



**UNIVERSITI PUTRA MALAYSIA**

***QUALITY OF LIFE AMONG CANCER PATIENTS UNDERGOING  
CHEMOTHERAPY IN GOVERNMENT HOSPITALS IN PENINSULAR  
MALAYSIA***

**SUHASINEE SUBRAMANIAM**

**FPSK(M) 2018 20**



**QUALITY OF LIFE AMONG CANCER PATIENTS UNDERGOING  
CHEMOTHERAPY IN GOVERNMENT HOSPITALS IN PENINSULAR  
MALAYSIA**

By

**SUHASINEE SUBRAMANIAM**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfillment of the Requirements for the Degree of Master of Science**

**May 2018**



© COPYRIGHT UPM

## COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs, and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



## DEDICATION

To

My parents, Mr Subramaniam and Mrs Indra Dewi

My siblings, Mr Thamodaran and Ms Darshnee

and my pillar of strength, my husband,

Mr Kumaresapathy,



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**QUALITY OF LIFE AMONG CANCER PATIENTS UNDERGOING  
CHEMOTHERAPY IN GOVERNMENT HOSPITALS IN PENINSULAR  
MALAYSIA**

By

**SUHASINEE SUBRAMANIAM**

**May 2018**

**Chairman : Professor Sherina Mohd Sidik, MBBS, MMED, PhD**  
**Faculty : Medicine and Health Sciences**

**INTRO :** Cancer is an important health concern globally and is one of the leading causes of morbidity and mortality worldwide. According to the World Health Organization (WHO), cancer is the second leading cause of death globally. An analytic cross-sectional study was conducted to determine the predictors of quality of life among chemotherapy cancer patients in government hospital in Malaysia. Cancer patients undergoing chemotherapy treatment in ten state government hospitals in Peninsular Malaysia were included in this study. Patients who did not give consent to participate in this study or who were absent during the data collection period were excluded.

**METHODS :** The data were collected using self-administered questionnaires including socio-demographic characteristics, quality of life (WHOBREF), social support (Multidimensional Scale of Perceived Social Support (MSPSS)), hopelessness (The Beck Hopelessness Scale (BHS) and physical effect (Common Terminology Criteria for Adverse Events (CTCAE) version 4.0) Data were analyzed using the statistical computer software of SPSS version 23. Descriptive statistics were conducted to obtain frequency and percentage of variables. Independent sample T-test and One way ANOVA were used to determine the association between variables at level of significance,  $p < 0.25$ . Continuous variables were presented as means with 95% Confidence interval (CI). Multiple linear regression model was used to determine the significant predictors. A p-value of less than 0.05 was considered statistically significant. The predictors of each domain was analysed separately.

**RESULTS :** Quality of life among cancer patients undergoing chemotherapy in this study was determined by four domains which were physical health, psychological, social relationships and environment. The overall mean score for physical health was 52.60, psychological was 52.55, social relationships was 50.79 and environment was 51.16. All 1333 chemotherapy patients completed the questionnaire in this study; giving a response rate of 100 %. Majority (61.0%) of patients were Malay female patients. Meanwhile 1021 patients (51.2%) received high social support and 38.0% of patients had moderate level of hopelessness in determining quality of life in patients. Highest number of patients (51.5%) were affected due to mild skin nail changes during chemotherapy and (31.4%) was affected with mild anorexia and vomiting in chemotherapy.

**DISCUSSION :** The significant predictors of physical effect domain were monthly income, cancer stage, social support, nausea and vomiting. The significant predictors of psychological domain were race, marital status, cancer stage, nausea and vomiting. The significant predictors of social relationships domain were race, educational level, social support, nausea and vomiting. The significant predictors of environment domain were race, marital status, hopelessness level, nausea and vomiting.

**CONCLUSION :** The quality of life among chemotherapy cancer patients is important to be observed. Based on the predictors found in this study, appropriate interventions can be taken to improve the quality of life outcomes and the response towards the treatment.

**Keywords :** cancer, chemotherapy, quality of life, social support, hopelessness

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

## **TARAF KEHIDUPAN DI KALANGAN PESAKIT KANSER KEMOTERAPI DI HOSPITAL KERAJAAN DI SEMENANJUNG MALAYSIA**

Oleh

**SUHASINEE SUBRAMANIAM**

**Mei 2018**

**Pengerusi : Profesor Sherina Mohd Sidik, MBBS, MMED, PhD**  
**Fakulti : Perubatan dan Sains Kesihatan**

**PENGENALAN :** Kanser merupakan salah satu punca utama morbiditi dan kematian yang amat membimbangkan di seluruh dunia. Menurut Pertubuhan Kesihatan Sedunia (WHO), kanser merupakan punca utama kedua kematian di dunia. Kajian analitik dijalankan untuk mengenal pasti kualiti kehidupan di kalangan pesakit kanser yang menjalani kemoterapi di hospital kerajaan Semenanjung Malaysia. Pesakit kanser dari sepuluh buah hospital kerajaan di Semenanjung Malaysia yang sedang menjalani rawatan kemoterapi telah dilibatkan dalam kajian ini. Pesakit yang tidak bersetuju untuk mengambil bahagian dalam kajian ini atau yang tidak hadir semasa pengumpulan data telah dikecualikan.

**KAEDAH :** Kaedah soal selidik telah digunakan untuk mengumpul data termasuk ciri-ciri sosio-demografi, kualiti hidup (WHOBREF), sokongan sosial (Multi-dimensional Scale of Perceived Social Support (MSPSS-M)), sikap putus harapan (The Beck Hopelessness Scale (BHS)) dan kesan fizikal (Common Terminology Criteria for Adverse Events (CTCAE) versi 4.0). Data yang dikumpul dianalisis dengan menggunakan perisian komputer statistik SPSS versi 23. Statistik deskriptif dijalankan untuk mendapatkan kekerapan dan peratusan pemboleh ubah. Ujian sampel T bebas (Independent sample T test) dan satu hala ANOVA digunakan untuk menentukan persamaan antara pemboleh ubah pada tahap yang signifikan,  $p < 0.25$ . Pemboleh ubah berterusan telah dibentangkan dengan kadar purata 95% keyakinan data berselang (confidence interval). Model regresi linier berganda digunakan untuk menentukan peramal yang signifikan. Nilai  $p$  kurang daripada 0.05 dianggap signifikan secara statistik. Peramal bagi setiap domain dianalisis secara berasingan.



