patient's attending physician and was designed specifically for use with IBS and PUD populations. (ii) The Psychosocial Adjustment to Illness Scale (Derogatis 1986): This measure was used to assess illness-related QoL. (iii) The Nottingham Health Profile (Hunt et al. 1985): This is a health status measure comprising two parts. Part 1 contains questions relating to health problems in six domains - energy; pain; emotional reactions; sleep; social isolation; and mobility. Part 2 lists seven likely problem areas - job; household management; social life; family life; sex life; interests and hobbies; and holidays - and the respondent indicates if their present state of health is causing any problems with any of these areas.

Results

Health was nominated significantly less frequently by the PUD than the IBS group ($p < 0.05$), despite the fact that both groups were attending hospital for management of their condition. This indicates that the assumption that health is automatically the most important component of patients' perceived QoL may not be warranted. It may be that health is viewed by patients as facilitating other important aspects of their lives rather than something to be valued in isolation.

Comparison of SEIQoL results with those of the PAIS and NHP indicated no significant relationships between the SEIQoL index score and either PAIS total or subscale scores. Neither was there a relationship between the SEIQoL index score and scores on part 2 of the NHP. The SEIQoL index score was significantly related to two of the six subscales of part 1 of the NHP, the sleep subscale ($r=0.38$, $p<0.01$) and the social isolation subscale ($r=-0.29$, $p<0.05$). The SEIQoL index score was not found to correlate significantly with the GSRS.

Conclusions: The low correlations that emerged between medically rated symptom severity on the GSRS and patient-related measures of QoL indicated that, in this sample, QoL was not directly proportional to severity of medical symptoms. This finding suggests that clinical assumptions about patient QoL, if based solely on levels of symptoms, may not relate to patients' own perceptions of their QoL. In the context of these patient populations, the SEIQoL methodology was found to be acceptable and feasible, and yielded results that were more sensitive to health status differences between the groups than were traditional health-related QoL measures.

3.2.3 Individual quality of life in a surgical population:

This was the first intervention study using SEIQoL. SEIQoL was administered pre- and post-operatively to a cohort of 20 individuals undergoing total hip replacement surgery (O'Boyle et al, 1992). Consecutive attendees to a Dublin orthopaedic hospital with unilateral osteoarthritis of the hip were invited to participate. Participants were matched for a central group by age, sex and socioeconomic status to healthy community residents, identified through general practice register. As with the study of healthy adults described earlier, respondents were asked both to nominate life areas (cues) currently of importance to them (*elicited cues*) and also to complete the SEIQoL task using life areas provided to them by the research team (*provided cues*). As before, provided cues consisted of physical, emotional and social functioning, living conditions and general health. SEIQoL was administered alongside a general health status measure (McMaster Health Index Questionnaire (MHIQ; (Chambers et al, 1982), a disease specific health status questionnaire (Arthritis Impact Measurement Scales (AIMS; (Meenan and Gertman ,1980), and an objective measure of functional capacity (Harris Hip Rating). Patients were first interviewed during routine inpatient preoperative assessment 6 weeks prior to surgery and again post-operatively, 26 weeks after

surgery in their own homes. The matched healthy community group were interviewed in their homes on two occasions 32 weeks apart.

Cues nominated by the patient and control groups are presented below. Both groups nominated social and leisure activities most frequently. A significant difference emerged in the proportion of patients and controls nominating 'happiness' as an important life area, 25% of the patient group identifying this cue as important, while none of the control group nominated this life area. Otherwise, no significant difference in cue nomination emerged between the two groups.

Cues nominated by the surgical and control groups, indicating the percentage of respondents who nominated each cue.

Cue Category	% THR	% control
Social & leisure activities	90	75
Family	90	70
Personal health	70	50
Relationships	50	45
Religion	45	45
Work	40	45
Finances	30	50
Family health	25	5
Independence	25	50
Living conditions	20	15
Intellectual function	5	1
Happiness	25	0
Miscellaneous	10*	15

* p<0.05

Overall SEIQoL scores derived from elicited cues improved significantly for the patient group from the pre- to the post-operative assessment (mean (SE): 61.6(4.2) vs. 70.7(2.5); $p < 0.02$). SEIQoL scores did not change significantly for the control group over the study period (mean (SE): 60.7(2.1) vs. 59.8(3.5); NS). The difference in SEIQoL scores between patient and control groups at the first assessment was not significant, whereas the patient group were reporting a significantly better QoL at the time of the second post-operative assessment than were the control group (mean (SE): 70.7(2.5) vs. 59.8(3.5); $p < 0.01$). Analysis of overall SEIQoL scores derived from provided cues yielded no significant differences either between groups or within groups over time.

Conclusions: Results of this study indicated that SEIQoL can be used as a measure of individual QoL both of people who are healthy and those who are undergoing medical intervention. As an individualised measure, it can be used to quantify the impact of disease and treatment on areas of life that are important to the individual patient. SEIQoL based on individually nominated cues was found to be sensitive to surgical intervention. In contrast, when an external set of cues were imposed (provided cues), the sensitivity of the measure was no longer apparent.

3.2.4 Individual quality of life in the elderly:

1. Quality of life in the healthy elderly: This study aimed to assess individual QoL in a healthy elderly cohort over a 12 month period (J. P. Browne et al. 1994). Fifty six healthy adults (36 female, 22 male) aged 65 or over (mean age: 73.7, range 65-90) were recruited through general practice registers for inclusion in the study and were interviewed on two occasions 12 months apart.

Mean overall SEIQoL scores declined slightly for the elderly group over time (mean (SD) SEIQoL: time 1: 82.1(12.2), time 2: 80.06(11.2)), although this difference was not found to be significant ($t=1.24$, $p=0.22$). At the time of the first assessment, the QoL of the healthy elderly group was found to be significantly better than that of the young healthy group, described earlier ($t=-2.04$, $p < 0.05$). Although continuing to be slightly better at time 2, the difference was no longer significant ($t=-1.21$, $p=0.23$).

Internal reliability coefficients for the elderly group were satisfactory at both assessments (mean r (SD): 0.66(0.24) and 0.73(0.18), respectively). Internal validity coefficients also reached acceptable levels (mean R^2 (SD): 0.72(0.15) and 0.78(0.12), respectively)

Conclusions: SEIQoL was found to be a reliable, valid and acceptable means of assessing individual QoL in healthy elderly adults.

3.3 Psychometric properties of the SEIQoL

Reliability and validity data from these various studies are illustrated in Table 2. These results indicate that, in general, individuals used judgment policies about their quality of life consistently (r) and that the combination of cues nominated by each individual explained much of the variance in terms of his / her judgment policy (R^2). Such findings contradict much of the research using JA in the context of expert decision making. Findings from these studies indicate that experts are largely unaware of how they make decisions. In the medical context, it has been found that, in particular, experts have difficulty in accurately predicting the relative weighting assigned by them to different clinical parameters and differ significantly from each other in their judgment policies ((Kirwan et al. 1983). It would thus appear that people are more accurate in applying judgment policies when making estimates about the quality of their lives than they are in applying a judgment policy to situations not directly involving themselves.

SEIQoL is sensitive to change over time as reflected in the intervention study described above. This sensitivity was not reflected if 'provided cues' were given to the patient. This reinforces the importance of the QoL measure being completely individualised with no pre-judgment of issues of importance being presented to the patient.

Internal reliability (Pearson r) and validity (R^2) data from developmental SEIQoL studies.

Study Population	Mean r	Mean R^2
Healthy adult group	0.74	0.75
Irritable Bowel Syndrome (N=28)	0.62	0.73
Peptic Ulcer Disease (N=28)	0.70	0.79
Osteoarthritis patients total hip replacement	0.64 (pre-op) 0.49 (7.5 months; post-op) 0.62 (24 months post-op)	0.62 (pre-op) Unilateral 0.65 (7.5 months) (N=20) 0.64 (24 months)
Healthy matched community controls for THR	0.71 (baseline) 0.62 (7.5 months) 0.66 (24 months)	0.76 (baseline) (baseline) 0.72 (7.5months) (N=20) 0.71 (24 months)
Healthy elderly community (N=56)	0.66 (baseline) 0.73 (12 months)	0.72 (baseline) residents 0.78 (12 months)

3.4 Conclusions regarding SEIQoL

In keeping with the broad-based definition of quality of life from which the SEIQoL was derived, the potential applications of the SEIQoL are not limited by factors such as health or illness and should also be free from cultural bias, although this has not yet been investigated empirically. To date, the SEIQoL has been used successfully with respondents ranging in age from early twenties to early nineties. It has not yet been used with children or adolescents; so that it is not possible at present to know what lower age limit applies.

Its applicability may be limited in conditions which impair cognitive functioning or motivational state. Successful completion of the SEIQoL requires that people are able to reflect and identify issues of importance to the quality of their lives at a point in time, to think abstractly in considering hypothetical cases and make judgments based on information presented in diagrammatic form, and to comprehend and make ratings on vertical and horizontal visual analogue scales. If these abilities are impaired, administration of the SEIQoL may be problematic.

The SEIQoL was developed specifically as an individual measure of quality of life. It is therefore ideally suited for use in single subject design and within-subject study designs in which respondents act as their own control. However, it is also possible to use the SEIQoL in between subject comparison studies, using the SEIQoL index score. Reducing SEIQoL information to summary scores and grouped data does compromise the individual nature of the measure. The individual patient profile result could be used in clinical situations to add information on the patient's view of their QoL.

The key feature of the SEIQoL methodology is its relevance to the individual. This is assured since the respondent defines those areas to be measured. Apart from its research application, a semi-structured format such as the SEIQoL, which elicits the individual's concerns, their perceived current status and relative value, can provide a basis for discussion in the consultation process. This may heighten self-awareness for the patient and increase physician insight of the patient's presenting problem. In summary SEIQoL has a combination of quantitative and qualitative methodology which provides a unique combination of information on QoL.

3.5 Schedule of Evaluation of Individual Quality Of Life- Direct Weighting (SEIQoL-DW)

Although Judgement Analysis technique is a successful aid to quality of life assessment, it needs 30 scenarios to measure consistency in judgement of the 5 domains. Using this instrument, the individual needs to be able to think abstractly and form their own judgement and is therefore not a suitable assessment tool for individuals with cognitive impairment. It also takes a considerable amount of time to administer- approx 40 minutes (Waldron et al. 1999) , (Stiel et al. 2011). The tool has been acknowledged as challenging and cumbersome in a number of studies (Blair et al. 2010) (Stiggelbout et al. 2008) and is not practical in a clinical setting in its existing form.

Due to the challenges in administrating the SEIQoL tool, a simpler and more user friendly tool was therefore developed based on the same concept of SEIQoL. This tool is referred to as SEIQoL D-W (Schedule for the evaluation of Individual Quality of Life by Direct Weighting (Hickey et al. 1996)(Browne et al. 1997)Wettergren et al. 2005) .The direct weighting procedure elicits cues and levels in the same way as the full SEIQoL, but the weights are elicited by means of a series of laminated, separately coloured discs which can be manipulated to form a type of pie chart with each segment representing the weight associated with a particular cue(Hickey et al. 1996). The SEIQoL-DW has been used in a number of population settings and due to its versatility, these properties distinguish it from other tools (Montgomery et al. 2002).

A systematic review of 39 studies that had selected the SEIQoL and SEIQOL DW tools as the instrument of quality of measurement was conducted by Wettergren et al. (2008). 36 of the 39 studies had used the shorter version SEIQoL-DW and three studies incorporated the longer version SEIQoL. Across studies, the time taken to complete the SEIQoL was 5 – 50minutes and most participants found the SEIQoL DW an acceptable measurement tool. Most studies did not describe in detail their analytical approach. Studies that were longitudinal in design were less in number and in those, patients did not change the areas of domain (cues) over time .The authors suggest that it would be good to follow participants over time when using SEIQoL to better understand what it could add to understanding the person in times of change. Suitability of the tool when assessing the quality of life of the older population and of a population with ALS (amyotrophic lateral sclerosis (motor neurone

disease) proved challenging with reports that the participants had difficulty manipulating the discs as it requires a degree of dexterity. Populations in other studies also found manipulating the discs challenging (Cheyne Alex and Kinn Sue 2001). However, in general, there was an overall positive attitude toward the SEIQOL tool from participants.

There is an absence of qualitative studies available to evaluate the use of the instrument however with regard its use in the clinical setting, the feasibility and validity of the instrument supported its use in complimenting other standardised measurements. Westerman et al. (2007) in their study of patients with lung cancer using the SEIQOL DW, highlight that listening to the patient is very important to ascertain the correct interpretation of the cue at each of the time points and to probe where cues are vague or open misinterpretation. This can be said about both the SEIQOL and the SEIQOL DW.

3.5.1 The Administration of the SEIQoL using a short-form direct weighting procedure (SEIQoL-DW)

As discussed above applicability of the SEIQoL has been found to be problematic as it requires full cognitive function, concentration and a certain amount of motivation to successfully complete the procedure. In other situations, where time may be restricted or where the SEIQoL is incorporated in studies where a number of other measures are also being used, administration of the SEIQoL may be time consuming. As a result, this simpler method of extracting cue weights has been developed alongside and validated against the full version of the SEIQoL, and found to be a valid and reliable measure of explicit weighting policies for quality of life domains ((Browne et al. 1997)(Browne et al. 1994) (Browne & O'Boyle 1997). The simpler method of extracting cue weight - SEIQoL - direct weighting (SEIQoL-DW) involves Step 1 and 2 as above discussed in SEIQoL methodology. Step 3 the weighting of elicited cues is different and is called direct weighting. The Direct Weighting procedure involved presenting a pie-chart called the SEIQoL Disk, containing five coloured segments representing the five life areas nominated by the individual as being important to quality of life. The individual is asked to allocate the appropriate area they feel would reflect the relative importance of each life cue, giving more area to cues of more importance and less area to cues of least importance (Figure 1.2). These segments may be adjusted and re-adjusted by the individual concerned until the individual is satisfied that the proportion of the pie chart given to each life area accurately reflects the relative weights attached by the

individual to those life areas. The pie chart itself consists of five interlocking, coloured laminated circular disks that can be revolved around a central clip to vary the proportion of the pie chart displayed by each colour (life area). The laminated disks are mounted on a larger backing disk, which displays markings from 0 to 100, and from which the relative size of each colour (quality of life area) can be read. The weighting procedure is therefore short, colourful, tactile and easy to understand. (Figure 2)

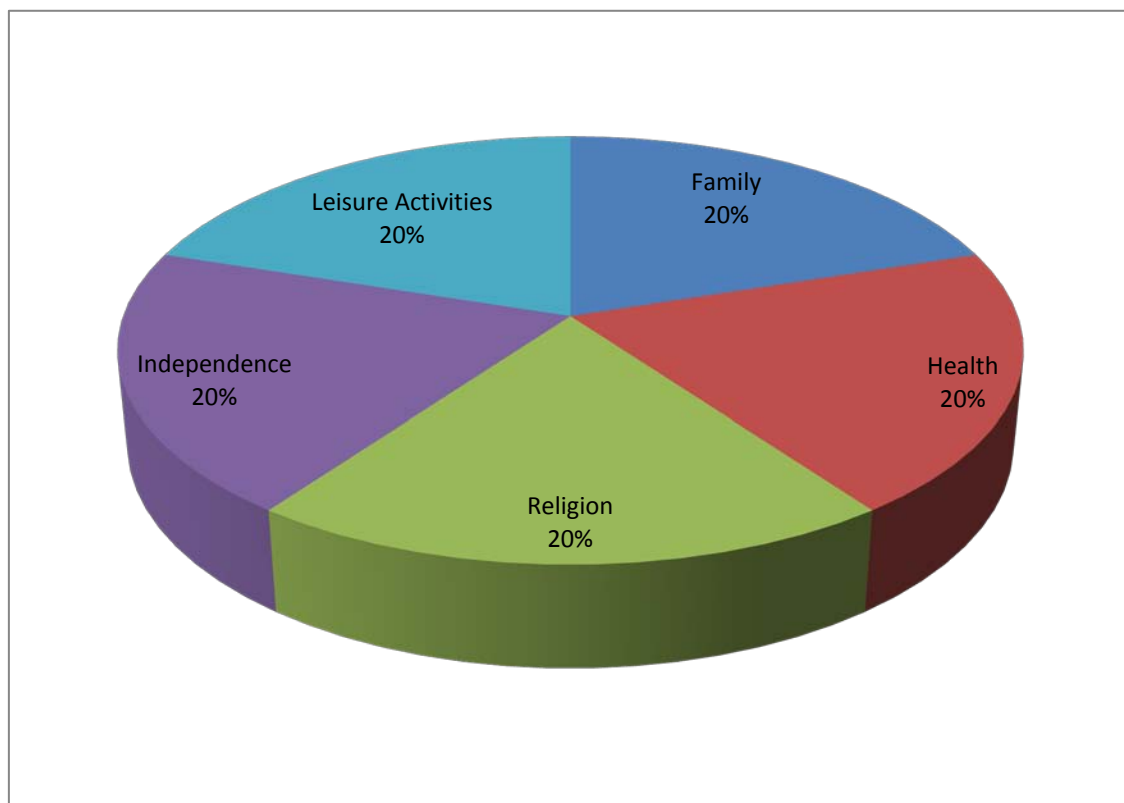


Figure 2

Example of SEIQoL Disk as presented to patient.

Each patient nominated 'cue' of relevance to QoL is presented on a separate colour and each colour given equal space.

The first clinical application of the SEIQoL-DW is in the area of HIV/AIDS (Hickey et al. 1996). The case group consisted of 52 people with a known HIV sero-positive status who were recruited primarily through two Dublin inner city general practices. The comparison group consisted of age / sex matched healthy adults drawn from the same neighbourhood.

The SEIQoL-DW maintains each of the steps of the longer form methodology, but replaces the JA method of deriving relative weights by a more explicit form of assigning weights using the disk system. Developmental studies indicate that the measure is reproducible and has high criterion validity. Browne et al. (1997), showed that SEIQoL measures implicit or unconscious thought and SEIQoL-DW measures explicit or conscious thought, they were not interchangeable as regards cue weights. This conclusion concerning implicit and explicit thought was made after completing a validation study in which a group of young healthy adults were asked to complete SEIQoL and SEIQoL-DW (time one) and after a suitable period of time had elapsed they were sent ten separate weightings of the cues they had nominated at time one and unknown to the participants within the ten weightings their actual weightings from SEIQoL (judgement analysis (JA)) and SEIQoL-DW (direct weighting using the SEIQoL Disk (DW)) were included. The participants were asked to rank order the different weighted profiles of their own cues as they would see most relevant to their QoL. The SEIQoL-DW weights were placed first and SEIQoL weights were placed in the top three by the majority of patients. This established criterion validity for the SEIQoL-DW as individuals ranked it as nearest to what they perceived their QoL profile to be.

3.6 Participant Experience with the SEIQoL DW tool

3.6.1 Individual quality of life experience of a terminally ill population

Waldron et al (1999) in their study of measuring Quality of Life in patients with advanced cancer using both tools found that 78% of the patients completed the SEIQoL whereas 100% of patients were able to complete the SEIQoL DW. Concordance between both tools had been previously demonstrated and Waldron et al proceeded to demonstrate and validate the psychometric properties of both. In their study with the application of the SEIQoL and SEIQoL-DW to a population of 80 terminally ill patients, the mean internal validity which demonstrated that the individual judgement was considered acceptable was 0.88. A score greater than 0.7 demonstrates internal validity. The mean internal reliability which essentially provides a measure of internal consistency was .90. Both scores are considered very high and supports the interchangeable application of both the SEIQoL and the SEIQoL DW.

3.6.2 Individual quality of life experience of a brain injury population.

Blair et al (2010) aimed to establish the construct validity of the SEIQoL DW by comparing outcome measures to that of other measurement instruments. She conducted a study of 28 individuals with traumatic brain injury with the mean age being 42. Results showed perceived changes in quality of life between time-points before and after their injury with some participants having worse quality of life scores prior to their injury. There was no evidence to suggest that a change in domains reflected an improvement in their quality of life. 68% of participants changed rating. Patients who were rendered disabled as a result of their brain injury reported a poorer quality of life than those who were not rendered disabled.

3.6.3 Individual quality of life experience in individuals with mental health issues

Prince and Gerber (2001) Undertook a study of 36 individuals with mental health issues in Canada. The participants on average took 23 minutes to complete the SEIQoL DW and researchers found that the tool permits a detailed view of the individuals' perspective of quality of life despite cognitive difficulties. It is a very adaptable tool and does not require the ability to read. They correlated the global measures with that of other measurement tools and found good concurrent validity.

3.6.4 Individual quality of life in individuals with addiction problems

Cheyne and Kinn (2001) suggest that SEIQoL DW is used in studies to assess the individual's ability to adapt to change but note that it is not frequently used by clinicians. They used this tool to determine if it would be beneficial to counsellors in reflection, planning and decision making. They conducted a randomised controlled trial of 42 participants who were receiving counselling for alcohol use from a three counsellors. The researchers assessed the participants in the intervention arm using the SEIQoL DW tool at a number of time points through-out their counselling sessions. Participants on the control arm received standard of care assessments by the counsellors. Participants who completed the SEIQoL assessments had a higher number of favourable outcomes with controlled drinking and there was a greater magnitude of improvement in quality of life scores over time with the intervention group compared to those on the control arm, although it was not statistically significant. In terms of practical application of the tool, the assessment took 20 minutes to

complete on average. Users found that the cues they identified as important helped them to focus and the researchers also found that the tool was responsive to change in the service users lives.

Feedback from participants indicated that the plastic disc was not sturdy enough and was difficult to manipulate. The researchers described SEIQoL DW as a dynamic way to measure quality of life and it permits the individual to include what is important and significant to them in the quality of life measure. They suggest that it seems to activate the reflective process. This is something that might be beneficial in some settings.

3.6.5 Individual quality of life experience of a population with cancer

Montgomery et al. (2002) used this tool to evaluate the quality of life in a population with leukaemia and lymphoma patients who were receiving chemotherapy, many of whom were in isolation due to their immune compromised status. The authors found the tool to be clinically useful. The patients understood the concept and there was no difference between cues nominated between patients receiving treatments of different degrees of severity- these were primarily family and health.

This emphasises the value of using an instrument that doesn't impose upon the thought process nor impose an external clinician derived set of values. The SEIQoL DW creates a snapshot of the patient and the authors suggest that the personalised nature of the SEIQoL could in fact, be therapeutic in value.

CHAPTER 4

“A man is more than the sum of all the things he can do” Bill Clinton 2004

4 The Argument for Individual Measurement of Quality of Life.

Application of measurements of health status and quality of life to different diseases, conditions, states, and populations is increasing. The preferred strategy depends on project aims, methodological concerns, and practical constraints as previously discussed.

Disease-specific measures assess the special states and concerns of diagnostic group and may be more sensitive for the detection and quantification of small changes that are important to clinicians or patients. Health Related Quality of Life measurements looks on how health and disability influences the patients Quality of Life and these measurements are based on the concept that ‘functional health has an impact on quality of life’ (Hunt 1997).

4.1 Ability versus Disability

People with disabilities and chronic illness who may have ill health would strongly disagree with this concept and studies have repeatedly demonstrated that patients with disability have good quality of life scores regardless of their somewhat compromised functional ability (Alexander 2010). This paradox, known as the ‘disability paradox’ exists where there is a perceived notion that people with disabilities would have a poorer quality of life but in fact, people with disabilities rate their quality of life equal to non disabled people (Albrecht & Devlieger 1999) . The concern for use of health related quality of life measures on those with functional limitations is echoed by (Thompson et al. 2012).She highlights that health related quality of life measures provide a score for the physical and social functional areas of the person, the lower the score, the poorer the quality of life. In people with disabilities, the score would be reduced due to the disability but, in fact, this may be an inaccurate reflection of the true quality of life of the person.This finding is also demonstrated by Neudert et al.(2001) who aimed to identify patient preferences concerning approaches to quality of life measurements and conducted a randomized controlled trial of three different tools. 51 patients were asked (1) how well they thought the tools measured what they perceived as

quality of life (perceived validity) and (2) on a visual analogue scale, to rate emotional distress caused by the administration of each instrument.

They were randomized to complete either the SF-36 health related quality of life measurement tool and the SEIQOL DW tool at two different time points. The Sickness Impact Profile was completed by all patients with Amyotrophic Lateral Sclerosis (ALS) also known as motor neuron disease. All participants preferred the SEIQOL tool over traditional measure.

The quality of life perceived by patients was significantly higher in the SEIQOL group than the SF-36 group and it was higher than that reported on the Sickness Impact Profile scale on all three visits. Only 50% of patients listed health as an important cue on the SEIQOL while 100% listed family as an important cue. The SEIQOL seemed to tell more about the patient as an individual and his values.

People with ALS experience severe declining health problems. The participants health related quality of life scores correlated in a linear trajectory with the objective health measures presented and which could be seen in the patient. The greater the clinical decline, the poorer the health related quality of life. Therefore it is not surprising that the Sickness Impact Profile questionnaire induced more emotional distress on the patients than SEIQOL as it focuses on the negatives that are occurring within this group and as such, health related questionnaire could be considered as an inadequate and inconsiderate choice of instrument to use in such a population.

4.2 Imposed Judgments versus Individual Judgment

Donnelly (2000) conducted a literature review of the Quality of Life Instruments used in the measurement of Quality of Life of patients in the palliative setting and found that many Quality of Life questionnaires have predetermined questions, custom made to assess specific aspects of life (physical functioning, emotional state etc) with each question having a fixed weight or value. She suggests that , similar to concerns identified by Neurdert et al (2001), these may not be of any relevance to the individual .This is because the questionnaires measuring quality of life are often created with the disease or problem in mind with Prince and Gerber (2001)suggesting that these questions typically comprise of domains derived

from the personal judgement of the person who created the questionnaire or the questions may be generated on foot of results of surveys or from review of literature.

The aggregation of Quality of Life information from a grouped population goes against the very thesis of patient centered care, decision making and patient autonomy. It can be said that these predefined questionnaires are contaminated with the views and values of others and impose a finite number of life domains applicable to the quality of life of the individual. As a consequence, the measure may be missing out on issues of relevance to the individual (D Waldron et al. 1999) which, in essence, removes the individuality from the individual. Plagnol (2010) concurs, suggesting that objective indicators that measure wellbeing were in fact created by a person- someone who first believed that those indicators were valuable indicators and as such, one can postulate that the 'objective indicators' are not truly objective and accordingly the reliability of that data would be compromised. Quality of Life is a highly individual concept and is phenomenological in nature (Mannion et al (2003), Mannion et al.(2012) Higginson & Carr (2001)) and as such the measurement of quality of life should not be driven by the suppositions of others but should be driven by internal values of which only the individual can assert.

4.3 Can We Rely On Our Nearest And Dearest To Be Proxy Players?

4.3.1 Clinician assumptions

Clinicians and family members alike often assume that through caring for the patient, they know how the patient feels and what is important to them. Empirical research shows that physicians are highly inaccurate at predicting the goals and preferences of patients ((D Waldron et al. 1999)(Percy et al. 2008),(Moulton & King 2010)).This is clearly demonstrated by Waldron et al (1999) who report in detail, the challenges associated with proxy Quality of Life ratings and who indicates that clinicians are more likely to use physiological indicators and symptom rating as a measure of quality of life. The results of their study of terminally ill patients demonstrated that doctors were not good proxy assessors of patients. Nurses were also inaccurate but not to the same extent as doctors. Both health care professionals persistently underrated the patients' quality of life. Findings from their study indicated that there was a significant difference in the doctor's perception of the patient's quality of life score compared to the quality of life score rated by the patient

themselves. Waldron (1999) reports that patients had heightened awareness of quality of life in the face of adversary with physicians often making end of life decisions when caring for patients nearing the end of life without being entirely cognisant of the patients true wishes or aspirations. Judgments and choices, whether from a patient or physician, vary amongst all beings and that is what characterises and defines each as individual.

This disparity between patient and clinician values and preferences is also demonstrable in research conducted by Percy et al (2008) who set out to assess the ability of clinicians and caregivers to make proxy judgements on behalf of 47 patients who were newly diagnosed with prostate cancer. The instruments used were FACT P, SEIQoL and overall quality of life Visual Analogue Scale. 47 patients and 25 partners of those patients completed the assessments. The clinicians completed the questionnaires immediately after the patient consultation.

The population under study by Percy et al (2008) were patients with early stage prostate cancer so values of both the patient and partner might be more convergent than it might be if the patients were terminally ill where family members might not have come to terms with letting go of their loved one and the patient might be resigned and accepting of the fact that the end is near. In Percys study, the clinicians listed survival as being most important to the patients' quality of life, where none of the patients surveyed mentioned survival. In this cohort of patients, only 2 patients had mentioned health as an important domain and the clinician had thought it would be a primary concern for 12 of the patients. The doctors had also expressed over emphasis on the post operative complications on symptoms and underestimated the importance of daily things such as family and home.

It is probable that this is a reflection of their concern based on their knowledge of the long term impact of the symptoms associated with prostate cancer. Percy suggests that the patients may not be unaware of the long term implications and consequences of the risks of surgery and may not be focused on the potential complications as they may also be experiencing a sense of relief to be alive.

It is not surprising that clinicians focus more on health as this is their area of interest and in the clinical setting, patients health should be foremost in the clinicians mind but perhaps it should not only be the only thing foremost in their mind. Percy et al (2008) suggest that

urology surgeons wouldn't have had a long relationship with the patient prior to this surgery, unlike oncologists, who maybe treating the patients over a longer period of time through adjuvant, metastatic and palliative setting which will allow them to build up a relationship with the patient. The authors suggest that greater attention should be give to discussion between doctors and patients and also postulates that as the nursing staff and advanced nurse practitioners spend more time with the patients , they might therefore be better positioned to accurately measure the patients quality of life.

4.3.2 Family member assumptions

It was reassuring to see concurrence of SEIQOL results between the patient and the caregivers in terms of identification of quality of life concerns in both domain rating and weighting .The overall global score as judged by the patient and the caregiver were very nearly identical. However, unlike the findings in Pearcys' study, disparity amongst caregivers and patients was demonstrated in work conducted by Kelly-Campbell & Atcherson (2012) who looked at the quality of life of hearing impaired individuals and their partners. There appeared to be differences in perception of overall quality of life amongst partners thus highlighting that partners may not necessarily be good proxy's for quality of life assessments.

4.4 Why choose to use SEIQoL in the clinical setting

4.4.1 Individual values

Waldron et al (1999) study demonstrated the variability of the individual in what is important to each person alone .The Individual quality of life allows the individual the discretion to select domains most important to them. Life domains such as leisure, family and work are predominantly elicited as significant more often by patients than by a healthy population(LeVasseur et al. 2005) (O'Boyle et al. 1992)(McGee et al. 1991)(Lhussier et al. 2005).Higginson & Carr (2001) highlight that, when measuring quality of life, it is impossible to capture all things important to a person but if the person is allowed to identify things of importance then the measurement will certainly be individual and tailored. This is supported by Donnelly (2000)who suggests that patient self assessment also offers the element of effortlessness, simplicity and frankness and thus suggesting that simple approach is important for patients with advanced cancer.

The Schedule for the Evaluation of Individual Quality of Life (SEIQoL) is a phenomenological approach to the measurement of quality of life, in which the terms of reference are determined by the individual (O'Boyle 1994). The SEIQoL was developed based on the premise that quality of life is individual in nature and that a person judges it on the basis of his or her evaluation on how they are doing in a number of salient life areas (O'Boyle 1994) (O'Boyle et al. 1992) (McGee et al. 1991).

The measure was designed to detect individual problems and facilitate decision making process between the physician and the patient (Higginson & Carr 2001). SEIQoL answer three questions about an individual's quality of life: (i) what areas of life are important to the respondent (cues)- elicited by means of a structured interview (ii) how the individual is currently doing in each of these areas (levels) measured on a visual analogue scale; (iii) what is the relative importance of each of these areas (weights) by using a technique called judgement analysis. Higginson and Carr (2001) highlight that the degree of priority identified by the patient will allow the clinicians to focus more on the more pertinent issue for the patient. Judgement analysis is a research method often used in studies of judgement and decision making and externalises the manner in which a person makes a judgement or decision and therefore validates those relationship and true degree of importance. Its goal is to quantify relationship between the judgement and the information used to make that judgement.

CHAPTER 5

5 Using Quality Of Life in the Clinical Setting

There has been a significant number of quality of life studies conducted measuring the quality of life of patients. The aims of these studies are varied, such as evaluating new quality of life tools (Chambers et al 1982), identifying the impact of therapies on the quality of life of different populations (Fallowfield et al. 2001), measuring the QOL of patients in different populations following interventions (Angstman et al. 2009), defining Quality of Life (Hunt 1997) and informing policy makers on patient needs. While there is increasing demands to include the patient in decision making and to include patient reported outcomes in clinical care, it isn't something that has been widely translated into daily clinical practice. As such, there is a need for a change of mind set and attitude toward its use. Change can only be effected when there is an understanding of what needs to be changed and also understanding the mechanism on how to make the change and understand the reason behind the results of that change.

The way quality of life measures are implemented may influence the outcome and determine the measure of its success. Education of the clinical team alone will not be enough to ensure success and this may need to be supported with other interventions such as guidelines.

A review of the literature has identified a number of barriers which inhibit the use of quality of life information in the clinical setting and as suggested by Greenhalgh & Meadows,(1999) these can be categorized as attitudinal and methodological barriers.

5.1 Benefits of Using Quality of Life Measurements in the Clinical Setting.

Very few studies have been conducted to evaluate the actual benefit of using quality of life information in clinical practice and in clinical decision making, (Detmar et al. 2002) (Velikova et al. 2004), (Higginson & Alison J Carr 2001) but in those that have been conducted, the benefits to using quality of life measures in routine practice is well demonstrated. Higginson and Carr (2001) identify eight uses for quality of life measures in practice. These are

1. to facilitate communication
2. Identify patient problems
3. identify patient preferences
4. monitor patient changes
5. monitor response to treatment
6. train new staff
7. use in clinical audit
8. Use for clinical governance.

These are supported through out the literature with some elaboration as follows:

5.1.1 Improves patient wellbeing

Velikova et al. (2004) conducted a randomized prospective trial to examine the benefits of repeated measurements of health related quality of life on well being and process measures of patients receiving chemotherapy in a Leeds Hospital in the UK. This was a three arm study; Group 1, the intervention group, completed a QoL questionnaire results which were fed back to physician, Group 2, the attention control group where the patients completed QoL questionnaire and results were not reported to the physician and finally group 3, controls who did not complete any questionnaire.

EORTC QLQ C30, HADS and FACT G measurement tools were used. 288 participants were randomly selected from the oncology clinic and randomly assigned to a study group. Baseline data was collected and participants completed the questionnaires during their clinic visits over the next 6 months. Results of questionnaires from the intervention group were printed in graphical format prior to the patient consultation with the doctor.

The doctors were educated with regard to reviewing the results and consultation visits were audio taped. Actions were coded into medical and non medical actions. The attrition rate for responses over time was 35-46% across groups- the baseline score was lower for those that discontinued than patients who had completed the study. 28 physicians working in the unit participated (6 consultants and 22 registrars).

Results showed an improvement in wellbeing in the intervention arm versus control arm ($p=0.006$) but not in the attention control versus control ($p=0.8$). HR QOL showed an

improvement in the intervention arm versus control arm ($p=0.01$). There was also an improvement in emotional wellbeing in the intervention arm versus control arm ($p=0.008$) but not in the attention control versus control ($p=0.43$). There was no difference in social or family wellbeing. Overall patients who were on the intervention arm had a more meaningful improvement in their quality of life.

There was more EORTC QLQ c30 specific symptoms reported by patients in the intervention arm which may indicate that this tool prompts people to talk about these specific symptoms, however there was no greater number of *other* symptoms reported which may suggest that the HRQoL questionnaires may be leading or prescriptive in nature. Along with the increased number of symptoms reported by the intervention group, there was also an improvement in the discussion surrounding symptoms and an improvement in HRQoL albeit, not quite reaching the criteria for significance. The authors suggest that using the HRQoL information may be important for patient outcomes. This may be because, despite there being no greater increase in changes in the plan of care compared to the control arm, the process facilitated discussion about patient symptoms and opened the channels of communication between the patient and physician. Velikova et al (2004) also found that physician communication regarding Quality of Life in the control group improved as the study progressed – suggesting that physicians may have been sensitized over the passage of time due to continued exposure to QoL concept.

Overall, physicians expressed satisfaction and a degree of usefulness of information in 71% of cases. The discussion of the QOL information did not prolong the consultation period and in this era of necessity of increased efficiency and greater number of patients attending clinics, then is a positive outcome given that the patients whose QOL was discussed had an overall greater sense of wellbeing.

5.1.2 Aides patient-physician communication

Quality of life measurements have emerged as an important variable for appraising the quality and outcome of provided health care (Moons et al. 2004). Greenhalgh & Meadows (1999) reviewed the literature with the aim to determine what evidence exists to support the use of quality of life information in the clinical setting. The authors found that there was improved communications between the patient and clinician reported in greater than 25 % of

the studies reviewed .They found that it informs clinicians on aspects of the persons wellbeing which will enable the clinician to treat problems. 4 out of 7 studies reviewed by the researchers showed that the use of QOL measurements in the clinical setting detected higher psycho-social problems and 2 out of 6 studies showed increased referral rates to other professionals, while 2 out of 10 studies showed changes in treatment plan in the intervention groups. 1 out of 7 studies indicated patients had improved mental functioning and lesser anxiety symptoms and improved functional status. Quality of life measurements allows for the opportunity for greater interaction between the patient and clinician and promotes shared decision making as clinicians and patients sometimes have different priorities Joint decision leads to a greater degree of satisfaction with the care and service and ultimately may improve treatment compliance.

5.1.3 Provides insight into patient functioning:

Because patients differ in their individual goals then it must be appreciated that coping styles, existing supports, medical needs and interaction with providers may vary as well. Yabroff et al.(2004)hypothesize that physicians may not detect psychological distress such as anxiety and depression and they may relate symptoms of depression such as poor sleep and loss of appetite to the side effects of treatment. The researchers cite a study where only 13% of patients were accurately identified as depressed. Studies also have found that quality of life information fosters relationship between the physician and patient thereby allowing for greater insight into patient functioning and thus can be used to help make decisions on patient care (Velikova et al.(2004), Higginson and Carr (2001).

Detmar et al. (2002) conducted a prospective randomized study to evaluate the efficacy of quality of life information in facilitating communication between consecutive patients receiving palliative chemotherapy across disease groups and 10 physicians in an outpatient clinic of a cancer treatment centre in Amsterdam. 273 Patients were randomized to either the control or intervention arm of the study. Patients in the intervention arm completed the EORTC QLQ-C30 quality of life questionnaires upon attending the outpatient clinic over 4 time points .This information was then converted into graphical format and given to both the patient and the doctor prior to consultation with the doctor. The study was cross over in design in that mid way through the study, each doctor crossed over from control to intervention arm and vice versa , thereby allowing each doctor to serve as their own control.

Each patient/physician consultation was audio taped and a number of other questionnaires were completed (Dartmouth primary care cooperative information functional health assessment and the world organization project of national colleges and academics, SF 36) and data was gleaned from the medical records regarding interventions and medications prescribed.

Statistical analysis revealed that while there was no significant difference between quality of life information communication between groups or patient management (0.6) there was a significant difference between groups in a positive direction toward the intervention group in physician recognition of moderate to severe problems, social functioning, mental health (43% v 30%), role functioning (22% v 11%) and emotional support received by the intervention group.

There was no significant difference between groups in the time the doctors spent in consultation with their patients (average 19 -20 minutes per consultation)-this indicates that there was minimal physician bias which adds to the reliability of the findings.

In this study, 87% of the patients thought that the QOL assessment would be beneficial to introduce as a measure of routine practice while 100% of the doctors found the patient QOL report beneficial but thought it would be better if it was tailored to indicate the specific individual problem. In general the findings indicate that although there wasn't any direct improvement in communication directly about QoL , the study does show that there is improvement in some aspects of functioning that would impact the quality of life of the patient and there was a greater overall degree of satisfaction in the intervention group regarding the awareness expressed by the physician on differing aspects of their functioning be it emotional or physical.

The authors acknowledge a limitation of their study suggesting there may be contamination with the cross-over design as there was a higher frequency of discussion surrounding quality of life in patients who were initially randomized to intervention and then crossed over to control compared with those who were initially randomized to control and then crossed over to intervention .It would be important to remember if using a cross over design methodology to first enroll patients onto the control arm and then cross over onto the intervention arm.

5.1.4 Training of staff

Higginson and Carr (2001) mention that use of quality of life measurements in the clinical setting is beneficial for training staff as training in this area of medicine is lacking. These assessments may help a physician appreciate the multifaceted dimensions of the patient care in their endeavors to provide total/ holistic care of the patient and in the decisions surrounding the management of that patient and what concerns to prioritize. Having this information to hand may also help clinicians be more efficient as they can focus on and address the issues directly.

5.2 Potential Challenges Associated With Using of Quality of Life Information in the Clinical Setting

5.2.1 Attitudinal challenges

Belief that Quality of Life Measures is of no value.

Greenhalgh & Meadows (1999) highlight that there is limited evidence to support the thesis that quality of life information in the clinical setting improves patient outcomes but as Greenhalgh et al. (2005) points out that while some quality of life studies inform on the usefulness of quality of life information in the clinical setting, many do not demonstrate the actual mechanism of action or explain the reasons for the outcome. They caution that if the results of quality of life information and patient reported outcome is negative, there may be an inaccurate assumption that the intervention itself (i.e. the quality of life intervention) is ineffective.

While there isn't many negative outcome reports about the use of quality of life information in the clinical setting, Chan et al. (2011) conducted a randomized controlled study of lone mothers with anxiety in Inner City Dublin. The intervention group was allowed to actively participate in the consultation process with the multidisciplinary team versus the standard of care group who received standard of care referral to the multidisciplinary care team. The SEIQOL tool was used at three time points to assess their quality of life. The study found that the intervention group was more depressed after 6 months. It was thought that this was possibly due to the mothers in the intervention group focusing more on their psycho-social

problems with the multidisciplinary team than the standard of care group who did not attend any multidisciplinary care meetings.

Greenhalgh & Meadows (1999) suggest that in many cases, there is an attempt to blame the study design or the hypothesis for the negative outcome whereas, in fact, there may be a number of co variables which might have contributed to the outcome. Following their review of the literature, they attempted to isolate these co-variables and through this, they determined that many of these co-variables associated with quality of life information are synonymous with the complexity of human life, disease and human intervention. They found a number of assumptions were implied within the study design which may not be always accurate such as the assumptions that (a) all patients wished to talk about their quality of life, (b) doctors would discuss the quality of life issues and results of the assessment, (c) clinicians view quality of life information as clinically important, (d) clinicians could readily interpret the results, (e) the assessment tool correctly captured the patients quality of life concerns, (f) clinicians would find it appropriate for patients to discuss quality of life issues with them- the authors cited a number of studies that would support the wide variability and inaccuracy of such assumptions. For example, Detmar et al (2000) found that only 60% of clinicians thought it was necessary to include emotional and daily functioning into their patient physician consultation.

Other variables that may influence the use of quality of life outcome measurements in the clinical setting may be:

1. Interpretation of the results may be unclear
2. There may be little confidence in the measurement tool to capture the result
3. There may be no confidence that the information is useful
4. Patients may not wish to discuss quality of life issues
5. The floor and ceiling effect may explain of efficacy of intervention in some instances.
The floor / ceiling effect occurs where for example in a stable healthy population the ability to change or improve health cannot improve further

5.2.2 Limited allocation of resources

The repeated exposure of mass media messages to heighten prevention awareness is effective in heightening public fear of getting cancer and as such resources are directed toward improving survival outcomes and disease prevention. Attitude to quality of life measurements in the clinical setting is not a priority particularly in the current economic climate where there is limited availability of resources both in terms of human cost and time needed to conduct quality of life assessments in the very busy clinic or hospital setting and also the cost of the actual measurement tools needs to be considered.

5.2.3 Clinician attitudes toward quality of life measurements

Within the acute health care setting, quality of life issues are often considered to be the concern of the palliative care team or end of life care team. Yabroff et al. (2004) postulate that many physicians may be reluctant to admit 'failure' to eliminate disease and may also feel ill prepared to set goals specific to quality of life issues which would be valuable to the patient. As a result, the lack of clarity may lead to confusion for patients who are nearing the end of life and so they might overestimate their prognosis. Higginson and Carr (2001) also support this premise, suggesting that introducing individual measurements may mislead the patient into thinking that all his individual needs will be worked on and as a clinician; it would be unethical as it might give some false hope.

Health Related quality of life measurements contribute greatly to identifying physical and psychological problems but may not be able to address the overall wellbeing of the patient (Velikova et al. 2004). Accordingly this may lead to an element of reluctance to incorporate quality of life care by the clinician due to fear of not being able to intervene constructively if the patient describes a concern that he, the clinician, may be limited in addressing such as financial needs or practical assistance. The clinician may also be concerned as to the boundary of information he should know about the patient and may feel ethically compelled not to cross this boundary in daily practice. Misunderstanding can be avoided by informing the patient at the onset that it may not be possible to meet some of his individual needs.

Greenhagh and Meadows (1999) also mention that clinicians may fear their colleagues comparing performance scores which may lead to reluctance incorporating quality of life

measurements in clinical practice. Quality of life should not be a sphere considered only by the palliative care team- it should be part of daily patient management and the total care package. Improvement in quality of life care will depend on reconciliation of philosophies of care from traditionalist medical model to the patient centered model. Objectives of both schools should coexist throughout the entire process. To do so, then good communication amongst providers is critical.

5.2.4 Resistance to change

All of the points detailed above are important if quality of life outcome measurements are to be used as a clinical tool in the clinical setting. Incorporating quality of life measurements will also pose a particular challenge within the team in terms of education and change of practice and time taken to incorporate these requirements.

Change of practice is sometimes a challenge and needs to be handled well in order to succeed. Implementing change in practice needs to be applied under the framework of evidenced based practice (Greenhalgh & Meadows 1999). To facilitate the process and encourage change of attitude and use of the tool, information and education must be provided to the clinical team regarding the change itself, the tool, how to use the tool and how to use the quality of life information derived from this tool.

Greenhalgh and Meadows (1999) in their review of 13 studies found that clinicians showed a positive attitude toward using quality of life measurements in the clinical practice. Clinicians also found the information accurate. Patients also demonstrated a willingness to complete measures. 4 of the 13 studies were inclusive of the physician actually using the quality of life information. All clinicians in the 4 studies used the information in their management of the patients.

5.2.5 Methodological Challenge

Selecting the correct tool

Challenges in tool selection were discussed in detail in an earlier chapter. Selecting the correct measurement tool poses a particular challenge for clinicians particularly for those who work within a multidisciplinary team setting where consensus about using that single tool is

critical. The team caring for the patient needs to know how to use the tool and understand its outputs and agree to use it. The myriad of measurement tools available to measure quality of life also makes it more difficult to select the correct tool that demonstrates the ability to measure change. In some studies, quality of life information is taken and presented on one single time point which does not reflect clinical management of a patient. The measurement must be relevant to the patient population and feedback of the information must not only be to the physicians but feedback is necessary to all the relevant members of the team and to the patient. It is also important for the clinical team to incorporate methods to maximize the usefulness of quality of life information in clinical practice which should include; relating the information to specific clinic visits and sharing the information with all relevant clinicians, gps and patients alike; providing guidelines and aides to clinicians to facilitate the interpretation of results; define specific measurable outcome from the outset so that their effectiveness or otherwise can be readily observed(use of the SMART framework could be applied when setting these outcomes); tool must be relevant to meet the joint needs of both the patient and clinician and the user must also be happy to disclose information regarding his quality of life information. The frequency of measurement of quality of life must also be considered as at present there is no standard frequency. Along with this, the complexity of the concept of response shift will come to the fore- but as quality of life for the person is based on the present, quality of life measurements and information should be addressed accordingly. Assessment should be designed in a way that mirrors the way decisions are made in clinical practice, i.e. over the course of time.

If studies are being conducted, then randomized controlled trials would minimize the risk of selection bias. Concealed methods of randomization have a greater reliability than using open randomization methods where investigator bias could occur and randomization of the clinicians would have greater reliability than randomizing the patients. When patients are randomized there is a risk of contamination due to the patient expectation and clinical behavior. The study must also be adequately powered to determine the differences between intervention and control arm and also to ensure the generalisability of findings.

Interpreting the scores / results of quality of life assessment and translating those scores into usable material is also a challenge. This must be easy to record and must be presented in a format that is readily accessible and easily understood.