**KEPUTUSAN** : Kualiti hidup di kalangan pesakit kanser yang menjalani rawatan kemoterapi dalam kajian ini ditentukan oleh empat domain iaitu kesihatan fizikal, psikologi, hubungan sosial dan persekitaran. Purata skor bagi kesihatan fizikal adalah 52.60, psikologi adalah 52.55, hubungan sosial adalah 50.79 dan persekitaran adalah 51.16. Kesemua 1333 pesakit kemoterapi telah melengkapkan soal selidik dalam kajian ini; memberikan kadar tindak balas sebanyak 100%. Majoriti (61.0%) pesakit adalah pesakit wanita Melayu. Manakala, 1021 pesakit (51.2%) menerima sokongan sosial yang tinggi dan 38.0% pesakit mempunyai tahap putus harapan yang sederhana dalam menentukan kualiti hidup pesakit. Kebanyakan pesakit (51.5%) telah terjejas akibat perubahan kuku kulit ringan semasa kemoterapi dan (31.4%) terjejas dengan anoreksia ringan dan muntah ketika kemoterapi.

**PERBINCANGAN** : Peramal signifikan domain kesan fizikal adalah pendapatan bulanan, peringkat kanser, sokongan sosial, rasa mual dan muntah. Peramal signifikan domain psikologi adalah bangsa, status perkahwinan, peringkat kanser, rasa mual dan muntah. Peramal penting domain hubungan sosial adalah bangsa, tahap pendidikan, sokongan sosial, rasa mual dan muntah. Peramal penting dalam domain persekitaran adalah bangsa, status perkahwinan, tahap perasaan putus harapan, rasa mual dan muntah.

**KESIMPULAN** : Kualiti kehidupan di kalangan pesakit kanser kemoterapi adalah penting untuk diperhatikan. Berdasarkan peramal yang dijumpai dalam kajian ini, intervensi yang sewajarnya perlu diambil untuk meningkatkan kualiti hidup dan tindak balas terhadap rawatan.

## ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere gratitude to my supervisor Prof Dr Sherina Mohd Sidik for her continuous support of my master's study and research. Her patience, motivation, enthusiasm, and immense knowledge have allowed me to grow relentlessly and mature exponentially. Her guidance has helped me during the course of this research and thesis writing. I could not have imagined having a better advisor and mentor for my master's study. Besides my supervisor, I would like to thank the rest of my thesis committee; Prof. Lekhraj Rampal, Dr. Siti Irma Fadhilah and Dr Ummavathy for their encouragement, insightful comments, and thought-provoking questions.

I also extend my sincere gratitude to all Directors of Hospital and Heads of Pharmacy Department in all the hospitals where I conducted my study for their assistance and support. I would like thank all the pharmacists in all the ten hospitals who have contributed directly or indirectly to this project. I am also thankful to my colleagues and my superiors for encouraging to further my studies while working.

Last but not the least, I would like to thank my family members; my parents, husband and siblings for supporting me throughout this research masters journey. Not only that, I would like specifically thank my sister Kirbashini Kanesan for always being there throughout my master's programme.

I certify that a Thesis Examination Committee has met on 28 May 2018 to conduct the final examination of Suhasinee a/p Subramaniam on her thesis entitled "Quality of Life among Cancer Patients Undergoing Chemotherapy in Government Hospitals in Peninsular Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

**Daud Ahmad bin Israf Ali, PhD**

Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Chairman)

**Dato' Faisal bin Ibrahim, PhD**

Associate Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Internal Examiner)

**Noorlaili binti Mohd Tohit @ Mohd Tauhid, PhD**

Senior Lecturer  
Universiti Kebangsaan Malaysia  
Malaysia  
(External Examiner)



---

**RUSLI HAJI ABDULLAH, PhD**  
Professor and Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: 30 July 2018

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the Master of Science. The members of the Supervisory Committee were as follows:

**Sherina Mohd Sidik, MBBS, MMED (Family Medicine), PhD**

Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Chairman)

**Lekhraj Rampal, MBBS, MPH, DRPH, FAMM, FAMS**

Professor  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Member)

**Siti Irma Fadhilah, BSc (Psychology), MA (Clinical Psychology), PhD**

Senior Lecturer  
Faculty of Medicine and Health Sciences  
Universiti Putra Malaysia  
(Member)

---

**ROBIAH BINTI YUNUS, PhD**

Professor and Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date:

## Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name and Matric No: Suhasinee Subramaniam, GS 42624

## Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

Signature: \_\_\_\_\_

Name of Chairman  
of Supervisory

Committee: Professor Dr. Sherina Mohd Sidik

Signature: \_\_\_\_\_

Name of Member  
of Supervisory

Committee: Professor Dr. Lekhraj Rampal

Signature: \_\_\_\_\_

Name of Member  
of Supervisory

Committee: Dr. Siti Irma Fadhilah

## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	i
<b>ABSTRAK</b>	iii
<b>ACKNOWLEDGEMENTS</b>	v
<b>APPROVAL</b>	vi
<b>DECLARATION</b>	viii
<b>LIST OF TABLES</b>	xv
<b>LIST OF FIGURES</b>	xvii
<b>LIST OF ABBREVIATIONS</b>	xviii

### CHAPTER

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Background	1
	1.2 Problem Statement	2
	1.3 Significance of the Study	3
	1.4 Research questions	3
	1.5 Study objectives	3
	1.5.1 General Objective	3
	1.5.2 Specific Objectives	4
	1.6 Research hypotheses	4
<b>2</b>	<b>LITERATURE REVIEW</b>	<b>5</b>
	2.1 Cancer	5
	2.2 Epidemiology of Cancer	5
	2.3 Chemotherapy	7
	2.4 Quality of Life among chemotherapy cancer patients	7
	2.5 Socio-demographic characteristics and quality of life among chemotherapy cancer patients	8
	2.5.1 Age	8
	2.5.2 Gender	9
	2.5.3 Race	9
	2.5.4 Marital Status	10
	2.5.5 Education level	10
	2.5.6 Working and monthly income	10
	2.5.7 Cancer stage, chemotherapy cycle and pain due to chemotherapy	11
	2.5.8 Joined cancer support society	11
	2.5.9 Worried of adverse effect due to chemotherapy	11
	2.6 Social support and quality of life among chemotherapy cancer patients	11



2.7	Hopelessness level and quality of life among chemotherapy cancer patients	12
2.8	Physical effects of chemotherapy and quality of life among chemotherapy cancer patients	13
2.8.1	Nausea and Vomiting	13
2.8.2	Anorexia	13
2.8.3	Diarrhoea	14
2.8.4	Constipation	14
2.8.5	Anaemia	14
2.8.6	Infection and fever	15
2.8.7	Fatigue	15
2.8.8	Bleeding	15
2.8.9	Hair loss	15
2.8.10	Mouth, gum and throat infection	16
2.8.11	Skin and nail changes	16
2.9	Conclusion of Literature Review	16
2.10	Conceptual Framework	17
<b>3</b>	<b>METHODOLOGY</b>	<b>18</b>
3.1	Study Location	18
3.2	Study Design	18
3.3	Study Duration	18
3.4	Study Population	18
3.5	Sampling frame	19
3.6	Sampling Unit	19
3.7	Study variable	19
3.7.1	Dependent Variable	19
3.7.2	Independent Variable	19
3.8	Sample Size Estimation	20
3.9	Sampling Technique	21
3.10	Inclusion and Exclusion Criteria	22
3.10.1	Inclusion criteria	22
3.10.2	Exclusion criteria	22
3.11	Data Collection	22
3.11.1	Instruments of Study	22
3.12	Quality Control	25
3.12.1	Validity of Questionnaire	25
3.12.1.1	Content Validity	25
3.12.1.2	Face Validity	25
3.12.1.3	Pretesting	25
3.12.2	Reliability of Questionnaire	25
3.12.2.1	Cronbach alpha	25
3.13	Data Analysis	26
3.14	Ethical consideration	26
3.15	Flow chart	27



<b>4</b>	<b>RESULTS</b>	<b>28</b>
4.1	Response Rate	28
4.2	Socio-demographic characteristics of the chemotherapy cancer patients	28
4.3	Social support among chemotherapy patients	30
4.4	Hopelessness level among chemotherapy cancer patients	31
4.5	Physical effects of chemotherapy among chemotherapy cancer patients	31
4.6	Mean for quality of life among cancer patients on chemotherapy	34
4.7	Associations of Quality of life (Physical health)	34
	4.7.1 Association between socio-demographic characteristics and quality of life (Physical health) among chemotherapy cancer patients	34
	4.7.2 Association between social support and quality of life (Physical Health) among chemotherapy cancer patients	36
	4.7.3 Association between hopelessness level and quality of life (Physical Health) among chemotherapy cancer patients	36
	4.7.4 Association between physical effects of chemotherapy and quality of life (Physical health) among chemotherapy cancer patients. (cont.)	37
4.8	Associations of quality of life (Psychological)	38
	4.8.1 Association between socio-demographic characteristics and quality of Life (Psychological) among chemotherapy cancer patients	38
	4.8.2 Association between social support and quality of life (Psychological) among chemotherapy cancer patients	40
	4.8.3 Association between hopelessness level and quality of life (Psychological) among chemotherapy cancer patients	40
	4.8.4 Association between physical effects of chemotherapy and quality of life (Psychological) among chemotherapy cancer patients	41
4.9	Associations of quality of life (Social Relationships)	42
	4.9.1 Association between socio demographic characteristics and quality of life (Social relationships) among chemotherapy cancer patients	42
	4.9.2 Association between social support and quality of life (Social relationships) among chemotherapy cancer patients	44
	4.9.3 Association between hopelessness level and quality of life (Social relationships) among chemotherapy cancer patients	44
	4.9.4 Association between physical effects of chemotherapy and quality of Life (Social relationships) among chemotherapy cancer patients	45
4.10	Associations of quality of life (Environment)	46

4.10.1	Association between socio demographic characteristics and quality of life (Environment) among chemotherapy cancer patients	46
4.10.2	Association between social support and quality of life (Environment) among chemotherapy cancer patients	48
4.10.3	Association between hopelessness level and quality of life among chemotherapy cancer patients	48
4.10.4	Association between physical effects of chemotherapy and quality of life (Environment) among chemotherapy cancer patients	49
4.11	Predictors of quality of life (physical health, psychological, social relationships and environment) among chemotherapy cancer patients	50
4.11.1	Predictors of physical health domain in quality of life among chemotherapy cancer patients	50
4.11.2	Predictors of psychological domain in quality of life among chemotherapy cancer patients	50
4.11.3	Predictors of social relationships domain in quality of life among chemotherapy cancer patients	51
4.11.4	Predictors of environment domain in quality of life among chemotherapy cancer patients	52
<b>5</b>	<b>DISCUSSION</b>	<b>53</b>
5.1	Response rate	53
5.2	Quality of life among chemotherapy cancer patients	53
5.3	Association between socio-demographic characteristics and quality of life among chemotherapy cancer patients	53
5.3.1	Age	54
5.3.2	Race	54
5.3.3	Marital Status	55
5.3.4	Education Level	55
5.3.5	Working and Monthly Income	56
5.3.6	Cancer stage and Pain due to chemotherapy	56
5.4	Association between social support and quality of life among chemotherapy cancer patients	57
5.5	Association between hopelessness level and quality of life among chemotherapy cancer patients	57
5.6	Association between physical effects of chemotherapy and quality of life among chemotherapy cancer patients	58
5.6.1	Nausea and vomiting	58
5.6.2	Fatigue	58
5.6.3	Nail and skin changes	59
5.7	Predictors of quality of life (physical health, psychological, social relationships and environment domains) among cancer patients undergoing chemotherapy	59
5.7.1	Social demographic characteristics as a predictor of quality of life (physical health, psychological, social	

	relationships and environment domains) among cancer patients undergoing chemotherapy	59
5.7.2	Social support as a predictor of quality of life (physical health and social relationships domains) among cancer patients undergoing chemotherapy	60
5.7.3	Hopelessness as a predictor of quality of life (environment domain) among cancer patients undergoing chemotherapy	61
5.7.4	Physical effects as a predictor of quality of life (physical health, psychological, social relationships and environment domains) among cancer patients undergoing chemotherapy	61
<b>6</b>	<b>CONCLUSION AND RECOMMENDATIONS</b>	<b>62</b>
6.1	Conclusion	62
6.2	Domains of Quality of life	62
6.2.1	Physical health	62
6.2.2	Psychological	62
6.2.3	Social relationships	63
6.2.4	Environment	63
6.3	Strength and limitations	63
6.4	Recommendations	63
	<b>REFERENCES</b>	<b>65</b>
	<b>APPENDICES</b>	<b>80</b>
	<b>BIODATA OF STUDENT</b>	<b>124</b>
	<b>PUBLICATION</b>	<b>125</b>

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
3.1 Proportionate allocation to each hospital	21
3.2 WHOQOL-BREF Domains	23
3.3 Reliability test results of questionnaire items	25
4.1 Calculation of response rate	28
4.2 Socio-demographic characteristics of chemotherapy cancer patients (N=1333)	29
4.3 Social support among chemotherapy cancer patients (N=1333)	31
4.4 Hopelessness level among chemotherapy cancer patients (N=1333)	31
4.5 Physical effects of chemotherapy among chemotherapy cancer patients (N=1333)	32
4.6 Mean for quality of life among cancer patients receiving chemotherapy	34
4.7 Association between socio-demographic characteristics and quality of life (Physical health) among chemotherapy cancer patients	34
4.8 Association between social support and quality of life (Physical Health) among chemotherapy cancer patients	36
4.9 Association between hopelessness level and quality of life (Physical health) among chemotherapy cancer patients	36
4.10 Association between physical effects of chemotherapy and quality of life (Physical Health) among chemotherapy cancer patients	37
4.11 Association between socio-demographic characteristics and quality of life (Psychological) among chemotherapy cancer patients	38
4.12 Association between social support and quality of life (Psychological) among chemotherapy cancer patients	40
4.13 Association between hopelessness level and quality of life (Psychological) among chemotherapy cancer patients	40
4.14 Association between physical effects of chemotherapy and quality of life (Psychological) among chemotherapy cancer patients	41