CHAPTER 6

6 Response Shift**6.1 Adapting to Changing Circumstances in Life.**

Quality of life is a dynamic construct .When an individual is faced with a crisis, events occur which enables him to adapt and cope. This adaptation process occurs at the time when the individual finds a difference between his current state and his goals. In an effort to reduce the discrepancy he must (a) either change his current state or (b) move the goal. In other words something must change to help him cope (Dempster et al. 2010). These life challenges prompts the person to adapt via a ‘discrepancy feedback loop’ in which he essentially identifies the discrepancy and makes measures to reduce the discrepancy by changing himself or changing the causative factor.

This adaption process is commonly observed in people who live with chronic illness and the concept is not foreign to oncologists who witness patients experience a sense of adaptation when it is not possible to improve their clinical state.(Waldron et al. 1999)(O’Boyle & Waldron 1997) . Areas of life which were previously meaningful to an individual shift through a process of adaptation and as Waldron et al (1999) suggests, the individuals internal frame of reference appears to recalibrate .It is this process of psychological adaptation that enables the person to cope and maintain good quality of life, even in the face of adversity.

This process of adaption is known as ‘intra subject construct dynamism’ also known as ‘response shift’ which Sprangers & Schwartz (1999) describe as a complex, multifaceted and dynamic reality of patient adaptation to illness .

Dempster et al (2010) describes the response shift phenomena as a recalibration or change in ones internal standards of measurement *and/or* a reprioritisation or change in the degree of importance *and/or* a re-conceptualisation or a change in the meaning of a particular life domain.

6.2 How does Response Shift Occur

Golembiewski et al. (1976) describe three types of change characterised as *Alpha*, *Beta* and *Gamma*. *Alpha*, change describes "the conventional concept of change. One assumes the construct under assessment is stable. An example of this is changing haemoglobin levels in a particular relevant condition." In this state haemoglobin remains haemoglobin, it's calibrated measurement continuum is constant and the condition being researched is constant (Allison et al. 1997). *Beta* change describes "a variation in the level of some state, complicated by the fact that after some interval the measurement continuum associated with the constant conceptual domain has been recalibrated" (Allison et al. 1997). An example of *beta change* is altering pain thresholds influencing the perceived and measured intensity of pain. *Gamma* change involves a redefinition or reconceptualisation of some domain, "a major change in the perspective or frame of reference within which phenomena are perceived and classified, in what is taken to be relevant in some slice of reality" (Allison et al. 1997). *Gamma* change could be applied to quality of life appreciation, the issues (cues) contributing to an individual's evaluation of his/her quality of life may not be constant, the relative importance of these issues (relative weights) may change and in addition the actual baseline perception of the level of quality of life itself may change. In essence an 'internal paradigm shift' in quality of life appreciation could occur. This profound form of hypothesised change could potentially confound the evaluation of longitudinal quality of life assessment unless accounted for (Sprangers 1996).

Wilson (1999) acknowledges the difficulties, challenges and importance of the phenomena of response shift and suggests that there is a growing interest in the challenges of measuring change in values of individuals and describes more simply the types of changes that occur (1) alpha being true behavioural change – the person develops new coping skills and (2) beta change meaning recalibration – where the person reassesses the weight of importance (3) gamma change which means redefining the values which gives it a different meaning.

When aiming to see the impact of change, it is necessary to see if the change has truly occurred and in clinical care and medicine, response shift is operationally difficult to establish.

6.3 Measuring Response Shift in the Clinical Setting.

Response shift blurs the true longitudinal effects of treatment over time and needs to be considered with evaluating those effects. One of the key challenges associated with measuring quality of life is that the individual changes over time and as such; the measurement instrument must capture that change (Tugwell and McGowan 1996).

The authors differentiate between ‘discriminate measurement instruments’ which measures whether or not a patient has good quality of life and ‘evaluative measurement instruments’ which captures the actual value of the improvement of a patient’s quality of life. It is important to remember the response shift phenomena, especially insofar as it may serve to attenuate or to exaggerate estimates of treatment effects as patients adapt to treatment toxicities or disease progression over time (I. B. Wilson 1999).

Sprangers & Schwartz (1999) have reviewed the methods suggested for evaluating response shift. Several of the methods are protocols for adapting existing tools, whilst others are new methods designed specifically to assess response shift. The best established approach is the retrospective pre-test design.

Traditionally changes in QoL are measured by an initial (pre-test) measurement, followed by a final (post-test) measurement after a set time period. To correct for the response shift occurring over this time, Howard & Dailey (1979) proposed a retrospective pre-test, or ‘then-test’. The initial pre-test is carried out as normal, but at the time of the post-test the subject is asked to respond to each item on the self-report measure twice. First, they are asked to report how they perceive themselves to be at present (post-test). After answering each item in this manner, they answer the same item again, this time in reference to how they now perceive themselves to have been at the time of the pre-test. The assumption is that the patient will use the same criteria for the conventional post-test and the ‘then-test’ rating.

O’Boyle et al. (2000) describe how the SEIQoL can be adopted to use this technique to measure response shift. If the SEIQoL were administered on two occasions, changes in the content of the cues selected by the respondent as being most important to their QoL would represent re-conceptualisation. Changes in values would be reflected by

changes in cue weights, whether these are derived by judgement analysis or by the direct weighting method.

6.4 Examples of the Response Shift Phenomena in Different Populations

6.4.1 Response shift in patients with cancer

Rees et al.(2003) measured the effect of response shift through a series of prospective and retrospective symptom assessments in 76 patients with advanced prostate cancer and 17 controls in the United Kingdom.

All participants completed questionnaires at three time points, baseline, 3 months and 6 months. Using the 'then test' technique, the patients on reflection considered their symptoms as more bothersome and therefore improvements on some assessments appeared to increase in magnitude. The author suggests that , internally, patients experience a shift in values and priorities as they adapt to their disease and their environment and as such, comparing the pre-test (baseline) to follow up assessments may not be definitively accurate because internally the standards may not have remained constant.- in other words internal re-conceptualisation may have occurred. The then test will act as a control for this internal re-conceptualisation. It is based on the thesis that patients will measure their existing quality of life on their current feelings and so too can comparisons only be made based on current feelings.

The difference between the pre-test score and the then test score is the degree of response shift.

Rees et al (2003) study showed a significant difference between the pre and post test score and the then test and post test score. There is always a risk of bias and in this instance; the authors acknowledge that participant bias may occur if the patients, in an effort to please their doctor, rate their previous functioning lower so as to demonstrate a greater improvement following treatment.

Waldron et al (1999) highlights that, even in the case of serious illness, the expected path of deterioration of patients with cancer does not occur. Her research observed response shift in the terminally ill population shifting from a state of agitation in the lead up to death to a more peaceful ,composed and accepting state prior to dying.

Sharpe et al. (2005) studied the effects of response shift in 56 patients with metastatic disease over three time-points and found that response shift was common phenomena during adjustment to illness.

Westerman et al. (2007) aimed to determine if the data of repeated measurement were relevant to determine whether response shift occurred. They studied 21 patients with squamous cell lung cancer over 4 time points – re-conceptualisation was observed in 43% of patients and 57% experienced a value change. The researchers validated the ability of the SEIQOL DW tool to elicit changes in priorities and perspectives. The authors suggest that re-conceptualisation and value change are interwoven concepts in response shift.

6.4.2 Response shift in individuals with chronic lung disease

Claessens et al.(2000) compared a group of patients with chronic obstructive pulmonary disease (COPD) to those who had lung cancer. The predicted survival for those with COPD was 23.9 months and that of the lung cancer patient group was 3.3 months.

All patients admitted to hospital completed the SEIQol DW measurement tool. Those with COPD were admitted with an acute exacerbation of their disease and patients across both groups expressed their preference to receive comfort measures only. As time progressed and as symptoms were resolving, the patients with COPD changed their preference from being content with just comfort measures to shifting their preference to life sustaining measures.

6.4.3 Response shift in the older population

Changes in conceptualization occur with changes in life events and normal life course transitions such as retirement and aging. Thompson et al. (2012) suggests that we should be cognizant of the age related response shift phenomena amongst older people when designing studies .They found in their study that older people exhibited a healthier lifestyle than middle aged people and the authors suggest that this may be due to the response shift phenomena where individuals as they get older change their internal values with reducing external demands such as work etc. People adapt, values shift over time and accordingly Plagnol (2010) suggest these changes may not necessarily affect the persons overall wellbeing but rather may affect specific domains of life that are important to the persons wellbeing. This is

reflected by the study conducted by Scott (2009) who found that older people identified health as an important domain whereas this was mentioned less often as an important life domain in younger people.

6.4.4 Response shift in people with disability

Higginson and Carr (2001) suggest that the effects of the disability paradox make it difficult to assess the value of an intervention. The disability paradox is where people with disabilities rate their quality of life comparable to that of non-disabled people. This paradox demonstrates that people adjust over the passage of time to their situation.

6.4.5 Response shift in patients undergoing cardiac rehabilitation

Dempster et al. (2010) aimed to test if response shift occurred in cardiac rehabilitation patients using the SEIQOL DW and explore the nature of response shift and the antecedents if any to this phenomenon. 84 patients were enrolled with the aim to complete the SEIQOL DW at two time points (T1 and T2) 27 were unable to complete T2. Response shift was calculated as the QOL index Then T1

The respondents rated their then test quality of life score lower than at the time of pre- test with the mean response shift score of minus 9.56.

Findings indicate that participants retrospectively rated their functioning lower than when they rated it initially therefore indicating that a response shift phenomena occurred. As there was no change in the cues then response shift was not attributed to re-conceptualisation. Little change in weighting indicated little change in re-prioritisation. Change in rate and value suggests that the patients may have *recalibrated and* adjusted their internal standards to aid adaptation.

When comparing differences between the standard assessment measures of T1 and T2 to the then test measures, a larger effect emerged and might provide valuable insight into why it seems little or no change occurs over time in patients getting treatment.

The authors suggest that identifying the catalyst for response shift might be helpful in patient assessment. They also highlight that interviewer bias might be introduced when using the

SEIQOL DW as it requires an interviewer present. This risk is reduced by standardising instructions and training the interviewer.

6.4.6 Response shift in an edentulous population

When quality of life measurements are used, Ring et al. (2005) suggests that they often don't control for the continuous adaptation individuals make in response to their changing circumstances. Individual quality of life allows the individual the discretion to select domains most important to them and over time these areas in life, of importance to the person may change. Ring et al. conducted the first longitudinal study of 140 subjects using the SEIQOL DW tool comparing individual quality of life of edentulous patients receiving implants versus edentulous patients receiving well fitted dentures. They assessed the patients at baseline and again at 3 months following the successful dental treatment. The authors assessed the different types of response shift that could occur over the time period of three months and suggests that response shift phenomenon would alter the interpretation of results of the scores. A response shift might cause one to over or under estimate the real effect of treatment.

In their study they found that 81% of participants recalibrated and nominated at least one different cue at the 3 month time point. The weights remained the same though-out. They found that there was no significant difference between the unadjusted index score from baseline to 3 months ($p=0.33$) but found when adjusted for response shift phenomena and internal recalibration, there was a significant difference in the index score between the two time points i.e. the then test T1 and time 2 score ($p=0.016$) and also between the base line score and the then test baseline score ($p=0.001$).

The patients also changed their rating on 4 of the 5 cues nominated when the then test was administered – this indicated a significant degree of recalibration amongst the group. Similar findings occurred in the weighting of cues.

Ring suggests that the study would show no treatment effect if the results were based on the real time data of patient values collected at different time points and then compared. The results are based on the inclusion of the then test and she suggests that adequate time between tests will minimise the risk of memory recall.

The authors suggest that improved knowledge about the way patients appraise their situation might give rise to more valid and reliable measures where one can extrapolate all other factors that may have influenced the measurable outcome.

CHAPTER 7

7 Study One**7.1 Background**

Quality of life is an important aspect of medical care and maximizing the patient's quality of care is an integral objective of the health management strategy. Outcome measures commonly used in evaluation of the health are often medically and functionally based and often reflect more the concerns of the service than the user (Lhussier et al 2005). Quality of Life is a multi-dimensional population health outcome that compliments the more traditional health measures of mortality, morbidity and survival outcomes (Thompson et al 2012).

When caring for patients with cancer, there is often significant engagement and inclusion of the patient in the decision making process at the time of diagnosis and treatment planning. The focus and discussion is very often based on those traditional health outcome measures; mortality, morbidity and survival. During the course of treatment, clinical interventions may be suggested that are believed to be in the best interest of the patient. The experience of cancer however, dramatically changes the pattern of a patients concern (Campbell and White 1998). As such, the clinical focus should also change to reflect those concerns. Moons et al (2004) defines quality of life as the “degree of overall life satisfaction that is influenced by the individuals’ perception of aspects of life important to them, including matters both related and unrelated to health”. The areas of most concern to the individual will have most influence on his quality of life. The value that a person considers their quality of life to be is simply that, no more or no less.

Contrary to popular belief, patients with advancing cancer do not necessarily experience a decrease in their quality of life as demonstrated by Campbell & Whyte (1999) and Waldron et al (1999). Waldron et al. (1999) suggest however, that poorer understanding by health professionals to recognise and understand the complex nature of the individual Quality of Life may result in inappropriate medical management that does not improve the patient's quality of life and indeed may even contribute to its decline.

Identifying the specific factors that lead to improved quality of life is a challenge. SEIQoL DW provides valuable information about the patient and their priorities and values and may

facilitate clinicians in identifying whether patients are adjusting to changing health (Westerman et al 2007). It may be useful in the clinical setting to address individual patient needs (Prince and Gerben, 2001). Identification of these individual differences in patients during routine clinical practice may facilitate in contributing to the provision of a care package tailored specifically to meet the needs of the individual patient and could also bring valuable insights into the evaluation of the newly developed person centred services. Individual quality of life measure may also serve as a bridge to bring together the views of the medical disciplines, caregivers and patients. Continuous individual assessment and interaction however should occur to fully realise the shifting needs and values of the patient.

Separation of intervention effects of quality of life measurements from the adaptation mechanisms of the patient and attributing any change in quality of life status to that clinical intervention is also a challenge. Higginson and Carr (2001) suggest that the effects of the disability paradox make the attribution of value of an intervention even more difficult. The disability paradox is where people with disabilities or chronic disease rate their quality of life comparable to that of non-disabled people as they have adjusted to their health status.

Along with this challenge, there is disparity of agreement on how quality of life should be measured. The diversity of individual measurement tools is indicative of the complexity and the multidimensionality of man. Quality of life and the weight of importance of what is of concern to a person can be demonstrated using the SEIQoL and SEIQoL DW tool as this allows the individual to define what is important and of relevance to him and also allows the individual to demonstrate the measure of importance of these areas.

There is a paucity of strong evidence in the literature to validate the thesis that quality of life assessment in clinical practice will in turn lead to improvement in the overall quality of life of the patient. To observe any difference by introducing such an intervention (i.e. quality of life assessments) into practice, further research is necessary.

It is therefore proposed to conduct a study to determine if Quality of Life assessment using the SEIQoL, SEIQoL DW and EORTC QIQ-C 30 along with symptom bother measurements at multiple time points during the patient treatment, will provide the medical team with a greater global understanding of the patient status, values and needs, toward which, patient centred care can be driven and overall improvement in quality of life can be recognised. To

that end ,it is hypothesised that incorporating quality of life assessments in clinical practice and using the information as a clinical tool in the clinical setting will improve quality of life.

7.2 Aims and Objectives

The overarching aim of this study is to evaluate patient outcome following accurate reporting of quality of life measurements of the individual patient to the multidisciplinary team in an acute hospital setting and to incorporate graphical information on quality of life and symptoms when planning clinical care of the patient. The underlying hypothesis is that, knowledge of patients' perceptions of their quality of life and symptoms by the multidisciplinary team, will aid in the clinical management of the patient. It is hypothesised that the quality of life of individual patients improve if, during clinical practice, the clinical team are more aware what is important to that individual patients' quality of life and that individual quality of life assessments should be an integral part of an acute patient service. The objectives of study one are grouped into a number of categories as out lined below along with the key questions associated with those objectives:

7.2.1 Primary objectives

- 7.2.1.1 To compare quality of life outcome in patients whose perception of their quality of life is reported to the multidisciplinary team to patients whose perception of their quality of life is not reported to the multidisciplinary team
- 7.2.1.2 Examine the differences in quality of life measurements between groups

7.2.2 Secondary objectives

- 7.2.2.1 To compare quality of life measurements using different measurement instruments.
- 7.2.2.2 To observe and measure the effect of response shift on quality of life in patients with advanced cancer.
- 7.2.2.3 To examine the relationship between the demographic characteristics of a population with advanced cancer and quality of life.
- 7.2.2.4 To identify quality of life concerns of the Individual and evaluate differences or changes in outcome between groups.
- 7.2.2.5 To evaluate the psychometric properties of the SEIQol Tools
- 7.2.2.6 To examine the practicalities of quality of life measurements in the clinical setting

7.3 Study Design

This was a prospective, single blind, randomised controlled study of patients with metastatic cancer who were admitted consecutively to Galway University Hospital for treatment of their cancer with chemotherapy. Sixty-Five patients who fulfilled the eligibility criteria and who consented to participate in the study were randomly assigned to one of two study arms in a 1:1 ratio.

Intervention Arm A: Results of Schedule for the Evaluation of Individual Quality of Life (SEIQoL) measurements for each individual subject were reported to the medical oncology team in the form of an Info-graph and this was repeated at 4 time point's through-out chemotherapy treatment

Control Arm B: Schedule for the Evaluation of Individual Quality of Life (SEIQoL) measurements were obtained from the individual subjects but were not reported back to the medical oncology team.

7.4 Sample

7.4.1 Population selection

The sampling method used for this study was purposive, random sampling .Sixty five patients, with metastatic cancer who were admitted to Galway University Hospital for systemic treatment of their cancer were enrolled consecutively onto the study. All patients fulfilled the following criteria:

7.4.1.1 Inclusion Criteria

1. Oncology patients with stage four (IV) metastatic diseases.
2. Patients attending inpatients and outpatient department for the purpose of chemotherapy.
3. All patients who were fully informed and signed consent for participation in the trial.
4. All patients about to start chemotherapy for the treatment of metastatic cancer

7.4.1.2 Exclusion Criteria

1. Confused patients
2. Patients unable to communicate verbally
3. Patient who were not willingly to consent to participate in the trial

7.5 Methodology

Patients with metastatic cancer, who were scheduled for admission to Galway University Hospital, to receive chemotherapy either on an inpatient and outpatient basis during the year 2013, were identified by the clinical team and oncology liaison nurses and referred to the researcher. Following admission to the hospital, the researcher discussed the study with the patients and invited them to participate on the study. Those who consented were enrolled and randomised to either the control or intervention group. They were then asked to complete a number of Quality of Life questionnaires(*SEIQoL*, *SEIQoL DW* and *EORTC C 30*).To minimise the risk of bias, all patients remained blinded to their assigned study group. The clinical team were made aware only of the intervention group. The clinical team were not made aware of the control group.

Quality of Life measurements of sixty five patients was obtained .The quality of life measurements of the 33 patients enrolled onto the Intervention Arm A was reported to the clinical team in the form of an info graph following each patient treatment .The info-graph was placed in the patients hospital chart The quality of life assessments of the 32 subjects randomised onto the Control Arm B were not reported to the clinical team. The quality of life assessments were repeated at three to four week intervals in line with their chemotherapy regimen at three subsequent time points for all participants

7.6 Enrolment Procedures

Patients were enrolled from Galway University Hospital site only. Potential patients were identified and invited to participate in the clinical study if they appeared potentially suitable for the study. Following consent and screening and upon confirmation that they met the inclusion/exclusion criteria specified above, patients were randomised to either the control or the intervention arm. Patients enrolled onto study were assigned consecutive study numbers so as to assure confidentiality and anonymity when entering data in the database.

7.7 Randomisation Process

The main purpose of randomisation is to avoid bias by distributing the characteristics of patients that may influence outcome randomly between treatment groups so that any difference in outcome can be explained only by intervention (Torgerson & Roberts 1999). To minimise selection bias, sequence generation and allocation concealment was conducted. As the trial was small there needed to be minimal risk of any substantial differences in group sizes. Therefore random allocation was made in blocks to ensure that sizes of treatment groups remained similar throughout the study. This will ensure that at no time will the imbalance be large and at certain points the numbers of participants in each group will be equal. Arm A and B were grouped into blocks of four and as such there was six possible combinations of these blocks which were: AABB, ABAB, ABBA, BAAB, BABA, and BBAA. One of the six arrangements was selected randomly and then four participants assigned accordingly. The process was then repeated until the required sample size was achieved. The software used for randomisation allocation was 'random allocation software' version 1.0. Following generation of the randomisation list, the randomisation codes (control or case) were placed in sequence into brown envelopes in numerical order from 01 to 66. The envelopes were labelled in numerical order from 01-66 by a colleague not working on the study. Subject groups were not stratified for any reason.

7.8 Study Blinding

As the quality of life measurements were subjective patient assessments, there was a real risk of expectation influencing findings and changing the behaviour of both the clinicians and the study participants which may have biased results. Blinding was incorporated into this study in an effort to eliminate the risk of such bias. Blinding patients to the arm of study they are allocated to in a controlled trial, is particularly important when the response criteria, such as quality of life, is subjective (Day & Altman 2000). All patients in this study were blinded to their allocated study group.

Despite careful consideration of methods to blind individuals in trials, situations will invariably arise when some or all groups of individuals simply cannot be blinded due to the nature of the intervention (Karanicolas and Farrokhyar 2010). In this study, the intervention itself necessitated the clinicians reviewing the results of the quality of life assessments of the

intervention group and therefore, they were not blinded to the intervention group. However, they were blinded to the control group and were unaware what other patients in their clinic were participating in the study.

7.9 Administration of Quality of Life Assessments

All patients were interviewed by the researcher, who was not a member of the clinical team involved in active patient care, at the time of admission and prior to receiving their first cycle of chemotherapy for their cancer. This assessment was repeated at 3 to 4 weekly intervals in line with the patients' chemotherapy regime. The following measurements were taken from each subject:

7.9.1 Demographic information:

Data regarding participants' age, gender, marital status, occupation, diagnosis, extent of disease, treatment interventions to date was collected.

7.9.2 Measurement of individualised quality of life

Both the Schedule for the Evaluation for Individual Quality of Life (SEIQoL) and the shorter Evaluation for Individual Quality of Life-Direct Weighting (SEIQoL-DW) were used to assess Quality of Life

7.9.3 SEIQoL

A detailed description of SEIQoL methodology and results of previous published studies using SEIQoL are outlined in previous chapters. A summary of the background and methodology of SEIQoL is now discussed. The working definition underlying development of the SEIQoL was based on the individual's personal view of life and its quality. Quality of life was thus defined as "what the individual determines it to be" (Joyce, 1988; O'Boyle, 1992; O'Boyle et al, 1993). There are three main features proposed with this definition: 1) QoL is individual in nature, the only valid means of QoL assessment, therefore, is by self-report; 2) QoL is dynamic in nature, an individual judges their overall QoL from an assessment of level of functioning in discrete domains of life which they consider important; 3) In judging QoL, an individual evaluates each important aspect of their life in terms of its

relationship to worst and best possible states. This will be specific to each individual, resulting from the influences of a variety of factors, including experience and expectations.

Based on these propositions, the SEIQoL methodology was developed by adapting a technique known as Judgment Analysis (JA) to the task of measuring QoL. Judgment analysis is a research method based on multiple regression analysis that statistically derives an algebraic model of the process by which a given individual makes a judgment. This process is discussed in detail in chapter one. The terminology used in judgment analysis, i.e., cue, case profile, judgment task, judgment policy is also discussed in chapter one. The application of JA to quality of life is referred to as the SEIQoL. The SEIQoL is administered in a standardised semi-structured interview format as follows:

1. *Cue elicitation:* The first step involves asking the individual to name the 5 areas of life considered to be central to the quality of his/her life. These areas of importance to the patient's QoL are called *cues*. Comments made by the individual about these cues and why they were important were written down by the interviewer. The cues nominated by the individual are referred to as *elicited cues*. From this point the cues are presented in the same order, one to five for step 2 and step 3.
2. *Determining current status on each cue:* The second step of the procedure is to determine the individual's current status or functioning on each cue. In this case, respondents rate current status of each cue against a vertical visual analogue scale labelled at the upper and lower extremities by the terms "as good as could possibly be" and "as bad as could possibly be", respectively. These ratings were recorded by the interviewer in the form of a bar chart. Each bar representing current status on a single cue. The possible score range for each bar is 0.0 - 100.0.
- 3) *Assess the relative weighting of each cue using judgement analysis:* A series of 30 hypothetical cases are presented for judgment by the patient using their nominated QoL cues in each hypothetical case. The patient is asked to imagine their QoL in each provided scenario and to indicate on a horizontal visual analogue scale (VAS), how he/she would rate overall quality of life given that particular scenario. The VAS is placed just below the hypothetical scenario and is labelled at the lower end "as bad as could possibly be" and at the other end "as good as could possibly be". These cases

are randomly generated in advance and are identical for each respondent. Each case is labelled using the 5 cues previously nominated by the individual and their cues are placed under the bar charts in the order one to five as they were initially presented by the patient in step 1. A total of 30 cases are presented. Ten cases are repeat cases included to allow estimation of internal reliability.

The relative weight assigned by the individual to each cue is calculated with multiple regression analysis using a statistics package developed for the purpose (Policy PC 1986). The value given to each hypothetical scenario is recorded by the VAS and can range from 0 to 100. Each value is recorded in the Policy PC programme with the correlating bar chart values (also from 0 to 100). From this the relative weight of each elicited cue is calculated. This package also computes an R^2 statistic which indicates the amount of variance in overall quality of life judgments explained by the 5 cues used (internal validity). R^2 values of 0.7 or greater is considered acceptable in the context of quality of life measurement (Stewart 1988). The R^2 statistic provides an estimate of the internal validity of the JA task. Internal validity is a measure of the variation in a person's judgement. A high internal validity score indicates less variance in judgments, thus suggesting that the cues nominated by the person really do matter to their QoL. Internal reliability is calculated by correlating the 10 repeat case judgments. Thus, it is possible to assess how well the particular judgment policy models the individual's assessment of quality of life (R^2) and how reliably the individual uses this policy (r).

It is possible to derive a single index from the SEIQoL data, referred to as a global quality of life score. This is calculated by multiplying each cue level of functioning by the corresponding cue weight and summing the products across the 5 cues:

$$\text{QoL} = \sum (\text{levels} \times \text{weights})$$

The global quality of life score can thus range from 0 to 100. As it is a continuous measure, it can be analyzed using parametric statistical analyses.

7.9.4 SEIQoL-DW

SEIQoL-DW involves step one and two as outlined above for SEIQoL. The weighting process is a simpler one than JA. Its validation and research application to date is discussed in earlier chapters.

The Direct Weighting procedure comprises a pie-chart containing five individually coloured segments (DISK) representing the five life areas (cues) nominated by the individual as important to quality of life. The pie chart consists of five interlocking, coloured disks that can be revolved around a central point to vary the proportion of the pie chart displayed by each colour (life area). The disk in its totality represents 100%.

The DISK is presented to the patient, labelled with the cues the patient nominated. The patient is presented the pie-chart with equal space allocated to each colour / cue (Figure 2). The patient is asked to give greater space to cues of most relative importance and less space to areas with less relative importance to the other cues. The coloured segments can be adjusted and re-adjusted by the individual concerned until the individual is satisfied that the proportion of the pie chart given to each life area accurately reflects their perception of the relative importance (weights) of each of these areas in their contribution to their overall QoL. This eliminates the degrees of freedom problem inherent in a pencil and paper pie-chart, where the proportion of the pie remaining diminishes each time a domain is weighted

The coloured disks displays markings from 0 to 100 and the relative size of each colour (quality of life area) can be read. The percentage of each weight is presented from 0-100 and weights are all calculated to add to 100%.

It is possible to derive a single index from the SEIQoL-DW data as above described for SEIQoL. Completing SEIQoL first could have an influence on the result of weighting using the Disk, so for this reason SEIQoL –DW was completed by the patient before completing the SEIQoL.

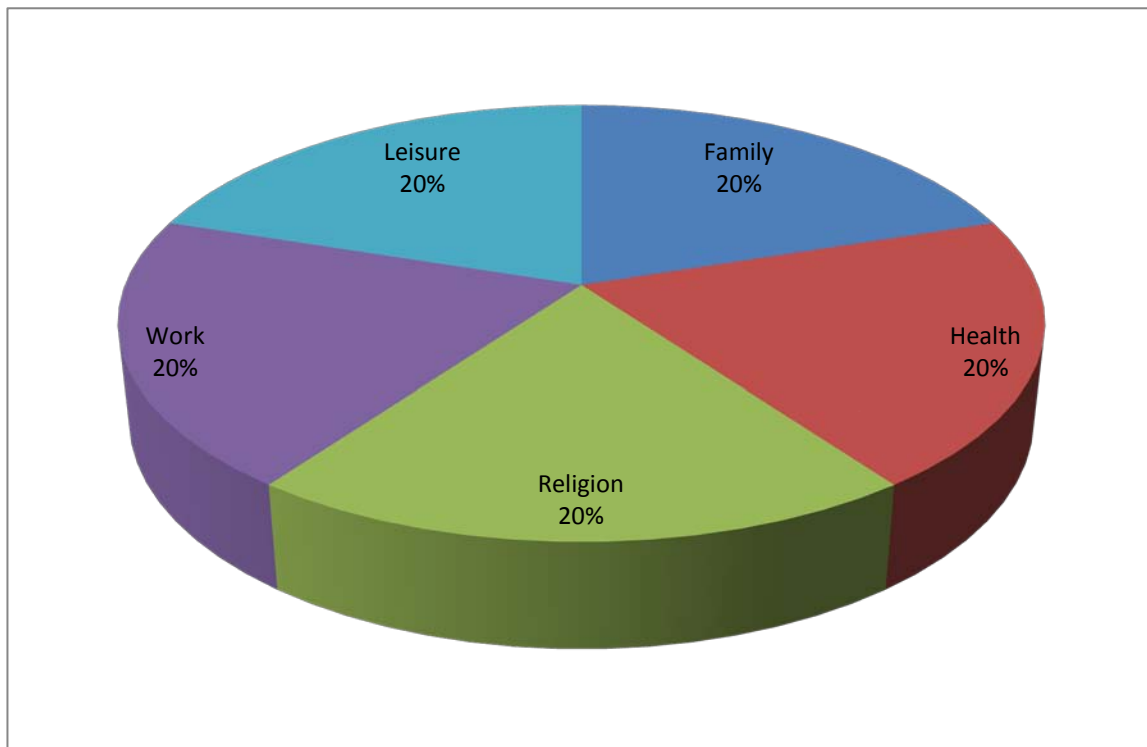


Figure 3 Example of SEIQoL Disk

7.9.5 Assessment of Health Related Quality of Life - QLQ C 30

Health Related Quality of Life was assessed using the European Organisation for Research and Treatment for Cancer Quality of Life Questionnaire QLQ C 30, version 3.0, a cancer specific questionnaire composed of five functional scales (physical, role, emotional, cognitive, social) the global health status and nine symptom scales that measures, fatigue, nausea, vomiting, pain, dyspnoea, insomnia, appetite loss, constipation, diarrhoea and financial difficulties. For the functional and global QoL scales, a higher score indicates a better level of functioning.

This cancer specific HRQoL instrument has been well validated and the details of the validation of this questionnaire and studies to date in which it has been used are outlined in an earlier chapter. The questionnaire has 30 questions. These 30 questions cover three main categories, how the patient is functioning, how their overall QoL is and if they have any of the physical symptoms considered common to patients with cancer. The patient functioning

and QoL are assessed by certain questions and these questions are placed at random throughout the questionnaire. The questions covering each aspect of functioning and QoL are divided into 'scales' and these scales may be inclusive of one or more questions

There are five functional scales which include:

- Physical functioning (PF2)
- Role functioning (RF2)
- Emotional functioning (EF)
- Cognitive functioning (CF)
- Social functioning (SF)

A global health status/ QoL scale (QL2)

Symptom Scales/Items: The questionnaire includes a number of multi-item scales and single items assessing a range of physical symptoms considered common among patients with cancer. An additional single item assesses the financial impact of the disease and treatment.

- Fatigue (FA)
- Nausea and Vomiting (NV)
- Pain (PA)
- Dyspnoea (DY)
- Sleep disturbances (SL)
- Appetite loss (AP)
- Constipation (CO)
- Diarrhoea (DI)
- Financial impact (FI)

All of the scales and single-item measures range in score from 0 to 100. A high scale score represents a higher response level. Thus a high score for a functional scale represents a high / healthy level of functioning, a high score for the global health status / QoL represents a high QoL. However a high score for a symptom scale / item

represents a high level of symptoms / problems. The principle for scoring these scales is the same in all cases:

- 1 Estimate the average of the items that contribute to the scale; this is the raw score.
- 2 Use a linear transformation to standardize the raw score, so that scores range from 0 to 100; a higher score represents a higher (“better”) level of functioning, or a higher (“worse”) level of symptoms. This allows for analysis using parametric statistics.

As discussed earlier, this measure has been well validated for assessment of QoL in cancer patients.

7.9.6 Abbreviated mental score test:

It was initially planned to screen patients using the abbreviated mental test score (AMTS) to confirm ability to think abstractly as this is necessary for SEIQOL assessment. The AMTS was introduced in 1972 to rapidly assess elderly patients for the possibility of dementia. Its use in medicine have become somewhat wider, e.g. to assess for confusion and other cognitive impairment, although it has mainly been validated in the elderly. Upon application of this test on the first seven participants in this study, the researcher deemed this tool inappropriate and replaced objective assessment of mental status with brief screening for orientation to time, place and person. Therefore the AMST instrument was not used.

7.10 Data Analysis

Statistical analysis was performed using SPSS software version 20.0 (SPSS inc., Chicago IL). For the analysis of the nominated areas using the SEIQOL DW, a standard qualitative analytical approach was used. The domains described by the respondents were transcribed verbatim and the individual statements were subsequently sorted and clustered according to the common content. Each cluster was labeled according to the best description of the meaning of the statement in that cluster such as family, well-being, health etc.

Statistical analysis was performed using the software package for the SEIQoL measurements. Policy PC programme for judgement analysis information was used to analyse weights.

This gives a measure of internal validity and reliability as well as processing the relative weights of QoL cues by multiple regression analysis. This has been used for analysis of SEIQoL and SEIQoL-DW data in previous studies.

SPSS version 20 was also used to analyse all other variables.

Sample size was determined using Epi Info .The primary response is the change in QoL from t4 to baseline. Assuming that the mean change in QoL across time for those receiving the intervention is 10 points with a standard deviation of 18, a sample size of 60 is needed to have 80% power at the 5% significance level using a two –sample t test to compare the mean improvement in QoL between arms over time.

The results of QoL measures were graphed on a normal probability graph to check for normal distribution. Standard measures (t test) were used to calculate differences between means between groups and when comparing overall QoL scores within the group with QoL instruments used and with the QoL score found in the patient group completing SEIQoL. Analysis of Variance (ANOVA)and Chi squared (χ^2) test was used to estimate the significance of difference in cues nominated as relevant to QoL within this study group and in comparison with other study groups on whom SEIQoL had previously been tested (O’Boyle et al. 1992; McGee et al. 1991; Hickey et al. 1996). The measure of agreement between the QoL instruments used in this study was assessed by calculating the correlation co-efficient ; as the overall QoL scores were continuous from 0 to 100, Pearson’s R was calculated for all results.

R measures the strength of a relation between two variables not the agreement between them. A summary of each result is given after each analysis for discussion later in this thesis.

7.11 Withdrawal Criteria

Research participants were informed that they could withdraw from this study at any time if they wished to do so without having any untoward effect on their care.

7.12 Risks

Volunteering for this study involves completing quality of life questionnaires. There were no foreseen risks associated with participation in this study

7.13 Benefits

Although there was no known direct benefit to participants for taking part in this study, it was agreed that researchers will learn more about the application of subjective quality of life assessments in patients with cancer which may guide future management of patients receiving care for the diagnosis of cancer and there was the potential that the intervention would improve quality of life as hypothesised.

7.14 Ethics and Regulatory Considerations

All study procedures were conducted in line with the International Conference of Harmonisation, Good Clinical Practice Guidelines, and the Declaration of Helsinki. To conduct the study as planned, permission from the Research Ethical Committee at Galway University Hospital was required. This was sought and permission granted (appendix 1).

Permission was also sought and granted from the Hospital Management Team to conduct the study within the hospital.

7.15 Working Documents

Relevant working documents were drawn up to aide in the conduct of the study; A consent form was created in line with requirements as per ICH-GCP guidelines (appendix 2).A working protocol was used which outlined the proposed study conduct. A template info-graph was drawn up (appendix 3) and viewed by medical oncologists to affirm that the information on it could be clearly and accurately interpreted and that the info-graph was fit for purpose This template was completed with individual patient quality of life measurement data of the thirty three patients on the intervention arm at each specific time point and it was placed strategically in front of the clinical notes for the teams to review when managing the patient

7.16 Data Protection

7.16.1 Data handling and record keeping

In line with the data protection act, measures were taken to ensure data protection legislation was adhered to. All subjects were given an ID number and all data was anonymised

7.17 Indemnity

This study is non-invasive. The researcher is covered under the Clinical Indemnity Scheme for clinical staff.

7.18 RESULTS

This chapter serves to provide descriptive statistics of the variables used within the dataset. It also summarizes the results obtained from analysing the data, giving details account of the tests performed using POLICY PC and SPSS Version 20 and the significance of those findings between groups were applicable.

7.19 Subject Demographic Characteristics

7.19.1 Gender balance

A total of sixty-five (n=65) patients who had stage 4 cancer participated in this study. Gender was balanced between groups with 28 male participants and 37 female participants. Gender balance was equally distributed with no statistical different between gender balance (p=0.914).

Table 2 indicates gender and group distribution.

Table 1 Demographics: Gender

Gender				
		Gender		Total
		male	Female	
	control	14	18	32
	intervention	14	19	33
Total		28	37	65

7.19.2 Age range

From the graph below Figure 4, we can see that the age ranged from 29 to 88. The median age group was 60-69 and the modal age group was also 60-69. The age profile is equally distributed between both genders.

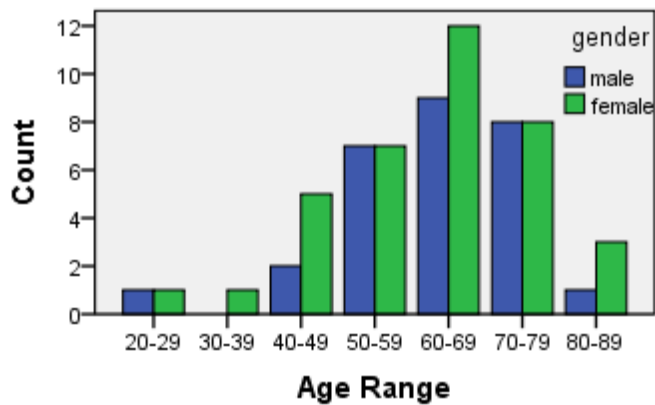


Figure 4 Demographics: Age Range

7.19.3 Marital/Partner status

Table 2 below demonstrates 89% of patients were either married or had a long term partner and/ or had children

Table 2 Demographics: Marital Status

Married +/- Children		
Status	Frequency	%
Yes	58	89.2
No	7	10.8
Total	65	100.0

7.19.4 Place of treatment

Table 3 below shows there was a total of 22 patients enrolled in study who received their chemotherapy treatment on an inpatient basis at Galway University Hospital. 43 participants received treatment on an outpatient basis in the Oncology Day Ward at Galway University Hospital.

Table 3 Demographics: Place of Treatment

Place of Treatment /Patient Admission Status		
Inpatient	22	33.8
Outpatient	43	66.2

7.19.5 Tumour type

Table 4 depicts the type of cancer across participants. The proportion of tumour types was as expected in this patient group and is reflective of the current prevalence of cancer types in Ireland for which chemotherapy is administered. The most common cancer being colon cancer, followed by breast, ovarian, lung and pancreatic.

It can be seen in Figure 5 also below that the cancers are evenly distributed across both the intervention and control groups.

Table 4: Cancer Type

Cancer Type	Frequency	Percent
Colon	21	32.3
Breast	14	21.5
Ovarian	8	12.3
Lung	5	7.7
Pancreas	5	7.7
Prostate	3	4.6
Melanoma	2	3.1
Renal	2	3.1
Oesophageal	1	1.5
Gastric	1	1.5
Osteosarcoma	1	1.5
Renal	1	1.5
Teratoma	1	1.5

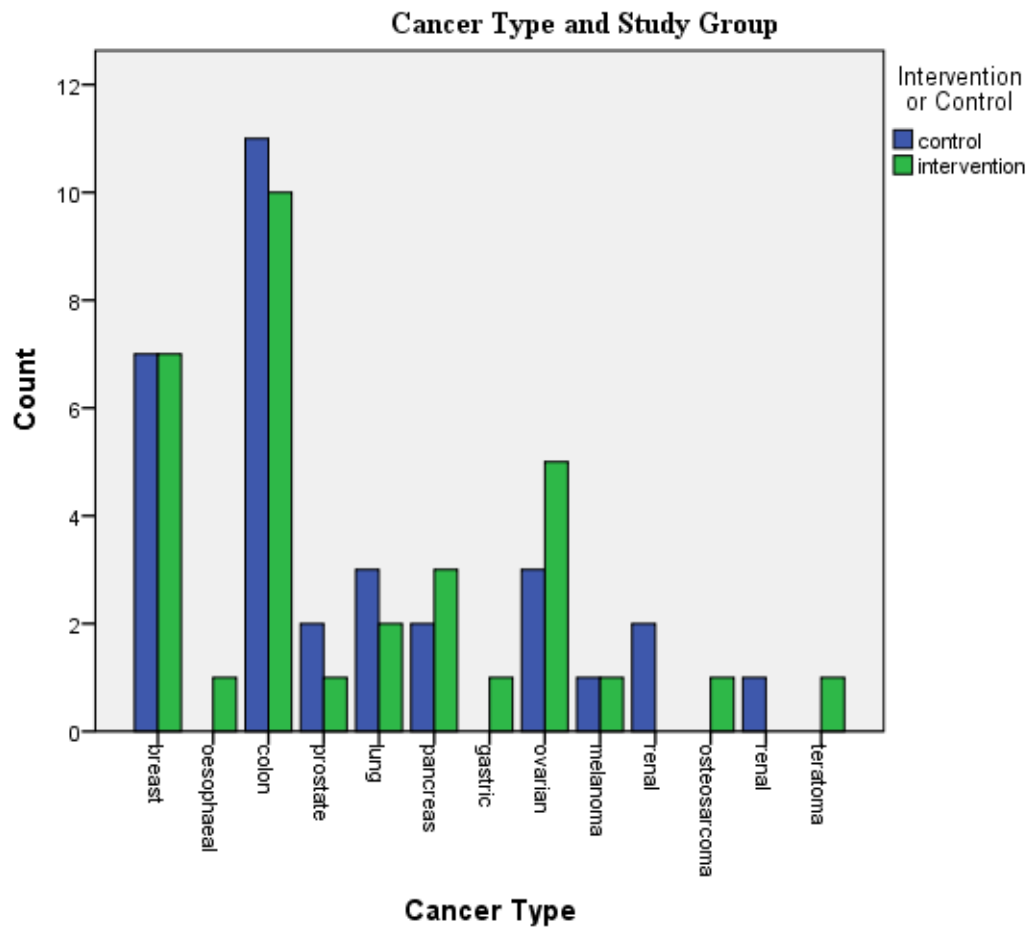


Figure 5: Cancer Type

7.19.6 Chemotherapy regimen

There were a total of 14 different chemotherapy regimens administered across all participants. The frequency of treatment regimen reflects the frequency of tumour type mentioned above with Folfiri regimen given for colon cancer representing 34 % and the next most frequently administered drug being docetaxel for the treatment of breast cancer. Table 5 and figure 6 below depicts the types of chemotherapy and the number of participants who received the drug.

Table 5 Chemotherapy Regimens

Treatment regimen		
	Frequency	Percent
Folfox/Folfiri	22	33.8
Dabrafanib	1	1.5
Liposomal doxorubicin	2	3.1
Methotrexate	1	1.5
Cepcatabine	1	1.5
Gemcitabine	8	12.3
Docetaxol	9	13.8
Cisplatin and gemcitabine	2	3.1
Carboplatin and Etoposide	2	3.1
Paclitaxel	5	7.7
THL	1	1.5
Vinorelabine	1	1.5
Ipilulimab	1	1.5
Roferon	1	1.5
Total	65	100.0

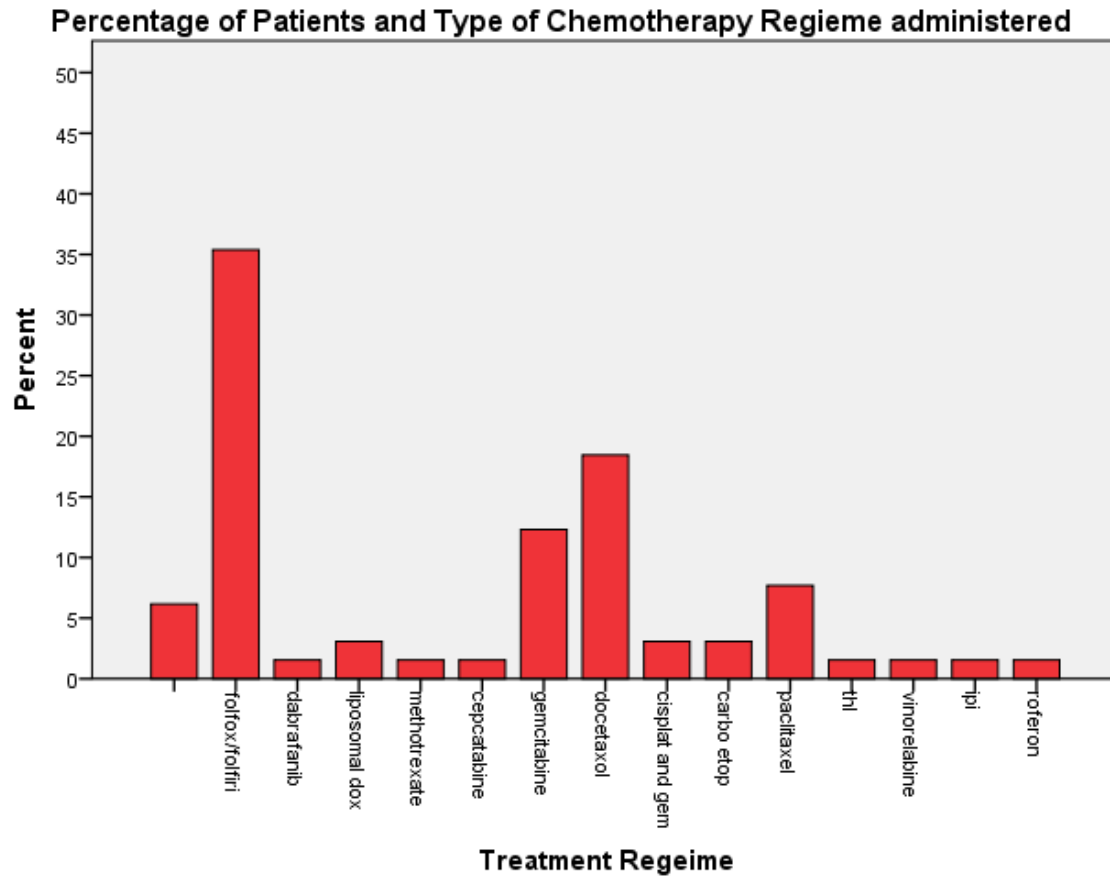


Figure 6 Chemotherapy Regimens

7.19.7 Line of treatment

Of the sixty five patients receiving chemotherapy, it can be seen on Figure 7 that 52 participants embarked on their 1st line of treatment following diagnosis of metastatic disease. 9 participants were starting their second line of treatment for their metastatic disease and 4 participants were commencing their third line of treatment for metastatic disease.

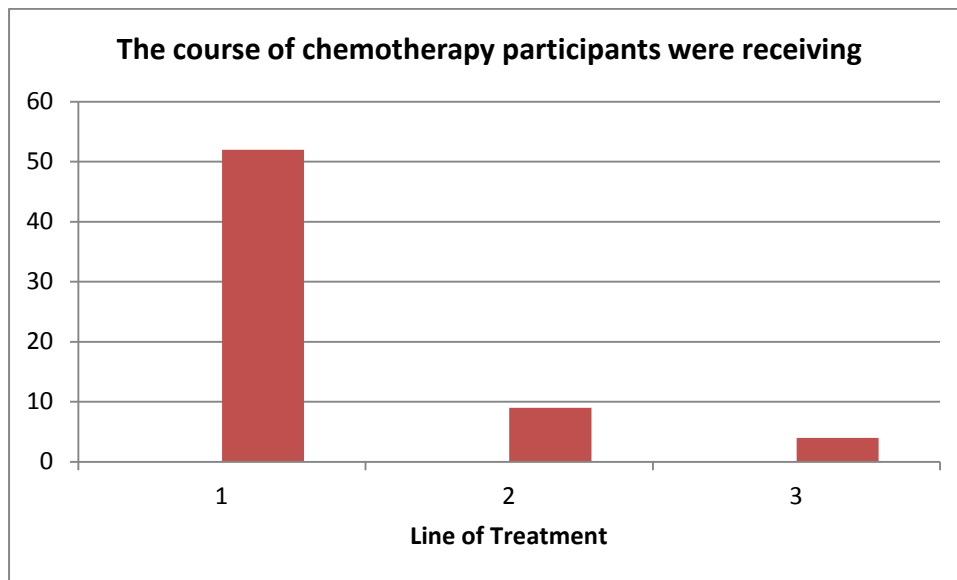


Figure 7 Line of Treatment

7.19.8 attrition

The frequency of visits to University Hospital Galway where participants attended for chemotherapy treatment and who completed Quality of Life assessments can be seen in table 6 and Figure 8 below. It can be seen that there was a high attrition rate over the six month study period which is not surprising in this population of patients with advanced cancer. 65 patients were recruited at the start of this study, 51 patients completed interview at time t (T2); 41 patients completed interview at time three (T3) and 27 patients completed the interview at time 4 (T4). The main reason for the fall in patient numbers over time was deterioration in patients health status due to disease progression and death over this study period. 18 patients discontinued chemotherapy during the course of the study primarily due to chemotherapy toxicity or progressive disease while two patients chose to discontinue treatment themselves. 12 participants died from their cancer before completion of 4 cycles of chemotherapy while 6 patients withdrew consent

during the course of the study .The reasons given for participant withdrawal of study participation were as follows; two patients did not see any relevance to the study and one participant said that it was of no benefit to herself. Two patients said that the study made them too upset because it reminded them that they were not well. While one participant said that the information was too personal to discuss. This high attrition rate is in keeping with other QoL studies in patients with metastatic cancer where the short term survival of patients with advanced cancer patients and the rapid deterioration of performance status produce problems in collecting QoL questionnaires. This leads to frequent but not necessarily random occurrences of missing data (Gridelli et al 2001)

Time Point	Number of Participant who completed QoL Measurement tool
T1	65
T2	51
T3	41
T4	27

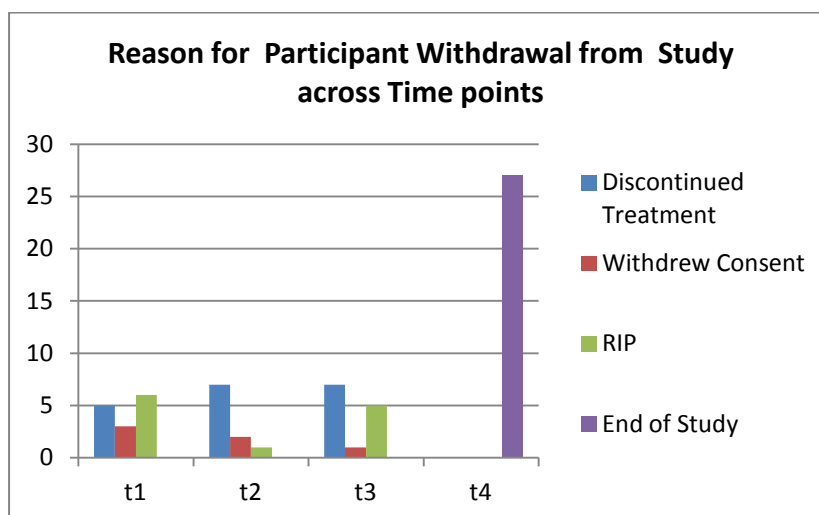


Figure 8 Reason for Participant Withdrawal from Study across Time points

7.19.9 Summary of demographics

It can be seen that gender balance was equally distributed between males and females and most patients were married (89%)

The age profile was a typical representation of the incidence of cancers across age groups with more patients being in the mid to higher age group .Cancers could be divided into three main categories Breast, Colon and others .80% of patients were receiving 1st line chemotherapy for metastatic disease and two thirds of the participants were being treated in the out-patient setting.

7.20 Graphs of normal probability

Because normal data is an underlying assumption in parametric testing, it is important to conduct an assessment of the normality of data .To assess the appropriateness of the methods of analysis used in this study, the results of Quality of Life scores from each measure was plotted on a normal probability plot for each of the four time-points the patients were assessed. The data was individually plotted .Because the sample size was relatively small, Shapiro-Wilk test was used to check if all the data was normally distributed.

The results indicate there is a very normal distribution of the QoL scores using SEIQoL and SEIQoL DW, VAS and EORTC instrument to measure quality of life in patients with metastatic cancer. Results and graphs are presented below.

SEIQOL DW Normal Probability plot at Time 1: Study Entry

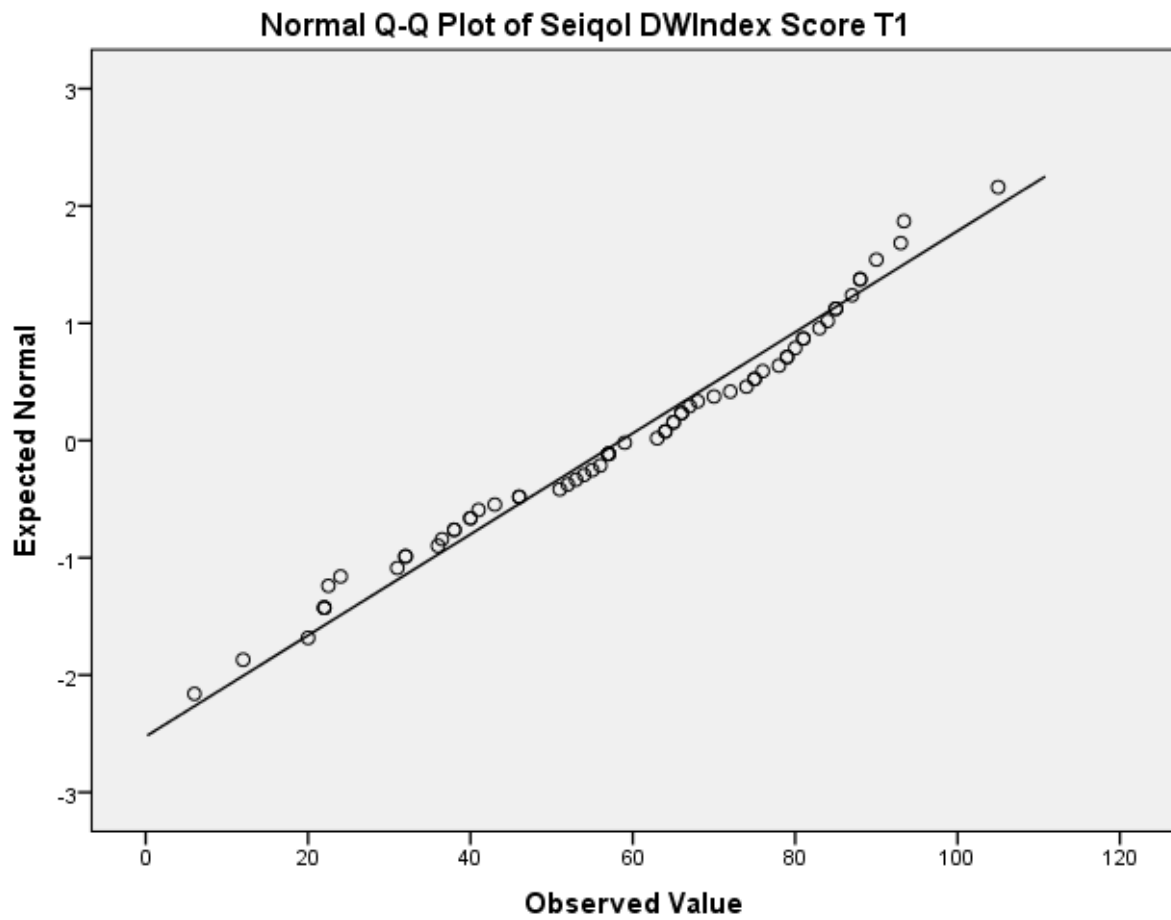


Figure 9

Table 7

Tests of Normality			
SEIQoL	Shapiro-Wilk		
	Statistic	df	Sig.
SEIQoL Index Score	.973	64	.173

Table 8

Correlations		
SEIQol Index Score T1		SEIQoL Index Score T1
	Pearson Correlation	1
	Sum of Squares and Cross-products	33906.383
	Covariance	538.197
	N	64

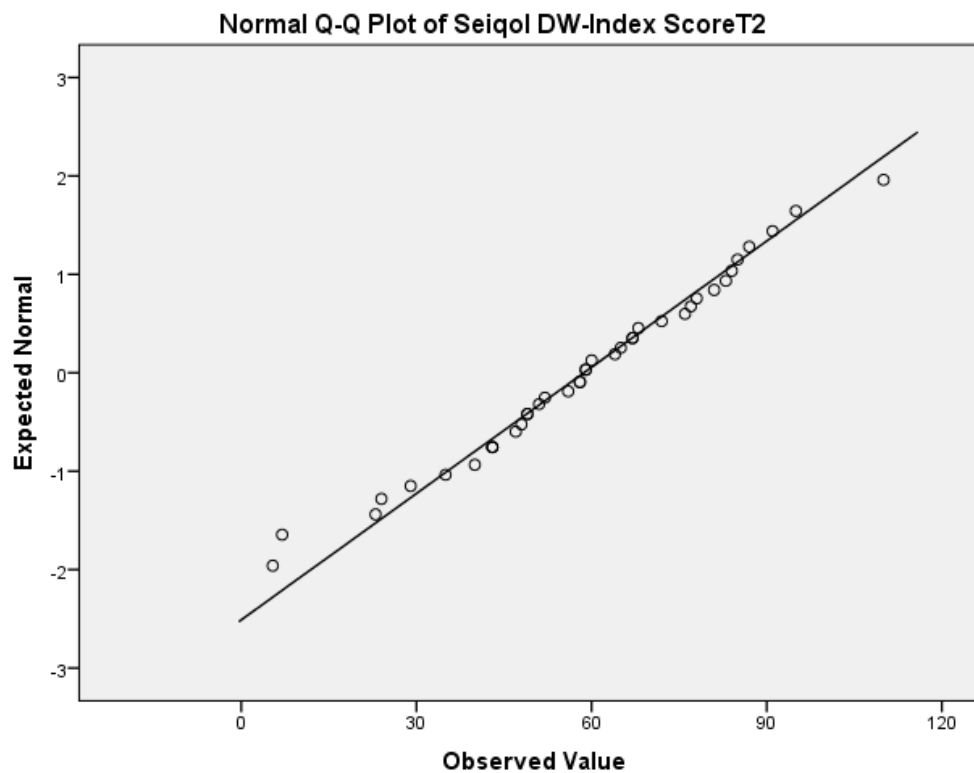


Figure 10

Table 9

Tests of Normality							
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
SEIQoL	DW-Index	.072	39	.200*	.986	39	.910
ScoreT2							
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

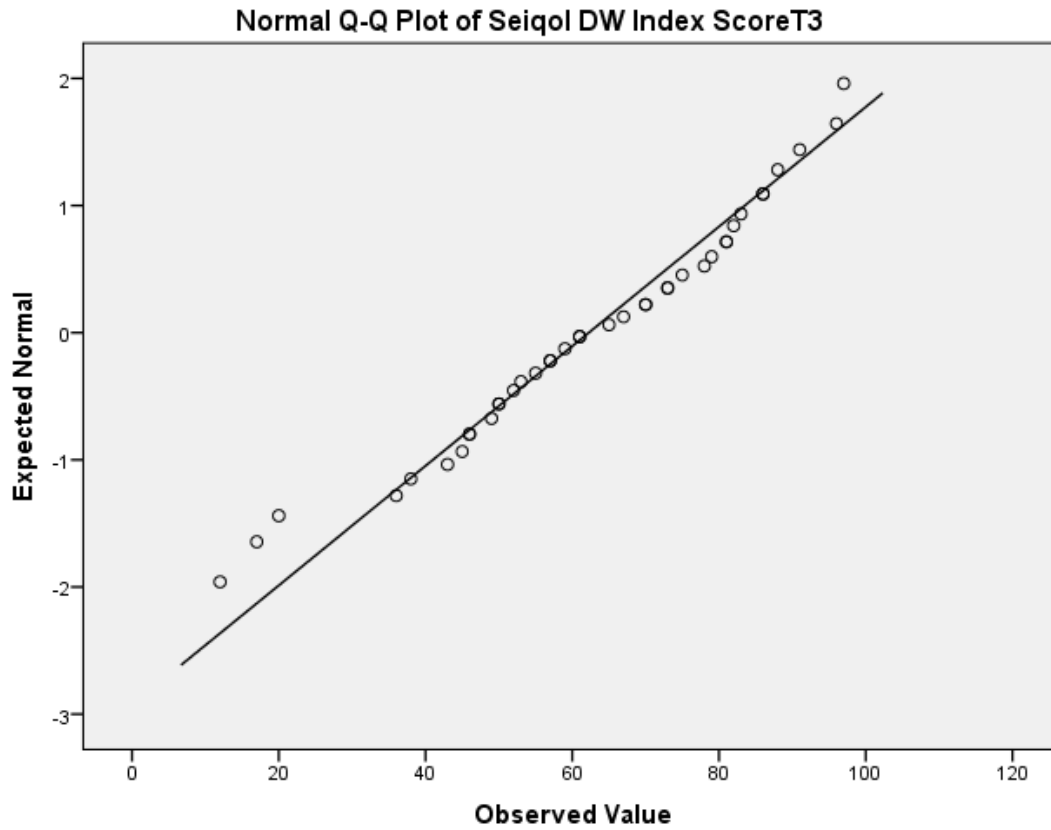


Figure 11

Table 10

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SEIQoL DW Index ScoreT3	.078	39	.200*	.966	39	.279
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

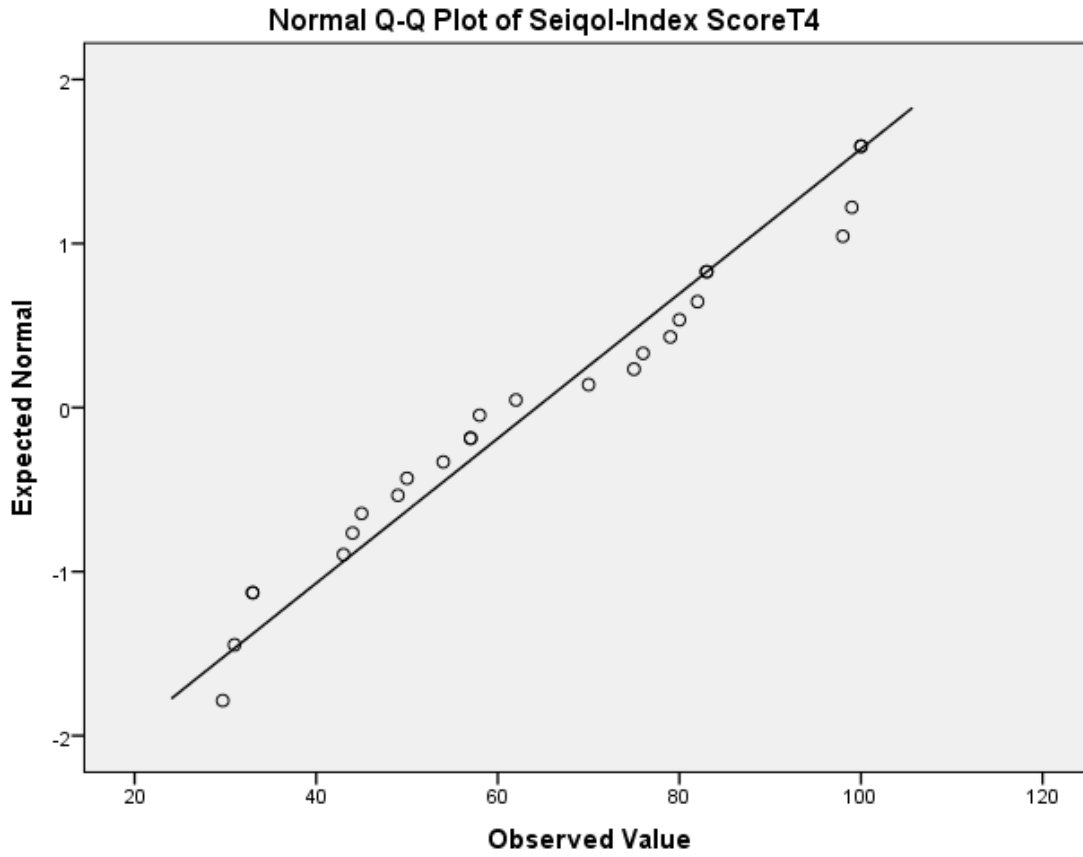


Figure 12

Test of normal probability

Table 11

	Shapiro-Wilk		
	Statistic	df	Sig.
SEIQoL-Index ScoreT4	.938	26	.124

SEIQol JA Normal Probability Plot at Time 1: Study Entry

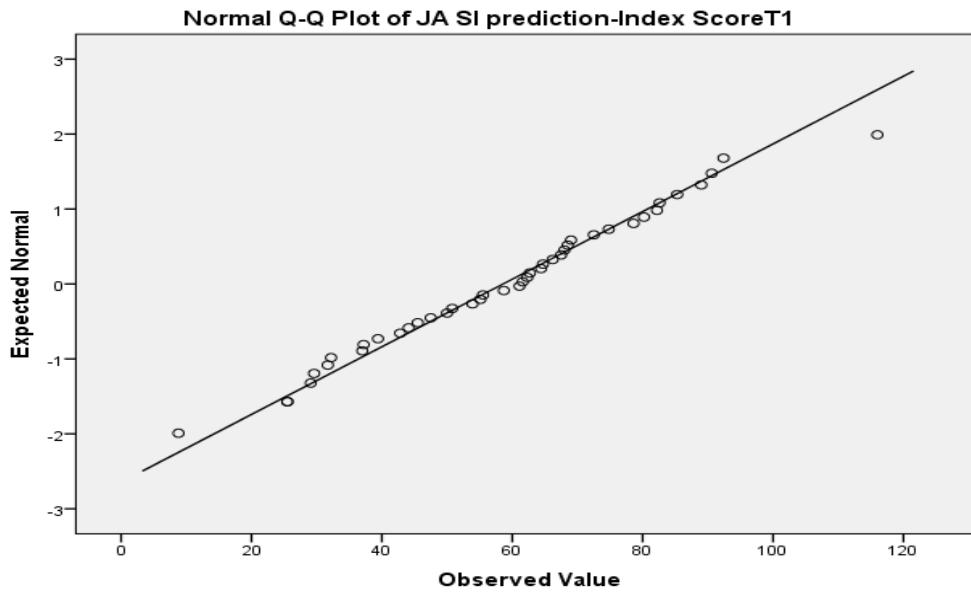


Figure 13

Table 12

Tests of Normality SEIQol JA T1			
	Shapiro-Wilk		
	Statistic	df	Sig.
JA SI prediction-Index ScoreT1	.990	42	.965

Table 13

JA SI prediction-Index ScoreT1	
Pearson Correlation	1
Covariance	1.271
Sum of Squares and Cross-products	20131.201
N	42

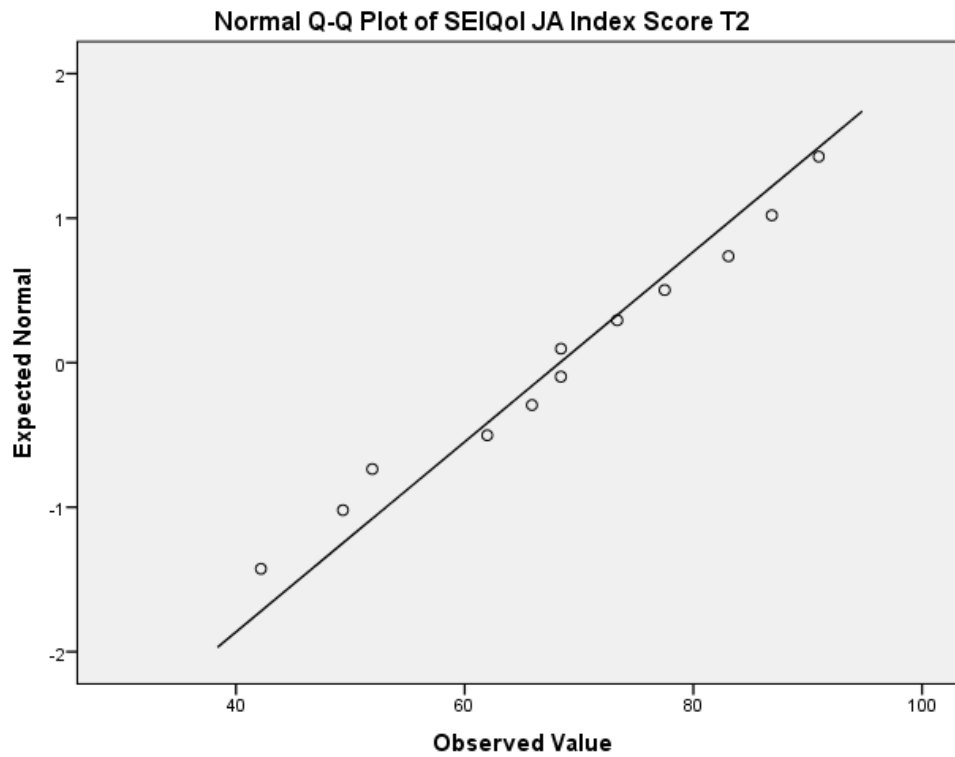


Figure 14

Table 14

Tests of Normality SEIQoL JA T2			
	Shapiro-Wilk		
	Statistic	df	Sig.
SEIQoI JA Index Score sp21	.970	12	.906
SEIQoI JA Index ScorePT3T	.924	12	.323
SEIQoI JA Index ScorePT4	.945	12	.570
*. This is a lower bound of the true significance.			
a. Lilliefors Significance Correction			

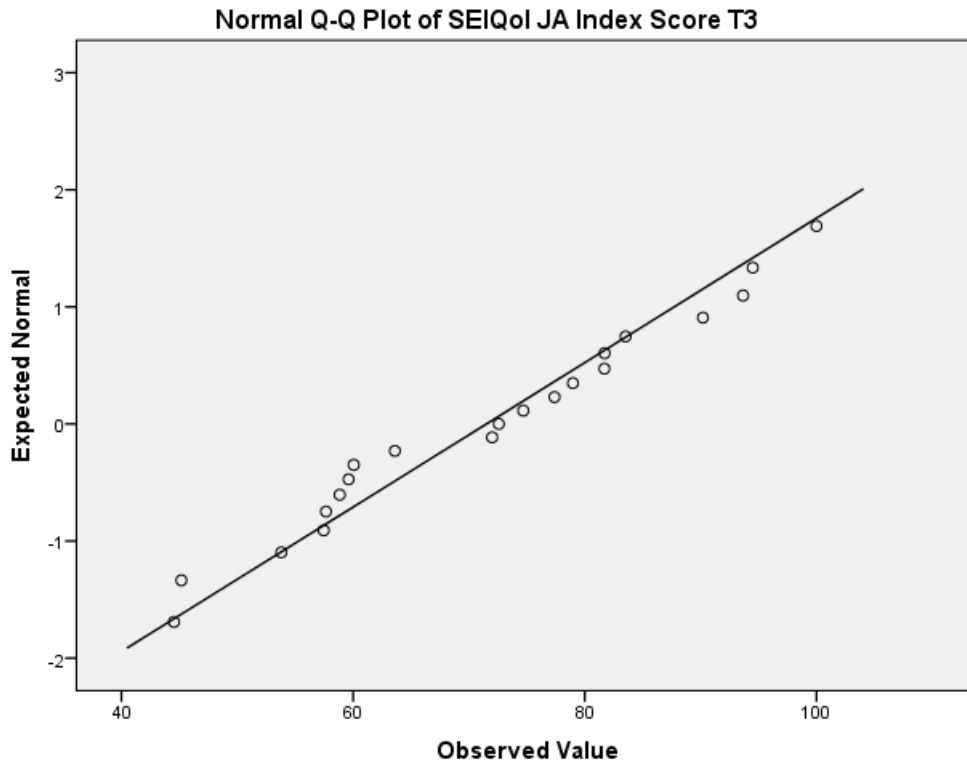


Figure 15

Table 15

Tests of Normality SEIQoL JA T3			
	Shapiro-Wilk		
	Statistic	df	Sig.
SEIQoL JA Index Score T3	.961	21	.537
*. This is a lower bound of the true significance.			
a. Lilliefors Significance Correction			

SEIQol JA Normal Probability Plot at Time 4

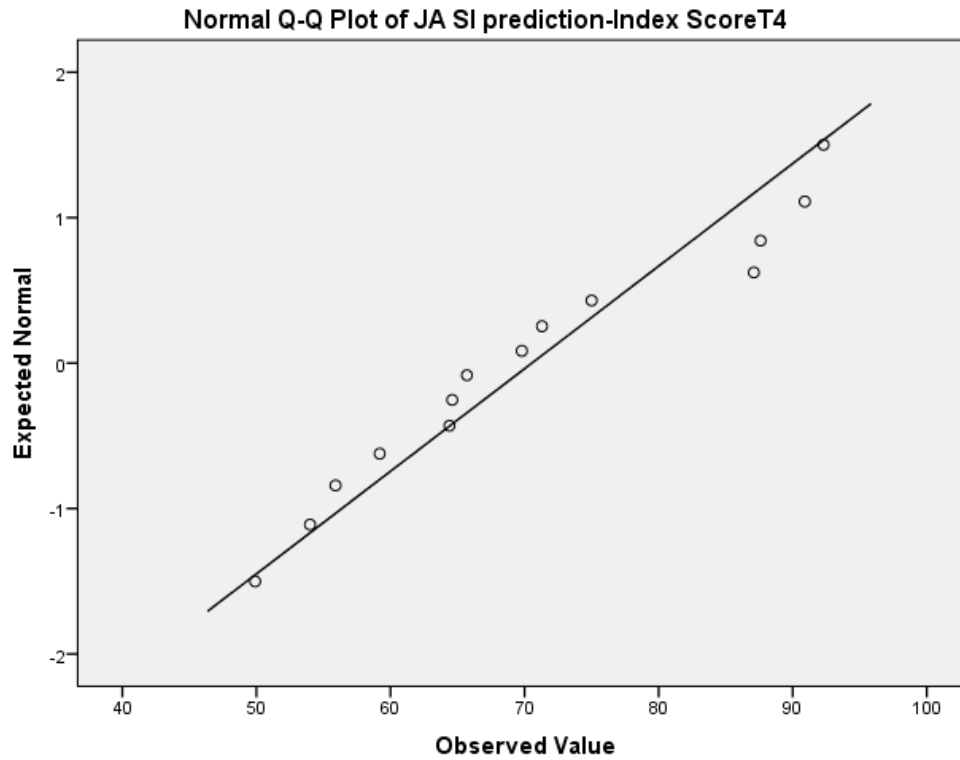


Figure 16

Table 16 Tests of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
JA SI prediction-Index ScoreT4	.927	14	.281

Table 17 Correlations		Intervention or Control	JA prediction- Index ScoreT4	SI
JA SI prediction-Index ScoreT4	Pearson Correlation	.204	1	
	Sum of Squares and Cross-products	17.600	2613.235	
	Covariance	1.354	201.018	
	N	14	14	

Visual Analogue Scale Normal Probability Plot at Time 1: study entry

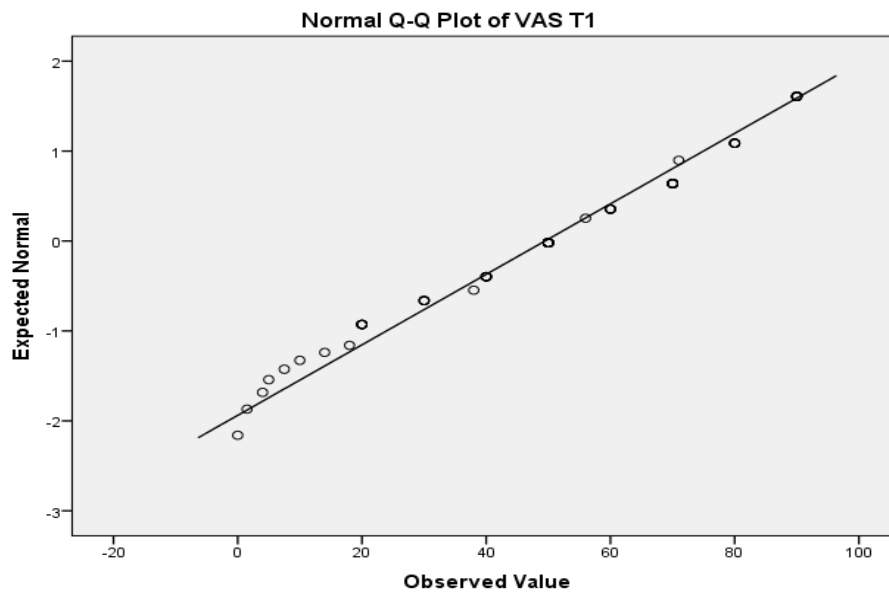


Figure 17

Table 18			
Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	Sig.
VAS T1	.955	64	.020
a. Lilliefors Significance Correction			

Table 19

Correlations

		VAS T1
VAS T1	Pearson Correlation	1
	Sig. (2-tailed)	
	Sum of Squares and Cross-products	41021.359
	Covariance	651.133
	N	64

Visual Analogue Scale Normal Probability Plot Timepoint 2

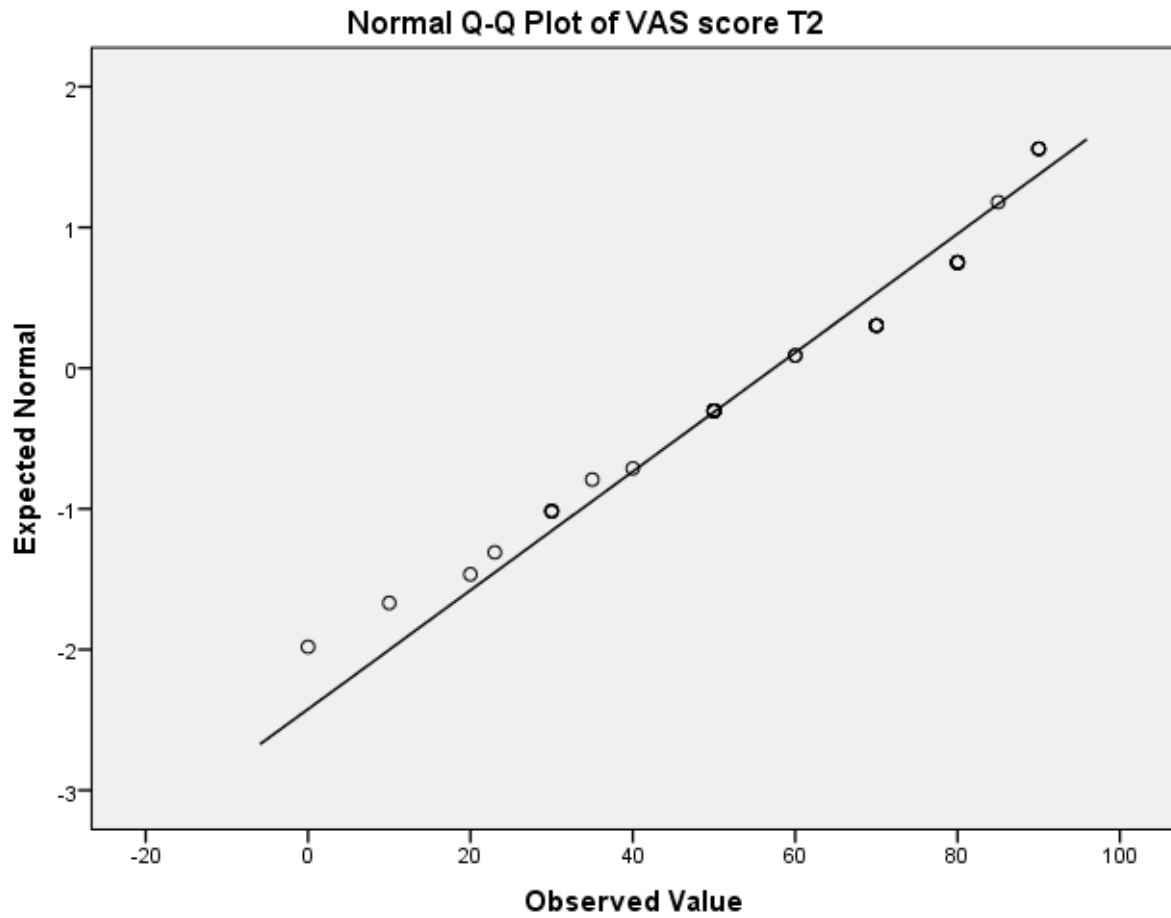


Figure 18

Table 20

Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	Sig.
VAS score T2	.935	41	.021
a. Lilliefors Significance Correction			

Visual Analogue Scale Normal Probability Plot Timepoint 3

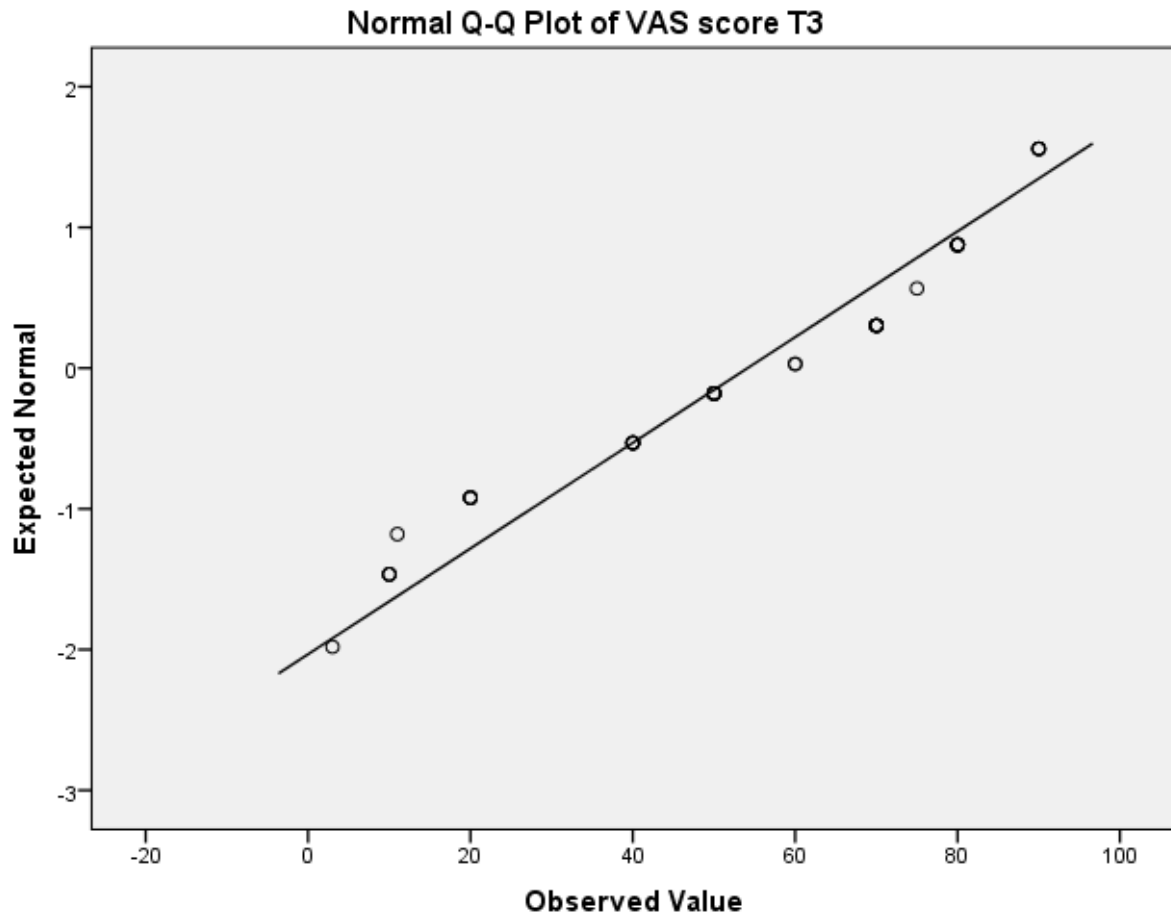


Figure 19

Table 21

Tests of Normality			
	Shapiro-Wilk		
	Statistic	Df	Sig.
VAS score T3	.915	41	.005
a. Lilliefors Significance Correction			

Visual Analogue Scale Normal Probability Plot Timepoint 4

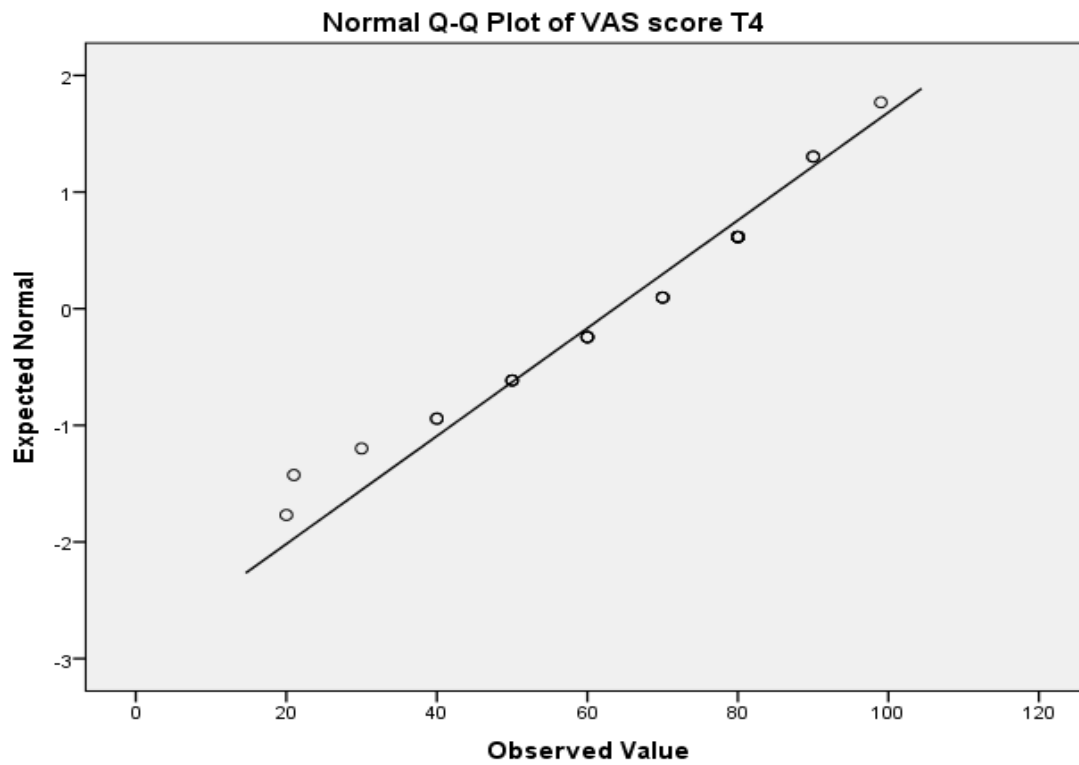


Figure 20

Tests of Normality

Table 22

	Shapiro-Wilk		
	Statistic	Df	Sig.
VAS score T4	.939	25	.139

Table 23

Correlation		VAS score T4
VAS score T4	Pearson Correlation	1
	Sum of Squares and Cross-products	11218.000
	Covariance	467.417
	N	25

EORTC QIQ-C30 Normal Probability Plot Timepoint 1

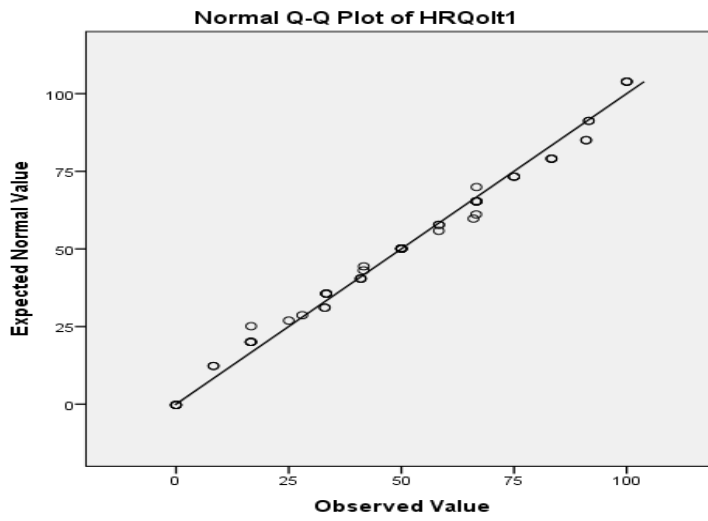


Figure 21

EORTC QIQ-C30 Normal Probability Plot Timepoint 2

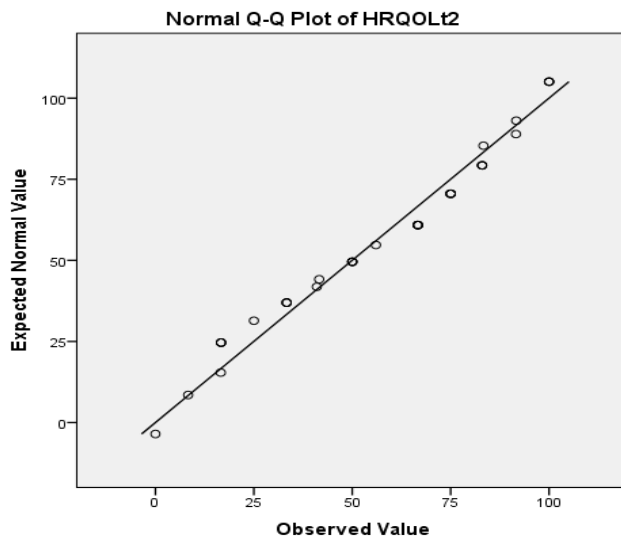


Figure 22

EORTC QIQ-C30 Normal Probability Plot Timepoint 3

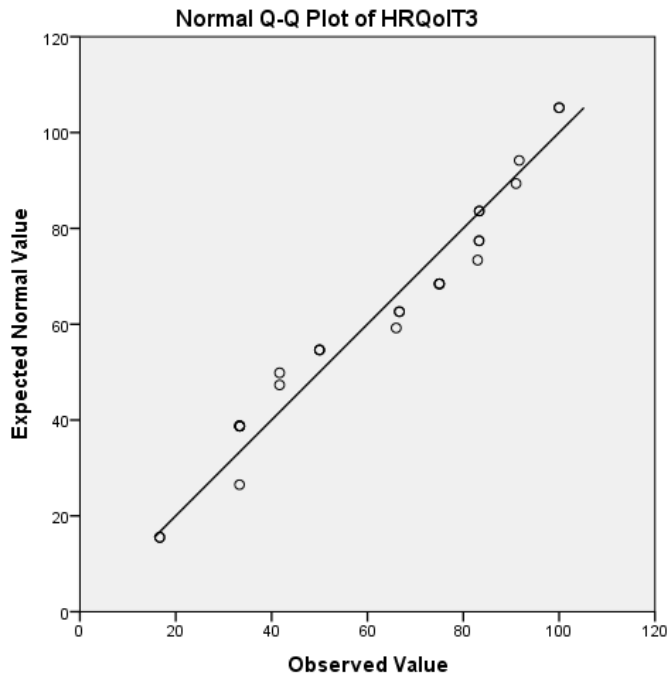


Figure 23

EORTC QIQ-C30 Normal Probability Plot Timepoint 4

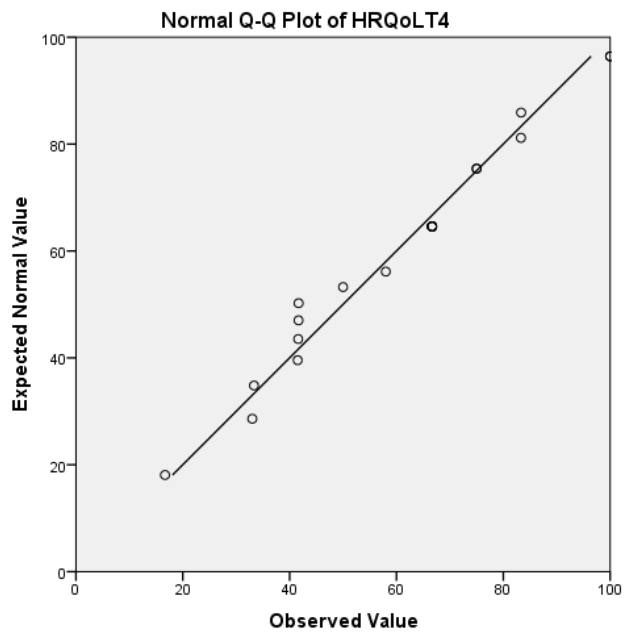


Figure 24

Table 24

Tests of Normality EORTC HR Tool				
	Intervention or Control	Shapiro-Wilk		
		Statistic	df	Sig.
HRQoL1	Control	.838	6	.125
	Intervention	.957	14	.681
HRQoL2	Control	.933	6	.605
	Intervention	.964	14	.782
HRQoL3	Control	.885	6	.292
	Intervention	.925	14	.257
HRQoLT4	Control	.904	6	.400
	Intervention	.924	14	.250
*. This is a lower bound of the true significance.				
a. Lilliefors Significance Correction				

7.20.1 Conclusion:

The plots and data presented above demonstrate normality in distribution of Quality of Life results across all instruments.

The significance level of >0.05 is demonstrated in all cases and supports the fact that an alternative hypothesis can be rejected and concludes that the data comes from a normal distribution.

7.21 Quality of Life Measurements

7.21.1 Is there any difference in quality of life over time on all patients receiving chemotherapy for metastatic disease and quality of life?

As described earlier, the quality of life measurements of patients receiving chemotherapy for metastatic cancer were assessed at 4 time-points during the course of their treatment. Participants completed the SEIQoL Judgement Analysis tool, SEIQol DW tool, Visual Analogue Scale and EORTC health related quality of life questionnaire.

As seen earlier in this chapter, Q plots were completed to assure normality in distribution across groups.

Quality of life score for each assessment tool from time point 1 to time point 4 for each participant was calculated. The mean QoL scores of SEIQoL Judgement Analysis, SEIQoL – Direct Weighting, EORTC QLQ C30 and a Visual Analogue Scale (VAS) of the overall population was calculated and are tabulated below (Table 25)

Table 25: QoL Index Scores Time point 1 to Time point 4

Overall Quality of Life Measurements across Instruments

Instrument		T1	T2	T3	T4	Total score	Total Gain Score	P value
SEIQoL DW	Mean	58.553	58.654	62.256	64.257	60.930	+6	P = <0.05
	Std. Deviation	23.199	22.872	21.262	22.6696	22.500		
SEIQoL JA	Mean	59.574	66.0556	71.505	64.7592	65.473	+5	
	Std. Deviation	23.535	18.936	16.208	20.630			
VAS	Mean	49.453	56.960	54.122	63.600	56.033	+14	
	Std. Deviation	25.517	22.306	26.626	21.619			
EORTC QLQ – C30	Mean	50.106	56.781	60.351	60.367	56.901	+10	
	Std. Deviation	28.338	28.6753	25.5758	22.632			

It can be seen that the mean QoL score over time across instruments ranged from 56 to 65 with the visual analogue scale rating lowest mean quality of life and the SEIQoL JA quality of life measurement tool deriving the highest mean quality of life score from this group of patients with cancer who are receiving chemotherapy for metastatic disease.

SEIQoL JA measurement showed an improvement in quality of life from time point 1 to time point 3 reaching a mean score of 71.5. It then subsequently dropped to 64.75. This may be

due to fewer people completing the SEIQoL JA assessment at this time point due to its complex nature. Whereas the mean quality of life score using the SEIQoL DW tool continues to improve over time from baseline through to T4.