4.15	Association between socio demographic characteristics and quality of life (Social relationships) among chemotherapy cancer patients	42
4.16	Association between social support and quality of life (Social relationships) among chemotherapy cancer patients	44
4.17	Association between hopelessness level and quality of life (Social relationships) among chemotherapy cancer patients	44
4.18	Association between physical effects of chemotherapy and quality of life (Social Relationships) among chemotherapy cancer patients	45
4.19	Association between socio demographic characteristics and quality of life (Environment) among chemotherapy cancer patients	46
4.20	Association between social support and quality of life (Environment) among chemotherapy cancer patients	48
4.21	Association between hopelessness level and quality of life (Environment) among chemotherapy cancer patients	48
4.22	Association between physical effects of chemotherapy and quality of life (Environment) among chemotherapy cancer patients	49
4.23	Predictors of quality of life (physical health)	50
4.24	Predictors of quality of life (psychological)	51
4.25	Predictors of quality of life (social relationships)	51
4.26	Predictors of quality of life (environment)	52

## LIST OF FIGURES

Figure	Page
2.1 Cancer Mortality Profile for 2014 in Malaysia (WHO, 2014)	6
2.2 Cancer Incidence Profile for 2014 in Malaysia (WHO, 2014)	6
2.3 Conceptual framework of quality of life among the cancer patients receiving chemotherapy	17
3.1 Research methodology process flow chart	27



## LIST OF ABBREVIATIONS

ADEs	Adverse Drug Events
CI	Confidence Interval
CTCAE	Common Terminology Criteria for Adverse Events
MOH	Ministry of Health
NCCN	National Comprehensive Cancer Network
NCI	National Cancer Institute
MNCR	Malaysia National Cancer Registry
EORTC	European Organization for Research and Treatment in Cancer
QOL	Quality of Life
WHO	World Health Organization
CRF	Chemotherapy-related fatigue
CDR	Cytotoxic drug reconstitution
CID	Chemotherapy-induced diarrhea
NV	Nausea and vomiting
CIC	Chemotherapy induced constipation
CIT	Chemotherapy induced thrombocytopenia
CIA	Chemotherapy induced alopecia
BHS	Beck Hopelessness Scale
BDI	Beck Depression Inventory
MPSS	Multidimensional Scale of Perceived Social Support



# CHAPTER 1

## INTRODUCTION

This chapter provides an overview on quality of life among cancer patients undergoing chemotherapy and the significance of this study to be conducted among chemotherapy cancer patients. It clearly states the study objectives, research hypotheses and the conceptual framework of the study.

### 1.1 Background

Cancer is an important health concern at the global level as some new fourteen million cases were registered in 2012, thus emerging as one of the top reasons for the escalating rates of mortality and morbidity at the global scale (Ferlay et al., 2013). In 2015, cancer caused 8.8 million deaths making it the second leading cause of death globally (WHO, 2017). In 2008, cancer as a disease was responsible for 7.6 million deaths, which is about 13% of overall deaths making it a leading cause of death with most cancer deaths caused by breast, prostate, lung, stomach and colorectal cancers. Risk factors found to be common contributing factors for cancer are physical inactivity, use of tobacco, irresponsible use of alcohol and an unhealthy diet (WHO, 2017). The prevalence of cancer in low and middle income countries is quite high where nearly 70% of deaths happen in low and middle income countries (WHO, 2017).

Based on a Malaysian National Cancer Registry (MNCR) report a whopping 103,507 is the number of established new cases of cancer between 2007 and 2011 in Malaysia. This is made up of 46,794 (45.2%) in males and 56,713 (54.8%) in females and 1 in every 10 males is prone to get cancer while the probability in female is 1 in 9 (Manan, Tamin, Abdullah, Abidin & Wahab, 2016). The main cause of fatality among most females and males in Malaysia diagnosed with cancer has been breast cancer and colon cancers respectively (Manan et al., 2016). According to a report by The Star, death from cancer has increased from 21000 in 2008 to 21700 in 2012. The burden of new cancer cases in developing countries is estimated to reach 21.4 million cases per year by 2030 (The Star, 2014). In Malaysia, the prevalence of colon cancer and breast cancer was mostly recorded among the Chinese population (Manan et al., 2016; Hilmi, Hartono, & Goh, 2010).

Cancer related deaths are rising tremendously due to factors such as smoking and tobacco use, poor diet, alcohol, lack of exercise or being overweight (WHO, 2017). Due to lifestyle choices such as incorrect diet, irregular exercise and smoking, the incidence of cancer is increasing globally; poor life style choices doubles the risk of cancer (Huxley et al., 2009; Kamarudin & Hidayah, 2006; Yang, Jacobs, Gapstur, Stevens, & Campbell, 2015). The increasing cancer cases are counteracted by the survival rate of cancer which is also subsequently increasing, although the survival



rates of cancer differ worldwide depending on the stage of the cancer diagnosed and respective country's development. When compared with other developed nations, cancer patients in Malaysia with 5 years of survival rate are relatively good (Muhamad et al., 2015; Veettil, Lim, Chaiyakunapruk, Ching, & Abu Hassan, 2017).

Patients' quality of life can be impacted largely by diagnosis as well as treatment for cancer. The basic treatments for cancer can be: local treatments of surgery, radiotherapy, systemic treatments using biological agents (for example hormones, antibodies and growth factors) and chemotherapy (NCI, 2017). Chemotherapy, which appears to be a treatment that plays a vital role in mitigating cancer, can be carried out in isolation or combined with other treatments, such as radiotherapy and surgery. Chemotherapy side effects can worsen quality of life in cancer patients (Xiao et al., 2016). Side effects will be different according to the chemotherapy treatment. The most common side effects of chemotherapy are nausea and vomiting, anemia, hair loss, bleeding (thrombocytopenia), bone marrow depression, alopecia and mucositis (Rasool Hassan, 2012). Nevertheless, it is also the treatment that can improve quality of life in cancer patients (Dehkordi, Heydarnejad, & Fatehi, 2009). The effectiveness of treatment for cancer can be determined by looking into quality of life, which reflects the measure of one's primary end-point, which also reflects patient's opinion about the effect of cancer diagnosis and treatment on daily living (Velikova et al., 2008). Quality of life is also a significant predictor of survival for cancer patients according to studies conducted in Malaysia (Ainuddin, Ghani, Dahlan, & Ibrahim, 2016; Edib, Kumarasamy, Abdullah, Rizal, & Al-Dubai, 2016), China (Yan et al., 2016) and Nepal (Manandhar, Shrestha, Taechaboonsersmsk, Siri, & Suparp, 2014).

## **1.2 Problem Statement**

Cancer, a major health disease in Malaysia has been an increasingly important public health concern. Cancer is ranked as fourth in the list of diseases causing deaths among Malaysians at government hospitals (Farooqui et al., 2013). Studies on quality of life and chemotherapy treatments are broadly studied in the western countries/populations. A study on chemotherapy cancer patients reported cancer patients being more depressed when they are less content with their life than those with no chemotherapy treatment. Moreover, they experienced significantly a poor physical, emotional and social/family functional well-being (Hwang, Chang, & Park, 2013). In Malaysia, several local published researches have investigated quality of life among cancer patients in Malaysia but limited studies exist on quality of life among chemotherapy cancer patients in government hospitals in Malaysia. A study among colorectal cancer patients reported had low level of emotional, cognitive, and social functions which further reduced the quality of life (Puteh et al., 2013). Moreover the study also reported majority of cancer patients were in younger age groups and presented at a late stage of cancer. Diagnosing and treating cancer impacts one physically, socially and also emotionally which is related to few factors and may differ for every individual. The presence of cancer diseases almost affects every aspect of life of the patients and their family. Patient's life will be directly affected with the worsening progression of their

illness. Hence, it is vital to measure patient's quality of life of having diagnosed with cancer and the treatments that they will have to endure.

### **1.3 Significance of the Study**

Study on quality of life conducted among chemotherapy cancer patients showed that chemotherapy treatment highly affects the quality of life among cancer patients compared to patients undergoing other treatments. Thus it is important to determine the quality of life in chemotherapy cancer patients progressively. This study will enhance our understanding of the association between chemotherapy treatment and how it is affecting patient's quality of life. Cancer-specific quality of life is related to all stages of the disease. It is important for cancer patients to complete their chemotherapy cycles, because it holds a vital role in the treatment outcome and their quality of life. (Heydarnejad et al., 2011). Evidence suggests that improvements in psychological, social support and physical health for cancer patients result in increased quality of life (Isa, Ming, Razack, Zainuddin, & Zainal, 2012; Kashania, Vazirib, Akbaric, Jamshidifard, & Sanaeie, 2014; Rab, 2012). Results from this study can be used by health care professionals to identify and manage the affected chemotherapy patients. It can improve patient's quality of life. Ultimately, information achieved from this research can be applied in management of health care of chemotherapy patients and to encourage self-care management of patients in future intervention researches. This will enable patients to understand about cancer and why it happens, cope better with their situation and be able to comprehend on the effects of their treatments on their life and hence comply better.

### **1.4 Research questions**

1. What is the quality of life among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia?
2. What are the predictors of quality of life among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia?

### **1.5 Study objectives**

#### **1.5.1 General Objective**

To determine the quality of life (physical health, psychological, social relationships and environment domains) among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.

### **1.5.2 Specific Objectives**

Based on the general objectives, the following are the specific objectives of the study:

- i. To determine the socio demographic characteristics (age, gender, race, marital status, education level, working, monthly income, cancer stage, number of chemotherapy cycle, pain due chemotherapy, joined cancer support society and worried of adverse effect due to chemotherapy treatment) among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.
- ii. To determine the social support received among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.
- iii. To determine the hopelessness level among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.
- iv. To determine the physical effects of chemotherapy (nausea, vomiting, anorexia, diarrhoea, constipation, anaemia, fever, fatigue, infection, bleeding, hair loss, mouth, gum and throat infection also skin and nail changes) among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.
- v. To determine the association between socio-demographic characteristics, social support, hopelessness level, physical effects of chemotherapy and quality of life among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.
- vi. To determine the predictors of quality of life among cancer patients undergoing chemotherapy in government hospitals in Peninsular Malaysia.

### **1.6 Research hypotheses**

The following are the hypotheses to be tested in the study:

1. There is significant association between socio-demographic characteristics (age, gender, race, marital status, education level, working, monthly income, cancer stage, number of chemotherapy cycle, pain due chemotherapy, joined cancer support society and worried of adverse effect due to chemotherapy treatment) and quality of life among cancer patients undergoing chemotherapy.
2. There is significant association between social support and quality of life among cancer patients undergoing chemotherapy.
3. There is significant association between hopelessness level and quality of life among cancer patients undergoing chemotherapy.
4. There is significant association between physical effects of chemotherapy (nausea, vomiting, anorexia, diarrhoea, constipation, anaemia, fever, fatigue, infection, bleeding, hair loss, mouth, gum and throat infection also skin and nail changes) and quality of life among cancer patients undergoing chemotherapy.

## REFERENCES

- Abu-Saad, H. H., & Abboud, S. A., (2012). Health-related quality of life among breast cancer patients in Lebanon. *Eur J Oncol Nurs*, 16(5):491-7. doi: 10.1016/j.ejon.2011.11.003
- Agegard, S. (2015). National Cancer Society Malaysia (NCSM). Retrieved from: <http://www.primadonastems.com/cancer/cancer-in-malaysia-national-cancer-society-malaysia>.
- Ahadi, H., Delavar, A., & Rostami, A. M. (2014). Comparing Coping Styles in Cancer Patients and Healthy Subjects. *Procedia - Social and Behavioral Sciences*, 3467 – 3470. doi: 10.1016/j.sbspro.2014.01.785
- Ainuddin, H. A., Ghani, S. N., Dahlan, A., & Ibrahim, S. A. (2016). Quality of Life and Associated Factors of Cancer Patients in Malaysia: A review of current literature. *Environment-Behaviour Proceedings Journal*, 76-86. doi:10.21834/e-bpj.v1i2.257
- Aizer, A. A., Chen, M. H., McCarthy, E. P., Mendu, M. L., Koo, S., Wilhite, T. J., ... Paul L. N. (2013). Marital Status and Survival in Patients With Cancer. *American Society of Clinical Oncology*, 31, 3869-3876. doi:10.1200/JCO.2013.49.6489
- Al-Naggar, R. A., Isa, Z. M., Azhar, S., Nor, M. I., Chen, R., Ismail, F., & Radman, S. A. (2009). Eight year survival among breast cancer Malaysian women from University Kebangsaan Malaysia Medical Centre. *Asian Pac J Cancer Prev*, 1075-1078.
- Arunachalam, D., Thirumoorthy, A., Devi, S., & Thennarasu. (2011). Quality of Life in Cancer Patients with Disfigurement due to Cancer and its Treatments. *Indian J Palliat Care.*, 17(3):184–190. doi:10.4103/0973-1075.92334
- Avci, I. A., Okanli, A., Karabulutlu, E., & Bilgili, N. (2009). Women's marital adjustment and hopelessness levels after mastectomy. *European Journal of Oncology Nursing*, 13(4):299-303. doi:10.1016/j.ejon.2009.03.011
- Azmawati, M. N., Najibah, E., Hatta, M. D., & Norfazilah, A. (2014). Quality of life by stage of cervical cancer among Malaysian patients. *Asian Pacific Journal of Cancer Prevention*, 15(13):5283–5286.
- Bayumi, A, H, A, E., & Mohamed, H, S. (2016). Factors Affecting Quality of Life among Cancer Patients with Chemotherapy at Qena University Hospital in Upper Egypt. *Journal of Nursing and Health Science*, 5(6):168–173. doi: 10.9790/1959-050601168173.