A paired t – test was performed to assess if there was a statistically significant difference in the mean QoL scores over the four time-points during treatment. Results indicate no statistically significant improvement in QoL measurements over time with the exception of quality of life as measured on a visual analogue scale where there was a significant difference between time-point 1 to time-point 4($p=0.018$). These results are depicted on table 26 below.

Table 25 also presents the percentage of gain from time point 1 baseline to time point 4 was analysed. This demonstrated clinical significance across all quality of life measurements $P<0.005$. This will be discussed later in the chapter in section 7.21.4

Table 26 Results of paired t- Test assessing QoL over 4 time points

Results of paired t- Test assessing QoL over 4 time points				
Paired	SEIQoL JA	SEIQoL DW	EORTC	VAS
T-Test	P value	P value	P value	P value
T1 – T2	.446	.596	.780	.073
T1 – T3	.435	.610	.261	.132
T1 – T4	.436	.853	.724	.018
T2 – T3	.889	.187.	.475	.227
T2 – T4	.779	.540	.813	.891
T3 – T4	.800	.384	.199	.763

7.21.2 Is there a difference in quality of life measurements between the intervention group and the control group over time?

One of the primary objectives of this study was to determine if the provision of individual quality of life information to the clinical team using the SEIQoL assessment tool, would improve quality of life outcomes for the patient. Participants were randomised to 2 groups, the control (quality of life was measured and results were not relayed back to the clinical team) and the intervention group (quality of life was measured and results were depicted on an info-graph and placed in the patients clinical notes for review by the clinician)

Quality of life measures from each participant was obtained using four instruments: SEIQoL, SEIQoL DW, EORTC-C 30 and Visual Analogue Scale, with the primary interest being in SEIQoL. The data was analysed using SPSS, Policy PC and Excel .Individual QoL scores for each assessment at each time-point was derived.

T-test analyses looks at differences between the two groups of variables and was performed , comparing the mean QoL scores of the patients on the control arm with the mean QoL scores of patients on the intervention arm of the study at the different time points . Where the standard deviations from each group are similar, a two-tailed p value was obtained. If the standard deviations from the groups were dissimilar, then Welch's corrected t test was performed.

Results varied slightly between instruments. While there was a clinically significant improvement in quality of life from baseline to time point 4 for all participants, ($p = <0.05$) there was no statistically significant difference between groups.

There was no imbalance in the mean SEIQoL Quality of life measurement at time-point 1 between the intervention group and the control group

The SEIQoL JA showed a greater increase in the quality of life in the control group at time point 2 which then proceeded to dip at time points 3 and 4 thereafter. Whereas, SEIQoL JA intervention group demonstrated a continuous gain in quality of life scores over each time point to time point 3 at which point there was a total gain of 12 points with the Intervention group from baseline. Both control and intervention group were similar at time-point 4 (64),

figures 25 to 28 below demonstrate the direction in quality of life between groups using the SEIQoL assessment.

There was no significant difference between groups using the SEIQoL DW .It was interesting that there was a slightly higher overall gain score in the control group.

Similar to SEIQoL JA, the EORTC tool demonstrated continuous improvement in the intervention arm and a greater overall gain score of 12 points in the intervention group from baseline to time-point 4.

The results of the visual analogue scale showed inconsistency in quality of life scores with dips and improvements in both arms throughout all time points for both arms.

Tables 27 to 31 below show the mean quality of life scores of patients from the control group of the study compared with patients from the intervention group at each timepoint.

Table 32 compares the mean quality of life between baseline and time point 4 . Findings demonstrate a clinically significant improvement in both groups $P < 0.05$

Table 27

Mean QoL scores of controls vs. intervention group at study baseline (T1)				
	SEIQOL JA(n42)	SEIQoL DW (n65)	EORTC(n65)	VAS(n65)
Control	58.9 (SD 21.8)	59.98 (SD20.6)	50 (SD 29.5)	50.3 (SD 24.6)
Intervention	60 (SD 25.3)	57.2 (SD25.6)	50 (SD 27.8)	48.6 (SD 26.6)
p value	.886	.636	.989	.790

Table 28

Mean QoL scores of controls vs. intervention group at T2				
	SEIQOL JA	SEIQoL DW	EORTC	VAS
Control	70.7 (SD 11.5)	63 (SD19.3)	53.7 (SD 28.1)	53.2 (SD24.0)
Intervention	63.3 (SD21.9)	55.8 (SD 24.8)	58.1 (SD 29.3)	59 (SD 21)
p value	.360	.292	.675	.34

Table 29

Mean QoL scores of controls vs. intervention group at T3				
	SEIQOL JA	SEIQoL DW	EORTC	VAS
Control	69.9 (SD 15.8)	67.8 (SD19.5)	57.4 (SD 32.1)	51 (SD 31)
Intervention	72.2 (SD 16.9)	59.7 (SD21.8)	61.7 (SD22.7)	55 (SD 24.2)
p value	.772	.281	.683	.595

Table 30

Mean QoL scores of controls vs. intervention group at T4				
	SEIQOL JA	SEIQoL DW	EORTC	VAS
Control	64.5 (SD25.4)	64.4 (SD21.6)	55.5 (SD32.1)	67 (SD22.0)
Intervention	64.8 (SD19.7)	58.9 (SD 23.3.)	62.4 (SD21.4)	61.7 (SD21.6)
p value	.980	.676	.546	.547

Table 31

Mean overall QoL scores of controls vs. intervention group				
Overall mean QoL score	SEIQoL JA	SEIQoL DW	EORTC	VAS
Control	66.0 (SD 18.1)	64.4 (SD21.6)	54.1 (SD 29.1)	55.5 (SD 25.6)
Intervention	65.1 (SD 21.1)	58.9 (SD 23.3)	58.1 (SD 25.3)	56.3 (SD 23.4)

Figures 25 to 28 demonstrates the direction in QoL between groups using SEIQoL JA measurement tool.

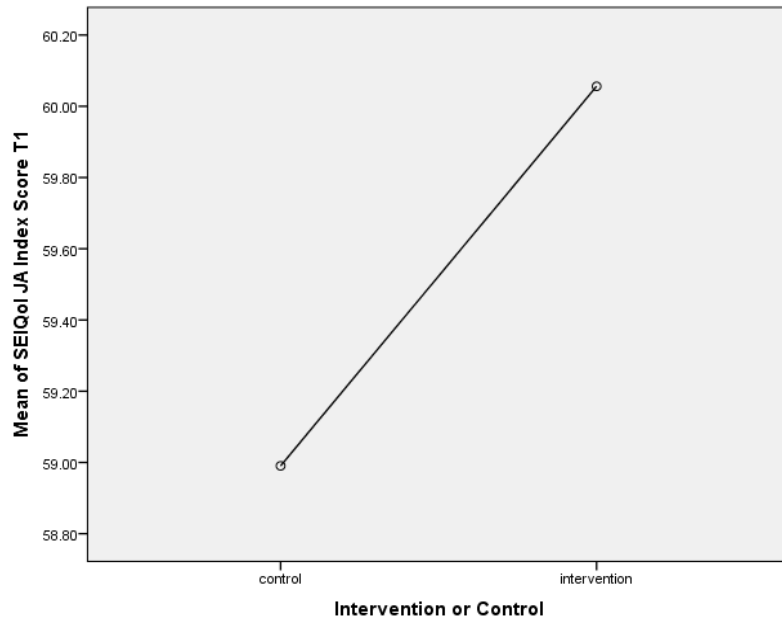


Figure 25

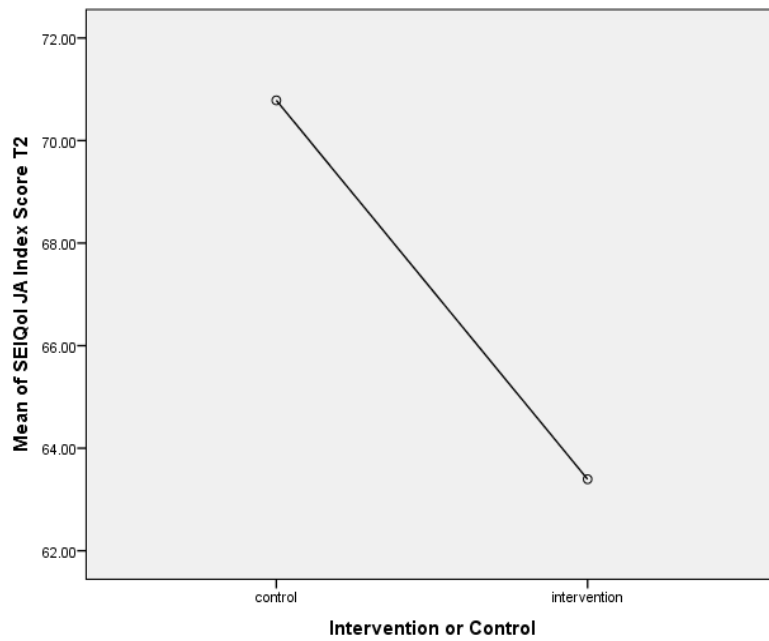


Figure 26

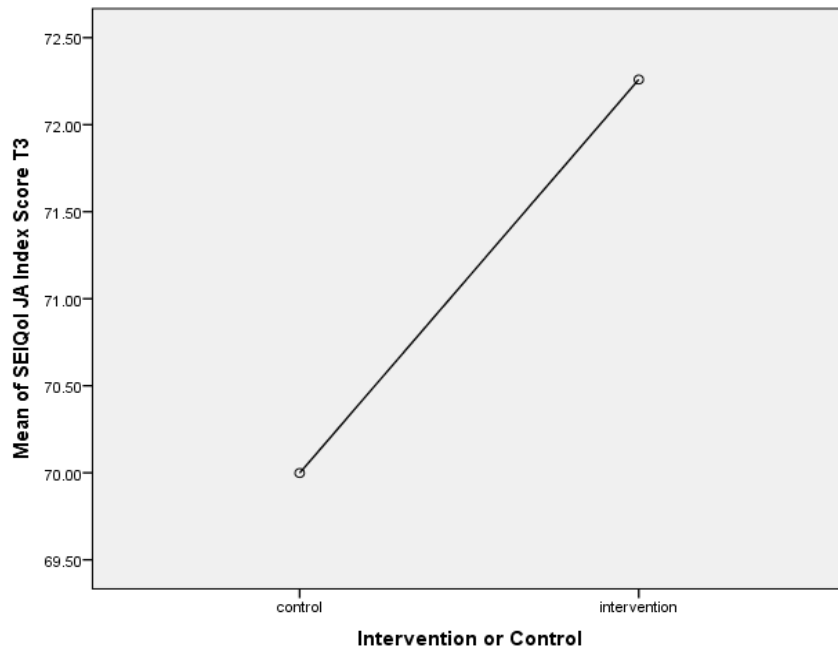


Figure 27

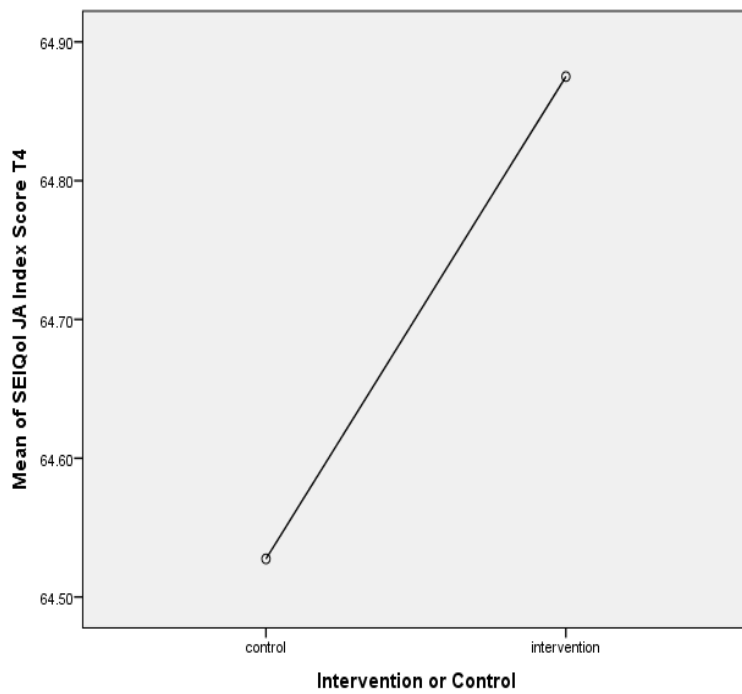


Figure 28

Table 32 Quality of life scores across time points

Quality of life scores across time points							
Instrument	T1	T2	T3	T4	Total score	Total Gain from baseline	P value
SEIQoL DW Control	59.9839	63	67.8333	67.125	64.48555	+7	<0.05
SEIQoL DW Intervention	57.2088	55.8069	59.7778	62.9833	58.9442	+6	
SEIQoL JA Control	58.9905	70.7844	69.9986	64.5275	66.0753	+10 (t3)	
SEIQoL JA Intervention	60.0561	63.3956	72.2593	64.8750	65.1465	+12 (t3)	
Eortc control	50.0471	53.7182	57.4011	55.535	54.17535	+6	
Eortc intervention	54.17535	50.1508	58.1858	61.7489	58.13103	+8	
Vas control	50.3387	53.2500	51.0000	67.5000	55.5222	+12	
Vas intervention	48.6212	59.4333	55.7407	61.7647	56.3900	+13	

Mean Quality of Life Measurements across Time-points across all Tools

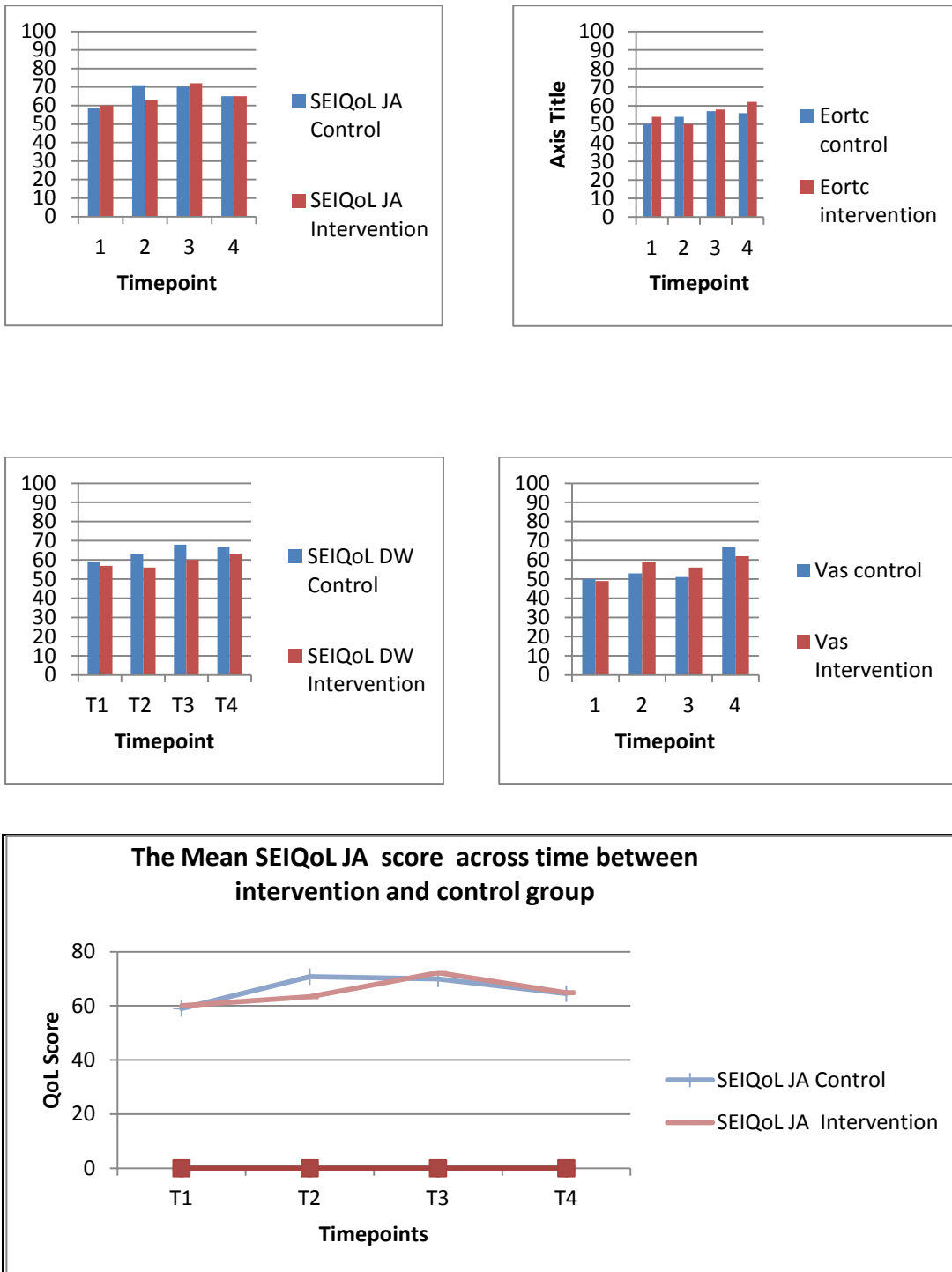


Figure 29 Mean SEIQoL JA score across time between Intervention and control group

A One way Analysis of Variance test (ANOVA) yielded no significant difference between groups with regard to overall quality of life between the intervention group and the control group across time $T1 = (F(1,62) = 0.071, P=0.790)$ $T4 = (F(1,23) = 0.373, P=0.547)$

It was surprising to see no significant difference between the control and intervention group. The trend was similar across all tools with the exception of the visual analogue scale. For SEIQoL JA, there was a continuous positive gain in quality of life scores in the intervention group from time point 1 to time point 3, whereas there are dips in the quality of life of the control group across time (Figure 29). It is interesting to see that there was continuous gain in the health related quality of life scores in the intervention group

Table 33 Difference within and between intervention and control groups

Difference within and between intervention and control groups across measurement instruments ANOVA				
Instrument	T1	T2	T3	T4
SEIQoL DW	0.636	0.292	0.281	0.676
SEIQoL JA	0.886	0.36	0.772	0.98
EORTC	0.989	0.675	0.683	0.546
Vas	0.79	0.342	0.595	0.547

7.21.3 Is there any clinically important difference between the control group and the intervention group?

One of the objectives of this study is to determine if there is any clinically important difference between the control and intervention group. In order to discuss the clinical relevance of the results of this study, one must first attempt to define what constitutes a clinically significant change on a QoL assessment. Several methods to assess clinical significance are developed (Osoba & Rodriguez 1998). One such technique is the calculation of the ‘minimum important difference’ or MID. This can be defined as ‘the smallest difference in score in the domain of interest that patients’ perceive as important, either beneficial or harmful, and which would lead the clinician to consider a change in the patient’s management (Guyatt 2002). Work in this area has suggested that across instruments and disease, MID values remain constant at 5 – 10% of the instrument range (Ringash 2002). Therefore, although any estimate of the MID is associated with a degree of uncertainty, using this best estimate can facilitate analysis of results.

In this study, an improvement or actual gain of 7% on the mean QoL score from base line to visit 4 of was considered to be the minimum clinically important difference. The minimum important difference was calculated for each group using the SEIQOL DW and JA assessment technique. It can be seen that the MID has been reached in both the control and the intervention group in this study across quality of life assessments from both the SEIQOL DW tool and the SEIQoL JA tool

Using the SEIQOL DW assessment technique, there was a mean actual gain in quality of life of 14% from baseline to T4 in the control group and 11% in the intervention group. While the SEIQoL JA assessment technique, demonstrated a much more pronounced actual gain in quality of life with a gain of 19% in the control group and 24% in the intervention group.

Table 34 and table 35 demonstrate the percentage gain in quality of life over time across all groups.

Table 34 Quality of Life % Gain over Time

SEIQoL JA assessment					Actual Gain to T3
	Time 1	T2	T3	T4	
Intervention mean	60	63	72	64	24%
Control mean	59	70	69	64	19.00%

Table 35

SEIQoL DW assessment					Actual Gain to T4
	Time 1	T2	T3	T4	
Intervention mean	57	56	60	63	11%
Control mean	60	63	68	67	14.00%

7.21.4 Is there any change in individual patient cues between groups which may impact quality of life?

In order to preserve patient blinding, the results of the assessments for the intervention group were placed in the patient clinical notes which were more frequently by the medical team.

As discussed in detail earlier, there is a body of evidence to show, that despite advances in quality of life, clinicians tend to focus on the medical and health needs of the patient. Therefore it was important to establish if there were any discrete changes (or perceived changes) in health related functioning of either the intervention or control group.

With this in mind, data pertaining to the individual cues was extrapolated and analysed and the most frequently nominate cues of importance to the patient were identified. Health was the most prevalent cue nominated by 92% of all patients as an area of concern. This was followed by social activity (64%), keeping active (58%) and family support (43%) which could be considered “softer” cues. These are areas of the patients life traditionally discussed with the patient by the nursing and social work team.

These top four cues were selected for further analysis with respect to impact on quality of life (all cues will be discussed later in this chapter).

The levels of the four cues, health, and social activity, keeping active and family support were analysed and comparison of means of each cue was performed at each time-point to establish if there were any differences, particularly improvements between Intervention groups compared to the control group.

Although there were slight differences between the control and intervention group in level of functioning of social activity, keeping active and family support, it is interesting to note that the level of functioning on each cue *decreased* from time point 1 through to time point 4 over time. These results are depicted on figures 30 to figure 32. Conversely and of most interest was health functioning. Health functioning increased across both the control and intervention group from time-point 1 through to time point 4. There was a notable difference in health functioning between groups with 51% improvement in Health Functioning in the intervention arm from time-point 1 to time-point 4 compared to a 19% the level of improvement in the control arm.

The means of health functioning across time points t1- t4 are tabulated below (table 36) and the trend is depicted in figure 33.

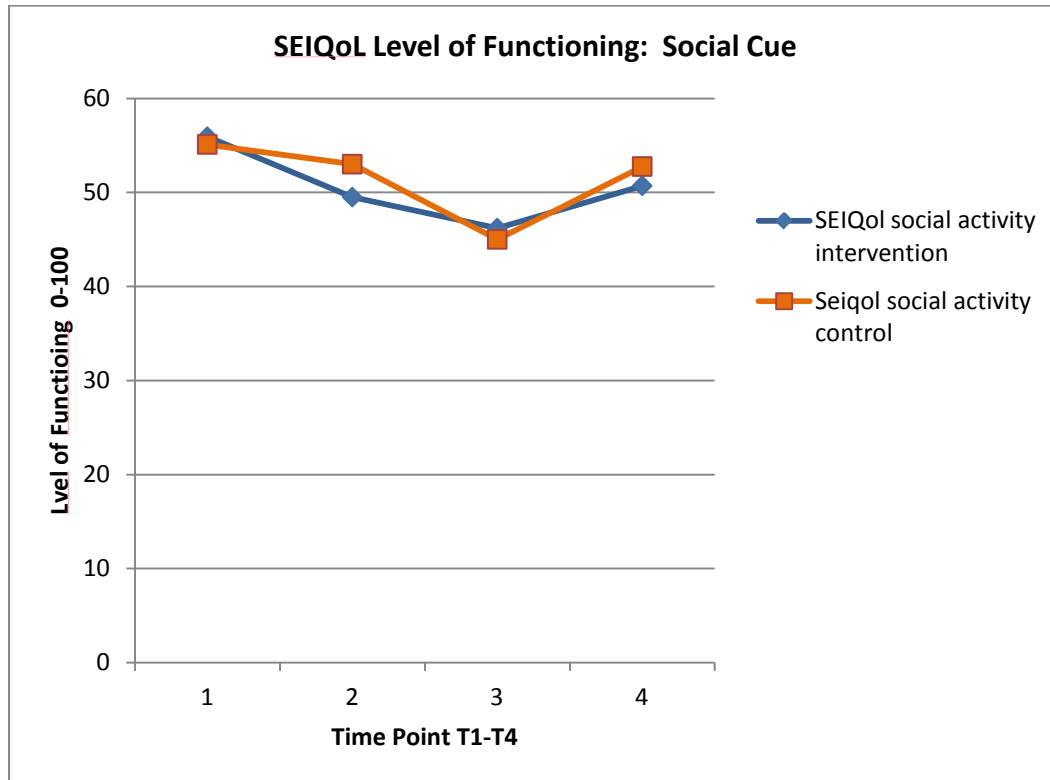


Figure 30

There was a decline of 9% (Control) versus 10% (Intervention) in social functioning between timepoint 1 and time point 3 with no significant difference between groups $P = 0.49$

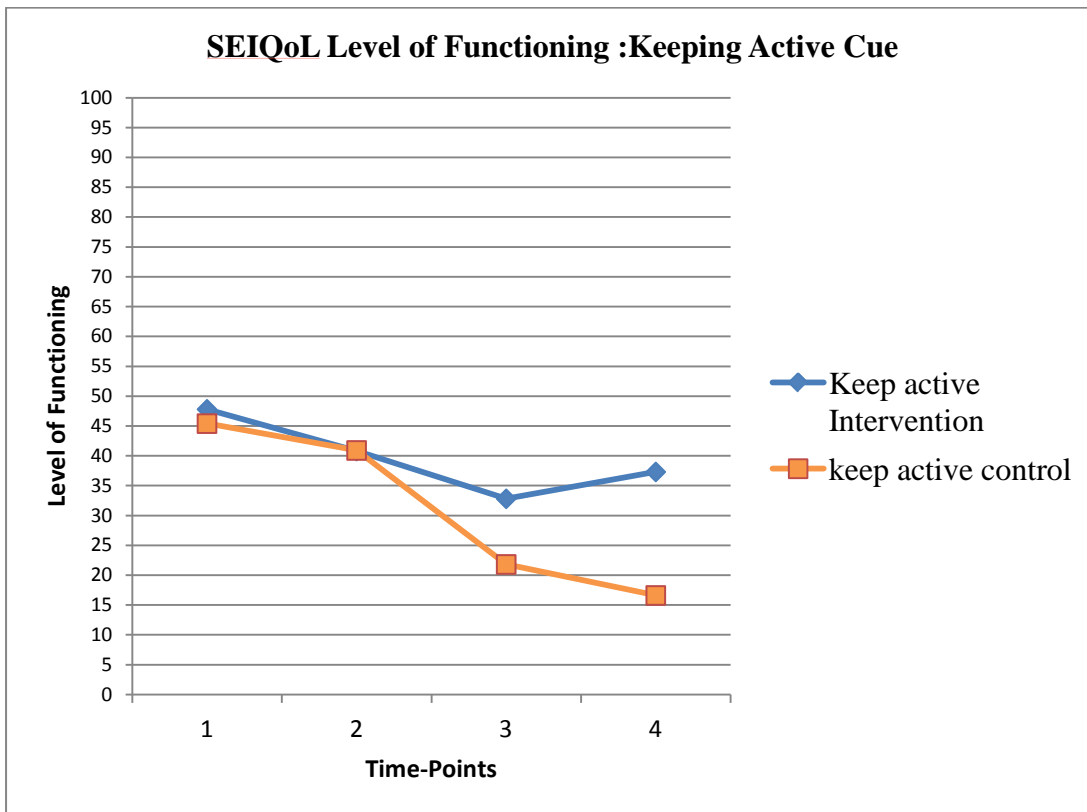


Figure 31

There was a 15% (control) versus 12% (intervention) decline in level of functioning in nominated cue 'keeping active' from baseline to time-point 2 indicating no significant difference between groups. $P = 0.82$ (The number of participants on study at t3 and t4 who had identified 'keeping active' as an important cue was too few to draw any valid conclusions for those time points).

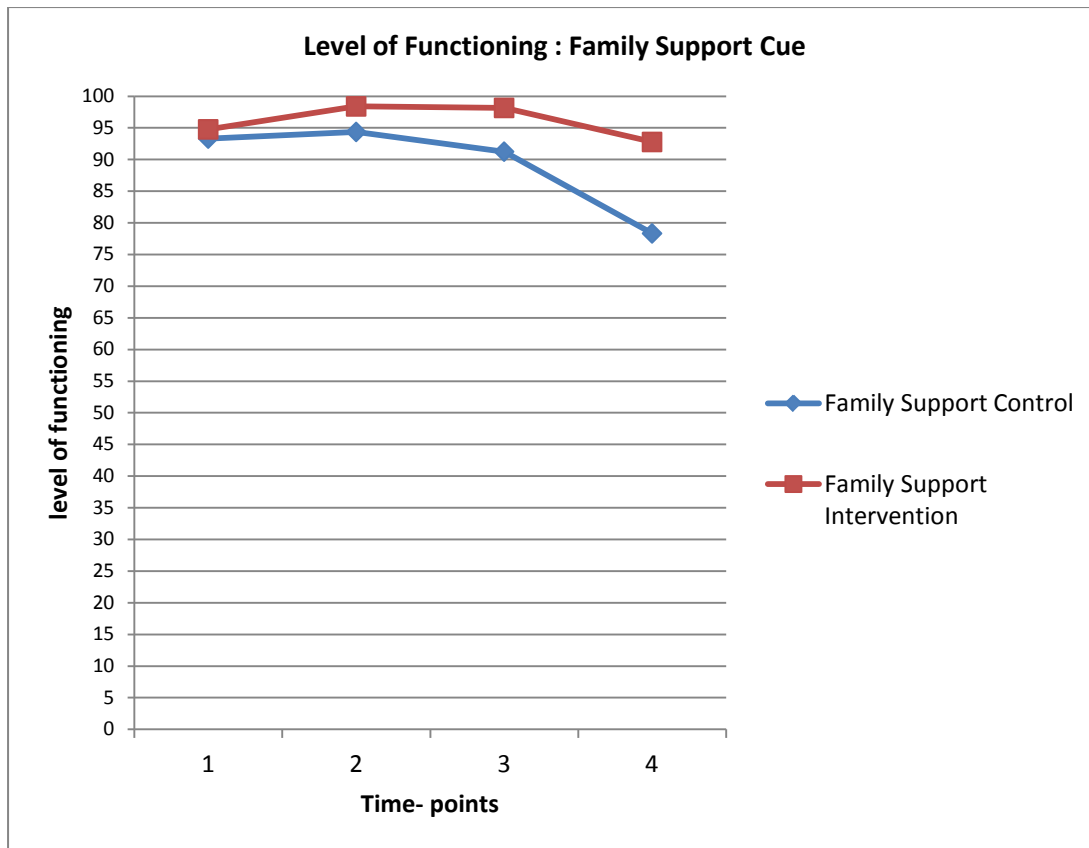


Figure 32

There was a decline of 3% in the control group compared to a 4 % increase in the intervention group in their perception of level of functioning of family support from time point 1 to time point 4. This difference is not significant $P=0.11$

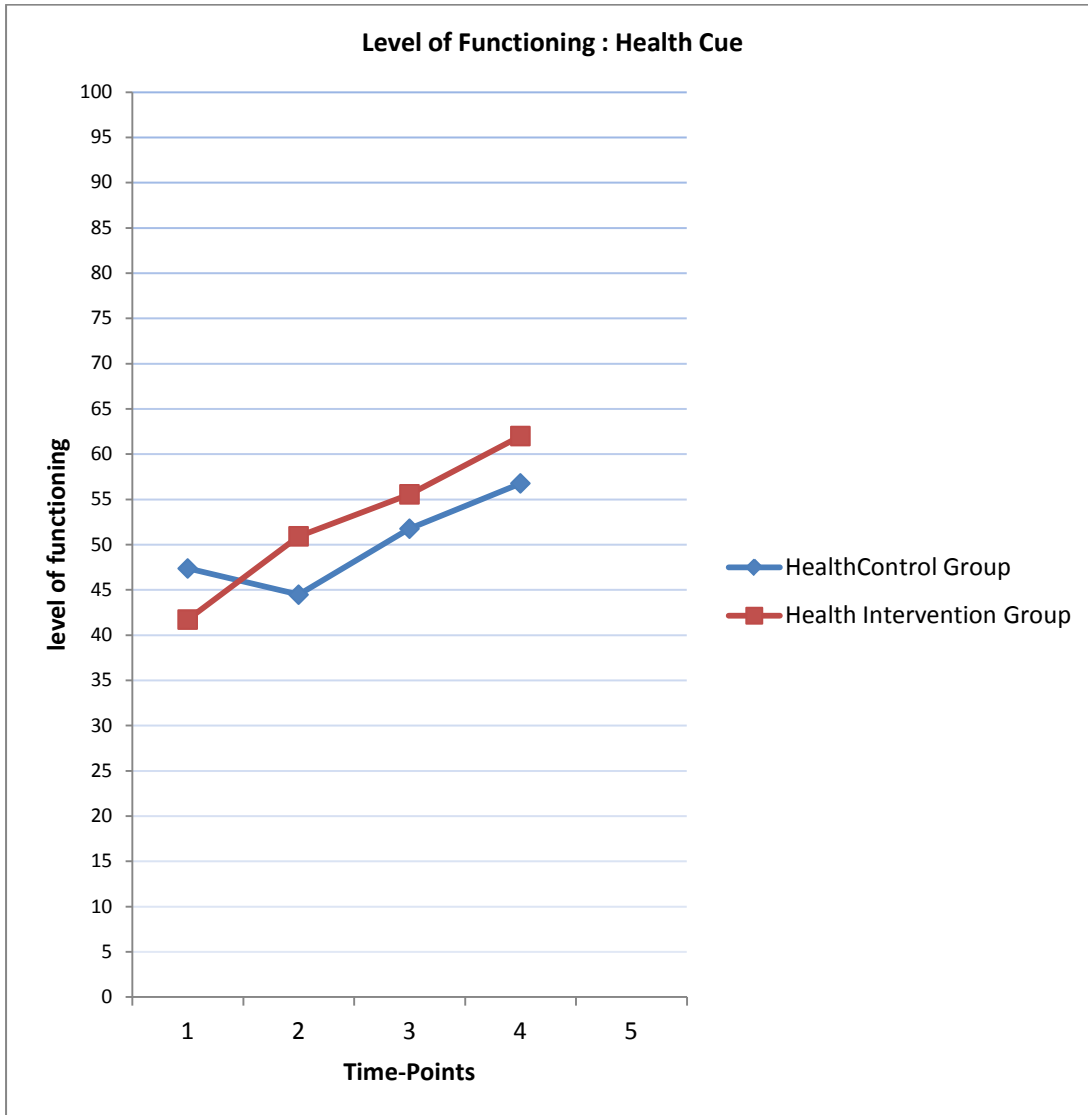


Figure 33

Table 36 Cue Levels Health Functioning						
Health		T1	T2	T3	T4	Total Gain from baseline
Control	MEAN	47.3666	44.47	51.76	56.77	+9.41 (19%)
	SD	22.4	22.5	29.4	29.8	
Intervention	MEAN	41.72	50.92	55.56	62	+21.28 (51%)
	SD	26.9	25.3	23.5	22.7	
P = 0.0014						

92% of patients nominated health as important to their quality of life. There was an improvement in health functioning of all patients; however, there was a statistically significant difference in health functioning between the intervention group and the control group. The intervention group demonstrated a 32% greater improvement than controls (P=0.0014).

These findings are important and are in keeping in line with the traditional model of medicine, where attention is focused on 'health'.

It would be anticipated as one area of life improves (i.e. health); the individual's focus of concern would shift toward salient areas of life that are less well functioning. It was

important to determine if there was a change in the mean weighting of the ‘health’ cue which might indicate a shift in participant’s values and may account for the apparent lack of differentiation in quality of life scores between groups.

A comparison of mean of the weighting of health between groups (intervention and control group) was conducted. The weight of importance of ‘health’ in the intervention group remained almost constant through-out time point 1,2 and 3 (t1=46, t2=46.6 and t3= 47.1) .This is keeping in line with the time periods where there was the greatest gain in health functioning. This suggests that there was no greater level of concern about health.

Interestingly, there was an increase in the weighting for health cue in the control group at time points 2 and 3 (t1=43.8, t2=48.7 and t3= 45.9) - this is keeping in line with the time periods where there was a decrease in health functioning of the control group, suggesting they has a greater level of concern about health at time-point 2 and 3.

Figure 34 to figure 36 below depicts the weights across time.

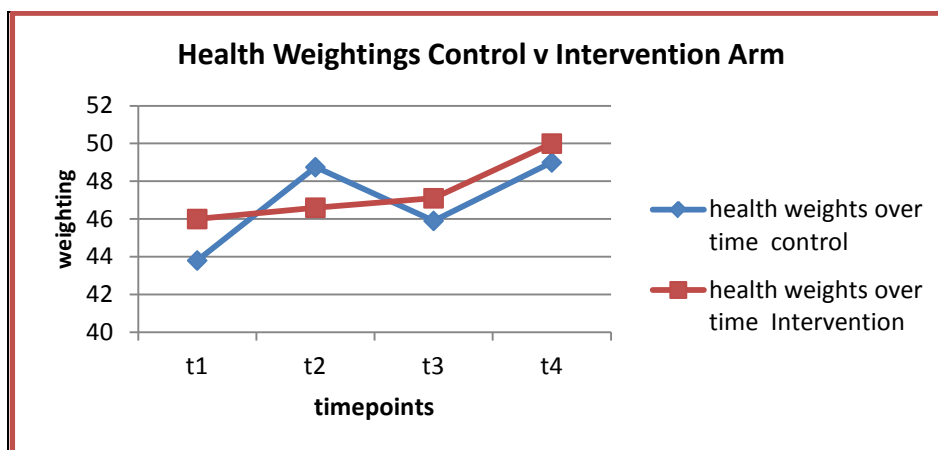


Figure 34 Health Weightings Control v Intervention Arm

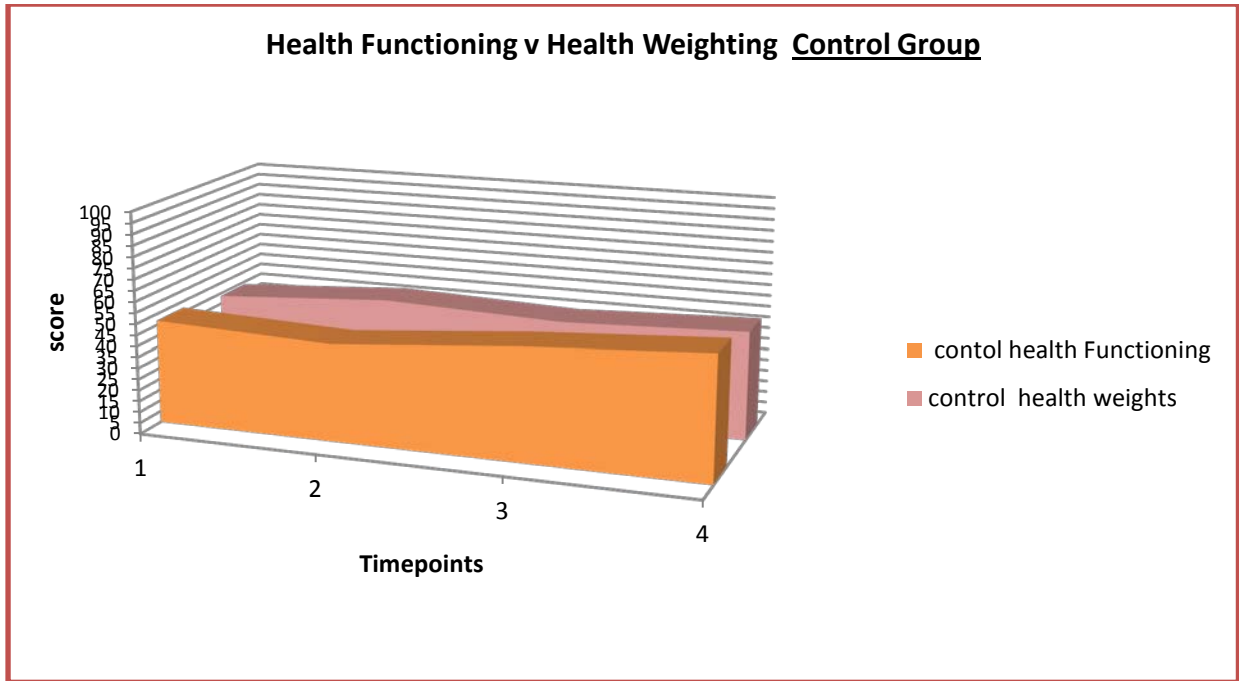


Figure 35 Health Functioning v Health Weighting: Control Group

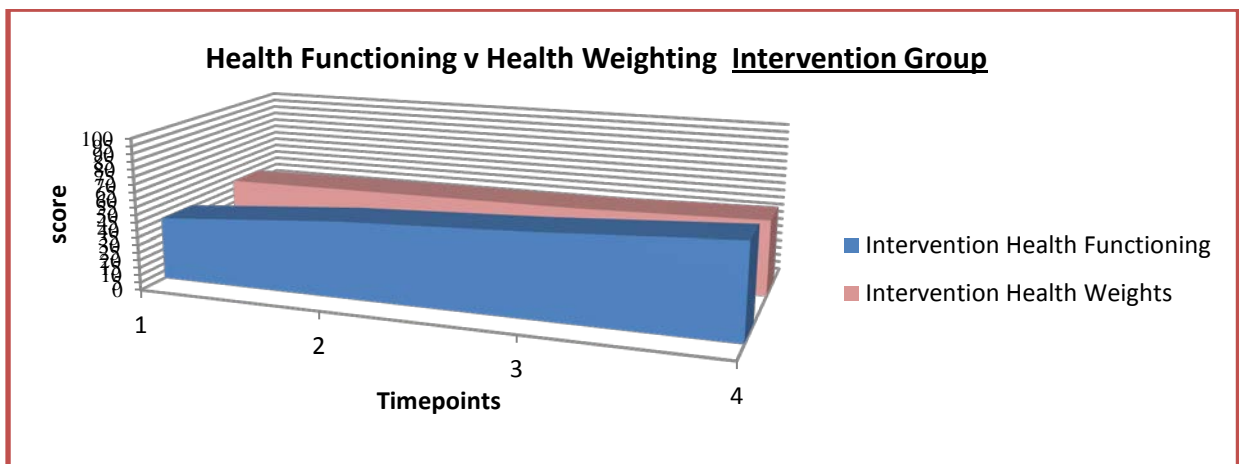


Figure 36 Health Functioning v Health Weighting: Intervention Group

7.21.5 Do patients with advanced cancer receiving chemotherapy have lower QoL scores than other patients and healthy populations ?

An unpaired t -test was used to test for similarities between this patient group and patients in other published studies using SEIQoL, using the means and standard deviations of the overall QoL results. Unpaired t-test analyses were completed by assessing the mean QoL score of the group being compared to the advanced cancer group and where the standard deviations from each group are similar; a two-tailed p value was obtained. If the standard deviations from the group being compared to the advanced cancer group were dissimilar, then Welch's corrected t-test was performed.. Table 37 below shows these results with all groups being compared to the advanced cancer group.

This produced some very interesting findings. The mean quality of life for this group is 65 and is comparable to the lung cancer group. There was a significant difference in subjective QoL between this group of patients and all of the other groups with the exception of the osteoarthritis (OA) group ($p=0.4$). This difference was highly significant in the prostate cancer group, the healthy elderly group and the healthy young group ($p<0.0001$). The significantly higher QoL in the prostate cancer group could be attributed to the fact that the majority of these patients (75%) had early stage disease at time of diagnosis. The significantly lower QoL in the palliative care group ($p=0.04$) is reflecting that this group, selected from a hospice in-patient unit were very ill, many were in the last weeks of their lives at the time of the study

Table 37:

Comparison of QoL in Patients in this and other populations

	This study N=65	Lung Cancer N=33	Pall Care N=80	Prostate Cancer N=76	HIV Asym N=33	HIV Sym N=19	Healthy Elderly N=56	OA Group N=20	Healthy Young N=40
Mean QoL Score	65.8	65	59	76.6	54.2	51.8	82.0	61	77.4
SD	14	12.1	17.8	15.3	17.06	19.56	12.2	18.8	9.5
SE	4.4	2.1	1.99	1.76	2.97	3.91	1.6	4.2	1.5
Lwr 95% CI	56.5	60.7	55.3	73	48	43.57	78.8	52.3	74.4
Upr 95% CI	74.3	69.29	63.3	80.1	60.2	60	85.4	69.8	80.3
Two tailed P value	<.000	.001	0.041 *	<0.0001	0.004 *	0.013 *	<0.0001	0.40 *	<0.0001

7.22 The Influence of Demographic Variables and Quality of Life

The SEIQoL Direct Weighting Index score was calculated by multiplying the level of the cue as indicated by the patient with the weight as indicated by the patient using the Direct-Weighting Methodology. This was calculated at each time- point. As the results of the SEIQoL DW between both groups were similar, analysis of data was conducted to determine if other variables influenced Quality of Life.

Observations made to determine if there were any significant differences in quality of life between genders, age group, treatment regimen, in patient versus outpatient status.

7.22.1 Is age positively correlated with the quality of life of the cancer patient?

A one-way between subjects ANOVA was conducted to compare the effect of age on quality of life. Subjects were categorised into age groups. Figure 37 depicts the group with the lowest quality of life at baseline –time-point 1 was that of the younger age group (20-29) and patients age 50-59 age group had the best quality of life at baseline albeit, there was no statistically significant difference in quality of life across age groups at baseline.

Certain age categories at either end of the spectrum were grouped in order to have large enough population to complete post hoc comparisons. Using the Tukey HSD test, the mean Quality of Life was significantly poorer at time point 2 for age group 20-49 compared to all other groups ($p < 0.005$). While at time point 3, the mean quality of life for age group 60-69 was significantly better than all other age groups at this time ($p < 0.005$).

SEIQoL* Age Group at Time-point 1

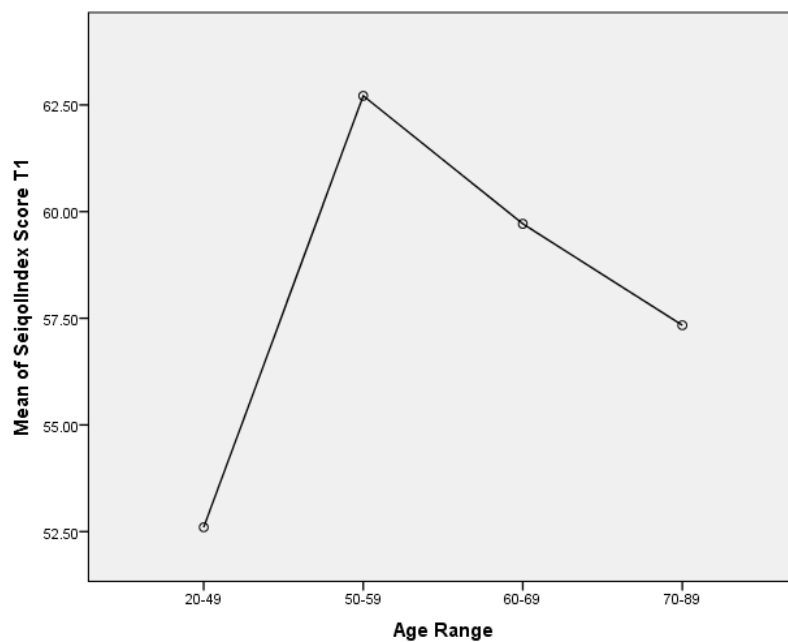


Figure 37 Quality of Life and Age profile T1

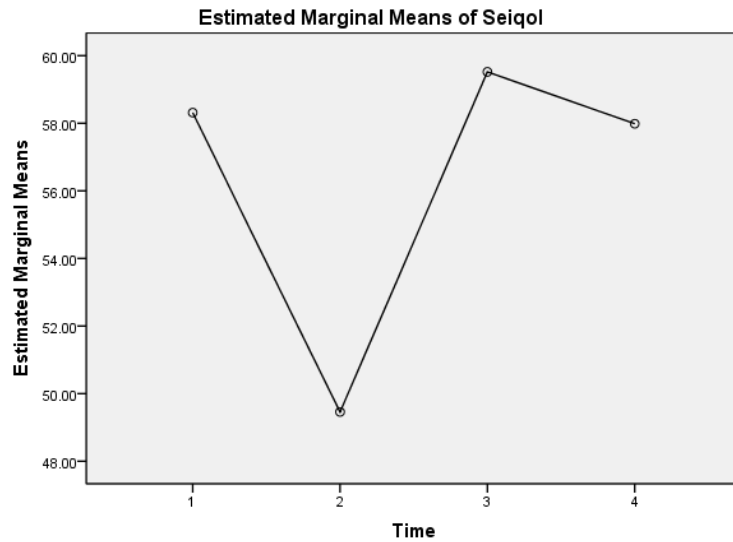


Figure 38 Estimated Mean of SEIQoL T1-T4 Age

7.22.2 Is there any correlation between the quality of life of the cancer patient and inpatient versus outpatient status?