- Barkokebas, A., Silva, I.H., de Andrade, S. C., Carvalho, A. A., Gueiros, L. A., Paiva, S. M., & Leao, J. C. (2015). Impact of oral mucositis on oral-health-related quality of life o. patients diagnosed with cancer. *J Oral Pathol Med*; 44(9):746-51. doi: 10.1111/jop.12282.
- Beadle, B. M., Woodward, W. A., & Buchholz, T. A. (2011). The Impact of Age on Outcome in Early-Stage Breast Cancer. *Semin Radiat Oncol.*, 21(1):26–34. doi:10.1016/j.semradonc.2010.09.001.
- Beck, A. T., & Steer, R. A. (1988). Beck Hopelessness Scale (BHS). *Clinical Psychology*. Retrieved from: <https://www.pearsonclinical.com/psychology/products/100000105/beck-hopelessness-scale-bhs.html>
- Benton, M. J., Schlairet, M. C., & Gibson, D. R. (2014). Change in quality of life among breast cancer survivors after resistance training: is there an effect of age? *J Aging Phys Act.*, 22(2):178–85. doi:10.1123/japa.2012-0227
- Bremberg, E. R., Brandberg, Y., Hising, C., Friesland, S., & Eksborg, S. (2007). Anemia and quality of life including anemia-related symptoms in patients with solid tumors in clinical practice. *Medical Oncology*, 24(1):95-102. doi:10.1007/BF02685909
- Brothers, B. M., & Andersen, B. L. (2009). Hopelessness as a predictor of depressive symptoms for breast cancer patients coping with recurrence. *Psychooncology*, 18(3):267-275. doi:10.1002/pon.1394.
- Chan, H. K., & Ismail, S. (2014). Side Effects of Chemotherapy among Cancer Patients in a Malaysian General Hospital: Experiences, Perceptions and Informational Needs from Clinical Pharmacists. *Asian Pacific Journal of Cancer Prevention*, 15(13):5305-5309.
- Cheng, H., Sit, J. W., Chan, C. W., So, W. K., Choi, K. C., & Cheng, K. K.(2013). Social support and quality of life among Chinese breast cancer survivors: findings from a mixed methods study.. *Eur J Oncol Nurs*, 17;788-96. doi: 10.1016/j.jpainsymman.2007.10.007
- Cherny, N. I. (2008). Evaluation and management of treatment-related diarrhea in patients with advanced cancer; A review. *Journal of Pain & Symptom Management*, 36(4):413-423. doi: 10.1016/j.jpainsymman.2007.10.007
- Costa, L. J., Brill, I. K., & Brown, E. E. (2016). Impact of marital status, insurance status, income, and race/ethnicity on the survival of younger patients diagnosed with multiple myeloma in the United States. *American Cancer Society*, 122(20):3183–3190. doi:10.1002/cncr.30183



- Costanzo, E. S., Lutgendorf, S. K., Mattes, M. L., Trehan, S., Robinson, C. B., Tewfik, F., & Roman, S. L. (2007). Adjusting to life after treatment: distress and quality of life following treatment for breast cancer. *British Journal of Cancer*, 97(12):1625-1631.
- Degi, C. L. (2013). Psychosocial Aspects of Cancer in Hospitalized Adult Patients in Romania. *Procedia - Social and Behavioral Sciences*. 82(3): 32-38. <https://doi.org/10.1016/j.sbspro.2013.06.221>
- Dehkordi, A., Heydarnejad, M. S., & Fatehi, D. (2009). Quality of Life in Cancer Patients undergoing Chemotherapy. *Oman Medical Journal*, 24(3):204-207.
- Department of Statistics Malaysia (2016). Current Population Estimates, Malaysia, (2014–2016). Department of Statistics Malaysia. Retrived from: [https://www.dosm.gov.my/v1/index.php?r=column/cthemByCat&cat=155&bul\\_id=OWlxdEV0YlJCS0hUZzJyRUcvZEYxZz09&menu\\_id=L0pheU43N WJwRWWSZklWdzQ4TlhUUT09](https://www.dosm.gov.my/v1/index.php?r=column/cthemByCat&cat=155&bul_id=OWlxdEV0YlJCS0hUZzJyRUcvZEYxZz09&menu_id=L0pheU43N WJwRWWSZklWdzQ4TlhUUT09)
- DeVita, V. T., & Chu, a. E. (2008). A history of cancer chemotherapy. *American Association for Cancer*, 68(21):8643–53.
- Edib, Z., Kumarasamy, V., Abdullah, N. b., Rizal, A. M., & Al-Dubai, S. A. (2016). Most prevalent unmet supportive care needs and quality of life of breast cancer patients in a tertiary hospital in Malaysia. *Health Qual Life Outcomes*, 14:26. doi: 10.1186/s12955-016-0428-4
- Eom, C. S., Shin, D. W., Kim, S. Y., Yang, H. K., Jo, H. S., Kweon, S. S., Kang, Y. S., Kim, J. H., Cho, B. L., & Park, J. H. (2013). Impact of perceived social support on the mental health and health-related quality of life in cancer patients: results from a nationwide, multicenter survey in South Korea. *Psycho-Oncology*, 22(6):1283-90. doi: 10.1002/pon.3133.
- Ezat, W, P, S., Noraziani, K., & Sabrizan, O. (2012). Improving Quality of Life Among Cancer Patients in Malaysia. *Asian Pacific Journal of Cancer Prevention*, 13(3):1069-1075.
- Fabbrocini, G., Cameli, N., Romano, M, C., Mariano, M., Panariello, L., Bianca, D., & Monfrecola, G. (2012). Chemotherapy and skin reactions. *Journal of Experimental & Clinical Cancer Research*, 31:50. doi: <https://doi.org/10.1186/1756-9966-31-50>
- Farooqui, M., Hassali, M. A., Knight, A., Akmal, A., Saleem, F., Farooqui, M. A., Saleem, F., ul-Haq, N., Othman, C. N., & Aljadhey, H. (2013). Cross sectional assessment of Health Related Quality of Life (HRQoL) among patients with cancer in Malaysia. *Asian Pacific Journal*, 14(5):3017–3021. doi:<http://dx.doi.org/10.7314/APJCP.2013.14.5.3017>

- Feller, L., & Lemmer, J. (2012). Oral Squamous Cell Carcinoma Epidemiology, Clinical Presentation and Treatment. *Journal of Cancer Therapy*, 3(4):263-268. doi:10.4236/jct.2012.34037
- Ferlay, J., Soerjomataram, I., Dikshit, R., Eser, S., Mathers, C., Rebelo, M., Parkin D. M., Forman, D., & Bray, F. (2013). Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11. International Agency for Research on Cancer. Extracted from: <http://globocan.iarc.fr/Pages/references.aspx>
- Filazoglu, G., & Griva, K. (2008). Coping and social support and health related quality of life in women with breast cancer in Turkey. *Psychol Health Med*, 13(5):559-73. doi: 10.1080/13548500701767353.
- Fortes, R. C., Monteiro, H. M., & Kimura, C. A. (2012). Quality of life from oncological patients with definitive and temporary colostomy. *J Coloproctol*, 32(3):253-259. <http://dx.doi.org/10.1590/S2237-93632012000300008>
- Frame, D. G. (2010). Best practice management on CINV in oncology patients: I. Physiology and treatment of CINV. Multiple neurotransmitters and receptors and the need for combination therapeutic approaches. *J Support Oncol*, 8(2 Suppl 1):5-9.
- Ganesh, S., Lye, M. S., & Lau, F. N. (2016). Quality of Life among Breast Cancer Patients In Malaysia. *Asian Pac J Cancer Prev.*, 17(4):1677-84. doi:<http://dx.doi.org/10.7314/APJCP.2016.17.4.1677>
- Gibson, R. J., & Stringer, A. M. (2009). Chemotherapy-induced diarrhoea. *Curr Opin Support Palliat Care* 3:31-35. doi: 10.1097/SPC.0b013e32832531bb.
- Gozzo, T. O., Moyses, A. M., Silva, P. R., & Almeida, A. M. (2013). Nausea, vomiting and quality of life in women with breast cancer receiving chemotherapy. *Rev. Gaucha Enferm*, 34(3):110-116. <http://dx.doi.org/10.1590/S1983-14472013000300014>
- Guner, P., Isikhan, V., Komurcu, S., Il, S., Ozturk, B., Arpaci, F., & Ozet, A. (2006). Quality of life and sociodemographic characteristics of patients with cancer in Turkey. *Oncol Nurs Forum*, 33(6):1171-6.
- Gunes, Z., & Calisir, H. (2016). Quality of Life and Social Support in Cancer Patients Undergoing Outpatient Chemotherapy in Turkey. *Annals of Nursing and Practice*, 3(7):1-5.
- Gustavsson-Lilius, M., Julkunen, J., & Hietanen, P. (2007). Quality of life in cancer patients: The role of optimism, hopelessness, and partner support. *Qual Life Res*. 16:75–87. doi: 10.1007/s11136-006-9101-4.

- Harandy TF., Ghofranipour, F., Montazeri, A., Anoosheh, M., Bazargan, M., Mohammadi, E., Ahmadi, F., & Niknami, S. (2010). Muslim breast cancer survivor spirituality: coping strategy or health seeking behavior hindrance? *Health Care Women Int.*, 31(1):88-98. doi:10.1080/07399330903104516.
- Hasanah, C. I., Naing, L., & Rahman, A. R. A. (2003). World Health Organization Quality of Life Assessment: Brief Version in Bahasa Malaysia. *Med JMalaysia*, 58(1).
- Hassan, M. R., Ismail, I., Suan, M. A., Ahmad, F., Khazim, W. K., Othman, Z., Said, R. M., Tan, W. L., Mohammed, S. R. N. S., Soelar, S. A., & Mustapha, N. R. N. (2016). Incidence and mortality rates of colorectal cancer in Malaysia. *Epidemiol Health*. 38:1-5. doi:10.4178/epih.e2016007.
- Hayat, M. J., Howlader, N., Reichman, M. E., & Edwards, B. K. (2007). Cancer Statistics, Trends, and Multiple Primary Cancer Analyses from the Surveillance, Epidemiology, and end Results (SEER). *The Oncologist*, 12(1):20-37. doi:10.1634/theoncologist.12-1-20.
- Health-Related Quality of Life & Well-Being (2018). *Healthy People.gov*. Retrieved from: <https://www.healthypeople.gov/2020/topics-objectives/topic/health-related-quality-of-life-well-being/objectives>
- Herbst, C., Naumann, F., Kruse, E.-B., Monsef, I., Bohlius, J., Schulz, H., & Engert, A. (2009). Prophylactic antibiotics or G-CSF for the prevention of infections and improvement of survival in cancer patients undergoing chemotherapy (Review). *Cochrane Collaboration*. (1):CD007107. doi: 10.1002/14651858.CD007107
- Heydarnejad, M., Hassanpour, A. D., & Solati, K. D. (2011). Factors affecting quality of life in cancer patients undergoing chemotherapy. *Afr Health Sci.*, 11(2):266-270.
- Hilmi, I., Hartono, J. L., & Goh, K. (2010). Negative perception in those at highest risk--potential challenges in colorectal cancer screening in an urban asian population. *Asian Pacific J Cancer Prev*, 11(3):815-822.
- Hitron, A., Steinke, D., Sutphin, S., Lawson, A., Talbert, J., & Adams, V. (2011). Incidence and risk factors of clinically significant chemotherapy-induced thrombocytopenia in patients with solid tumours. *J oncol Pharm Pract*, 17 (4):312-9. doi:10.1177/1078155210380293
- Hosseini, S. A., Bahrami, M., Mohamadirizi, S., & Paknaad, Z.. (2015). Investigation of eating disorders in cancer patients and its relevance with body image. *Iran J Nurs Midwifery Res*, 20(3): 327–333. doi:10.1177/1078155210380293