Figure 39 below demonstrates the mean quality of life for outpatients was higher quality than that of inpatients at time-point 1. Although the difference is not statistically significant, patients who were embarking on their treatment on an outpatient basis reported their QoL higher than inpatients at this time.

An estimated margin of means was calculated over time for both groups. On looking at figure 40 below, it can be seen that Quality of life dipped to 45 at time-point 2 for the inpatients and recovered slightly but not to the level of time point one. While, conversely, the quality of life of outpatients improved from time point 1 to time-point 4 with the greatest improvement seen at time-point 3.

Comparison of Quality of life at Time point 1 Inpatient versus Outpatient

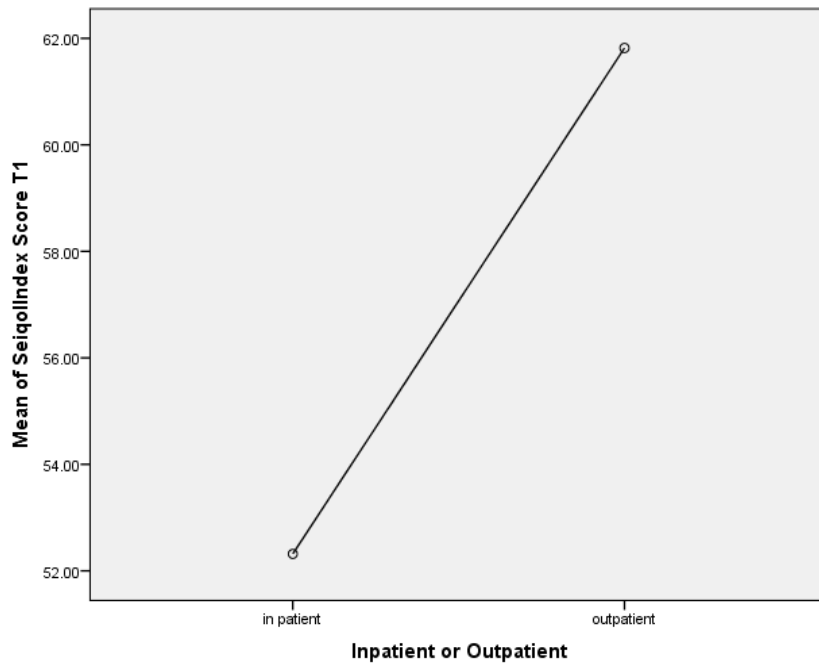


Figure 39 Mean QoL Index Score Inpatient V Outpatients

Mean Quality of Life Inpatients versus Outpatients over Time

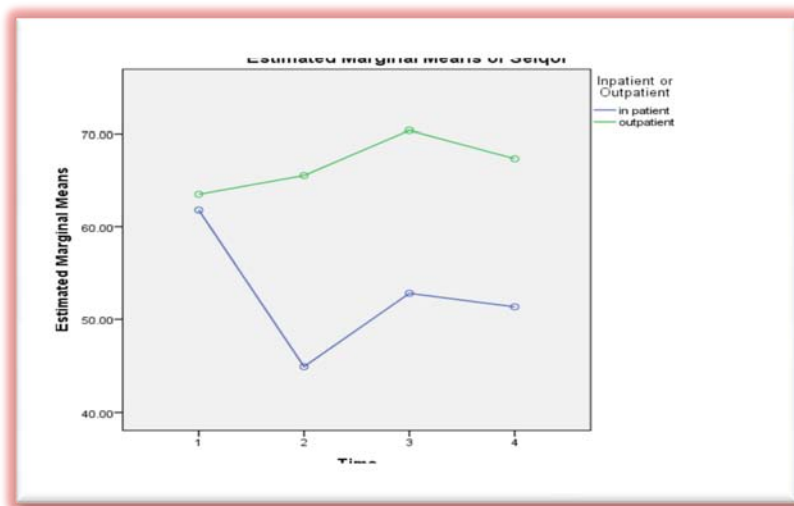


Figure 40 Quality of Life versus hospitalisation status T1-T4

7.22.3 Is there any difference between the quality of life and type of cancer over time?

Table 38 depicts the mean SEIQoL Index Score of participants across disease group over time. The column on the right of the table indicates the degree of improvement or decline across groups.

It can be seen that there is a decline in the mean quality of life across all disease groups with the exception of breast and oesophageal cancer and with the subject with teratoma.

The mean SEIQoL index score for participants with breast cancer improved by 26 points from T1 to T4 while the mean SEIQoL score for participants with oesophageal cancer improved by 41 points over from time-point 1 to time point 4.

The greatest decline in reported Quality of Life was with the participant with Melanoma - results show decline of -36.

Several tests were run to look at SEIQoL DW QoL over time across disease group. Robust tests of equality of means could not be performed because at least one group had the sum of case weights less than or equal to 1. Breast cancer and colon cancer were sizeable enough to remain as individual categories. All other cancers were grouped together and labelled 'other'. With the cancers grouped into colon, breast, and other, and with only considering T1-3 to minimise the effect of the rate of attrition, there appears that there may be a statistically significant variation between groups. It can be seen on Figure 41 that the Quality of life of patients with Colon cancer was significantly better than breast cancer at all time points ($p < 0.05$) and was significantly better than other cancers at time point 2 ($p = 0.024$).

Disease		SeiqollIndex Score T1	SEIQoL-Index ScoreT2	SEIQoL-Index ScoreT3	SEIQoL- Index ScoreT4	Difference between T1 and T4
Breast	Mean	48.0714	45.7000	49.5556	74.8000	+26
	N	14	10	9	5	
	Std. Deviation	19.28816	14.01626	24.65315	25.24282	
Oesophageal	Mean	38.0000	72.0000	70.0000	79.0000	+41
	N	1	1	1	1	
	Std. Deviation	
Colon	Mean	69.4762	71.7222	72.2143	67.4167	-2
	N	21	18	14	Index 12	
	Std. Deviation	22.50915	19.82810	21.35120	23.49645	
Prostate	Mean	50.6667	64.6667	65.6667	64.6667	-6
	N	3	3	3	3	
	Std. Deviation	28.04164	25.92939	19.85783	15.94783	
Lung	Mean	64.2000	57.0000	60.0000	54.0000	-10
	N	5	3	3	2	
	Std. Deviation	8.58487	12.76715	13.00000	5.65685	
Pancreas	Mean	51.6000	51.0000	44.0000	44.0000	-7
	N	5	2	2	1	
	Std. Deviation	19.75601	11.31371	1.41421	.	
DGastric	Mean	85.0000	78.0000	73.0000		-12
	N	1	1	1		
	Std. Deviation	.	.	.		
Ovarian	Mean	56.0488	44.5000	67.0000	33.0000	-23
	N	8	6	4	1	
	Std. Deviation	30.75942	30.21754	16.57307	.	
Melanoma	Mean	65.0000	5.4000	57.0000	29.7000	-36
	N	2	1	1	1	
	Std. Deviation	1.41421	.	.	.	
Renal	Mean	69.5000	65.0000			-4
	N	1	1			
	Std. Deviation	.	.			
Teratoma	Mean	22.0000	48.0000	38.0000		+16
	N	1	1	1		
	Std. Deviation	.	.	.		
Osteosarcoma	Mean	22.000	N/A	N/A	N/A	-----

SEIQol DW and disease group over time

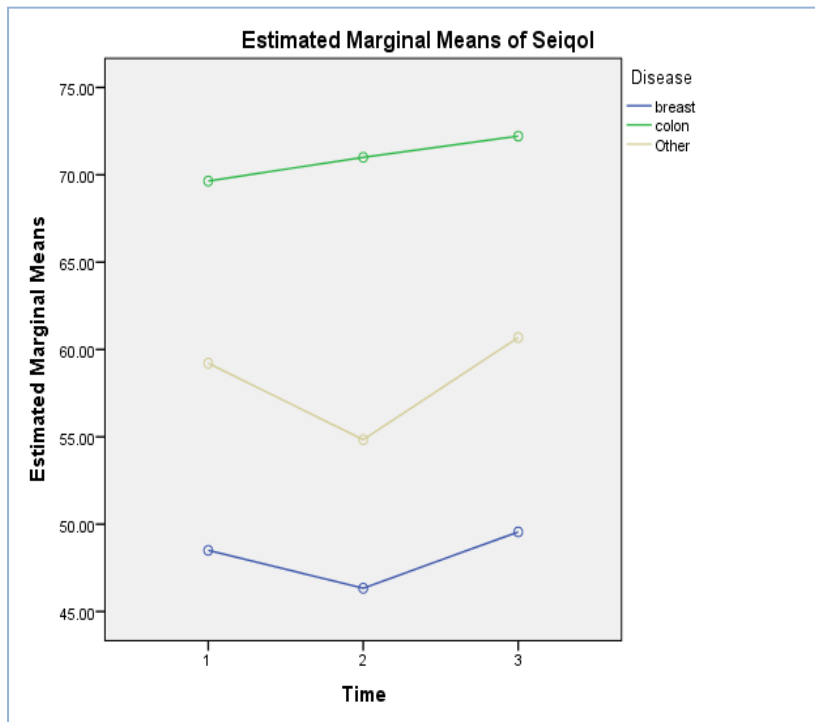


Figure 41 Quality of Life and Disease T1-T4

		gender		Total
		male	female	
Disease	Breast	0	14	14
	oesophageal	1	0	1
	Colon	14	7	21
	Prostate	3	0	3
	Lung	2	3	5
	Pancreas	3	2	5
	Gastric	1	0	1
	Ovarian	0	8	8
	Melanoma	2	0	2
	Renal	1	1	2
	osteosarcoma	0	1	1
	Renal	1	0	1
	Teratoma	0	1	1
Total	28	37	65	

7.22.4 Is any relationship between quality of life and treatment regimen of patients receiving chemotherapy for metastatic cancer?

Given the diversity and small sample populations for some treatment regimens, data was regrouped into three treatment regimen categories: folfox, docetaxel and other.

A one-way between subjects ANOVA was conducted to compare the effect of treatment regimen on quality of life.

There was a significant effect of treatment regimen on quality of life at the $p < .05$ level [$F(1, 2) = 5.031, p = 0.012$].

Post Hoc comparisons using Bonferroni test revealed a statistical difference between the Folfox group and the “other treatments” group ($p = 0.009$). (Figure 42)

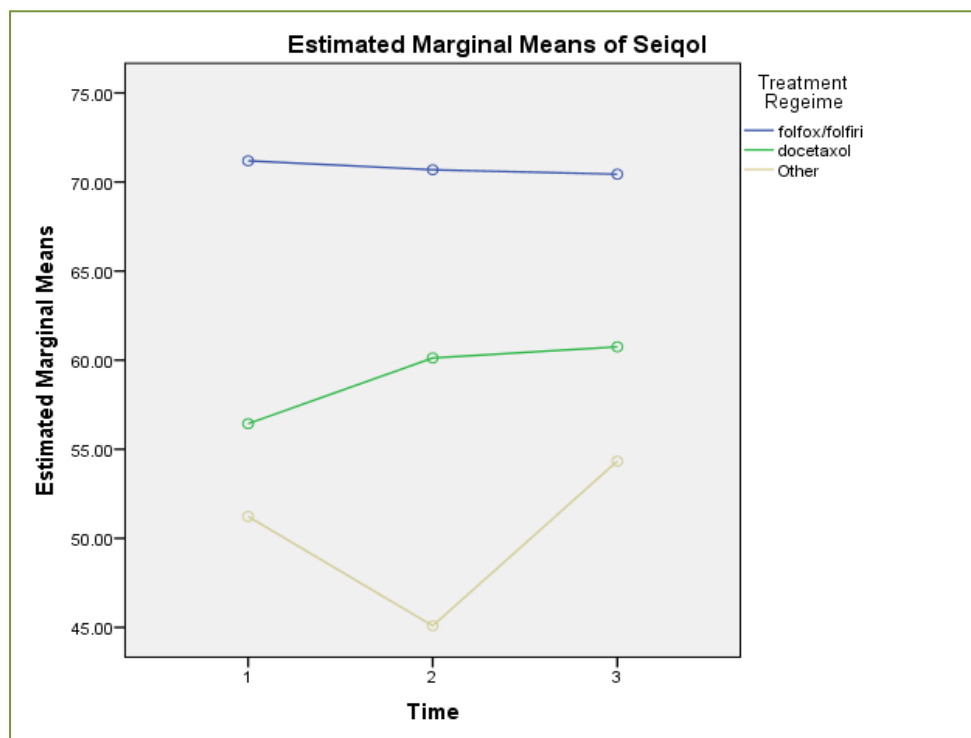


Figure 42 Quality of Life and Regimen T1-T4

7.22.5 Is any relationship between quality of life and the line of treatment patients of receiving chemotherapy for metastatic cancer?

Figure 43 below indicates the mean quality of life score of patients at time point 1. Patients on their first line of treatment for metastatic disease had a lower quality of life with a mean of 56 compared to those commencing their third line of treatment – mean 68. A one-way ANOVA of line of treatment yielded no significant differences between groups in regard to overall quality of life of experienced over time ($F(2,61) = 0.838, P=0.437$)

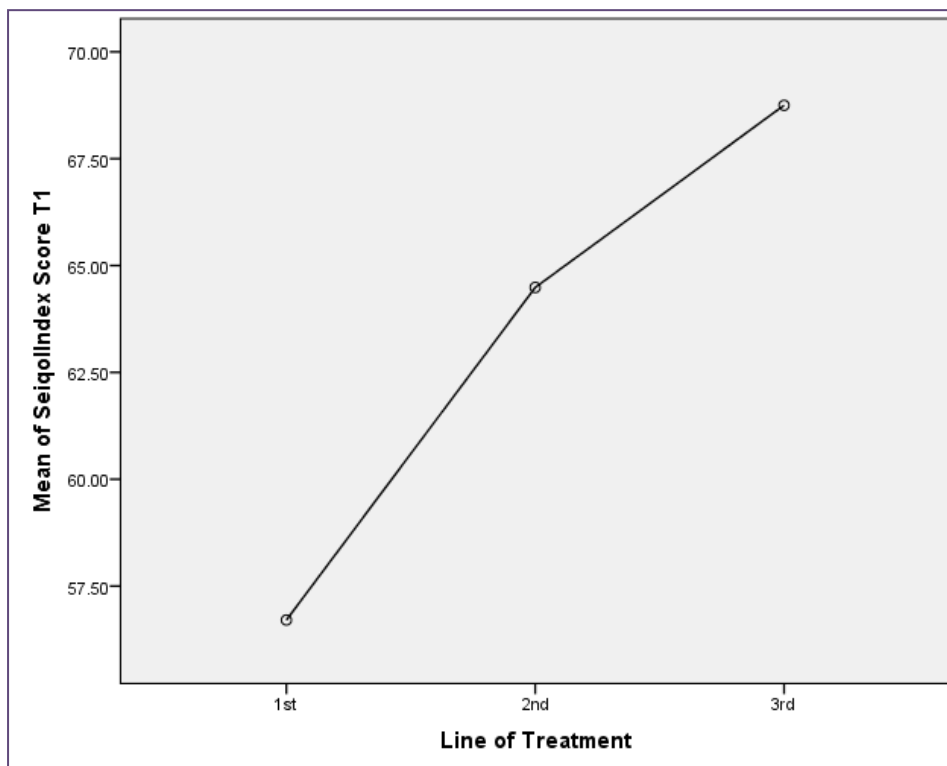


Figure 43 Quality of Life and Line of Treatment T1-T4

7.22.6 Is there is any difference between the quality of life and gender type of patients with metastatic cancer?

There was no significant difference in quality of life at baseline between males and females. A one-way analysis of variance revealed significant difference between the gender and quality of life at time-point 2 only, $F(1, 46) = 6.38, p = 0.015$.

Curiously, inversion in quality of life between groups occurred at time point 4 with the quality of life higher in males and lower in females at time point 1. At time point 4, the quality of life is lower in males and higher in females (Figures 44-47).

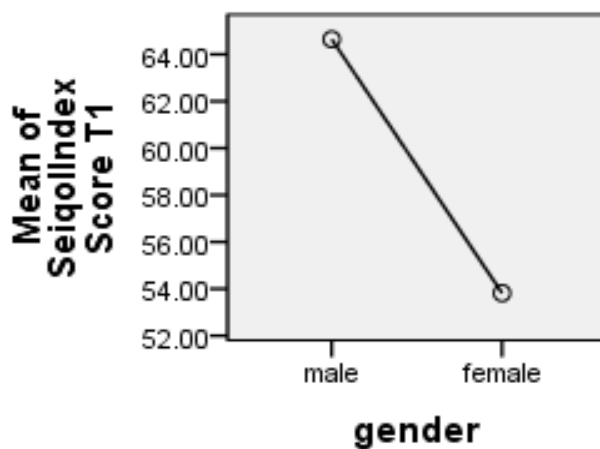


Figure 44 Quality of Life and Gender T1

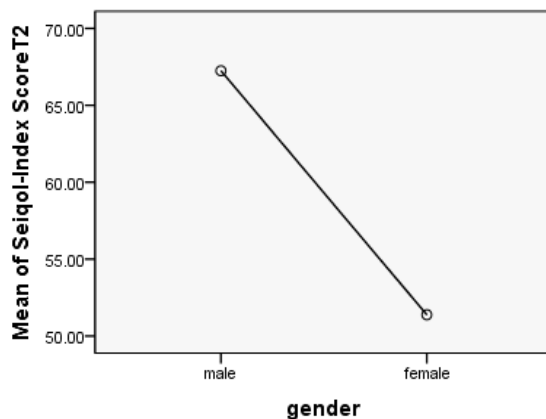


Figure 45 Quality of Life and Gender T2

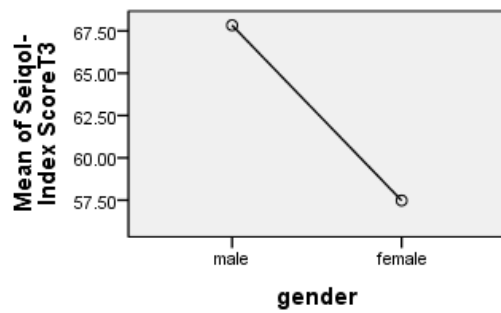


Figure 46 Quality of Life and Gender T3



Figure 47 Quality of Life and Gender T4

7.22.7 Conclusion

The effects of independent variables on quality of life of patients receiving chemotherapy for advanced cancer are summarised.

Overall, Quality of life was poorer at time-point 2 for patients in the 20-49 age group categories while that age 60-69 had significantly better quality of life at time point 3 compared to any other group.

As expected, patients who were receiving chemotherapy on an outpatient basis experienced better quality of life than those who were getting chemotherapy on an inpatient basis. There was a continuous improvement in the quality of life of outpatients over time, while the inpatients had an overall decline in their quality of life from time-point 1 to time point 4 with a very pronounced dip in their quality of life at time point 2.

Cancer type: the greatest improvement in quality of life across cancer type can be seen in oesophageal cancer with a gain of 41 points. However, as there was only 1 patient with oesophageal cancer this result cannot be generalised. Breast cancer patients had a mean improvement in quality of life by 26 points. Patients with melanoma experienced the greatest decline in their quality of life -36 points while overall, the quality of life of patients with colon cancer was significantly better than those with breast cancer at all times and it was better than all other at all times other than time point 2.

With regard to cancer treatment regimens, there was no significant difference in the quality of life of those who received folfox folfiri regimen typically administered for the treatment of colon cancer compared to docetaxel, typically administered for the treatment of breast cancer. However, there was a significant difference between the quality of life of those who got folfox/ folfiri regimen and all other chemotherapy regimens.

Men had a higher quality of life at baseline, it being significantly better than women's quality of life at time point 2 but by time-point 4, the quality of life of men had declined to lower than baseline, while the quality of life of women was much greater at time-point 4 than it was at baseline.

In summary, it can be seen that independent variables have varying effects on quality of life.

7.23 Issues of Relevance to the Individual Patients

As QoL is individual in nature the most valid means of measuring QoL is by self report. In this study the issues of relevance to patients with advanced cancer QoL were ascertained in step 1 of the SEIQoL interview 'cue elicitation'.

Patients were asked to nominate 'the five most important areas of their life at present' which were termed 'individual cues'. Over the course of the study there were 184 SEIQoL interviews performed.

All cues and descriptions nominated by individual patients were documented .To assist in analysis; cues were re-labeled and categorized under the most fitting description into one of 17 categories. Table 40 shows the cues of relevance to QoL nominated by this patient group.

Health was the most frequently nominated cue, nominated by 59 out of 65 cases (92%). This was followed by social contact (65 %) and keeping active (58%).Family was very important to the participants either in terms of having support from the family (family support 43%) or being concerned about the welfare of the family (family well being 34%) or being at home surrounded by family(29%)

Table 40 Cue Frequency

Cue	%
Health	92
Social activity	64
Keep active	58
Family support	43
Family wellbeing	34
Being home	29
Religion	23
Worry/Stress free	23
Maintain normal activities of daily living (ADLs)	18
Work	18
Financial security	17
Pass-time	15
Service	11
Symptom control/symptom free	8
Communication	6
Appearance	3
Intimacy	1.5

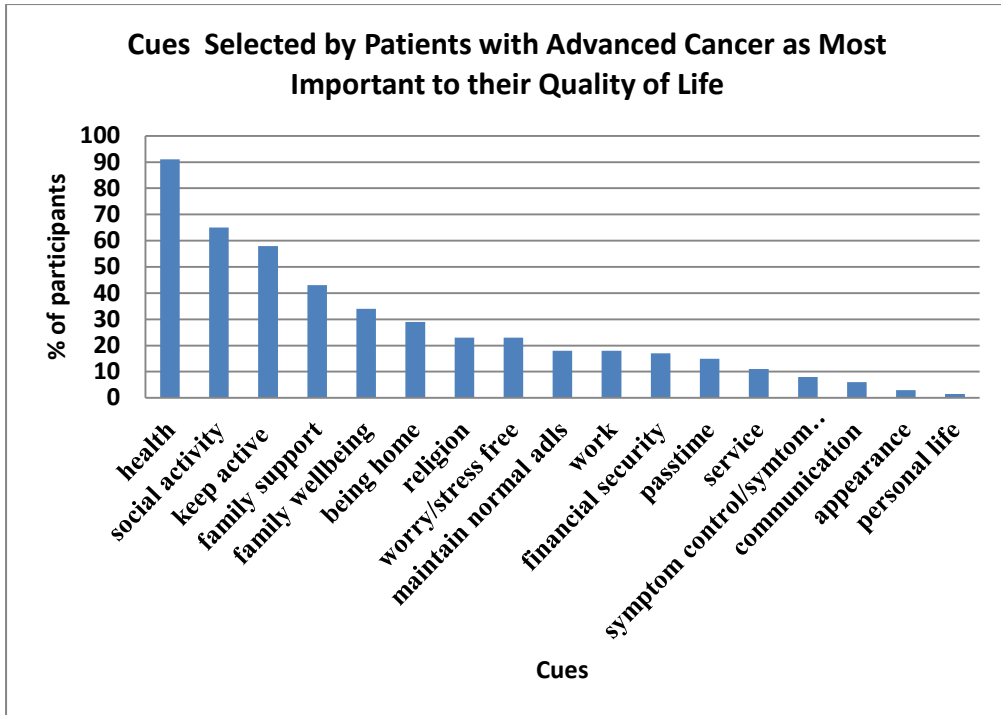


Figure 48 Cue Frequency

It can be seen from figure 49 that the mean health of all participants at time point one was 44. This improved gradually over the course of treatment to a mean of 57 at time point 4.

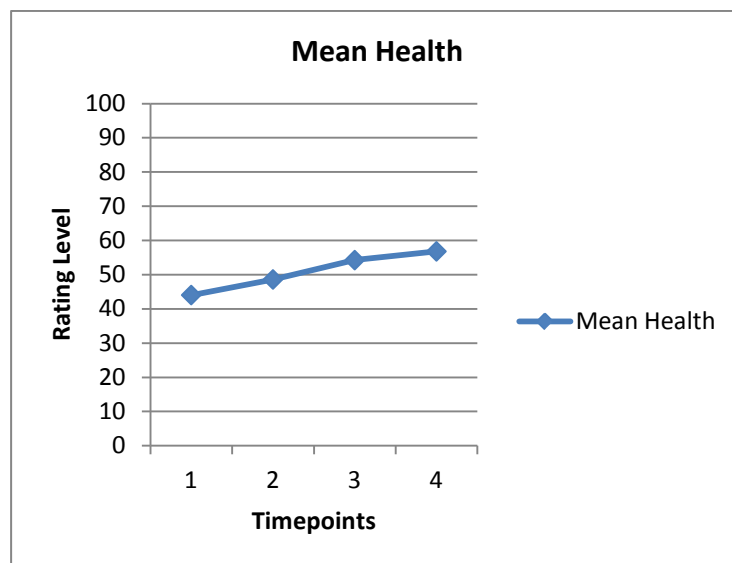


Figure 49 Health functioning over time

Social activity was very important to this population. This would be expected for two reasons (1) many of the patients are receiving their 1st line of treatment for metastatic disease and most likely had active social lives until their recent disease relapse and (2) The Irish culture is world renowned for enjoying an active social life.

It can be seen that the patient did not experience any re-conceptualization or shift in their opinion of the value of this cue as social activity remained important in this group though out the course of time. However, the level of functioning decreased over time amongst the group (figure 50).

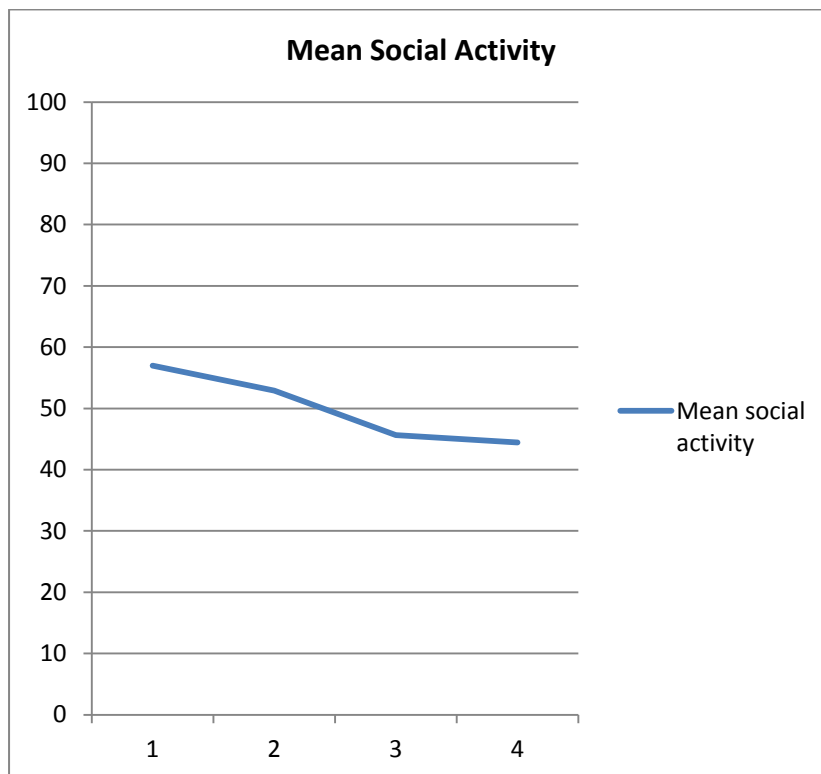


Figure 50 Social Activity functioning over time

Family support was also very important to 43% of patients. It is not surprising that the support from the family is relatively high at the Time point 1 and the level of family support reduces over time as the patient adjusts to their circumstances.

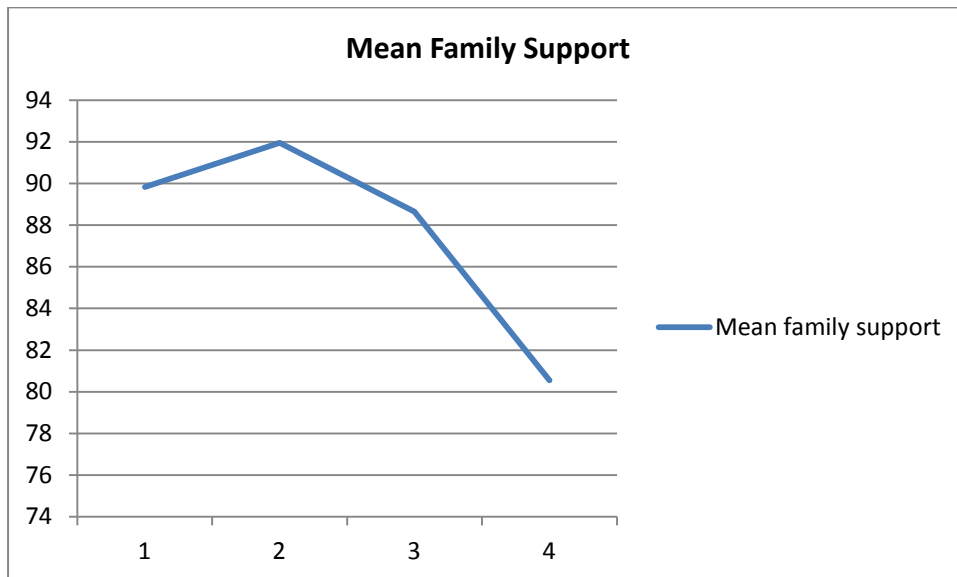


Figure 51 Family Support functioning over time

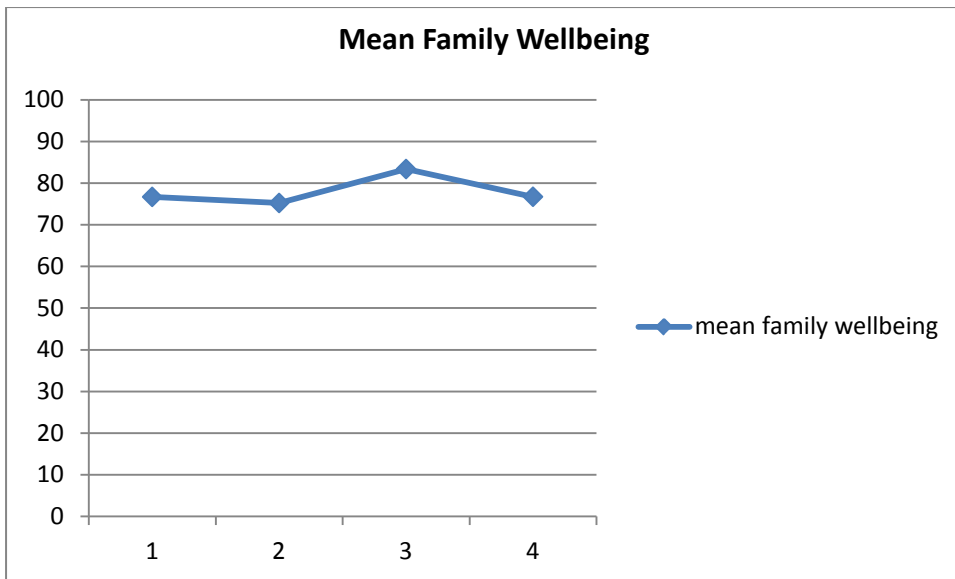


Figure 52 Family Wellbeing functioning over time

Being stress free was important to 23 percent of patients. It can be seen in figure 53 below, stress level were higher at time point 1 and at time point 4. This is not unexpected as patients usually have repeat scans at time-point 4 to determine the efficacy of the chemotherapy on their advanced disease. It is a time of great worry and stress.

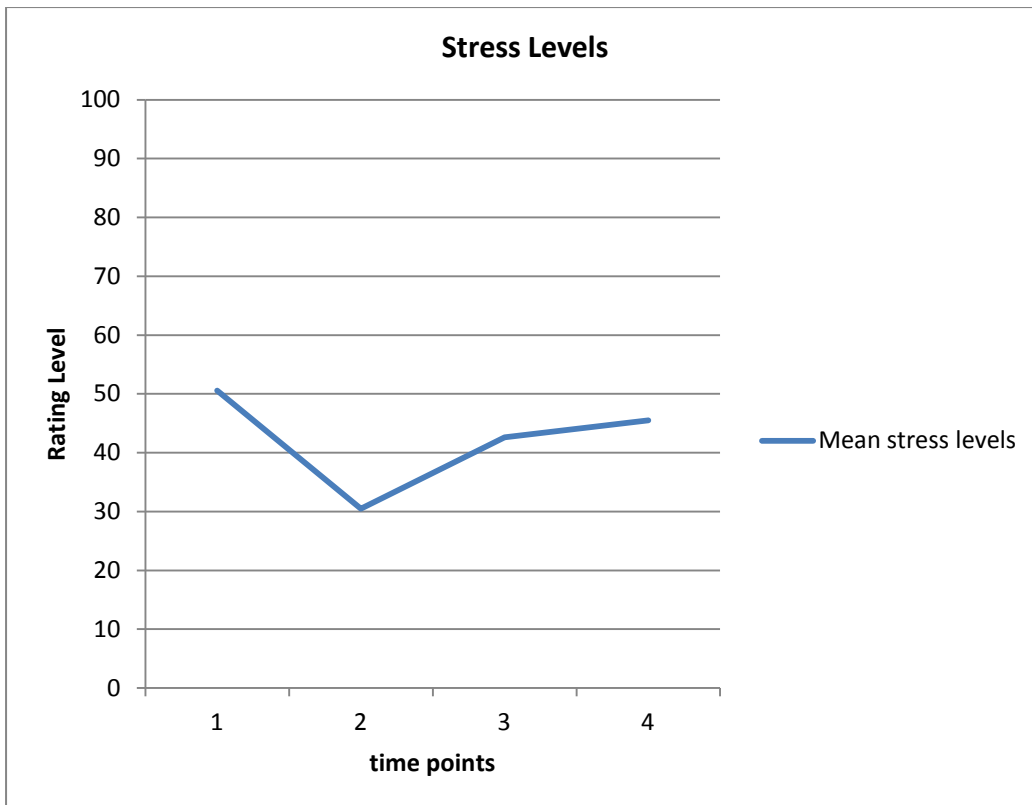


Figure 53 Stress levels over time

Other cues nominated with the frequency shown were not really surprising. Religion was important to 25% of the patients. This differs significantly from those in Waldron's study of palliative care patients with whom religion was important to all patients. Table 7.23.1 compares the top 10 cues elicited by other groups in previously published studies using the SEIQoL tool.

7.23.1 Table comparing the 'top 10 cues' elicited by other groups, (both well and chronically ill patient groups) involved in other published SEIQoL studies

CUE %	This Study	Lung Cancer Study n=75	Palliative Care n= 80	Prostate Study n=76	HIV asymp. n=33	HIV symp n=19	Healthy Elderly n=56	Osteo Arthritis n=20	Healthy Adult n=40
Health	92	92	69 *	57 **	70 *	72 *	91	50 **	83
Family	43	78	94 *	83	61	83	89	70	62
Religion	23	72	38 **	0 **	9 **	28 *	75	45 *	7 **
Social/Activity (pastimes)	15	49	45	37	30	33	95**	75*	38
Finances	17	45	19 *	37	61	56	25 *	50	60
Home /Living conditions	29	28	0 **	41	0 *	0 *	80 **	0 *	21
Work	18	18	19	20	15	6	5	45 *	38 *
Friends (social activity)	64	18	38 *	25	30	33	18	45 *	86 **
Independence/ Mobility	58	5	13	20 *	0	0	0	0	0
Relationship with partner	1.5	5	13	65 **	39 **	22	0	0	0

*p< 0.05 for Chi-square comparisons of all groups with Advanced Care group.

**p< 0.0001 for Chi-square comparisons of all groups with Advanced Care

Equivalence in cue definition across studies is a challenge due to the property of individuality of the SEIQoL tool.

7.24 Psychometric Properties of SEIQoL and SEIQoL-DW

In the analysis of the psychometrics of an instrument for clinical use there are four main considerations: acceptability; validity; and reliability of the instrument and responsiveness to change over time. All of these properties are examined below. The psychometric properties of the EORTC questionnaire is not dealt with in the same detail as SEIQoL as it has been well tested in a cancer patient population before and SEIQoL or SEIQoL-DW have not been used to the same extent in this patient population.

7.24.1 Is SEIQoL –DW and SEIQoL JA acceptable tools to assess QoL in patients with advanced cancer ?

All patients completed SEIQoL – DW with ease at each time point. The time taken (mean 12 minutes) was similar to EORTC completion and is similar to results of other studies in other populations .There were no negative responses on completion of SEIQoL – DW.

SEIQoL JA proved more challenging for a number of patients with some patients declining. This will be discussed further in the next paragraph. However, for those that did complete the SEIQoL JA, all the cues nominated were tested for measures of internal validity as part of the SEIQoL JA analysis and were found to have extremely high R^2 reflecting that patients were nominating areas of importance to their QoL (Mean $R^2 = .76$)

7.24.2 Is SEIQoL – DW more acceptable than SEIQoL to assess QoL in patients with advanced cancer ?

SEIQoL has been well tested in healthy and ill populations as discussed in earlier chapters. However there has been some criticism of SEIQoL as a measure for use in ill patients , one being that “ the method is long winded and technically demanding” (Ahmedzai 1993). In this study, 65% of patients completed at least one SEIQoL JA whereas 100% compliance rate to completing SEIQoL DW. The primary reasons for non-completion of the SEIQoL JA by 35% was difficulty in understanding the concept .Some patients were incorrectly applying the global score on the individual cues and found the tool too confusing while a small number of patients considered it inappropriate to apply quality of life scores to hypothetical cases.

Similar to finding in other studies, SEIQoL JA took longer to complete than SEIQoL – DW (mean time 24 minutes versus 12 minutes). It required a greater degree of concentration which may be a burden to ill patients and it involved a greater degree of explanation. For these reasons SEIQoL – DW is more acceptable for patients with advanced cancer.

Table 41 represents the time taken for patients to complete both assessments.

Time in minutes	SEIQoL JA	SEIQoL - DW	EORTC
Mean	24	12	11
Median	27	13	12
SD	+/_ 6.86	+/_ 4.51	+/_ 2.52

7.24.3 Is SEIQoL JA and SEIQoL DW reliable measurement instruments:

Reliability refers to the ability to produce consistent results, and to produce this on different occasions, when there is no evidence of change. SEIQoL JA looks at a form of test – retest reliability by replicating 10 cases during the JA procedure. The internal reliability (r) can be calculated using a Pearson Product Moment Correlation and a value >0.7 is considered acceptable. In this study the mean r was 0.76; median 0.80; SD 0.14. The mean r values at the 4 study time points are displayed in Table 42

Cronbach's alpha was used to examine the internal consistency within the SEIQoL DW .In this case the case alpha is slightly above .80

ICC scores for all analyses were above the established lower boundary of 0.70 and indicate good internal consistency and reliability.

Table 42 Internal Reliability of SEIQoL JA

Internal Reliability of SEIQoL JA						TOTAL
		T 1	T2	T3	T4	Overall
Total	Mean	.7581	.7404	.7305	.8257	.76
	Std. Deviation	.16773	.14673	.16384	.08501	
	Median	.8000	.7900	.7900	.8550	0.81

7.24.4 Are SEIQoL and SEIQoL-DW valid measures of individualized QoL?

Validity is the extent to which an instrument measures what it is intended to measure (Steiner and Norman, 1989) - in this case individual QoL. According to Anastasi (1988) the 'validation process begins with the formulation of detailed trait or construct definitions, derived from psychological theory, prior research or systematic observation and analysis of the relevant behaviour domain'. Hence, to begin to discuss the validation of these instruments, the definition behind this validation process is clearly stated as follows: 'QoL is what the individual says it is'. Subjective health assessment scales are evaluated in terms of their content, construct and criterion validity for use in outcomes research and clinical practice (Albrecht, 1994). The following results provide a detailed analysis of SEIQoL with regard to its content, construct and criterion validity and the results of SEIQoL-DW are included with regard to information from step one and two of the SEIQoL, as they are the same. There is a slight variance but non-significant difference in the overall QoL score between both tools with the mean SEIQoL (65.82, SD +/-16.66) and mean SEIQoL-DW (61, SD +/-22.02). There is a high correlation (0.90). Tables 25 depict mean quality of life across time points.

7.24.5 Content validity

Content validity refers to the representativeness or sampling adequacy of the content purportedly measured by the scale, in this case individual QoL. In other words, does

SEIQoL include a representative sample of the behaviour domain under measurement and exclude irrelevant factors. The structure of the SEIQoL is such that individuals themselves generate the sample of items (cues) for inclusion in the QoL assessment.

The number of cues elicited was set at five for a number of reasons previously discussed. To summarise these reasons: research indicates that most individuals experience difficulty in making judgments requiring the combination of information from a large number of cues and studies of decision making have made use of relatively few cues (Stewart, 1988b); The number of cases which the individual must judge increases in direct proportion to the number of cues on which the judgments must be made; Ten cases are required for three cues and a further 5 cases for each additional cue (Policy PC Manual) thus giving a requirement of 20 cases for 5 cues; In the SEIQoL, 10 replicates are also included to calculate internal reliability. This gives a total requirement of 30 cases.

There are two properties of SEIQoL to reflect content validity: 1) Individual cues are nominated by the patient and 2) Internal validity of cues can be calculated.

7.24.6 Individual cues

Patients nominated a number of individual cues which fell into 17 different themes or categories. Health was nominated by almost all participants while the actual symptom related issues ranked fourteenth in frequency of concern. SEIQoL tool ensures that the individual profile is maintained and thus the output i.e. the domains nominated by the individual is validation of the content. Table 43 below shows the cues of relevance to individual quality of life as nominated by this patient group.

Table 43 Cue Frequency

Cue	%
Health	92
Social activity	64
Keep active	58
Family support	43
Family wellbeing	34
Being home	29
Religion	23
Worry/stress free	23
Maintain normal adls	18
Work	18
Financial security	17
Pass-time	15
Service	11
Symptom control/symptom free	8
Communication	6
Appearance	3
Personal life	1.5

7.24.7 Internal validity

Internal validity is an approach necessary to determine the confidence by which this information/output can be interpreted as truly reflecting patient issues.

The extent to which judgment policies derived from JA explain the overall judgments of QoL made by the individual may be assessed from the variance (R^2) estimate (internal validity) provided by Policy PC. Higher variance scores indicate that the combination of cues elicited is, in fact, that used by the individual in making overall QoL judgments. An acceptable mean internal validity score should exceed 0.7. The R^2 results in this study were consistently high with a mean of 0.75. The majority of patients therefore nominated the areas of relevance to their QoL with little variance. These results are comparable to the R^2 results from other published studies and can be seen on table 44 below.

Table 44 Internal validity (R^2) of judgment analysis in a number of SEIQoL studies to date

Internal validity (R^2) of judgment analysis in a number of SEIQoL studies to date	
STUDY POPULATION	MEAN R^2
This Study (Advanced Cancer on active treatment= 65)	0.75
Lung Cancer (n=75)	0.86
Palliative Care (n=80)	0.86
Prostate Cancer (n=74)	0.82
Healthy Adults (n=42)	0.75
Healthy Elderly (n=56)	0.72
Osteoarthritis Pts undergoing total hip replacement (n=20)	0.62
Irritable Bowel Syndrome (n=28)	0.73
Peptic Ulcer Disease (n=28)	0.79

7.24.8 Criterion validity

Criterion validity concerns whether or not the variable (QoL) can be measured with accuracy. Criterion validity is usually measured by the extent to which a new measure is correlated with existing measures. This is sometimes referred to as 'gold standard' measures because their validity has been clearly established. If the measure and a 'gold standard' are administered simultaneously, and a high correlation is demonstrated, then the new measure is said to possess 'concurrent criterion validity'. If a gold standard is to be administered at some time in the future, and its results predicted are by the new measure, then the new measure demonstrates 'predictive criterion validity'. However, as discussed earlier, there is no gold standard available to measure QoL. To overcome this problem, what has been done in research to date in the area of QoL measurement is that a new instrument is correlated against a gold standard measure of a concept that is closely related to QoL, such as an established HRQoL measure. If the correlations are too high, i.e. greater than 0.8, then this would imply that the new instrument is measuring health status rather than QoL, while a weak correlation, i.e. 0.2, would suggest the measure is invalid (Ruta and Garratt, 1994). SEIQoL results in this study are assessed for 1) Concurrent criterion validity and 2) Predictive criterion validity.

7.24.9 Concurrent criterion validity

As discussed above SEIQoL and SEIQoL-DW were correlated against a well established, well validated cancer specific HRQoL instrument, the EORTC-QLQ, and also against the VAS single question assessment of QoL. Pearson Product-Moment correlation was calculated and as can be seen in table 45 SEIQoL-DW had moderate correlation with the EORTC and the VAS tool result while the SEIQoL JA correlated poorly with both EORTC and VAS tool.

Table 45 Pearson's Product Moment-Correlation of overall QoL scores from each measure used

Pearson's Product Moment-Correlation of overall QoL scores from each measure used				
No Selector	SEIQoL JA	EORTC QL2	VAS QoL	SEIQoL – DW
SEIQoL JA	1.000			
EORTC QL 2	0.265	1.000		
VAS QoL	0.269	0.436	1.000	
SEIQoL - DW	0.90	0.464	0.396	1.000

Conclusion: The SEIQoL and SEIQoL-DW are highly correlated and may therefore be interchangeable. There is a small to moderate positive correlation with other measurement tools in this study. This further substantiates the argument presented in the construction of the individualised definition of QoL i.e. it is not measuring exactly the same thing as the other two measures. Therefore, SEIQoL and SEIQoL-DW have good concurrent criterion validity.

7.24.10 Predictive criterion validity:

Predictive criterion validity concerns the ability of the scale used to predict the expected results as a gold standard. In the absence of a gold standard, this will serve to predict expected results as compared to the next best thing, a gold standard. Hence, as SEIQoL has been well validated in other patient groups, then comparison with these published studies will give a good indication of predictability in this patient group. Two aspects are important to assess with regard to prediction: a) whether the cues elicited are again predictive when compared to the elicited cues of other groups and b) whether the scores of overall QoL are as could be expected when compared to other groups studied with the same instrument.

7.24.11 Construct validity

Construct validity refers to the power, adequacy and precision of the constructs which theoretically underpin the actual measurement instruments. "Construct validity attends to the theoretical adequacy of the model being employed and allows the researcher to test alternative explanations and to construct causal arguments from the results of studies. If a scale has good construct validity, then other constructs and theories should not be able to explain the results with equal facility" (Albrecht, 1994). So, construct validity asks 'does the measure assess the theoretical construct of individual QoL?' Three fundamental aspects of the SEIQoL interview help to establish this 1) *unique individual cue generation*; 2) *individual weighting of cues can be assessed and*; 3) *individual QoL profiles*, all of which supply specific information not likely to be generated by prejudged questions or assessments that do not look for relative weightings. This can be assessed by looking at the difference in cue nomination specific to the individual, also by examining some individual patient profiles to detect unique cues and to look at the weighting assigned to these cues.

Most traditional measures purporting to measure QoL provide the individual with a pre-determined list of items which are previously weighted on the basis of grouped data. This study shows that, while a number of cues frequently assessed by such instruments were often elicited using the SEIQoL (e.g. health, social activity and family), other cues such as keeping active, pass-times, finance and work were also nominated. Cues unique to a single study participant were also elicited regularly. Tables 46 outline some unique individual cues generated in this study, indicating the need for an individual approach to QoL assessment.

Table 46 Cues Nominated less frequently by Patients with Advanced Cancer

Cues nominated less frequently by patients with advanced cancer	
Peace of mind	Communication
Sexual Activity	Gardening
Religion	Keeping fit
Appearance	Family Unity
Normal Household	Life Satisfaction
Having a partner	Swimming

7.24.12 Individual weighting of cues: evidence of need for an individual approach to QoL assessment

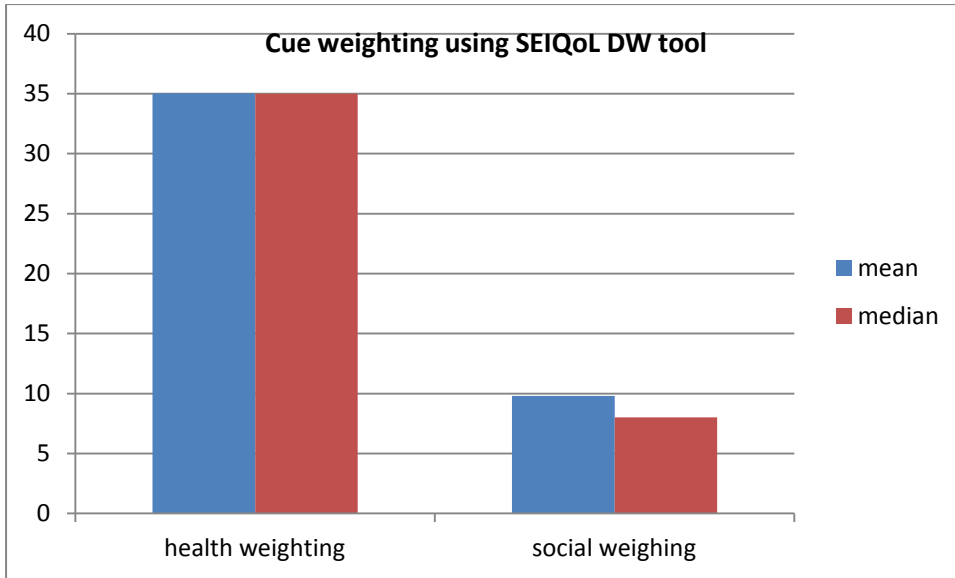
Without observing the weights given to these unique areas it is not possible to say just how important these areas are to the individual. The patient profiles outlined in this chapter reflects the importance of looking for individual cues with weighting from patients in the context of clinical interpretation. In this section, the importance of weighting cues is discussed in a group context.

There is a tendency to presume that health is of great importance to the QoL of patients with advanced disease and hence, all QoL measures used to date have used HRQoL questionnaires to measure QoL. It is therefore important to analyze the information obtained from SEIQoL to see if this is what patients themselves feel and to see if there are other areas of equal or more importance to patients facing a terminal illness. The first two nominated cues were therefore analyzed, both from weights generated by SEIQoL and SEIQoL-DW in order to see what relative weightings were given to these cues. As outlined in Figures 48 the two most frequently nominated cues in this patient population were Health (92%) and Social activity (64%).

Using the Judgment analysis method, the mean weighting for Health was 35.1; median 35 ; SD 19.23 For social activity the mean weighting was 9.8; median 8 ;SD 13.63.

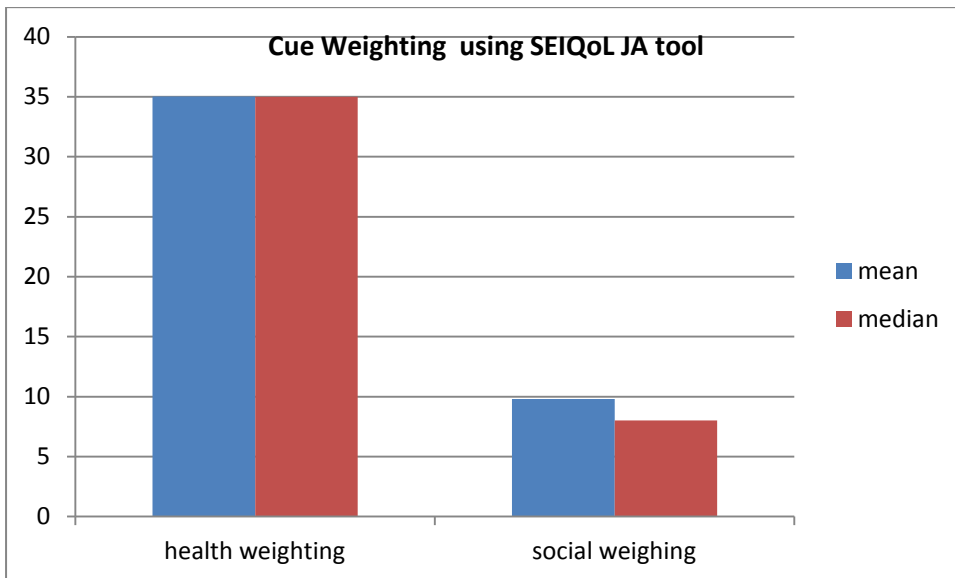
Using the direct weighting method the mean weighting for Health was 42.11; median 40; SD 20.38. For social activity the mean weighting was 9.9; median 8; SD 10.81.

It is interesting to note that the weighting results are almost similar with no significant difference between both tools and this further demonstrates criterion validity of the SEIQoL DW tool. It is not surprising that the weighting for health is relatively high and although social activity has been identified by 64% of the patients as important, it can be seen that the weight of importance is relatively low.



Comparison of mean relative weighting of cues ' Social Activity ' and 'Health' using the SEIQoL Direct Weighting approach.

Figure 54a: Mean weighting of cues using SEIQoL DW



Comparison of mean relative weighting of 'Social Activity' and 'Health' using Judgement Analysis approach

Figure 54b: Mean weighting of cues using SEIQoL JA

The value of a patient profile towards a better understanding of Quality of Life

SEIQoL levels multiplied by the corresponding weights can be summed to achieve an overall QoL score. The value of this score is that it allows patient groups and QoL instruments to be compared and it also allows for prospective assessment and analysis of patient QoL. There is a certain impersonal element to the assessment of QoL as an overall score. To reduce an individualized methodology to a number belies the essence of the application. Four randomly selected patient profiles will now be discussed and depicted in an info-graph format which will demonstrate the individuality of the patient and the value of individual profiles.

Individual Patient Profile # 1: 61 Year old male

The patient profile depicted in figure 55 and figure 56 was a 61 year old man with 4 grown up sons. His passion was hurling and he spent a lot of time training his local team and being involved in local GAA events. He had a very close relationship with his wife and family. He was just diagnosed with pancreatic cancer and was starting his first cycle of chemotherapy. Health was functioning at a level of 63% and its relative importance to other cues was 0.4 (out of a possible 0->1). Communication with the family was important with its level of functioning being 100 (out of a possible 100) and its level of importance relative to other cues being 0.3). The SEIQoL index = 78.56 and $R^2 = 0.89$.

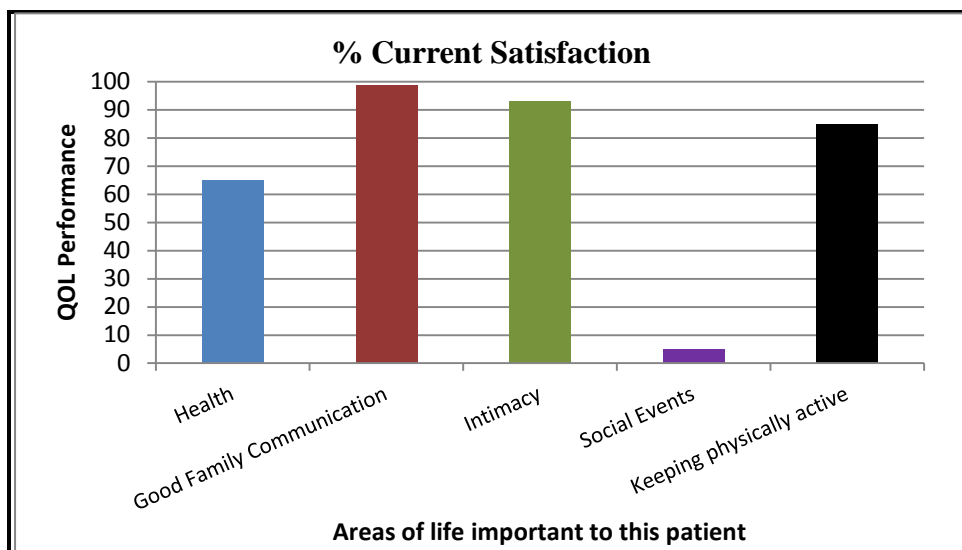


Figure 55: Male with pancreatic cancer: Cues of importance and level of functioning at T1

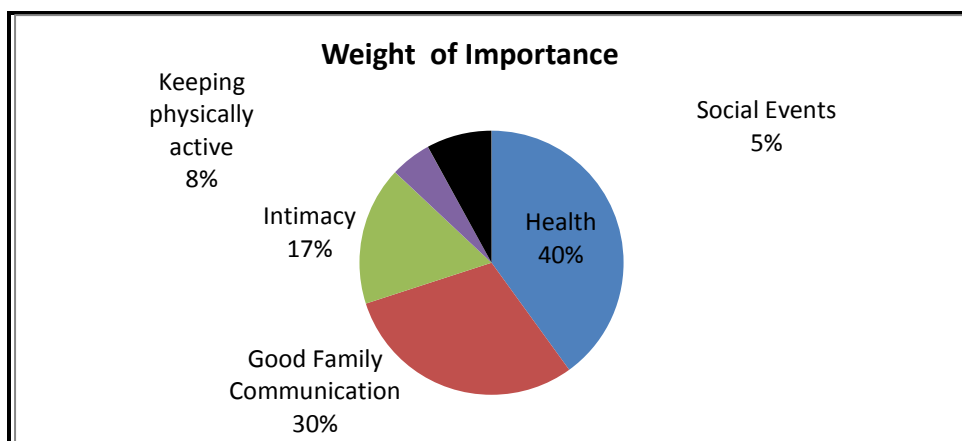


Figure 56 Male with pancreatic cancer: Weighting of cues at T1

Individual Patient Profile # 2: 67 year old female

The patient profile depicted in figure 57 represents the cues nominated by female aged 67 years diagnosed with recurrent breast cancer. She had recurrent metastatic disease to the liver and she was an in-patient for commencement of her 2nd line treatment for recurrent disease. She spoke quite positively and had an optimistic outlook. Her self- rated level of functioning of health was 68 (out of a possible 100). She rated its relative importance as .35 (out of a possible 0->1) (figure 58). Her husband was deceased and her primary concern was for wellbeing of her three sons and daughter. The SEIQoL Index score = 76.34 and $R^2 = 0.87$

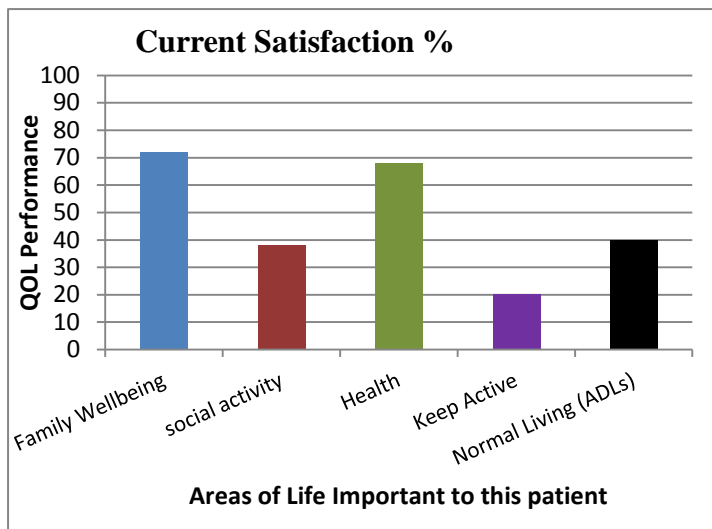


Figure 57 Female with breast cancer: Cues of importance and level of functioning at T1

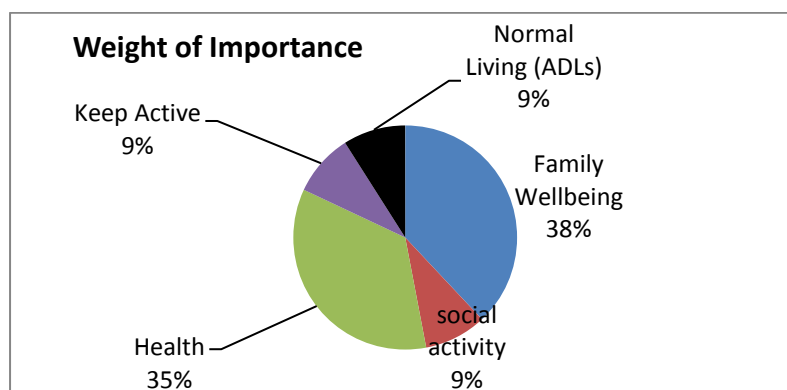


Figure 58 Female with breast cancer: Weighting of cues at T1

Individual Patient Profile # 3: 66 year old female

Figures 59 and Figures 60 below represents the individual areas of concern for a 66 year old lady with breast cancer. This is the first episode of disease recurrence. She was attending the oncology day ward for her 1st cycle of chemotherapy. She was accompanied by her sister. She was visibly distraught about her disease and this distress is reflected in the low level of functioning she nominated to health (16 out of a possible 100). She found the whole diagnosis very stressful and nominated freedom from stress as important to her giving it a relative importance of 0.09 (out of a possible 0->1).

Although, this patient has less disease burden and is clinically at an earlier stage of disease, it is interesting to see the contrast between this patients self-rating of her health and the previous patients self-rating of health .This supports the need to focus on the individual person and the individuals' quality of life. The SEIQoL Index score = 59.65 and $R^2 = 0.88$

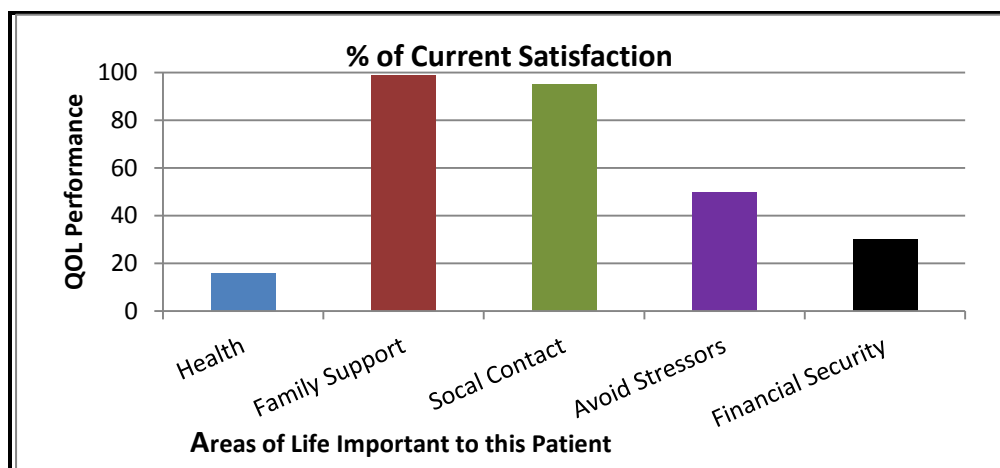


Figure 59 Female with breast cancer: Cues of importance and level of functioning at T1

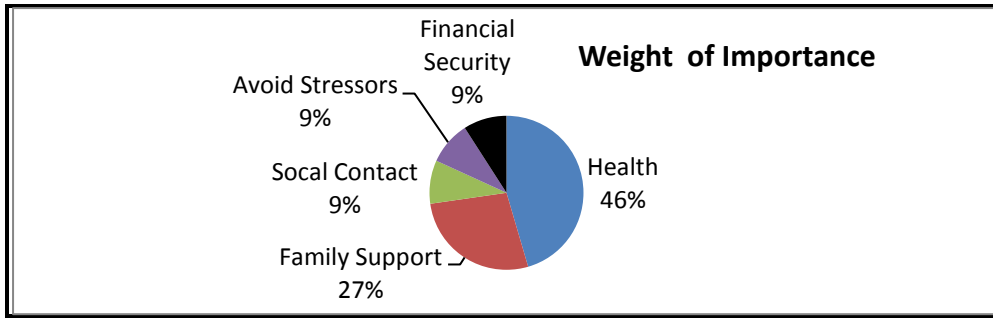


Figure 60 Female with breast cancer: Weighting of cues at T1

Individual Patient Profile # 4: 46 year old male

Figure 61 and 62 represents the individual profile of a young 46 year old man who was diagnosed with metastatic lung cancer. This assessment was taken during his first cycle of chemotherapy. He selected just 4 domains of importance to him. He had two teenage sons and their welfare took precedence over his health in terms of relative importance (.52 out of a possible 0->1) with health being secondary importance at a weight of 0.31 (out of a possible 0->1).

The SEIQoL index score was 59.65 and R2: 0.89

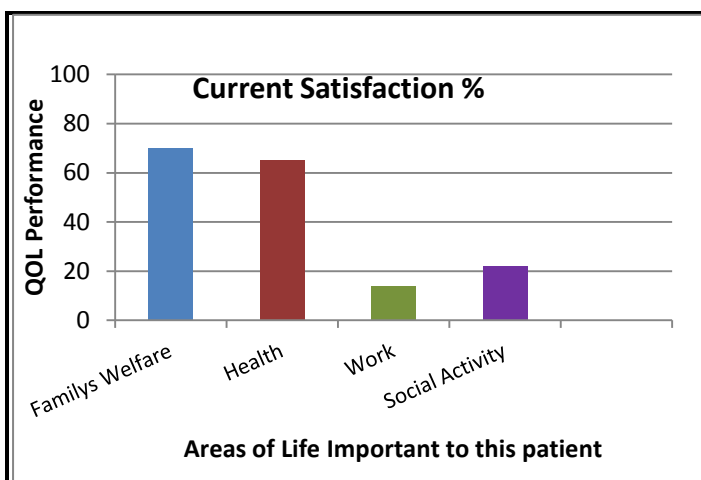


Figure 61 Male with lung cancer: Cues of importance and level of functioning at T1

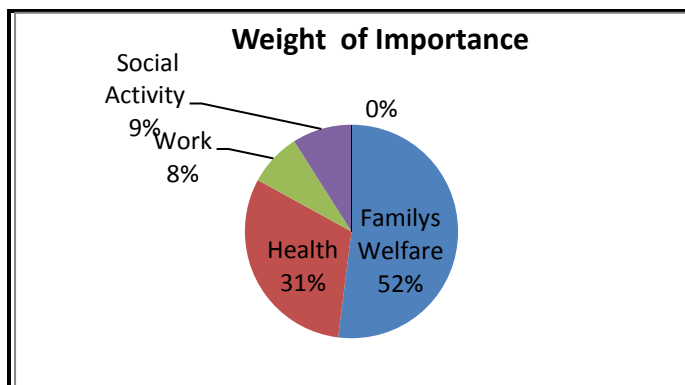


Figure 62 Male with lung cancer: Weighting of cues at T1

Conclusion:

Patients nominate single cues unique to their lives, with an unpredictable importance rating (weighting) of cues. SEIQoL patient profile results as discussed, reflect the deeper insight into the minds of individuals facing a shortened life span, and also reflect the unpredictable variation between individuals on what influences their QoL. All reflect the need for an individualized approach to QoL measurement.

7.24.13 Are SEIQoL and SEIQoL – DW interchangeable for clinical measurement of an overall QoL score ?

The SEIQoL – DW was derived from the SEIQoL and developed for use in populations for whom the full SEIQoL might prove impractical (Hickey 1996; Browne & O' Boyle 1997). In a palliative care population Waldron found a high correlation between global QoL scores for SEIQoL and SEIQoL – DW (Pearson's $r = 0.923$) and good concordance when the "limits of agreement" were assessed between the two measures. In a population with lung cancer Mannion et al (1993) found there was also a high correlation between global QoL scores for SEIQoL and SEIQoL- DW (Pearson's $r = 0.87$).

This study also found acceptable correlation coefficient (Pearson's $r = 0.90$) for SEIQoL DW and SEIQoL JA predictions. These results indicate that SEIQoL and SEIQoL- DW are interchangeable for clinical measurement of an overall QoL score.

7.25 Response Shift in QoL

In recent year the concept of response shift has been introduced into the field of QoL assessment and to date there is little published work looking at the concept of response shift in patients with advanced cancer. In this study we assessed for evidence of response shift by incorporating the ‘then-test’ into the SEIQoL –DW methodology as outlined earlier in this chapter.

By doing so, we hope to understand the true changes in QoL for patients with advanced cancer and to increase the accuracy of future studies incorporating QoL assessment.

7.25.1 Is there a response shift in subjective QoL of patients with advanced cancer receiving chemotherapy ?

The ‘then-test’ was performed using SEIQoL – DW at T2, T3 and T4 and compared with the mean SEIQoL-DW QoL scores to assess for evidence of response shift at these different time points. The results are outlined in Table 47.

The mean SEIQoL – DW score was 58.55 at first interview at T1. At the second interview, (T2) the mean SEIQoL –DW score was 62.25. A paired t-test revealed no significant difference between scores ($p=0.59$). However at T2 when patients were retrospectively asked to rate their QoL at T1 (1st T-T) they rated it much higher, mean SEIQoL – DW score was 62.5, indicating a response shift of 4.05 points. A paired t-test comparing the mean SEIQoL – DW score at T1 and the ‘then-test’ score shows no significant difference between scores ($p>.05$). There were similar findings at time point 2. However at time point 3, there was a significant difference between scores. ($p<.032$). These results suggest that response shift is occurring in this study population. This has significant implications both for the interpretation of previous studies that have not allowed for response shift and for the design of future studies in which QoL is used as an outcome measure. By explicitly measuring response shift it may be possible to assess changes in perceived QoL with greater validity and sensitivity.

Table 47 Mean SEIQoL –DW QoL and Then-Test (T-T) Scores T1 –T4

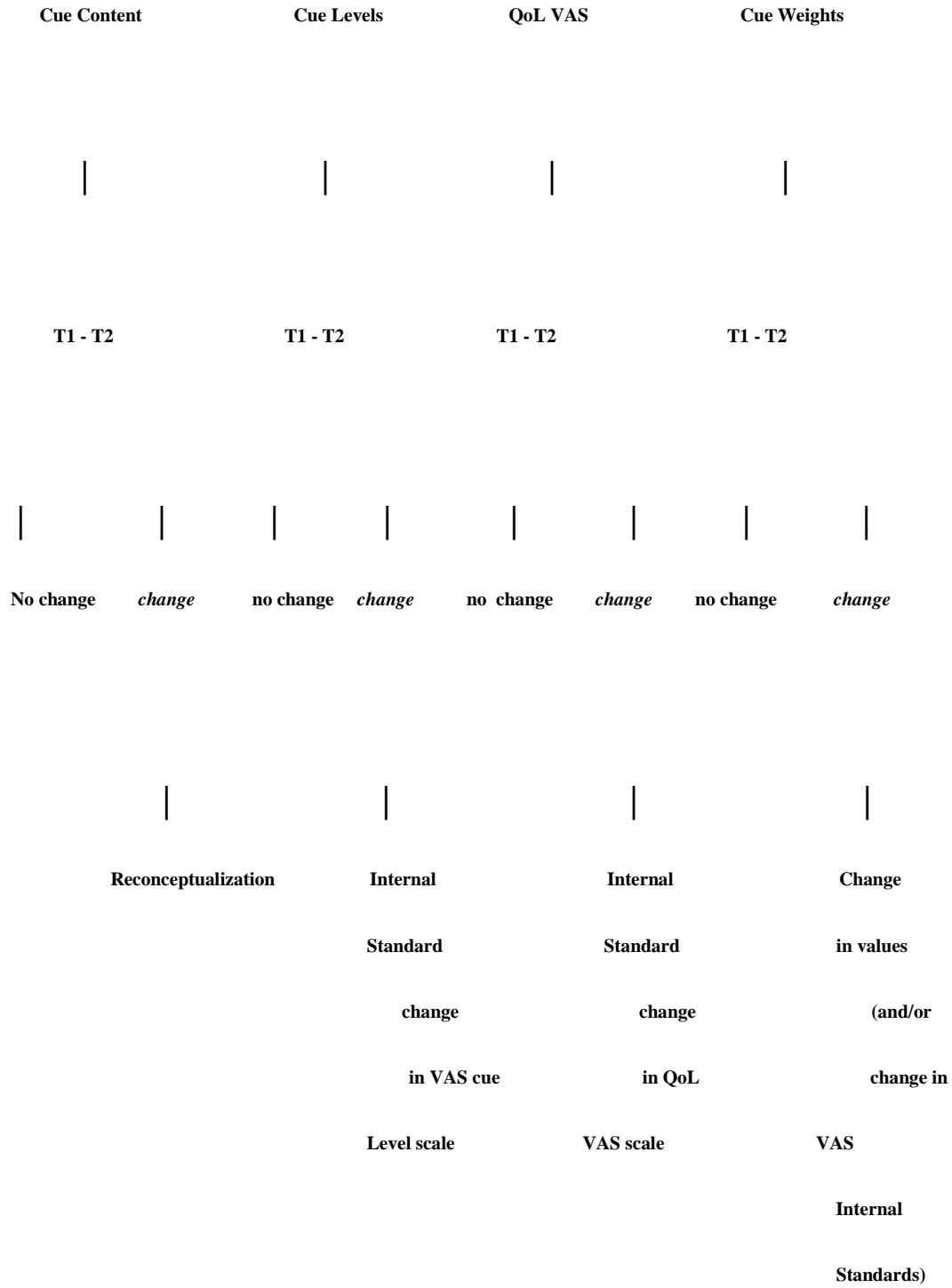
Mean QoL Score	T1 (n=65)	T2 (n=51)	1 st T-T (n=51)	T3 (n=41)	2 nd T-T (n=41)	T4 (n=27)	3 rd T-T (n=27)
SEIQoL – DW	58.5530	58.6542	62.5556	62.2564	60.3333	64.2577	63.0067
Response Shift	n/a		4.00		1.78		.75
P value*	n/a	0.596	.671	.187	.644	.384	0.032

P* = Paired t test

7.25.2 Can the Schedule for the Evaluation of Individualized QoL (SEIQoL) be used in this population to assess for possible response shift?

O'Boyle et al have described how the SEIQoL can be adapted to measure response shift (O'Boyle, McGee & Browne,2000). The diagram overleaf demonstrates how the various components of the SEIQoL might relate to the various types of response shift proposed by Sprangers and Schwartz previously discussed. If the SEIQoL were administered on two occasions Time one (T1) and Time two (T2), changes in the content of the cues selected by the respondents as being the most important to their QoL would reflect re-conceptualisation. Changes in values would be reflected by changes in cue weights, whether these are derived by Judgment Analysis or by Direct Weighting. However two complications arise here. First, the cues generated by the SEIQoL using the policy PC program are relative cues and are constrained to unity. Consequently, a change in one cue weight necessarily means that at least one of the other weights must change. Free weights that would be independent of each other may be more appropriate for determining changes in value. The second complication is that, in the full SEIQoL, cue weights are determined by using the multiple regression analysis of data derived from a visual analogue scale (VAS). QoL ratings are made on a horizontal VAS. Respondents first rate their current QoL and then judge the overall QoL that they would associate with a set of 30 profiles generated using their own cues. The levels of the cues in each profile are represented by means of a VAS. A change in internal standards on either or both of these scales might result in a change in weights generated. Consequently changes in weights might not be a pure indication of changes in values but might be influenced by changes in internal standards. A case study of one of the study population follows which will help to illustrate this further.

SEIQoL component



Application of the SEIQoL to the assessment of response shift

Individual case study demonstrating response shift

Mr J.A is a 68 year old single gentleman who was diagnosed with colon cancer NSCLC at presentation. He lived alone next door to his sister. He had worked in the construction industry for a number of years prior to his diagnosis. At the first interview at time of diagnosis (T1) he nominated five cues as being important to his quality of life : social activity, comfortable living conditions, good access to medical service, health and general wellbeing. He gave high weightings to general wellbeing (53%), health (32%) and much lower weightings to social activity (7%) living conditions (4%)and access to medical service (4%). As he rated general wellbeing and health as reasonably low (48) he had a low SEIQoL – DW score - 19.56 out of a possible 100

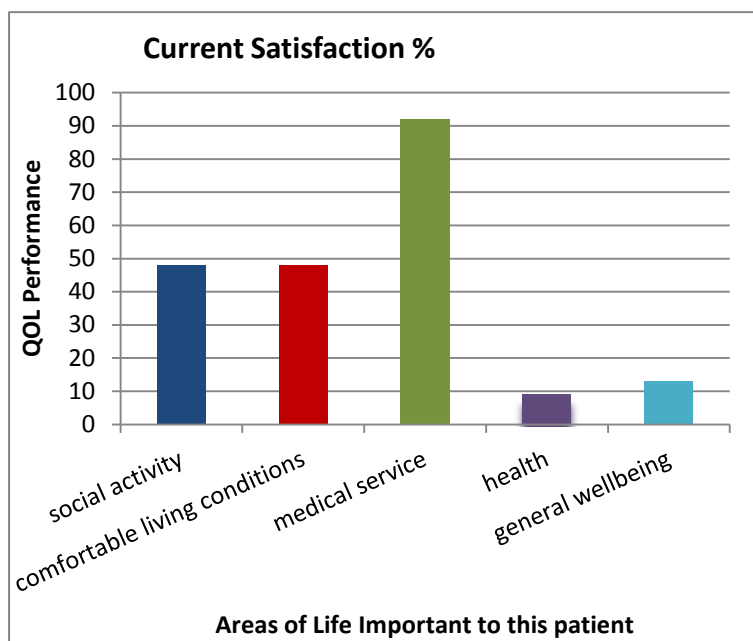


Figure 63 *Individual case study Level of Functioning*

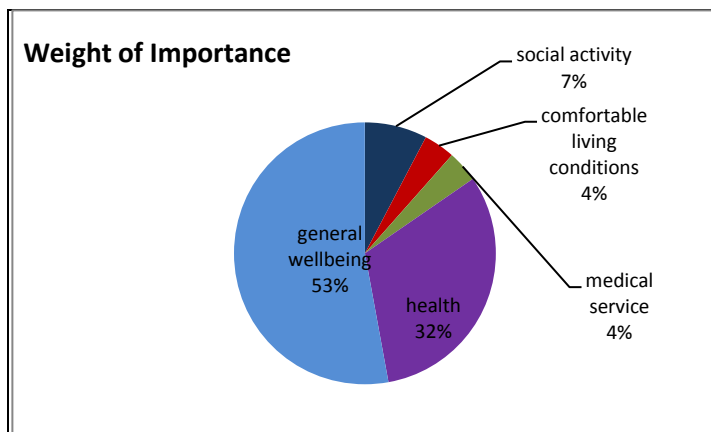


Figure 64 Individual case study Cue Weighting

Figure 63 and 64: Individual Patient Profile at T1

SEIQoL – DW Index: 19.56 VAS score: 70/100

At the second interview at three weeks later (T2) he nominated five cues as being important to his quality of life (figures 65 and 66). Four of these were the same as T1: social activity, good access to medical service, health and general wellbeing. His second cue ‘activities of daily living’ was a new cue which he nominated in place of ‘comfortable living conditions’. This change in cues reflects **re-conceptualisation**. There was also a change in cue weighting at T2; general wellbeing remained the highest weight (45%) followed by health (35%), access to medical service (5%) social activity (10%) and ADLs (5%). This change in cue weights is reflecting a **change in values**. As the VAS score were dissimilar at the two time points (70/100 vs. 73/100) there appears to be a change in internal standards in QoL VAS scale. He rated his top two weighted cues (wellbeing and health)as functioning very low .This reflected on his SEIQoL – DW score at 34 out of 100. At this time point, the gentleman had indicated that he was quite sick after the first cycle of chemotherapy and he felt exhausted.

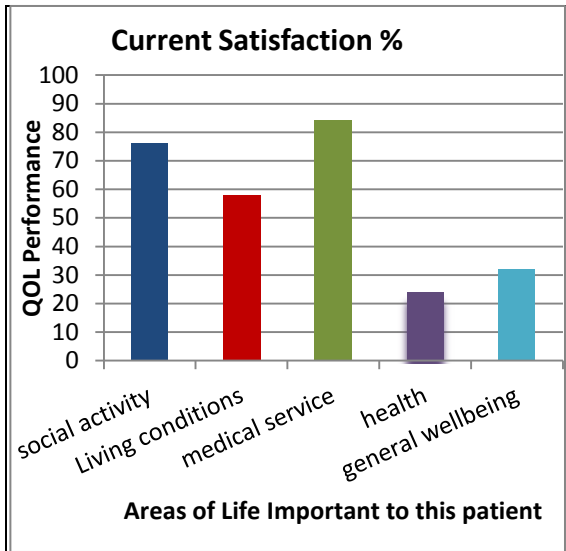


Figure 65

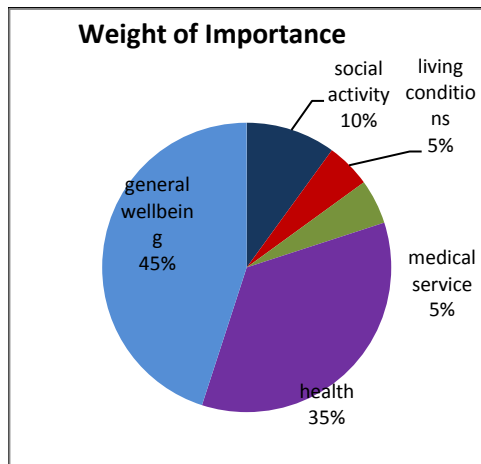


Figure 66

Figure 65 and 66 Individual Patient Profile at T2

SEIQoL - DW Index: 82.85 VAS Score: 30

The results of this gentleman's then-test are very interesting. At the second interview (T2) he was asked to remember how the 5 cues he had nominated at the first interview were functioning then; in addition he was asked to remember how important he felt these areas were in relation to each other at that time .

Retrospectively he rated 4 of the 5 cues as functioning much higher than he had rated at the time of the first interview. In particular there was a marked difference in how he rated the functioning of his health (9/100 at T1 vs 24/100 'then-test'); social activity (48/100 at T1 vs 76/100 'then-test') and living conditions (48/100 at T1 vs 58/100 'then-test'). This change in cue level functioning is reflecting an internal standard change . There was also a difference in his weighting of cues; retrospectively he gave a higher weighting to health (40% 'then-test' vs 32% T1) and a lower weighting to wellbeing 45% 'then-test' vs 53% T1). He gave almost similar weightings to the other 3 cues - social activity (5% 'then-test' vs 10% T1), access to services (5% 'then-test' vs 4% T1) and living conditions (5% 'then-test' vs 4% T1). His 'then - test' SEIQoL –DW score is 34.5 out of a possible 100. This individual case profile allows us to examine how this gentleman has undergone a 'response shift' to his illness. Traditional pre and post test SEIQoL – DW scores at T1 and T2 show an improvement in QoL (19.5 vs 34.5) however by incorporating the results of the 'then-test' we can see that this gentleman has undergone a 'response shift' of minus 15.0 points (19.5 – 34.5) and in fact he has had no actual improvement in subjective QoL at T2 of 0 points (34.5 – 34.5). This would account for the paradoxical characteristics of self rated VAS instrument score and the SEIQoL functioning infograph at timepoint 1 and 2. The patients overall SEIQoL profile looks improved at time point 2 compared to timepoint 1 but the self rating analogue score suggests the patients quality of life is worse at time point 2 that he rated it at time point 1.

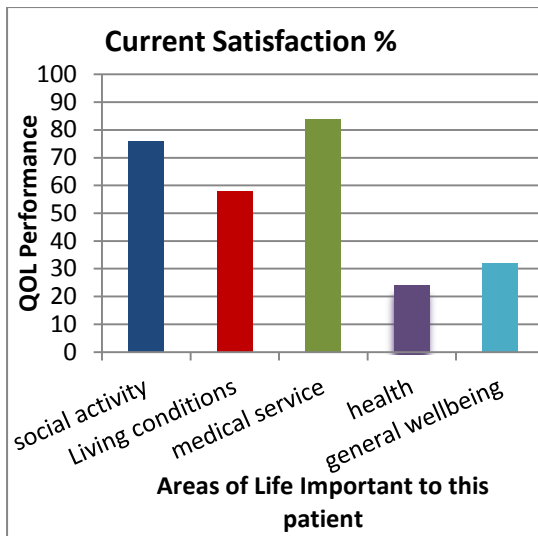


Figure 67

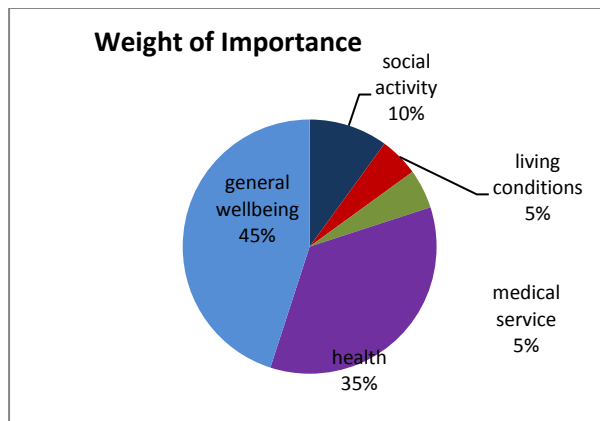


Figure 68

Figure 67 and 68 : Individual Patient Profile 1st then-test

SEIQoL – DW Index: 35.5

7.25.3 What is the clinical relevance of response shift?

In assessment of QoL, it is vital that instruments accurately reflect changes encountered by patients. As previously discussed and as just demonstrated, work in this area has sometimes reported somewhat paradoxical findings, for example patients reporting a stable QoL over time while their clinical health status deteriorates considerably. The possibility of response shift occurring in cancer patients threatens the validity of previous studies reporting QoL outcomes where this has not been accounted for. This study looks at changes in subjective QoL both with conventional pre/post testing and with the retrospective pre-test or then-test technique. This provides a comparison of results with and without the incorporation of response shift.

In order to discuss the clinical relevance of these results, one must first attempt to define what constitutes a clinically significant change on a QoL assessment. Several methods to assess clinical significance are under development (Osoba & Rodriguez 1998). One such technique is the calculation of the 'minimum important difference' or MID. This can be defined as 'the smallest difference in score in the domain of interest that patients' perceive as important, either beneficial or harmful, and which would lead the clinician to consider a change in the patient's management (Guyatt 2002). Work in this area has suggested that across instruments and disease, MID values remain constant at 5 – 10% of the instrument range (Ringash 2002). Therefore, although any estimate of the MID is associated with a degree of uncertainty, using this best estimate can facilitate analysis of results.

The presence of response shift questions the results of studies that do not allow for its presence. Furthermore, it questions the results of studies that use retrospective assessments of QoL or symptoms as a surrogate for contemporaneous acquisition of data. The phenomenon of response shift has significant implications in situations where medical decisions are made based on QoL judgments.

We cannot assume that decisions made by patients at one time point of their clinical treatment are necessarily representative of decisions they would make at a later stage when re-conceptualisation or changes in values are likely to have occurred (O'

Boyle et al. 2000). Continuous assessment of patient values and comparison of values at prior time points must take place.

CHAPTER 8**8 Study Two:****The Impact of Symptoms on Quality of Life and Assessment of Symptom ‘Bother’ in this Patient Population over Time.****8.1 Background to Study Two**

Symptom control is a very important aspect of clinical care and complex symptoms is relatively common for patients with advanced cancer. In addition, symptom assessment is necessary when investigating the efficacy of new technologies for comparisons of treatment benefits and side effects. Symptoms, and the degree to which they bother patients, as well as the degree to which they impact on overall quality of life may be a factor that is related to the individual’s life. This may relate further to how the individual lives his/her life particularly in the context of the hopes and expectations held whereby the reality of the ‘here and now’ is impacting on those hopes and expectations. There are measures currently being used in the cancer care settings to assess symptoms but, as with quality of life assessments, most measures present a prejudged list of symptoms to the patient. The Edmonton Symptom Assessment Scale (ESAS) (Bruera et al. 1991), The Rotterdam Symptom Checklist (de Haes et al. 1990), the NCI Common Toxicity Criteria are all examples of this. These scales are different in the type of assessment they ask the patient to make, and as the symptoms are prejudged, and typically measure the frequency and intensity of the symptom. Accordingly, the measure of the true burden of symptoms to the patient may not be captured or appreciated. What one person finds troublesome, another might not. For example, some patients may find fatigue intolerable where others might have adapted to living with it. Similarly some patients may have adapted to living with ‘pain’ and may not find it as bothersome as someone who is highly sensitive to pain.

The term symptom ‘bother’ is sometimes used interchangeably with the word ‘troublesomeness’ and for the purposes of this study, symptom bother is the term used to describe the sense of affliction that the symptoms place on the patient. Waldron (1995) demonstrated that there are two important factors to consider when dealing with symptoms

(1) the degree of symptom bother and (2) if these symptoms interfere with ones quality of life- a term known as symptom interference. She defines symptom bother as it being “ what the patient says it is” and the definition given for symptom interference with overall QoL is ‘what the patient says it is. As with QoL assessment, the impact, bother or interference of symptoms is a vague and ethereal concept that may defy definition in a scientific manner. However as with QoL measurement, it is important to try to measure this factor.

Waldron and Mannion conducted longitudinal research in the area in the palliative care and the lung cancer groups respectively with Waldron first adapting the SEIQOL DW tool for use in clinical assessment of symptom bother. It is proposed to add to this work by conducting similar work in the population with advanced cancer who were enrolled onto study one just discussed.

8.2 Objectives of Study Two

Assessment of symptom interference with QoL and assessment of symptom ‘bother’

When treating symptoms, clinicians may be aiming at the wrong target with individuals by concentrating on one symptom and ignoring a symptom seen as minor to health carers but as distressing to a patient in the context of their lives.

Vainio (1993) notes that the choice of symptoms recorded depends on the purpose of the assessment: “ one can measure the most common symptoms, the most distressing, or the most treatable”. It could be argued that the best way of developing a symptom measurement tool would be to try to cover all of these aspects together. As with QoL assessment, the patient should be allowed to influence each step of the assessment process. In this study the SEIQoL Disk was used as a tool to measure the symptom bother of symptoms nominated by the patient and the same disk was used to assess symptom interference with overall quality of life.

It is hypothesised that there is a relationship between symptom interference and overall quality of life. This study aims to prove this hypothesis.

Specific Objectives of Study Two

The specific objectives of this study are presented as questions to be addressed and can be grouped into two main categories outlined below:

1) Symptom interference with overall QoL from the patient's perspective:

- (i) Is symptom interference with overall QoL an understandable concept for patients with advanced cancer?
- (ii) Is there a relationship between symptom interference and overall QoL?
- (iii) Does symptom interference impact on the overall QoL over time?
- (iii) Is there a correlation between symptoms measured by the EORTC-QLQ C30 and patient nominated symptoms ?

8.3 Methodology

This study was undertaken in conjunction with study one, as such the cohort of patients who participated in study one took part in study two. Patients were interviewed at time-point 1 when attending for their first dose of chemotherapy and follow up assessments were carried out at three subsequent visits for treatment.

8.4 Population

Inclusion Criteria

- 5. Oncology patients with stage four (IV) metastatic diseases.
- 6. Patients attending inpatients and outpatient department for the purpose of chemotherapy.
- 7. All patients who were fully informed and signed consent for participation in the trial.
- 8. All patients about to start chemotherapy for the treatment of metastatic cancer

Exclusion Criteria

4. Confused patients
5. Patients unable to communicate verbally
6. Patient who were not willingly to consent to participate in the trial

All patients gave full informed consent (Appendix 2) and the interviews took place at Galway University Hospital. All interviews were performed by the author. Sixty-five patients were interviewed at time of attending for first dose of chemotherapy (T1); fifty one patients were interviewed at time point 2,(T2); forty one patients were interviewed at time point 3 (T3); 27 patients were interviewed at time-point4 (T4). The two main reasons for the high attrition rate over time were discontinuation of chemotherapy due to patient preference or deterioration of performance status and patient death. This is in keeping with other QoL studies in patients with advanced lung cancer where the short term survival and the rapid deterioration of performance status produce problems in collecting data.

Measures

Demographics Records were made of age, sex, marital status, occupation and diagnosis and chemotherapy regimen/All demographic characteristics are displayed in the previous chapter.

Interview The interviews were all completed by the author.

8.5 Assessment of patient nominated symptoms

Step 1) Patient nomination of symptoms :The patient was asked to nominate the worst symptoms for him/her in the previous two weeks. If more than five symptoms were nominated then the patient was asked to nominate the five most significant to him/her.

Step 2) Assessment of patient perception of 'symptom interference' with overall QoL Patients were presented with a modified version of the SEIQoL Disk, with two overlapping colours, one colour reflecting overall QoL and the other representing overall symptom

interference (Figure 69). The patient was asked to reflect on how much they felt the symptoms they had nominated had interfered with their overall QoL as they had just represented in the first part of the interview (for Study One). They were then asked to display this graphically by giving more space to the symptom colour if symptoms had interfered a lot and less space if they felt symptoms had not interfered with their QoL in the previous week.

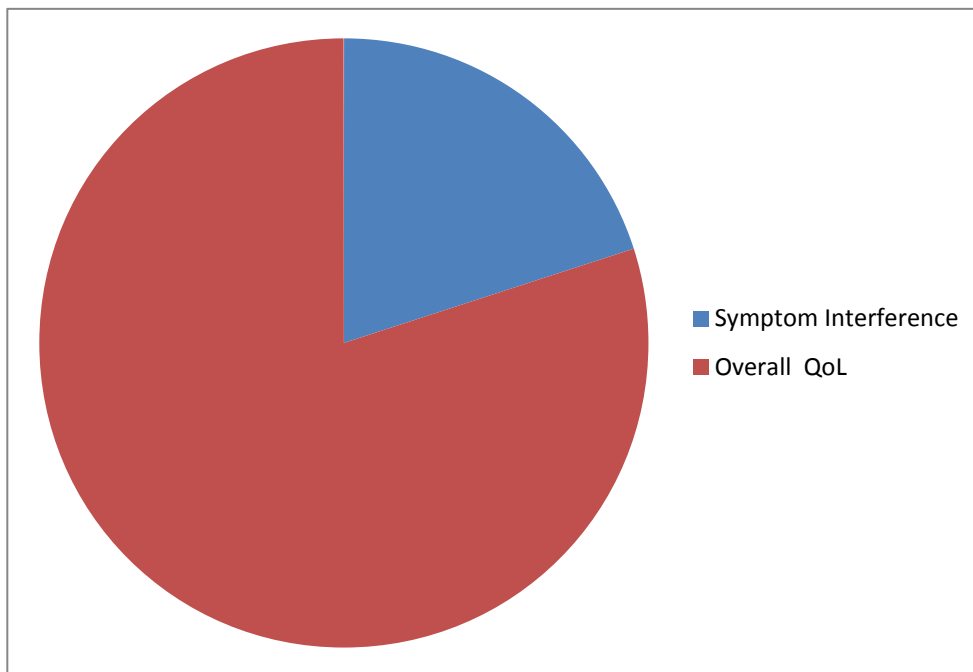


Figure 69 SEIQoL Disk displaying symptom interference with overall QoL

Step 3) Assessment of patient's perception of symptom frequency and severity

The patient was asked to mark, on a categorical scale the frequency and severity of their nominated symptoms.

Step 4) Assessment of patient's perception of 'relative symptom bother'

This was assessed on a categorical rating scale in a similar manner to symptom frequency and severity (Appendix 2). Answers ranged from 'never' (0) to 'continuous' (5)

8.6 Results of study two

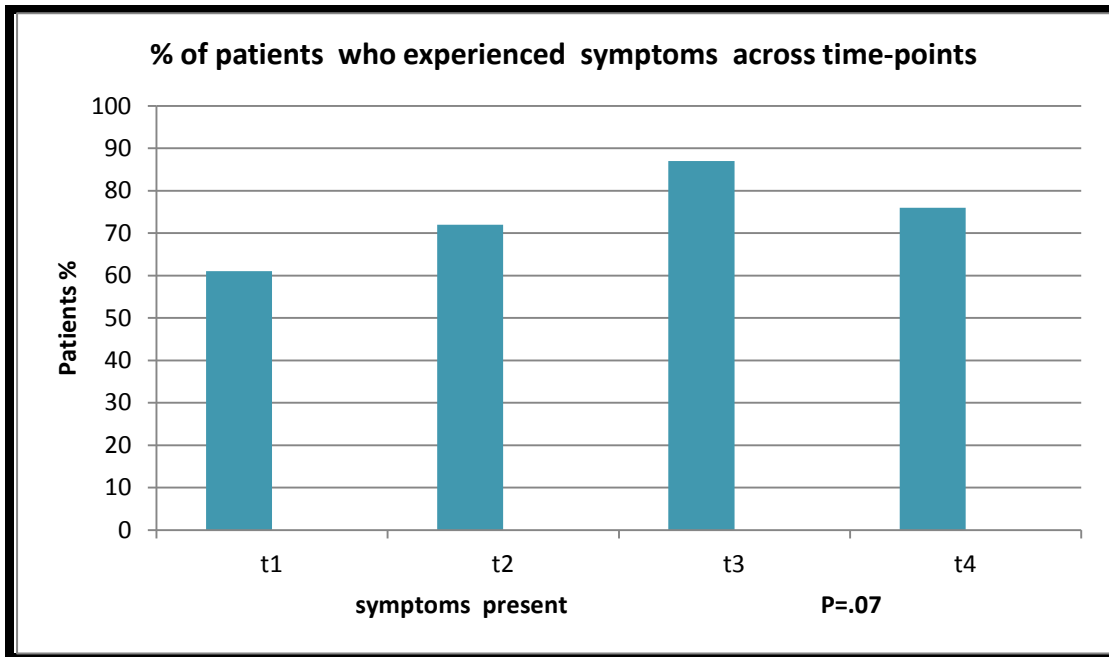
8.6.1 Is symptom bother and symptom interference with overall QoL an understandable concept for patients ?

Patients readily understood the concept of symptom bother. They had no difficulty completing the process of nominating the degree to which symptoms impacted on their overall QoL in the 2 weeks prior to each assessment. Nor did they have any difficulty understanding the concept of symptom interference with their quality of life. In all cases the patients understood the concept and managed to use the SEIQoL Disk with ease to visually display the degree to which symptoms interfered with their QoL.

8.6.2 Symptom Bother: How bothersome is it?

Although some patients present with symptoms, the symptoms may or may not have been always bothersome. It was therefore, important to first determine if the patients had symptoms and then confirm that symptoms were bothersome to the patient and if so then measure of interference of symptoms on the patients quality of life. The table (48) below indicated the number of patients who experienced symptoms at each time point. 61% of patients experienced symptoms at T1, 72% of patients experienced symptoms at T2, this increased to 87% at T3 and those who had symptoms at T4 was 76%.

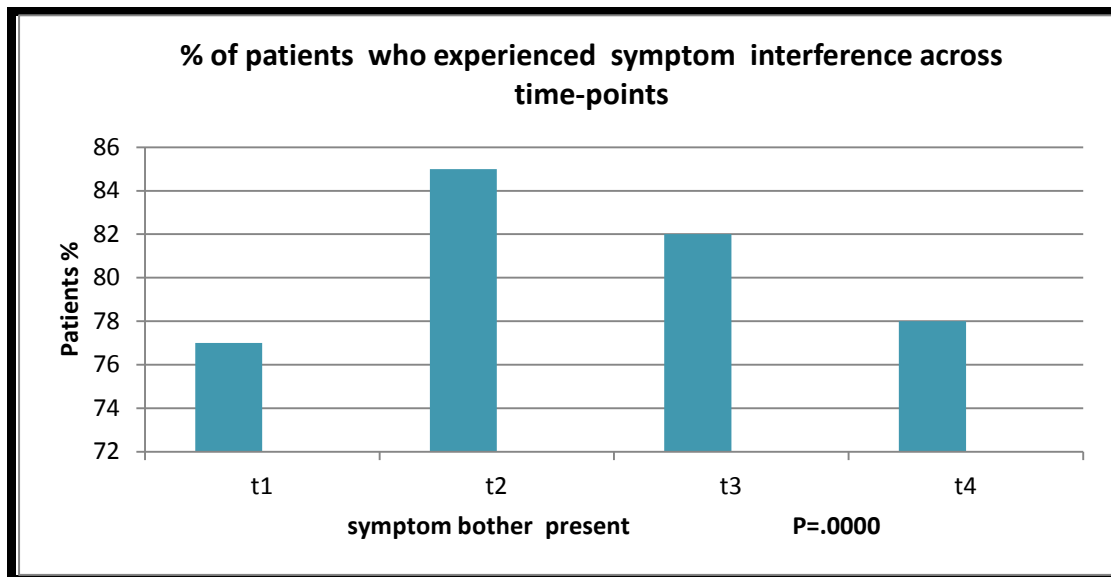
Table 48 the percentage (%) of patients who experienced symptoms across time-points



8.6.3 Do symptoms interfere with the patients quality of life

As mentioned, although it is expected, it could not be assumed that all symptoms were bothersome. The number of patients who reported symptom bother was observed. And was significant at all timepoints (p=0.0001) At t1, 77% of patients who were experiencing symptom bother saying that it interfered with their quality of life. As expected following chemotherapy, this number increased to 85% of patients at T2 and 82% of patients at T3 of patients experiencing symptom bother and 78% of patients at time 4 experienced symptom interference (table 49).

Table 49 % of patients who experienced symptoms bother across Time-Points



8.6.4 Bothersome symptoms experienced by patients with advanced cancer.

Table 50 and Figure 70 below depict the types of symptoms experienced by all patients. It can be seen that fatigue is the most common symptom experienced by 40% of patients. This is followed by pain and shortness of breath and weakness.

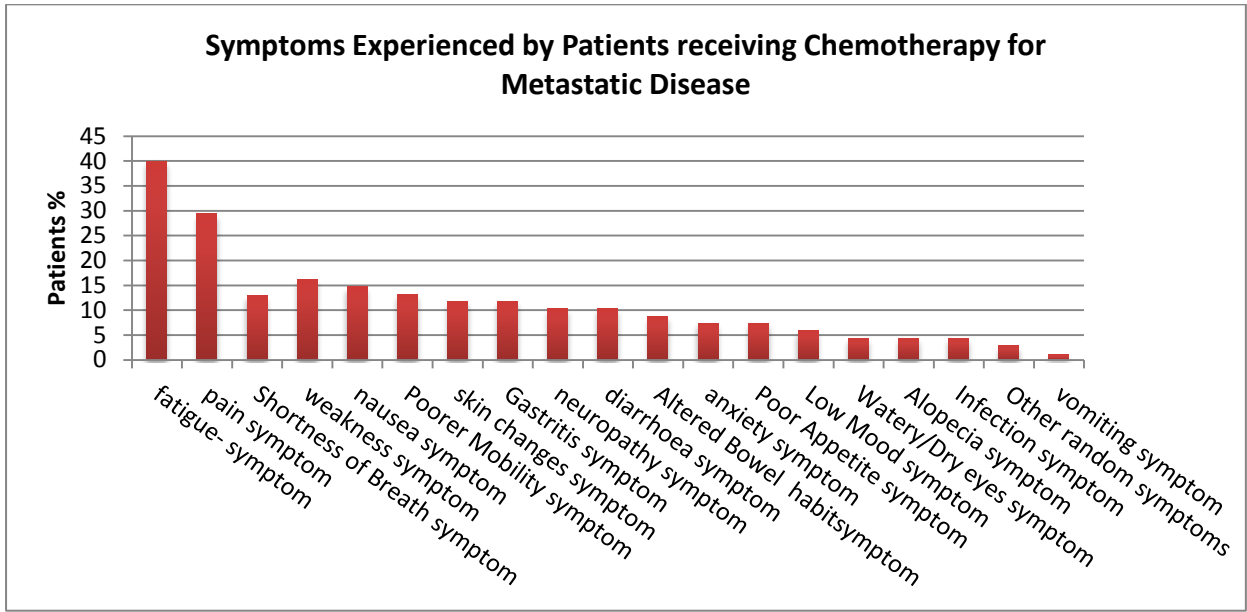


Figure 70 Symptoms Experienced by Patients receiving Chemotherapy for Metastatic Disease

Table 50 Symptoms experienced

Symptom	Total	%
Fatigue	27	40
Pain	20	29
Shortness Of Breath	13	19
Weakness	11	16
Nausea	10	15
Poorer Mobility	9	13
Skin Changes	8	12
Gastritis	8	12
Neuropathy	7	10
Diarrhoea	7	10
Altered Bowel Habit	6	9
Anxiety	5	7
Poor Appetite	5	7
Low Mood	4	6
Watery /Dry Eyes	3	4
Alopecia	3	4
Infection	3	4
Other Random Symptoms	2	3
Vomiting	1	1.5

8.6.5 How much does symptoms interfere with quality of life

The mean symptom interference with QoL at each time point is outlined in Table 51. At the initial assessment the average symptom interference with QoL was 32.4%; this peaked to 50.25% at the second assessment ; at the third assessment interference with QoL was at 48.35 and at the final assessment at time-point 4 symptom interference had decreased to almost the same as baseline at 35%.

Table 51 Symptom Interference from T1 to T4

Symptom Interference with QoL from time of initial assessment (T1), through to T4 Total Participants					
Symptom Interference with QoL	T1 (n = 31)	T2 (n=30)	T3 (n=28)	T4 (n=15)	Overall mean
Mean	32.42	50.25	48.35	35.05	41.5
Median	10.00	55.00	55.00	30.00	37.5
Std. Deviation	30.602	30.044	31.090	30.115	30.46
(P= <0.005)					

8.6.6 Is there a relationship between symptom interference and overall QoL?

Paired T test was conducted to compare quality of life results with symptom interference. There was a significant difference in the scores for quality of life and symptom interference across time-points 1, time-point 2 and time-point 3 ($p < 0.005$) suggesting as QoL (as measured by the SEIQoL DW) changes so too does symptom interference. This supports the hypothesis that symptoms significantly impact on quality of life..

8.6.7 Is there a difference between symptom bother/symptom interference between the intervention group and the control group?

Q Plots 71 to 74 below demonstrates normal distribution of data. It can be seen that there was an increase in the number of patients with whom symptoms impacted on their quality of life particularly at time-point 2 and time-point 3. It can also be seen the impact of symptoms on the patients also increased at time point 2 and time point 3. Analysis of means was conducted to determine if there was any difference in the impact of symptoms between the control group and the intervention group

Table 52 below demonstrates that symptom interference on the quality of life in the intervention group is lower than symptom interference on quality of life in the control group. These findings are very interesting and are in keeping with the findings of study one. We can see from study one that the patients quality of life improved over the course of time on both

the control and intervention group. Upon further analysis of the data in study one, we found that there was an overall improvement in Health cue over time of the Intervention group compared to the Control group. This result strengthens the suggestion that clinicians acted upon both the information on symptoms and the health cue measurements depicted on the info-graph. This combined review resulted in significantly significant perceived improved health outcomes for participants.

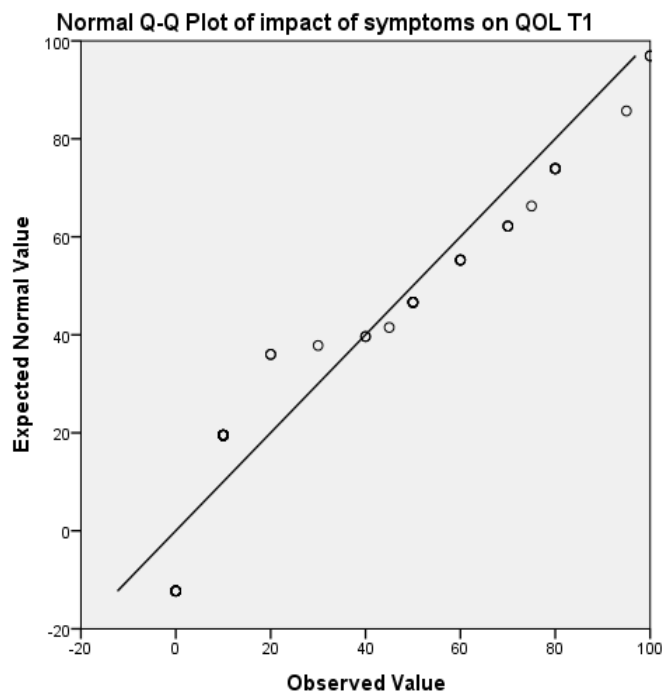


Figure 71

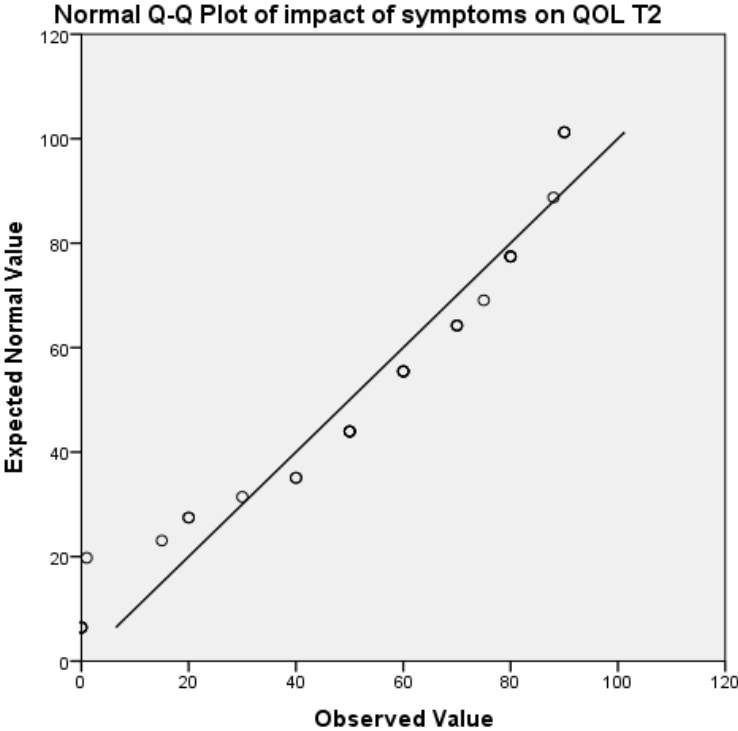


Figure 72

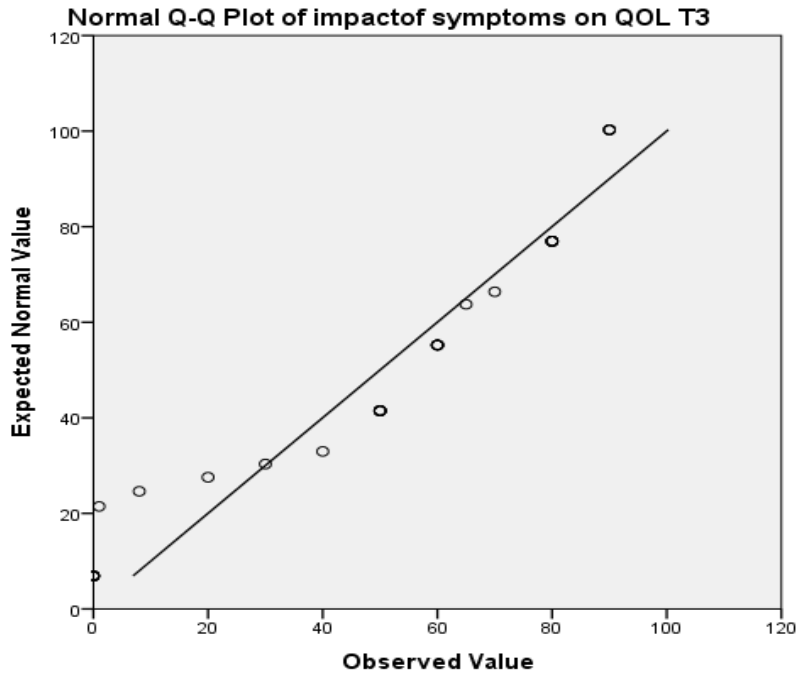


Figure 73

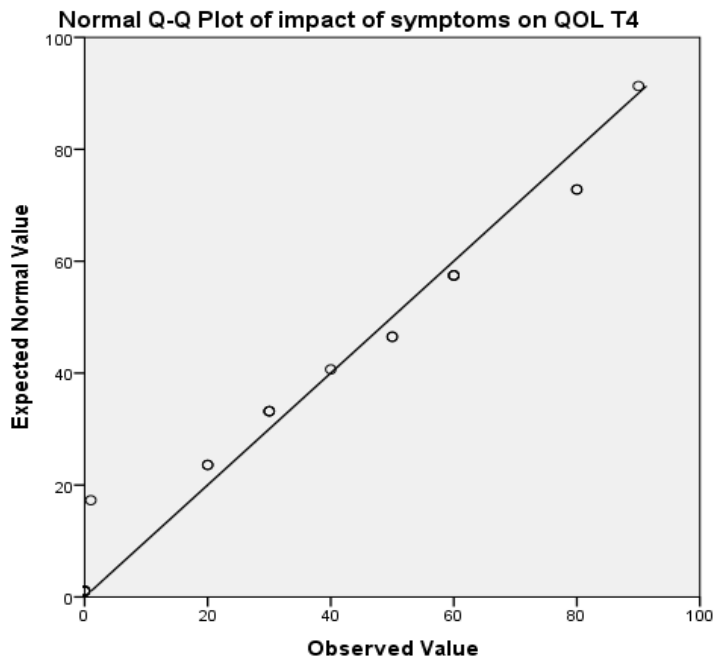


Figure 74

Table 52

Symptom Interference with QoL from baseline through to T4							
Control group and Intervention group							
Study Arm		T1 symptom interference on QoL	T2 symptom interference on QoL	T3 symptom interference on QoL	T4 symptom interference on QoL	Mean	% differen ce from T1- T4
Control	Mean	30.47	60.36	51.5	41.43	45.94	
	Std. Deviation	28.408	27.628	28.821	30.237	28.77	+ 38%
Intervention	Mean	34.38	43.82	46.64	31.62	39.11	
	Std. Deviation	32.989	30.339	32.789	30.696	31.70	-10%
							P=0.0000

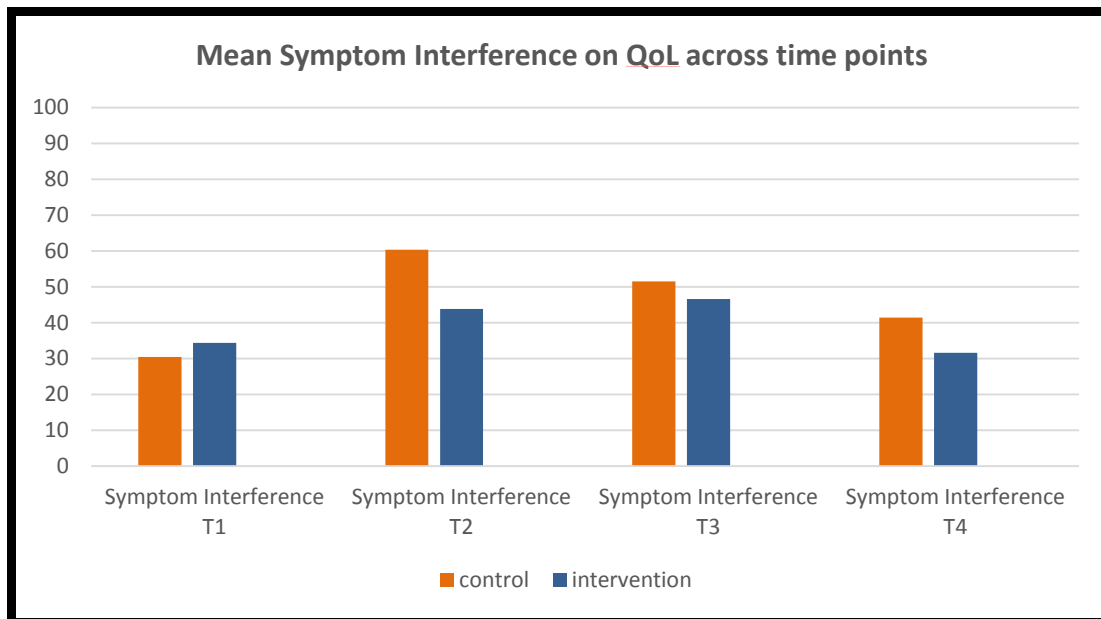


Figure 75 Symptom Interference

8.6.7 Conclusion

Greater than 60% of patients receiving chemotherapy for with metastatic disease were symptomatic ($p=0.07$). Common symptoms ; fatigue, pain, shortness of breath, weakness and nausea .Of those who had symptoms, approximately 80% found the symptoms bothersome while the mean interference of these symptoms on their quality of life being 41.25%. ($p=0.0000$)

Patients were divided into two groups. Those in the intervention arm whose symptoms and symptom interference was depicted on an info-graph for the clinical team to review during clinical management and those in the control arm whose symptoms and symptom interference was not disclosed to the clinical team. Patients whose symptom information was provided to the clinical team in graphical format had significant improvement in their QoL ($p=0.0000$)

All patients readily understood the concept of symptom bother and also understood the purpose and function of the SEIQoL DW tool in this regard. This would lead one to suggest that that the use of this tool for the measurement of symptom interference would be very beneficial in the clinical setting.

8.7 Patient case report with accompanying assessments

Patient B

This patient gave her permission for her case report to be used for educational and research purposes.

History

Patient, B, was an eighty one year old lady with fourteen grown children and twenty nine grand-children. She had one daughter who died from malignant melanoma and another who is surviving breast cancer.

B lived at home with her daughter and had a very busy social life. She and her friends took turns hosting a card game in each- others home twice a week .She enjoyed working in the garden and was self -caring in her activities of daily living. She was a non-smoker and non-drinker .Her past medical history was limited to a cholecystectomy four years earlier, hiatus hernia and asthma.

B presented with rectal bleeding in November 2012. A colonoscopy and CT scan showed a locally advanced rectal carcinoma with diffuse liver metastases. Her rectal biopsy showed no definite invasion and B did not have surgery. A liver biopsy confirmed the liver involvement.

Having been seen by the oncologist, a chemotherapy regimen was prescribed as per the degramont schedule which is standard of care treatment for colorectal cancer. The chemotherapy drugs included 5-Fluorouracil and Leucovorin and the Kras inhibitor Panitumumab administered every 2 weeks.

Time-point 1

B was been admitted to hospital outpatient for treatment of chemotherapy in early January 2013.The first assessment took place on day one of her chemotherapy. Upon meeting B, she was very willing to participate in the study. However, her mood appeared quite low and she spoke very quietly. When asked to identify 5 most important things to her and her quality of life, she readily came up with 5 cues. Ill health has impacted her life greatly, so health and

recovery was most important to her. She nominated health as her first cue. She nominated meeting her friends /social activity as her second cue .She had played cards with her friends two nights a week and this was an important social outlet. She disclosed that she stopped going to the card .Upon gentle probative questioning to determine the reason why she stopped playing cards; B said that the hospital staff had told her to be careful as infection was a potential side effect of chemotherapy. She said she was afraid of catching germs and getting any infection so she stayed in doors away from everyone including her friends and her grandchildren. This impacted on her social contact and contributed to her feelings of low mood.

B identified outdoor activity (gardening) as important to her quality of life. Due to her fear of infection however, she now refrained from gardening in case she got a finger prick from the shrubs in the garden. This compounded her low mood.

As an elderly person, B said it was very important for her keep active and she described her need to ‘feel useful’ around the house. She always made the tea and did light house work, dusting and tidying at home .She reported feeling tired and not in the mood to do much around the house now. The final cue nominated as important to her quality of life was pass-times. B enjoyed sewing and reading – however, her motivation to enjoy these was overshadowed by her low mood.

The cumulative effect of the information about infection that B had received, along with the symptoms of fatigue and low mood appeared to have major impact on Bs quality of life.

This was Bs first cycle of chemotherapy so it was surprising that B experienced fatigue this early in her treatment as one would typically expect fatigue to become a problem during the course of treatment.

Having identified the areas of importance (cues) to her quality of life, B completed the assessment.

The info -graph below is a representation of Bs Quality of life. The bar chart represents the current rating / level of each cue. Each cue scored by the patient on a scale of 0 (worst ever) to 100 (best ever). The pie chart represents the weight of importance of each cue to B. Health

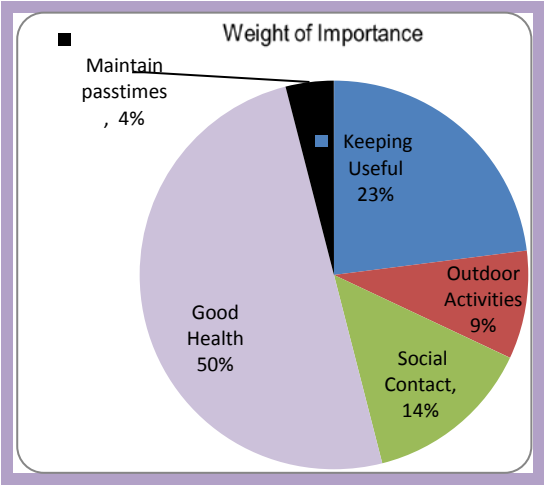
was most important to Bs quality of life (weighting 0.5 out of a possible 0 -> 1.0) .and she rated its function very low at this time(5 out of 100).

The total quality of life SEIQoL DW index score is 6.9 of 100.The bar graph clearly illustrates to the reader the abysmally low quality of life.

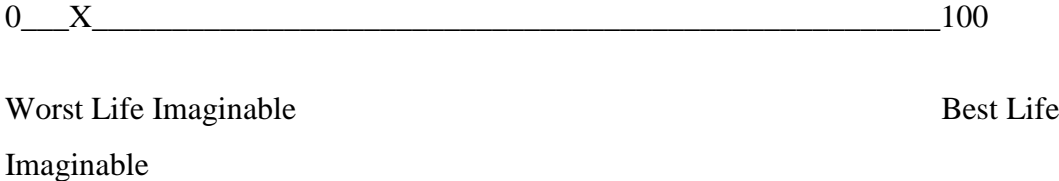
B completed SEIQOL judgment analysis (JA) tool at the first time point. Judgment analysis externalizes the manner in which a person makes a judgment or decision - their 'judgment policy'- by using statistical methods to derive an algebraic model of the judgment process. The goal of JA is to quantify the relationships between a person's judgment and the information, or 'cues', used to make that judgment. Upon analysis, the multiple coefficient of determination was high ($R^2 = 0.71$) indicating that this is a good representation of Bs judgment. SEIQOL tables below represent the weights of each cue as informed by JA technique. When the relative weight for a cue is less than 10, the function form for the judge may not be so meaningful. However, for cues greater than 10, the function form should have meaning. It can be seen that all but one (social activity) had cues greater than 10.It is important to recognize that symptoms affect quality of life .B identified fatigue and low mood as key symptoms at that time and measures a 50% impact of symptoms on her quality of life. This is depicted on the PIE chart below

TIMEPOINT 1 Info graph

Individual Quality of Life. SEIQOL Patient B



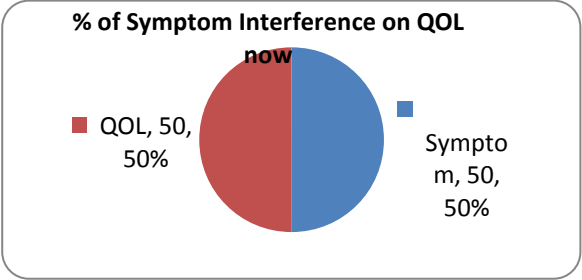
This Patients Overall Individual Quality of Life Self Measurement= 06.9



Existing Symptoms

Fatigue

Low Mood



Time point 2

The second quality of life assessment took place in the oncology day ward 4 weeks later. Cue description did not change with B nominating the same cues as the five most important areas contributing to her overall QoL. B felt some improvement in her health, rating it now at a level of functioning of 20 (out of a best possible 100) however, there was very little improvement in any other area of her life and in fact outdoor activity decreased to almost absent. B indicated that she only went outside for a small walk around the house every day. The relative importance of the cues had shifted with health becoming more important at 0.8 (out of a possible 0 -> 1.0) and all other domains of importance being equally divided at 0.05 each.

Although she had more symptoms at this time (fatigue, shortness of breath and mouth ulcers), she rated the bothersome effect of these symptoms on quality of life as 60%. It seems paradoxical that although B has more symptoms increase, she rated her health higher (35 out of 100) compared to time point one. She also gave more weight of importance to health at this time. Overall SEIQoL index score showed a great improvement now measuring 29 out of 100

Info-graph labeled Time-point 2 below illustrates B's description of her quality of life.

Time Point 3

Following time point 2 assessments, B was admitted to hospital with diarrhea and an atypical respiratory infection. A CT of the chest showed extensive bilateral pulmonary emboli and bilateral extensive ground glass opacification on small bilateral pleural effusion.

Chemotherapy was delayed by 2 weeks and on her return for treatment in April, assessment three was conducted. B rated her health a little lower at this time (20 out of a best possible 100) but it remained equally as important as the previous time point 0.8 (out of a possible 0 - > 1.0) .

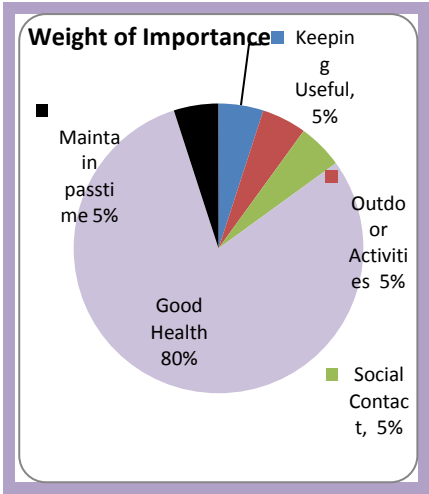
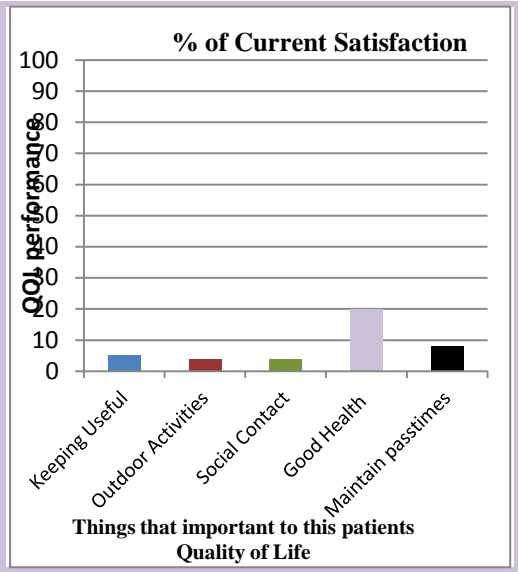
Upon talking to B, it was visually obvious that the infection and her time in hospital had taken its toll on her person. B rated the other 4 areas of importance to her quality of life as poorly. Bs overall SEIQoL index score dipped at this time-point to 17.

Her symptoms, shortness of breath, low mood and diarrhea persisted and she added poor appetite to these. The symptoms encroached on her quality of life by 65%.

Info-graph labeled Time-point 3 below portrays Bs description of her quality of life.

TIMEPOINT 3 Info-graph

Individual Quality of Life. SEIQOL Patient B



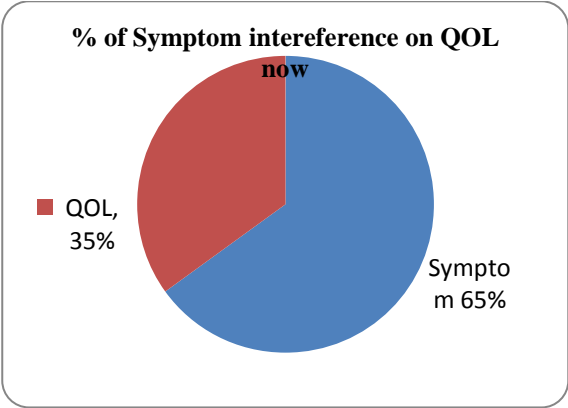
This Patients Overall Individual Quality of Life Self Measurement= 17

0 _____ X _____ 100

Worst Life Imaginable

Best Life Imaginable

- Existing Symptoms**
- Shortness of Breath
 - Low Mood
 - Poor appetite



Time Point 4

Upon a visit to the consultant following visit 3, due to Bs poor quality of life, a decision was made to reduce the dose of chemotherapy and to continue Panitumumab as single agent. This had a favourable effect on Bs quality of life. She was feeling much improved. The level of satisfaction on all five areas of importance to her quality of life had increased significantly with a greater than 4 fold improvement in the overall SEIQoL DW index score from her first assessment to final assessment. Her SEIQoL DW index score was now 49.

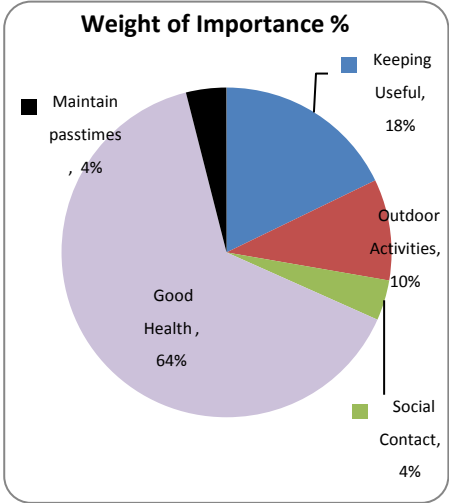
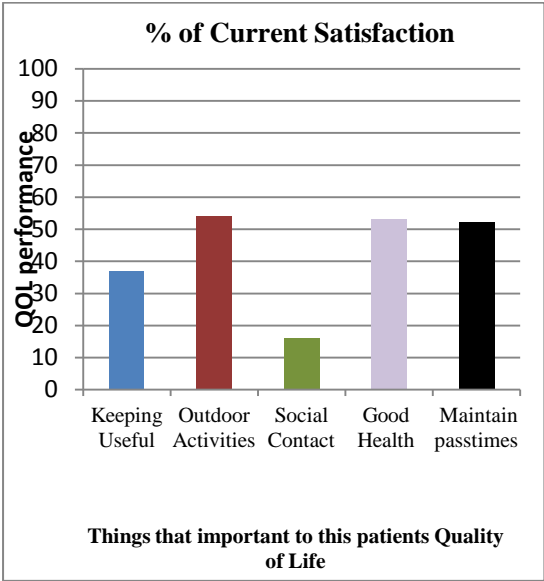
Feeling of usefulness was now of greater importance to B .She gave this a weighting of .18 (out of a possible 0 -> 1.0) while the weight of importance for health reduced to. 64 (out of a possible 0 -> 1.0).

Bs symptoms had now fully resolved, with none impinging on her quality of life.

Info-graph labelled Time Point 4 depicts Bs self reported Individual Quality of Life.

TIMEPOINT 4 Info-graph

Individual Quality of Life. SEIQOL Patient B

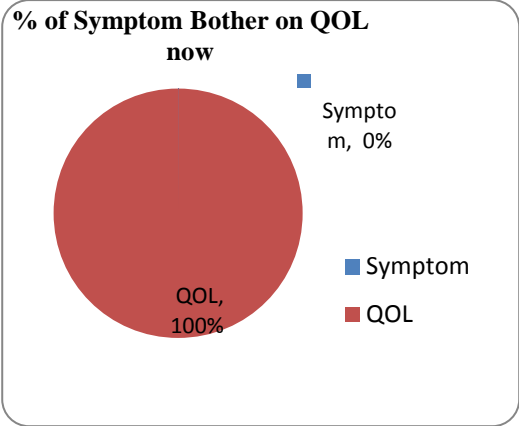


This Patients Overall Individual Quality of Life Self Measurement= 49



Existing Symptoms

none



B continues to receive treatment for her metastatic colorectal cancer. It is very promising to see specific reference to Bs overall 'improvement in quality of life' written in letters of correspondence from the consultant clinic visits during the course of the year since this research took place.

8.8 Patient case report with accompanying assessments Patient E.

Patient E

This patient gave his permission for his case report to be used for educational and research purposes.

History

Patient, E is a 55 year old man with a wife and four sons in their twenties. He had no significant past medical history with the exception of rheumatic fever as a child and hypertension. He is a non-smoker and drinks only socially.

In March 2012, E presented with dysphagia. He had an endoscopy which demonstrated a poorly differentiated adenocarcinoma tumor of the Esophageal Gastric Junction. A CT suggested lymph node involvement but the PET scan did not reveal any distant metastasis.

He was treated with neo-adjuvant chemo-radiation and had the tumor removed in June 2012.

Following surgery he recovered well with no signs or symptoms of disease for six months and had a repeat endoscopy in January 2013 which showed the anastomosis well healed and no signs of local recurrence.

In February 2013, E attended the oncology outpatient clinic and complained of intermittent difficulty in swallowing solid foods. He had an emergency CT which demonstrated a 4cm liver lesion consistent with metastasis. A treatment plan to proceed with 6 cycles of systemic chemotherapy regimen EOX (Epirubicin, Oxaliplatin and Capecitabine) on an outpatient basis every 3 weeks.

Time-point 1

E was been admitted to the oncology day ward outpatient service for treatment of chemotherapy on March 29th 2013. The first assessment took place on day one of his chemotherapy. Upon meeting E, he was very willing to participate in the study. He was very upset about his cancer and anxious about what the future may hold. He identified health as his primary concern and at this time, health was most important to his quality of life. Family was central to his being. His wife and four sons all lived at home and they were a close family. Family was nominated as the second cue.

E had a busy social life. He was involved in the local gun club and sporting activity in the community and enjoyed meeting his friends occasionally in the local pub. This was his social life. Meeting his friends and spending time with them was important, he therefore nominated social activity as a third cue.

E owned a small farm. He enjoyed working the farm, walking the land and spending time close to nature and said this is when he is most relaxed. Spending time on the farm was important to him and was nominated his fourth cue.

E nominated work as his final cue. He was an electrical contractor and worked in partnership with a colleague. Work was important as he was the main provider in the home and the contractor work was the main source of income. However his sons were working so the pressure of finance was lessened. E ran his business in partnership with his colleague, whom he also considered dear friend. The strong bond between them made work an enjoyable part of Es life.

E was invited to complete the SEIQOL DW assessment. He rated his current level of health as very poor giving it 16 (out of the best possible 100) and gave its weight of importance 0.6 (out of a possible 0 -> 1.0). The second most important cue to Es quality of life was family support. He assigned a weighting of 0.2 (out of a possible 0 -> 1.0) to this and he indicated that he was getting great support from his family assigning it 90 (out of a possible 100). E needed this support as he was very upset and fearful about what the future held for him. It was interesting to see that he rated his functioning on the farm as relatively high 70 (out of

best possible 100).The farm was a place where he found solace and it appears his illness did not restrict his physical ability. However paradoxically he rated a lower functioning (43 out of 100) in the cue 'work' which would have been less physically demanding than farming . Social activity was also rated low at 46 (out of a possible 100) .The relative importance of these final three cues to all other cues was low at .07.

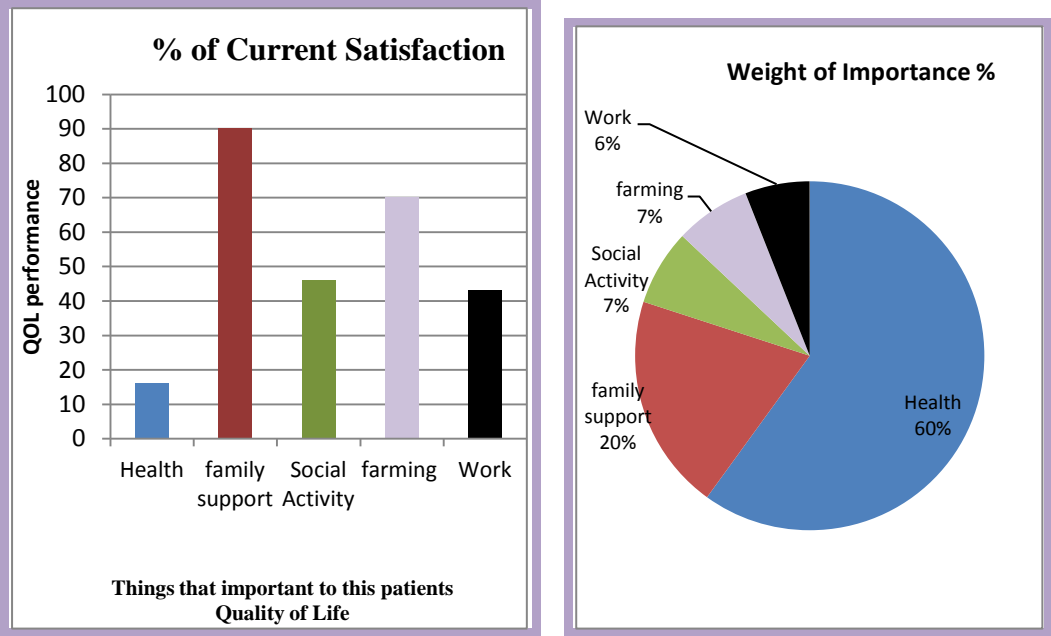
Es SEIQoL DW index score was 38.3 at this time which is indicative of a poor quality of life.

E also was invited to undertake the SEIQOL assessment using judgment analysis. As previously mentioned, the purpose of JA technique is to externalise the manner in which a person makes a judgment or decision and to quantify the relationships between a person's judgment and the information, or 'cues', used to make that judgment. The table below indicate that judgments for each cue as assigned by E. Health Family and farming are meaningful cues with weight greater than 10.

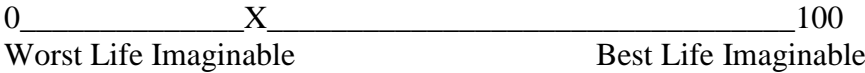
At this time, the multiple coefficient of determination was quite high at 0.82 indicating that this is a good judgment policy. With respect to Es symptoms, he had a cough and slight gastric reflux which impacted on his quality of life by 40 %.

The info-graph labeled time point 1 depicts Es self rated individual quality of life as he commenced 1st line chemotherapy for metastatic disease.

TIMEPOINT 1 Info graph Individual Quality of Life. SEIQoL Patient E



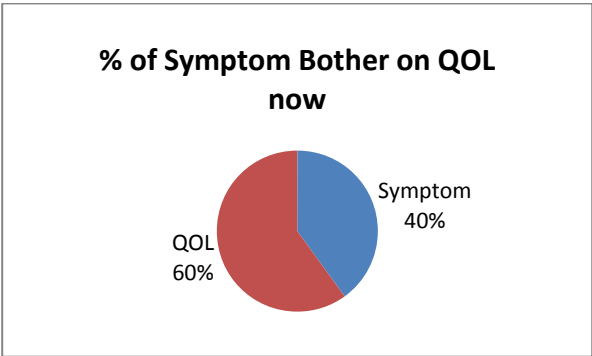
This Patients Overall Quality of Life Self Measurement = 38.3



Existing Bothersome Symptoms

Reflux

Cough



Time point 2

The second quality of life assessment took place in the oncology day ward 3 weeks later. Cue description did not change with E nominating the same cues as the five most important areas contributing to his overall QoL. E was much more relaxed and positive at this visit compared to his first treatment. The anxiety that was clear to be seen at timepoint 1 was no longer present. He had a more determined attitude now and appeared stronger in spirit to fight this cancer. There was a substantial improvement in his rating of his health which he now rated as 80 out of 100 (at time point 1 he rated it at 16 out of 100) . This inversion of qol scores from time point 1 to time point 2 may be attributed to Es anxiety at time point 1 as there wasnt any change in his status clinically. The relative weight of importance of health to Es quality of life remained at 0.6 (out of 0 →1.0). The level of functioning in the cue ‘family support’ dropped a little to 72 out of 100 and the level of functioning on the farm also dropped to 42 compared to 70 at time point 1.

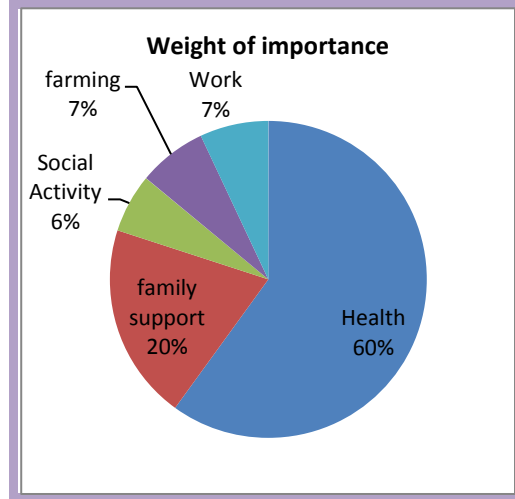
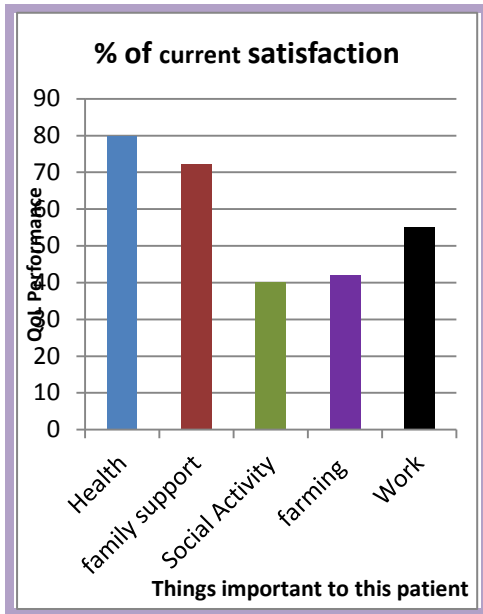
E had more symptoms at this time (neuropathy, decreased appetite, rash, laryngeal spasm) which affected his quality of life by 50% .It adds to the paradox of E rating his health higher (80 out of 100) compared to time point one and substantiates the theory of Es view of his health being entirely distorted by worry and anxiety.

Overall SEIQoL index score showed a great improvement now measuring 71.59 out of 100

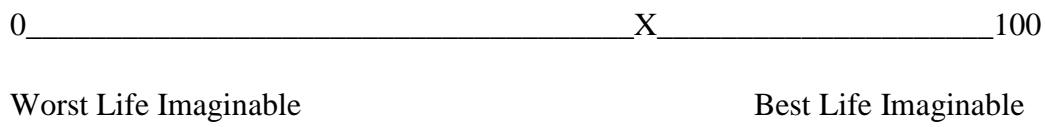
Info-graph labeled Time-point 2 below illustrates Es description of his quality of life.

TIMEPOINT 2 Info-graph

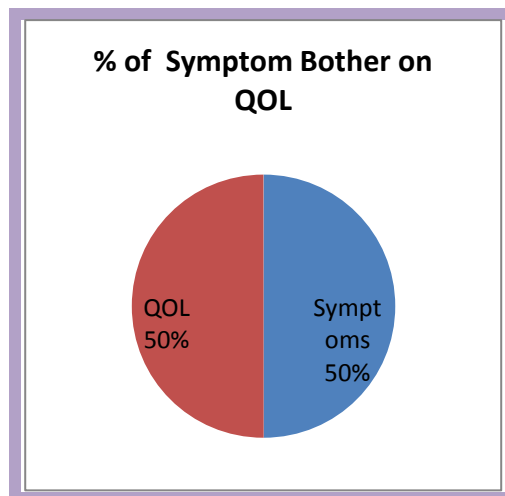
Individual Quality of Life. SEIQoL Patient E



This Patients SEIQoL DW index score = 71.59



- Existing Bothersome Symptoms**
- Neuropathy
 - Decreased Appetite
 - Rash
 - Laryngeal Spasm



Time Point 3

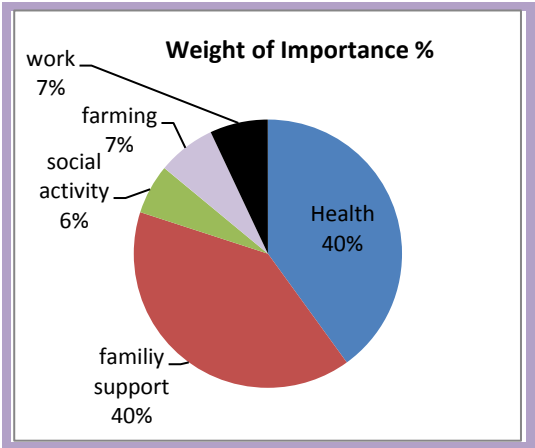
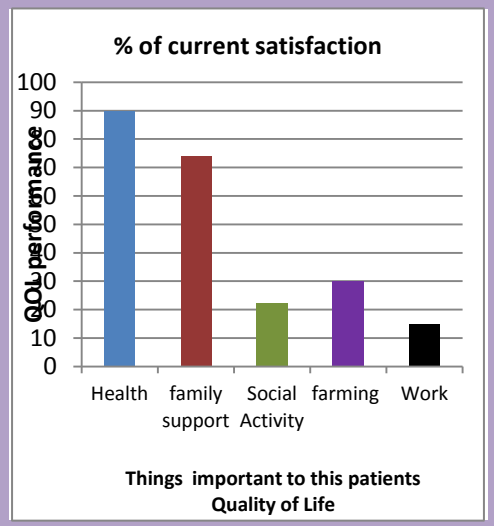
E continued to receive his chemotherapy on schedule and undertook time point 3 assessment in April 2013. E now rated his health higher giving it a level of 90 (out of a possible 100) . The relative importance of health reduced to 0.4 (out of 0→ 1.0)and E now weighed family support higher than before and equally as important in weight as his health (0.4) .E's overall SEIQoL index score was 70.28 at this time-point.

Although Es symptoms remained similar to those at time point 2 (neuropathy, laryngeal spasm, rash and gritty eyes) he reported these as less bothersome on his quality of life at this time (30%)

Info-graph labeled time-point 3 below portrays Es description of his quality of life.

TIMEPOINT 3 Info-graph

Individual Quality of Life. SEIQOL Patient E



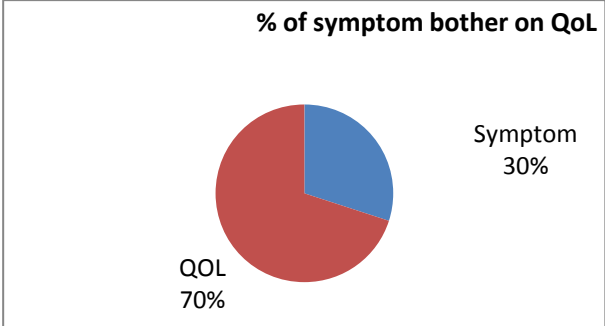
This Patients Overall Quality of Life Self Measurement = 70.28

0 _____ x _____ 100

Worst Life Imaginable

Best Life Imaginable

- Existing Bothersome Symptoms**
- Neuropathy
 - Dry eyes
 - Rash



Time Point 4

E had a follow up outpatient visit with the oncologist following visit 3 .He described his tolerance to chemotherapy as quite good with tolerable symptoms. A CT scan at this time showed a reduction of the liver lesion from 4cm to 1.7cm. Needless to say this was excellent news for E so it was interesting as a health carer to note at time point 4 assessment immediately after this news in May, E rated his health slightly lower than before (85 out of 100) and increased its weight of importance to 0.62. Given this good news, one would expect that the level of health should be rated higher than before. This demonstrates the value of the individual judging his own quality of life and supports the data by Waldron (1999) who found significant differences in health carers' views of the patients' quality of life versus the patient own views of his quality of life.

E rated family support at a level of 70 (out of 100), this was similar to time point 3 but the weight of importance was much lower at 0.26. There was also a decline in the level of functioning in social, farming and work cues.

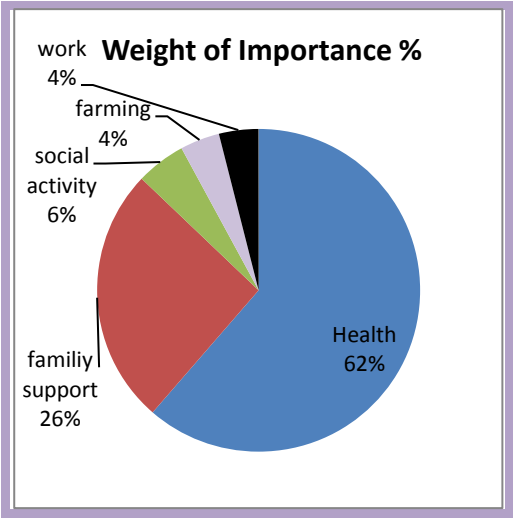
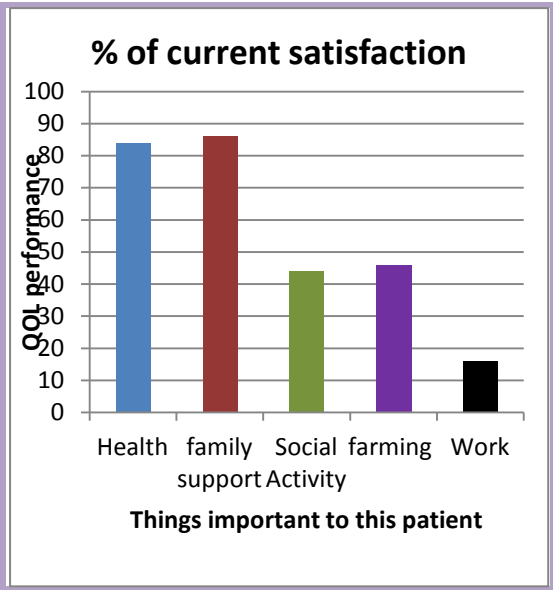
Time point 4 was the final assessment. His SEIQoL DW index score for this time point was now 78.88. The overall SEIQoL DW index score from first assessment to final assessment showed a significant gain of + 40.58 points.

The multiple co-efficient R^2 score at this time-point was very high 0.89 indicating a good representation of this judgement policy. The tables below labelled SEIQOL JA Time- point 4 demonstrate the relative weight of each cue by judgement analysis. Es symptoms were resolving (laryngeal spasm, flatulence and decreased concentration) and were impinging less on his quality of life. He now rated symptom bother on quality of life as 40%.

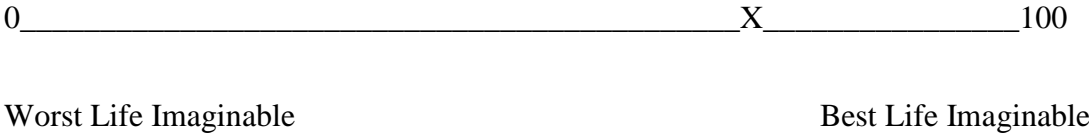
Info-graph labelled time Point 4 depicts Es self- reported Individual Quality of Life

TIMEPOINT 4 Info-graph

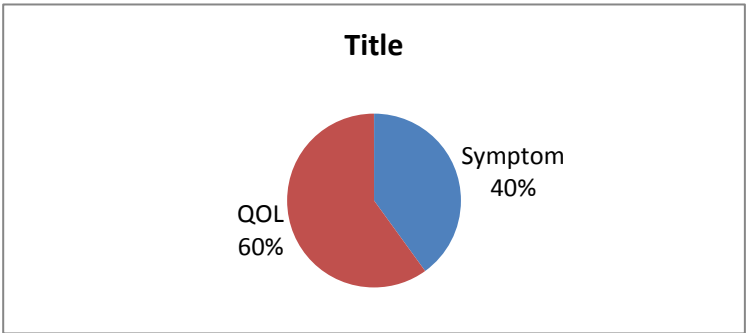
Individual Quality of Life. SEIQOL Patient E



This Patients Overall Individual Quality of Life Self Measurement= 78.88



- Existing Symptoms**
- Flatulence**
 - Larangela Spasm**
 - Decreased Concentration**



E completed 6 cycle of chemotherapy as first line treatment for metastatic oesophageal cancer in June 2013. A repeat CT scan in July showed complete absence of disease however, an MRI indicated a small residual lesion of 1.2cm. He was referred to St Vincent's Hospital to see if resection of this solitary lesion was an option. This was resected in September 2013. At the time of write up, E presented with an enlarged para-tracheal lymph node earlier this year which was confirmed as further progression of metastatic disease and he is now undergoing further chemotherapy for treatment of this.

CHAPTER 9**9 Discussion**

Cancer is the second leading cause of death in Ireland .To date; advances in cancer management have focused primarily on development of drug therapies to improve survival time and to slow the time to disease progression. With the increase in life expectancy, there comes a shift in societal needs to focus on health promotion and quality of life (Thompson et al. 2012).

Moulton & King (2010) suggest that clinical benefit alone does not establish the reasonableness of necessity of all medical interventions. Some cancer treatments are stressful and are often disabling particularly in certain patient groups such as leukaemia (Montgomery et al. 2002).

Research conducted by Percy et al. (2008) , Teno et al (2002) in Moulton and King (2010) and Waldron (1999) demonstrate non-convergence in values exist amongst the medical profession and patients .In Percys study of patients with prostate cancer, he found that clinicians listed survival as being most important to the patients quality of life whereas none of the patients surveyed mentioned survival or complications as a concern. Teno et al (2002) observed that only 41% of their study population indicated their care reflected their preference, while Waldron (1999) found discordance between the clinician and patient with respect to clinical care and symptom bother and determined that clinicians are not suitable proxy's for patients. Thus with all factors considered, it can be said that decision making should go beyond the traditional clinical opinion and extend to the individual, being inclusive of his values and concerns.

One way of identifying those individual concerns and values is through quality of life assessments. As with other conditions , the state of the art of assessing quality of life in cancer patients is developmental. No one measure satisfies the multidimensional and subjective components of quality of life. This poses a shortcoming for clinicians as it leads to the necessity of administering more than one quality of life measurement tool to capture the relevant dimensions of it and all that it encompasses .

With the growing number of instruments available for the measurement of quality of life, investigators must be careful to select instruments that are reliable. Similarly, investigators must choose an instrument or instruments which are best suited to detect the primary outcomes of interest for a specific population. In choosing a measurement instrument, or set of measures, key questions to consider are whether a disease specific and / or generic measure is needed and whether either requires supplementation with site specific measure or single domain measures that are important to the study aims. Saunders CM. and Baum (1992), Fallowfield (1990) and Bowling (2001) recommend the EORTC-QLQ for use with cancer patients. This covers physical, social and psychological functioning as well as cancer specific symptoms.

Health related quality of life measurement tools are however, prescribed tools, with predetermined questions which focus only on performance in health (Waldron et al.1999) Minion et al .2003).To ensure accuracy of evaluation, the fundamental component of subjectivity must be included in measuring quality of life particularly when those quality of life concerns drive treatment decisions.

Individual quality of life measures recognize the individual and his values(Stiggelbout et al. 2008) .The Schedule of Evaluation for Individual Quality of Life (SEIQoL) is a measurement tool specifically designed to capture the individuality of man. Unlike the health related quality of life tools, it doesn't steer the individual patient to focus on any particular aspect of his health or life, but rather it could be described as a blank canvas, allowing the individual patient to identify and nominate the concerns that influence his quality of life (Stiel et al. 2011) as ultimately, the patient is the best judge of determining what is important to him (Montgomery et al. 2002). A third person cannot judge and often overestimates the effect of life events on others (Waldron 1999),(Plagnol 2010). With that in mind, the SEIQoL tool is most fitting. This tool also allows the patient to demonstrate how these salient areas of his life are functioning and finally it allows him to demonstrate just how important each area of concern is. It's a simple concept but very effective.

Use of Quality of Life information in the clinical setting hasn't changed much during the past decade and, with the exception of the palliative care setting, there has been limited attention given to implementing the use of quality of life measurements of patients with cancer. In fact, there is a near absence of this in the acute setting in Ireland and yet we strive to deliver

quality care. Quality in health care is all encompassing and therefore should not be confined to health only. The most important reason for including quality of life measurements in practice is to allow us to focus on the individual patient and not just the disease (Higginson & Carr 2001) and as such it must be appreciated that in the acute setting, there is a significant reliance on information that can only be provided by the individual (Willke et al. 2004).

Studies have demonstrated the value quality of life information is to the clinician in informing him of the patients psychosocial and physical functioning but the question remains about the usefulness and applicability of this information with regard to clinical outcome. Does this knowledge really make a difference to the patients overall quality of life? Does it tell us more about the patient on which we can then base our clinical decisions and does it improve the patients overall clinical outcome or, is it just an additional layer of work without any real value to patient outcome?

The objectives of this study are to answer these questions and in doing so a randomized controlled trial was conducted. A total of 184 Individual quality of life assessments of 65 patients with advanced cancer was conducted by the researcher over four time points during their cancer treatment. The quality of life information of 33 patients in the intervention group, was shared with the physician in the format of an 'info graph', while for the control group, individual quality of life information for 32 patients receiving chemotherapy for advanced cancer was assessed by the researcher but was not shared with the medical team. As expected in this population, there was natural attrition of participants in both groups as time progressed.

9.1 Quality of Life over Time in Patients Receiving Chemotherapy for Advanced Cancer

The primary objective of the study was to determine if there was an improvement in the quality of life of patients whose individual quality of life information was shared with the clinical team. Along with the SEIQoL measurement tools (both the longer Judgement Analysis version and the shorter Direct Weighting version), the health related quality of life tool EORTC QCQ 30 was used and a visual analogue scale.

Unlike the results found by Mannion et al (2003), where there was a general decline in the quality of life of a population with lung cancer over time, the results of this study showed an overall improvement in the mean quality of life across time irrespective of the measurement tool used. This may be attributable to the non-homogeneity of disease group of the population which can be divided into three disease groups (1) breast cancer, (2) colon cancer and (3) others compared to Mannions patients with lung cancer- a disease commonly associated with poorer clinical outcomes. Within this study, the improvement in quality of life affirms the medical management of this population with advanced cancer.

Comparison of the SEIQoL DW index scores of the intervention and the control group was made. Consistent with the finding of the study by Westerman et al.(2007) who measured the quality of life on 21 patients with squamous cell lung cancer over time and found that individual quality of life improved at time point T2 with a slight decrease at T3, the control group in this study demonstrated an improvement in quality of life at time point 2 with a slight decrease at time point 3 but then a further decline.

While there was no statistically significant difference between the intervention and control group, there was a consistent improvement in the quality of life SEIQoL JA global index scores of the intervention group at each time-point, whereas the index scores of the control group showed improvements and then dips in the quality of life over time.

9.1.1 Clinical significance

With the population under study, there was a diminishing sample size. As such, the magnitude of difference between groups may have been too small to detect a statistical significance over time however clinical significance was observed. Clinical significance is often referred to as the meaningfulness and usefulness of findings in clinical practice which should be thoughtfully addressed by clinicians when applying research to practice (Oberst 1982).

In order to discuss the clinical relevance of the results of this study, one must first attempt to define what constitutes a clinically significant change on a quality of life assessment. Several methods to assess clinical significance have been developed (Osoba & Rodriguez 1998). One such technique is the calculation of the 'minimum important

difference' or MID. This can be defined as 'the smallest difference in score in the domain of interest that patients' perceive as important, either beneficial or harmful, and which would lead the clinician to consider a change in the patient's management (Guyatt et al. 1993) . Work in this area has suggested that across instruments and disease, MID values remain constant at 5 – 10% of the instrument range (Ringash JG, et al 2002) Therefore, although any estimate of the MID is associated with a degree of uncertainty, using this best estimate can facilitate analysis of results.

In this study, an improvement of greater than 7% on the mean score was considered to be the minimum important difference. The minimum important difference was calculated for the total group using the SEIQOL DW and JA assessment technique. There was a 10% improvement in mean SEIQoL JA index scores across time-points from base line to time point 4 with a maximum gain of 20.3% at time point 3 .The SEIQoL DW assessment results are comparable at time point 4 demonstrating a quality of life improved by 10.0%

9.1.2 Clinical significance between groups

The primary objective of this study was to determine if there is an improvement in quality of life following clinician awareness of the issues of importance to the individual. Data analysis showed the MID was achieved by both the control and the intervention group. The SEIQoL JA assessment technique demonstrated a 24% improvement in the intervention group from baseline to time-point 3 compared to a lesser yet clinically significant improvement of 19% in the control group. The SEIQoL DW assessment also demonstrates a clinically significant improvement in both the control and the intervention arm with a mean actual gain in Quality of Life of 13.5% from baseline to T4 in the control group and 10% in the intervention group.

In an effort to gain a more comprehensive insight into the variables potentially influencing quality of life, it was necessary to analyse the areas of importance (cues) nominated by the patients .This yielded remarkable results. Within the intervention group, the health domain improved almost three times greater than the control arm with a 51% gain from baseline within the intervention group and 19% gain in the control group.

One would think if health is improving then the patient would be feeling better so other areas in life particularly social activity and keeping active should also improve. Analysis of the data yielded some interesting results. Findings were paradoxical. There was no corresponding increase in the levels of functioning across social activity, family support and keeping active and in fact, data demonstrated a decrease in both the intervention and control arm from baseline to time point 4.

One of the challenges high-lighted in the literature regarding the use of quality of life information in the clinical setting is the physicians concern regarding his ability to intervene or to take constructive action if the participant identifies concerns which the professional may be limited in addressing such as financial needs or practical assistance (Greenhalgh & Meadows 1999) This finding leads one to purport that, keeping in line with the more traditional model of medicine, the medical team focused on health issues alone nominated by the patient and gave less regard to the psychosocial areas of concern to the patient. To substantiate this theory, one would expect to see an improvement in some aspect of the patients' physical health. The symptoms that patients identified as bothersome during their course of treatment were reviewed. Symptom bother was measured and so too was symptom interference on quality of life. As anticipated and in keeping with the improvement in the health domain in the intervention group, there was a 9% reduction in symptom interference on quality of life in the intervention arm whereas, in the control arm there was a 36% increase in symptom interference on the control arm. These findings bear strong clinical significance for patient. ($p < 0.05$)

Of interest also was a comparison of outcomes derived by EORTC health related quality of life assessment. In keeping with the improvement in health demonstrated by SEIQoL and symptom bother and interference as measured by SEIQoL, there was a greater improvement in the quality of life of the intervention group compared to the control group. (Intervention group index score: T1 = 50, T4 = 62 vs. control group index score T1 = 50, T4 = 55).

Analysis of the single item score for health showed 28% improvement from baseline to T4 in the intervention group compared to a 10% improvement in the control arm. Again, this demonstrates a clinically significant difference in health related quality of life over time favouring the intervention group.

Overall, following evaluation of all measurements: SEIQoL, EORTC and Symptom bother and Symptom Interference, findings suggest that the intervention group derived a greater clinically significant improvement in the quality of life with regard to health outcomes compared to the control group.

9.1.3 Effects of response shift on quality of life - change of cues

Recognizing the clinically significant improvement in the level of functioning in the cue “Health” as nominated by the majority of patients, it was important to examine some of the other cues with reference to their effect on the individuals quality of life.(Hunt 1997) suggests that the foundation of Quality of Life should be based on individual values which are in a state of constant change .How the person is functioning in a particular domain at any given time may change and secondly, the degree of importance of that particular area of life /domain at that time may change. People who undergo significant change in life are likely to also undergo a shift in values. The SEIQoL and SEIQoL-DW have properties appropriate to test this change/shift and successfully captures the patient profile to provide valuable information with regards to what has changed for and within the patient.

The phenomenon of response shift and conceptualisation has been clearly demonstrated by a number of authors (Waldron et al 1999,Blair et al. (2010) Blair et al and Mannion et al 2003) . Similar to their findings, response shift also occurred amongst this population, with the weight of importance in cues of changing over time, but unlike the participants in Blairs study, the participants in this study, did not change domains.

9.1.4 QOL domains and quality of life

Because of the variability of domain definition, it is difficult to directly compare studies. It can be seen however, that the most frequently nominated cues elicited in this study are similar to those also frequently nominated in other published SEIQoL studies with health, family and social activity being primary concerns by a significant proportion of all populations of varying stages of illness and health ranging from healthy adults (O’Boyle et al. 1993) to the dying(Waldron 1999) .

In this study approximately seventeen domains important to their quality of life were identified by the patients. Individual functioning of each domain was rated between 0-

100percent. The most common domain health was rated with a mean of 50.9 % .Social Activity was the next leading domain nominated by 64 % of the population with a level of functioning of 49.98 .The third most common domain nominated was ‘ keeping active’. The mean level of functioning was 55.6 %. Family support function was quite high 87.74%

9.1.5 Family support

As mentioned, the mean level of functioning of family support was quite high. This may be representative of the Irish culture particularly when one looks at the age profile of the population under study. The majority of patients were in the 40- 70 year old age group who were born in the pre-contraception era of the 1950s and 1960s and as a result are now fortunate to have large families with many siblings to now offer support.

9.1.6 The impact of family wellbeing and partner/children

A review of the data as outlined by Plagnol (2010) notes that married people/people with a partner has a positive effect on wellbeing with individuals being significantly more satisfied with their life than single individuals. A positive association was also found between having children and wellbeing (Haller and Hadler 2006 in Plagnol 2010). In this study, the number of patients with a partner was 89%. As such no real conclusions could be drawn about the relationship of marital/ partner status on quality of life.

9.1.7 Stress.

Matsushita et al. (2007) conducted a study using the EORTC tool over a trajectory of 3 time points to investigate the relationship between quality of life and demographic/ clinical factors. They found that cancer patients have higher levels of anxiety compared to non - cancer patients. In this study, 23% of the participants nominated being free from ‘stress’ and ‘worry’ as important to their quality of life. Zimmermann et al. (2011) also found that patients awaiting cancer treatment had worse emotional wellbeing than those receiving treatment ($p < 0.001$). The findings in this study were similar. Of those who identified stress/anxiety/ worry as a concern, 86% of patients were embarking on their 1st line of treatment and had a lower SEIQoL index score of 56 compared to the remaining 14% with a mean SEIQoL DW index score of 68 who were about to begin either the second or third line treatment for metastatic disease.

Chan et al. (2011) found that poorer socioeconomic status lends itself to poorer health outcomes, with psychosocial problems, anxiety and depression being most prevalent amongst those in the poorer and lower socioeconomic group.

In their study, they found that lone mothers were more likely to suffer from anxiety than mothers who were supported. Zimmerer et al (2011) also found that lower income predicted worse social well-being. Although the socioeconomic status was not captured in this study, it is interesting to note that 23 % of participants listed absence of anxiety or stress as an important domain and none of these patients referred to financial security.

9.1.8 Religion

It is likely as patients are approaching death; religion becomes more important to the individual. Waldron et al (1999) found 73% of participants' nominated spirituality as important in their life, whereas despite having advanced cancer only 23% of patients nominated religion as important in this study. These results are almost similar to findings by (Campbell & Whyte 1999) in which lower frequency of patients (13%) nominated religion as an area of importance to their quality of life. The lower levels of concern are probably due to the fact that these patients are being actively treated for their disease and accordingly are still fighting to survive.

9.2 Effects of Demographic Variables on Quality of Life

9.2.1 Age

As we age, the naturally occurring phenomenon of declining health occurs. (Zimmermann et al. 2011) suggests age and treatment status are also strong predictors of quality of life. Studies demonstrate that satisfaction with health decreases with age(Easterlin 2006 in Plagnol 2010) however, Plagnol (2010) also notes that retirement can be associated with improved sense of wellbeing in contrast to those who suddenly find themselves 'retired' through some external cause forced upon them such as ill health or redundancy.

In this study, relationship between quality of life scores and age was examined. It was found that there was positive relationship between aging and quality of life.

Those in the younger age group (20-49) experienced poorer quality of life and those aged between 60 and 69 years had a significantly better quality of life than all other age groups at time point 3.

A number of young mothers had participated in this study. Lack of energy identified on the individual quality of life assessment and fatigue as a bothersome symptom left these patients in most distressed state as they were unable to attend to their children's needs at home. Being young mothers also meant they also had new homes with additional financial constraints. This in turn required their partners to work, thus leaving these people more reliant on the help and assistance of their families. Each individual quality of life profile demonstrated this heavy reliance on family. Campbell and White (1999) suggest that as family is predominantly a leading cue, more emphasis should be placed upon integrating patient care with the family. The primary care community services were notified to assist these patients at home and practical advice was also given regarding managing at home. With cases like these, the ability to extract information specific to the individual patient which leads to supports being put in place, demonstrates the unique and invaluable properties of the SEIQoL measurement tool.

9.2.2 Gender

In a study by Zimmerman et al (2011) male gender predicted better emotional and physical well-being. This study demonstrated a similar position at time point 1 and time point 2 but as time progressed, this reversed and women had a better quality of life than men later in treatment.

9.2.3 Disease stage

Some studies suggest that the global quality of life score of the patient can be significantly predicted by severity of surgery and performance status and that co morbidity, family support and disease stage are not predictive of Quality of Life Scores (Matsushita et al 2007).

Findings are to the contrary in this study with respect to prediction of quality of life and disease stage. Although all patients had stage 4 disease, most patients (n52) were just newly diagnosed with advanced cancer and accordingly were embarking on their first line of treatment. The remaining patients (n13) were embarking on a journey of either second or third line treatment for progressive advanced disease. The patients in this latter group

reported a better quality of life than that experienced by the first line treatment group. The phenomenon of response shift may be responsible for this improved quality of life in what would be perceived the 'less well' population as time would have allowed for the process of adaptation and reevaluation of the important things in life. This would be in keeping with findings by Waldron (1999) who demonstrated that patients in hospice, facing death, reported a good quality of life.

9.2.4 Treatment, hospitalization and quality of life

Montgomery et al (2002) measured the quality of life of patients receiving chemotherapy for leukaemia and lymphoma using the SEIQOL DW tool and found that the greater the intensity of chemotherapy, the poorer the global score.

No discrimination of treatment intensity was made in this study except to say that many regimens of chemotherapy were given on an out-patient basis and as such, the intensity would be deemed comparable. Accordingly, the results show that patients on the folfiri regimen had a significantly improved quality of life compared to those on other chemotherapy regimens ($p=.0009$).

Patients who were hospitalised however, would typically be receiving longer treatment regimens. Their quality of life was lower than that of the outpatients. This may in fact be attributable to the treatment regimen or as Courtney et al. (2011) suggest, patients experience a sense of de-conditioning during hospitalization which affects quality of life. Their study examined the effects of nursing and physiotherapy support services on patients discharged from hospital and they demonstrated that provision of support services such as exercise and follow up programs improved the quality of life of the elderly. This study supports this finding; the quality of life of those who received chemotherapy on an inpatient basis was lower than those who attended for treatment on an outpatient basis. A continuous improvement of the quality of life of outpatients occurred over time compared to the inpatient population. Similar to Courtney et al (2011) keeping active ranked third highest as an area of importance to the quality of life of over half the patients in this study and although the level of functioning declined over time, this cue remained important.

9.2.5 SEIQoL as a communication aide

Velikova et al. (2004) found that patients with lung cancer and older patients were more likely to decline participation in their health related quality of life study. In this current study of 65 patients, the age of the participants ranged from twenty nine to eighty eight. The median age group was 60-69 years. Unlike Velikova et al (2004), the researcher found that elderly patients, particularly men, were eager to participate and indeed some of them indicated that on occasion, they wanted to phone the researcher between treatment visits to discuss quality of life issues. As the completion of the SEIQoL measurement tool involves a semi structured interview technique, perhaps it provided an opening for these patients to talk candidly about things that were important to them. The patients were very willing to participate and readily share personal information. Campbell and White (1998) in their study of quality of life experience of patients participating in phase 1 clinical trials noted that the SEIQOL interview stimulated conversation and a large proportion of time was spent discussing topics raised. A similar occurrence was observed in this current study. The time it took to complete the assessment was prolonged in approximately 80% of cases due to discussion about the topics raised. This demonstrated the patients need to talk. These observations support the suggestion by Hickey et al (1996) that the SEIQOL tool aids communication. In becoming a more multi-cultural society, the SEIQOL instrument also lends itself greatly to the non-English speaking community as the patient himself defines the areas of life with importance specific to himself and his cultural idioms. All participants in this present study were English speaking patients.

The view of SEIQoL being an aid to communication is also supported by (Neudert et al. 2004) who studied patients with ALS. They suggest that SEIQOL may have positive interventional measures such as aiding communication, to use as a guide when planning treatment options and to facilitate in counseling patients and families as it may help patients to identify and considerer important areas of life and thus assist in developing coping strategies

9.2.6 Reliability of judgment

In addition to providing relative levels and weights, SEIQoL computes important measures of internal reliability and validity. The reliability α is based on concordance of judgments on 10 repeated profiles, which, unknown to the respondent are embedded within 30 hypothetical case judgments (Waldron 1999). The validity measure (R^2) indicates the amount of variance in overall quality of life judgments explained by the particular combination of cues generated. Values of 0.7 or greater are considered acceptable in the context of quality of life measurements (Stewart 1988, Waldron 1999). These measures therefore indicate how well the particular judgment policy explains the individuals overall assessment of quality of life and how reliably the individual uses this policy. In this study the mean R^2 score was 0.75 thereby indicating a very high degree of internal reliability across all time points and correlation between both the SEIQoL JA and the SEIQoL DW instruments was high (0.90)

9.2.7 Visual analogue scales and differences in global scores

Plagnol (2010) highlights that a likert scale of zero to ten is a typical measurement tool for life satisfaction (zero being completely dissatisfied) and suggests that the advantage of subjective wellbeing is that the person makes the evaluation based on what is important to them. Global scores defines overall general wellbeing compared to component scores which are itemized subsets of the global score such as social, physical social, cognitive, psychological, symptom, role activity or personal component.

The global index score allows for grouping of data but care must be taken when comparing index scores as they may be differences between groups. Despite index scores being near identical, the challenge is not to make assumptions about the areas of concern for any group of patients (Campbell & Whyte 1999). One must remember that individual patients with the same condition may have very different profiles also. As suggested by Cheyne and Kinn (2001), the areas of life most important to an individual will most likely influence their overall sense of wellbeing. Therefore, if the areas of assessment in predetermined quality of life questionnaires are not of interest or relevance to the patient, then this will reflect in their global quality of life score and bias the results.

In this existing study, the visual analogue scale was also used to measure quality of life. The VAS global index score was much lower at time point 1 than the score produced by any of the other tools but for the remainder of the time points, quality of life improved and the VAS score was comparable with that of the other tools. Visual analogue scales have the advantage of being easily understood and easily completed by all participants and easily interpreted by clinicians. Along with this, as it doesn't take up much space it can be added to any existing clinical documentation.

9.2.8 EORTC findings

The single item HRQoL sub scores were suitable for assessing physical and functional QoL rather than global wellbeing. Research carried out by Mannion et al (2003) in patients with lung cancer showed a significant difference in overall quality of life score at the initial time-points (SEIQOL Mean Index Score at T1 – 67.69 and T2= 67.09 and EORTC index score was significantly lower: T1 51.44 and T2=49) suggesting that the scores were lower when measures were associated primarily with health rather than individually driven. Findings were comparable in this study, with the SEIQoL mean index score at T1 =59 and T2 = 66 and the EORTC index score lower: T1=50 and T2= 56.

9.3 Study Limitations

A number of limitations within this study are acknowledged

9.3.1 Design bias

Velikova et al (2004) suggest that physicians may be sensitized to the concept of quality of life over the passage of time. They found as their study progressed, physician communication regarding quality of life improved over time in the control group and as such the physician may have unwittingly altered their patient management behaviour across all groups thereby narrowing the gap in the difference between groups.

In this study, 4 medical oncologists in Galway University Hospital referred patients onto the study. Patients were randomly assigned to either the intervention or control arm of the study. As physicians became more acquainted with the quality of life assessment and info-graph in patients charts, they may have been a change in their behavior overtime with all patients. Absence of statistically significant findings may have been caused by this contamination. To minimize this risk of design bias in future research studies, it would be recommended to first enroll patients onto the control arm and then follow with enrolment of participants to the intervention arm.

9.3.2 Selection bias;

Selection bias may have occurred in Patients were identified by the clinical nurse specialist and also by the medical team. Some patients were not referral by the team as they considered the patient not suitable due to emotional fragility.

9.3.3 Training and education to the wider multidisciplinary team.

Training was given to the clinical team only and to maintain participant blinding, the info graph was placed in the clinical notes. that frequently reviewed by the medical team. It can be seen that there was clinically significant changes in health functioning. Improvement in functioning in the 'softer' psychosocial cues may have occurred if further training had been given to the wider multidisciplinary team with greater access to the info- graph

9.3.4 SEIQOL JA instrument

Not all patients completed this instrument at all time-points as it was very lengthy and abstract to use. Results would be more robust with a larger population completing all assessments at all time points.

9.3.5 Follow up time period

Wan Sun Chan et al,(2011) highlight that there are many social, personal and environmental detriments of health that reach beyond the scope of any one intervention and in order to make necessary change it may be necessary to have more rigorous follow up from health professionals over a longer period of time. In this study, participants were followed from time point 1 through to time point 4 during their course of chemotherapy for the treatment of cancer. A more rigorous follow up may have had greater yield for participants.

9.4 Challenges of conducting this research

1. The primary challenge associated with the conduct of this study was the transformation of the quality of life assessment results into an info graph. This involved transferring the data onto a computer and creating individual graphs, then returning to the clinical area and putting the data in the clinical notes. To successfully implement a program of using quality of life as an information tool, the results of the assessment i.e. the output must be readily created. This requires the expertise and cooperation of an Information Technology specialist.
2. The training of all personnel involved in the study was not a challenge in this instance as it was confined to the medical team but successful implementation of this practice would necessitate the involvement of the full multidisciplinary team. Training staff on how to use the measurement tools and obtain the relevant output would not be without its challenge.
3. As the patients in this study had advanced cancer, at times, some patients were tired and lacked the energy to carry out an assessment. Along with this was declining participant numbers due to natural attrition. This posed a challenge in terms of study analysis.
4. The researcher needed to allow plenty of time to spend with each patient, particularly at time point 1 as many of the patients needed to talk .The lack of privacy in the day ward was also particularly challenging at times especially when the treatment area was busy. There is a need for dedicated space in the outpatient cancer setting to allow patients to talk candidly.

9.5 Recommendations for Future Research

Several interesting areas for future research arise as a result of this study

Inclusion of the Wider Multidisciplinary Team

The key finding in this study is that patient's quality of life 'health functions' improved in the absence of improvement in the other areas of importance to their quality of life. It is hypothesized that this outcome was primarily due to the physician's practice of traditional medical model of care which focuses on health outcomes. To seek improvement in the psychosocial aspects of one's quality of life, a follow up study is necessary which should involve greater active participation of the wider multidisciplinary team and not just the physician and nursing team.

Acceptability of using the SEIQoL tool as standard of practice in the clinical setting

The challenges associated with introducing quality of life assessments as part of routine practice is outlined in earlier chapters. Further research is warranted to measure the acceptability of using the SEIQoL tool in the clinical setting by both the clinician and patient and determining the challenges encountered.

Longitudinal study with a larger sample size.

There is a need to study larger groups longitudinally to assess how quality of life progresses throughout the disease trajectory and to assess and compare the use of quality of life outcome measures to improve quality of life outcomes over short and longer time period

Awareness of patient knowledge

During the execution of this study, 92% of participants identified health as important. It became clear to the researcher when talking to the patients, that while many expressed a hope that the chemotherapy would keep their disease at bay, a small number of participants expected the treatment to 'cure their cancer'. These patients appeared not to appreciate the true intent of the treatment. It is important to establish the patients' knowledge and understanding of the purpose of treatment. Individual quality of life assessment in the clinical setting gives the clinician the opportunity ask questions ,to assess the patients understanding

and /or acknowledgment of their disease status and helps in identifying those patients to whom the clinician needs to reiterate the purpose of treatment. This may facilitate patients in adjusting to their circumstances more readily.

Future research of patients receiving active treatment for advanced cancer is recommended to determine patients' extent of understanding the objective of the treatment.

Translation of Individual Quality of Life assessments into other areas of general medicine

SEIQoL is an individual quality of life measure that has been validated using a number of populations both healthy and ill. This current study is the first of this nature to evaluate the benefit of using quality of life outcome measures in the clinical setting to further improve quality of life. There is a need to replicate this research in other areas of medicine within the acute setting to further validate its value.

An analysis of the economic benefits of quality of life measurements in clinical practice

Improvement of patients perception of health along with a decrease in symptoms has been demonstrated within this study and it could therefore be hypothesized that there could also be an economic benefit to both the patient and the health service. A study to measure the economic impact of using quality of life would be recommended to test this hypothesis.

Therapeutic value of SEIQoL assessments

Quality of life studies can be particularly sensitive and can give rise to a number of emotions. Montgomery et al (2002) suggested that the personalised nature of the SEIQoL could be therapeutic in nature. This was not explored in this current study. The researcher observed that patients were very willing and eager to participate and talk and in a number of instances, the patients stated that they would have liked if the researcher seen them in between treatment visits. A suggestion for future quality of life studies is to include a sub-study to explore the patients' perspective of the experience of undertaking a quality of life study.

Response Shift:

Further research is recommended to measure the impact of response shift on the assessment of the clinical significance of changes in quality of life and to determine to what extent response shift occurs at different stages in the disease trajectory and to examine the impact of different treatment modalities on response shift.

Further exploration is also recommended into the phenomenon of response shift with regard to recalibration, reprioritisation and re-conceptualization of specific domains of importance to the individual as the process of adaptation occurs during disease trajectory.

Symptoms

It has been seen that the SEIQoL disk is a simple and effective tool for measuring symptom interference. Further research across other disease groups and in large populations is warranted to further validate the SEIQoL disk in measurement of symptom interference with quality of life and to further measure the relationship between quality of life and symptom bother in a larger patient population.

9.6 Conclusion

Quality of life was traditionally an area of interest in palliative medicine perceived to be associated with facilitating patients during their transition from life to death. Modern approaches to patient treatment increasingly recognize the importance of subjective patient ratings and the need to incorporate the views of patients in treatment planning. While improving patient quality of life is now an important goal in healthcare and although widely accepted that it should be considered as a primary endpoint of treatment both in clinical practice and clinical trials, this has not been yet prioritised in the acute medical setting to any great extent.

The findings of this study demonstrate that the translation of quality of life information from the individual patient with advanced cancer to improve his/her clinical outcome can be successfully achieved in an acute setting. Traditional outcome measures of survival and tumour response can be complimented with individual quality of life assessments and may offer a more comprehensive, tailored approach in evaluating the relative risks and benefits associated with treatments in harmony with patient preferences. The individual's own view of his or her present reality, hopes and expectations can only be described by the individual (O' Boyle, Joyce, 1994). Therefore, when planning care, patients with advanced cancer should be asked what they prioritise in their lives.

Failure by health professionals to understand the complex nature of individual quality of life could result in treatment regimens that not only fail to improve quality of life but actually contribute to its deterioration. Based on a biomedical model of disease, it is often assumed that quality of life invariably deteriorates with advancing disease. This study demonstrates improvement in the overall quality of life of patients receiving chemotherapy for advanced cancer and demonstrates a marked improvement in health functioning. This is demonstrative of the willingness by clinicians to embrace the concept of using quality of life information in the clinical setting albeit their focus appears to remain fixed on *health functioning* and *symptoms*.

As the process of adaption to their illness occurs, the focus of quality of life judgements may shift from health to spiritual, psychological and social domains. This ability to adapt to changing circumstances is a defining characteristic of human beings, and illustrates

the resilience and extraordinary vitality of the human spirit. Accordingly, the translation of quality of life outcome information to the wider multidisciplinary team such as social workers and physiotherapists, who have greater expertise in managing psychosocial aspects of care, should lead to even further gains in the quality of life of the individual patient. The outcome of this research demonstrates that quality of life is important to patients being actively treated for advanced cancer and use of quality of life information may have application across other disease groups and treatment settings. SEIQoL has proven to measure the subjective and dynamic elements of life likely to have major influence on patients with advanced cancer. The practice of using quality of life information in the acute care setting has far reaching implications, not only for the patient in terms of improvement in health and wellbeing but it may go toward lessening the burden of disease on the state and could be used by acute health care institutions as a tangible measure of quality in health. SEIQoL has the potential to bring significant contribution to the evaluation of the health service and is a valuable tool in the clinical setting.

END

“All this will not be finished in the first one hundred days. Nor will it be finished in the first one thousand days, not in the life of this administration, nor even perhaps in our lifetime on this planet. But let us begin.”

President John F Kennedy 1961

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Appendix 1



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



Merlin Park University Hospital
Ospidéal na h-Ollscoile, Páirc Mheirlinne
GALWAY UNIVERSITY HOSPITALS

Clinical Research Ethics Committee
Main Administration Building
Merlin Park
Galway.

30th March, 2012.

Ms. Veronica McNerney
Clinical Research Manager
Clinical Research Facility
National University of Ireland
Geata an Eolais
University Road
Galway.

*Ref: C.A. 693 – A Prospective Study of the Impact of Receiving Quality of Life
Information from Patients with Cancer*

Dear Ms. McNerney,

I have considered the above project, and I wish to grant Chairman's approval to proceed.

Yours sincerely,

Dr. Shaun T. O'Keeffe
Chairman Clinical Research Ethics Committee.

Appendix 2

PATIENT INFORMATION SHEET

Study Title:

Using Quality of Life Information as a Clinical Tool.

A Single Centre, Single Blind, Prospective, Randomised Controlled Trial of Using Subjective Quality of Life and Symptom Outcome Measures as a Clinical Tool Reporting to the Multidisciplinary Team: to Determine its Impact on the Subsequent Quality of Life and Symptoms Outcomes of Individual Patients with Cancer.

Principal Investigators:

Veronica McInerney, Clinical Research Facility, National University of Ireland Galway.

Dr Dympna Waldron, Consultant, University Hospital Galway.

Dr Eileen Mannion, Consultant, University Hospital Galway

You are being invited to take part in a research project. Before you agree to take part in the study you must understand why we are doing the study and what will be expected of you if you agree to take part. We are providing you with this information sheet to explain the study to you but if you have any questions about the study after reading this sheet please ask us.

What is the purpose of this study?

The purpose of this study is to evaluate the quality of life of individual patients with cancer and to determine if quality of life assessments of individual patients are reported directly to the medical team, will there be any difference in quality of life and symptom outcome over the course of time. We would also like to evaluate the economic impact of cancer on you and the service.

What will happen in the study?

A total of 65 patients will be invited to participate in this study. Following consent, all patients will be asked by the researcher to complete a number of questionnaires relating to quality of life. In order to determine if there is any difference in patient outcomes, the quality of life assessment of 33 patients will be reported back to the multidisciplinary team by the researcher and the quality of life assessment for the remaining 32 patients will be seen only by the researcher and will not be reported to the multidisciplinary team. The patients will be randomly selected into each group. You will not be told whether your Quality of Life information is reported to the multidisciplinary team.

During your course of treatment, you will be asked to complete 4 sets of quality of life assessments. One at the beginning of the study and the others at 2-4 week intervals.

Using Quality of Life Information as a Clinical Tool.

Patient Information Leaflet and Consent Version 3 February 4th 2013

Page 1 of 4



HRB Clinical Research Facility, Galway

Áis Taighde Chliniciúil HRB, Gaillimh

Why have I been chosen?

You have been asked to participate in this study because you are receiving treatment for the diagnosis of cancer and we are interested in your quality of life and symptoms with this diagnosis.

Do I have to participate?

Participation in this research project is entirely voluntary. You do not have to take part. If you choose not to take part, this will not affect the care that you receive from your medical team.

If you agree to take part you will be asked to sign a consent form. However you are free to withdraw from the study at any stage and you are not obliged to give a reason for your withdrawal.

What is required of me if I take part?

Following consent onto study, the researcher will ask you to complete some questionnaires that will be specific to how you feel your quality of life is and how you feel your health is at the moment. This will take approximately 1 hour. Information regarding your diagnosis, treatment and age, gender etc will also be obtained from your hospital chart

The researcher will meet you to complete a similar set of questionnaires at two to four weekly intervals for a total of 4 times.

Are there any risks involved in participating in this study?

No risk is associated to the participation in this study

What will I do if I have more questions?

If you have questions about any aspect of this study you should contact the Researcher or her supervisors who are named at the end of this sheet.

Will my participation in this study be confidential?

Your general details will be collected from your hospital chart and will be entered onto the study database. This information will be stored anonymously and securely by the researchers. Your personal details and identity will remain confidential at all times. During the course of the study only authorised personnel may review your medical chart and collect data to assist with the research study. All personnel have a duty of confidentiality to you as a research participant.

Can I withdraw from this study?

You are still free to withdraw from this study at any time and without giving any reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive from health professionals.

HRB Clinical Research Facility, Galway

Áis Taighde Chliniciúil HRB, Gaillimh

What will happen to the results of the research study?

The results of this study will be published in relevant medical journals and the results will be presented at suitable medical meetings. At no time will you be identified in any report or publication.

Who has reviewed the study?

This study has been reviewed by the Galway Regional Hospitals Research Ethics Committee. A copy of this information sheet and consent form will be given to you to keep and a copy will be kept in your clinical notes.

For additional information now or in the future please contact:

Principal Investigator's:

Veronica McInerney, Clinical Research Facility, National University of Ireland Galway.

Dr Dympna Waldron Consultant, University Hospital Galway.

Dr Eileen Mannion, Consultant, University Hospital Galway

Phone Number: 091 494031

HRB Clinical Research Facility, Galway

Áis Taighde Chliniciúil HRB, Gaillimh

Consent Form

Using Quality of Life Information as a Clinical Tool.

A Single Centre, Single Blind, Prospective, Randomised Controlled Trial of Reporting Quality of Life Outcome Measures to the Multidisciplinary Team to Determine its Impact on the Subsequent Quality of Life Outcomes of Individual Patients with Cancer.

Principal Investigator:

Ms Veronica McInerney Clinical Research Facility, National University of Ireland Galway.

Dr Dympna Waldron Consultant University Hospital, Galway Ireland

Dr Eileen Mannion Consultant, University Hospital, Galway Ireland

Please read each sentence and initials each box if you agree.

Tick

1.	I am an adult and of my own freewill and not under duress have agreed to take part in this study.	
2.	I confirm that I have read and understood the Patient Information Sheet Version 3 Date 4 th February 2013 for the above study and have been given a copy to keep. The information has been fully explained to me and I have been able to ask questions. I understand why the research is being done and any risks involved.	
3.	I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason and without my rights being affected in any way	
4.	I understand that relevant sections of my medical notes and data collected during the study may be seen by authorised individuals such as those from the University College Hospital Galway and Clinical Research Facility Galway I give permission for these individuals to have access to my records.	
7.	I agree that information about me that is relevant to the above study may be held on a secure confidential database in accordance with the Data Protection Acts (1988 & 2003).	

Name of Subject

Signature of Subject

Date

Name of Witness if applicable

Signature of Witness if Applicable

Date

Name of Person taking consent

Signature of Person taking Consent

Date

Using Quality of Life Information as a Clinical Tool.

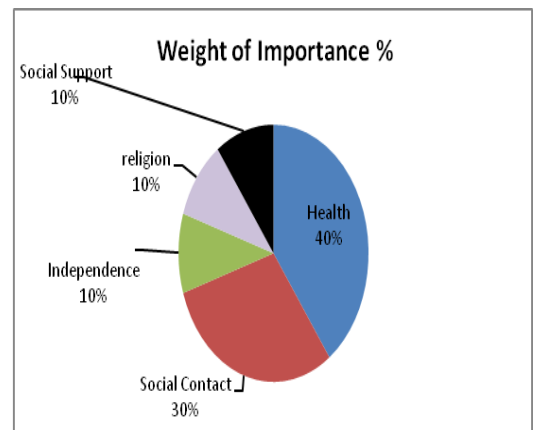
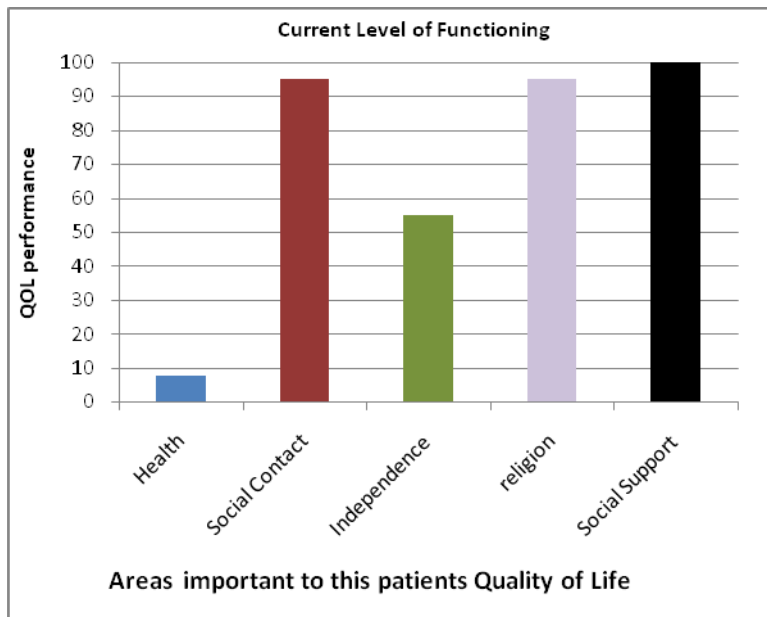
Patient Information Leaflet and Consent Version 3 February 4th 2013

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Appendix 3

Individual Quality of Life. SEIQOL

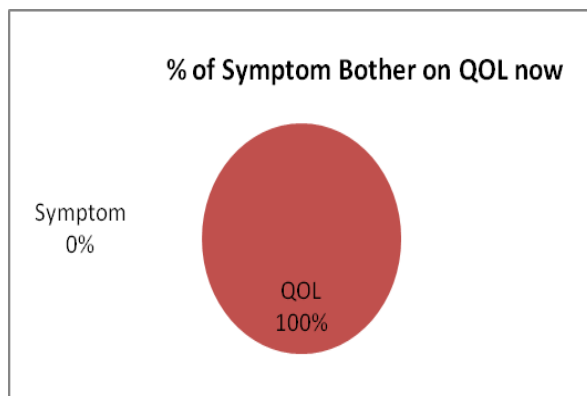


This Patients Overall Quality of Life Self Measurement = 50

0 _____ 100
 Worst Life Imaginable Best Life Imaginable

Existing Bothersome Symptoms

None



End