- Huxley, R., Ansarya, M. A., Clifton, P., Czernichow, S., Parr, C., & Woodward, M. (2009). The impact of dietary and lifestyle risk factors on risk of colorectal cancer: a quantitative overview of the epidemiological evidence. *Int J Cancer*, 125(1):171-180.
- Isa, M. R., Ming, M. F., Razack, A. H., Zainuddin, Z. M., & Zainal, N. Z. (2012). General health related quality of life and associated factors among prostate cancer patients in two tertiary medical centers in Kuala Lumpur, Malaysia: A cross-sectional study. *Asian Pacific Journal of Cancer Prevention*, 13(12):5999–6004.
- Jassim, G. A., & Whitford, D. L. (2013). Quality of life of Bahraini women with breast cancer: a cross sectional study. *BMC Cancer*. 13:212. <https://doi.org/10.1186/1471-2407-13-212>
- Jatoi, A., & Nguyen, P. (2008). Do patients die from rashes from epidermal growth factor receptor inhibitors? A systematic review to help counsel patients about holding therapy. *Oncologist*, 13:1201-1204. doi:10.1634/theoncologist.2008-0149
- Jemal, A., Bray, F., Center, M., Ferlay, J., Ward, E., & Forman, D. (2011). Global cancer statistics. *CA: a cancer journal for clinicians*, 61(2):69–90.
- Jones, R. A., Taylor, A. G., Bourguignon, C., Steeves, R., Fraser, G., Lippert, M., & Kilbridge, K. L. (2008). Family interactions among African American prostate cancer survivors. *Fam Community Health*, 31(3):213–220. doi:10.1097/01.FCH.0000324478.55706.fe.
- Joshi, S. S., Ortiz, S., Witherspoon, J. N., Rademaker, A., West, D. P., Anderson, R., & Lacouture, M. E. (2010). Effects of epidermal growth factor receptor inhibitor-induced dermatologic toxicities on quality of life. *Cancer*, 116(16):3916-23. doi:10.1002/cncr.25090
- Kamarudin, R., Shah, S. A., & Hidayah, N. (2006). Lifestyle factors and breast cancer: a case–control study in Kuala Lumpur, Malaysia. *Asian Pac J Cancer*. 7(1):51-4.
- Kashania, F. L., Vazirib, S., Akbaric, M. E., Jamshidifard, Z., & Sanaeie, H. (2014). Stress Coping Skills Training and Distress in Women with Breast Cancer. *Procedia - Social and Behavioral Sciences*, 159:192 – 196.
- Kavradim, S. T., Ozer, Z. C., & Bozcuk, H. (2013). Hope in people with cancer : a multivariate analysis from Turkey. *Journal of Advanced Nursing*, 69(5):1183-96. doi: 10.1111/j.1365-2648.2012.06110.x.
- Khatib, O., & Aljurf, M. (2008). Cancer prevention and control in the Eastern Mediterranean region: the need for a public health approach. *Hematol Oncol Stem Cell Ther*, 1(1):44–52.

- Kim, I. R., Cho, J., Choi, E. K., Kwon, I. G., Sung, Y. H., Lee, J. E., Nam, S. J., & Yang, J. H. (2012). Perception, Attitudes, Preparedness and Experience of Chemotherapy-Induced Alopecia among Breast Cancer Patients: A Qualitative Study. *Asian Pac J Cancer Prev*, 13(4):1383-8.
- Kitano, T., Tada, H., Nishimura, T., Teramukai, S., Kanai, M., & Nishimura, T. (2007). Prevalence and incidence of anemia in Japanese cancer patients receiving outpatient chemotherapy. *International Journal of Hematology*, 86(1):37-41. doi:10.1532/IJH97.07040.
- Kwan, M, L., Ergas, I, J., Somkin, C, P., Quesenberry, Charles, P., Neugut, A, I., Hershman, D, L., Mandelblatt, J., ... Kushi, L, H. ( 2010). Quality of life among women recently diagnosed with invasive breast cancer: the Pathways Study. *Breast Cancer Res Treat*, 123:507-24. doi:10.1532/IJH97.07040.
- Laarhoven, H. W, V., Schilderman, J., Bleijenberg, G., Donders, R., Vissers, K. C., Verhagen, C. A., & Prins, J. B. (2011). Coping, Quality of Life, Depression, and Hopelessness in Cancer Patients in a Curative and Palliative, End-of-Life Care Setting. *Cancer Nursing*, 34(4):302-314. doi:10.1097/NCC.0b013e3181f9a040
- Larsson, M., Ljung, L., & Johansson, B.B.K. (2012). Health-related quality of life in advanced non-small cell lung cancer: correlates and comparisons to normative. *European Journal of Cancer Care*, 21, 642–649
- Lee, C., & Longo, V. (2011). Fasting vs Dietary Restriction in Cellular Protection and Cancer Treatment. *Oncogene*, 30:3305-3316. doi:10.1038/onc.2011.91
- Lee, S. J., & Kim, H. K., (2016). Factors Influencing Quality of Life among Cancer Patients in South Korea. *Indian Journal of Science and Technology*. 45(4):604-12. doi: 10.4040/jkan.2015.45.4.604.
- Lemeshow, S., Jr, D. W. H., Klar, J., & Lwanga, S. K. (1990). Adequacy of Sample Size in Health Studies. John Wiley & Sons Ltd.
- Leung, J., Pachana, N. A., & McLaughlin, D. (2014). Social support and health-related quality of life in women with breast cancer: a longitudinal study. *Psycho-Oncology Journal*, 23(9):1014-20. doi:10.1002/pon.3523
- Li, Q., Gan, L., Liang, L., Li, X., & Cai, S. (2015). The influence of marital status on stage at diagnosis and survival of patients with colorectal cancer. *Oncotarget*, 6(9):7339-47.
- Lua, P. L, Salihah, N. Z, & Mazlan, N. (2012). Nutritional Status and Health-Related Quality of Life of Breast Cancer Patients on Chemotherapy. *Mal J Nutr*, 18(2): 173 - 184. doi:10.1186/s12885-017-3336-z.
- Lustberg, M. B., (2012). Management of Neutropenia in Cancer Patients. *Clin Adv Hematol Oncol*, 10(12): 825–6.

- Magaji, B. A., Moy, F. M., Roslani, A. C., & Law, C. W. (2017). Survival rates and predictors of survival among colorectal cancer patients in a Malaysian tertiary hospital. *BioMed Central*, 17(1):1-8. doi:10.1186/s12885-017-3336-z.
- Manan, A. A., Tamin, N. S. I., Abdullah, N. H., Abidin, A. Z., & Wahab, M. (2016). Malaysian National Cancer Registry Report 2007-2011. National Cancer Institute (NCI). Retrived from: <https://www.crc.gov.my/wp-content/uploads/documents/report/MNCRRrepor2007-2011.pdf>
- Manandhar, S., Shrestha, D. S., Taechaboonsermsk, P., Siri, S., & Suparp, J. (2014). Quality of Life among Breast Cancer Patients Undergoing. *Asian Pacific Journal of Cancer Prevention*, 15(22):9753-7. doi:<http://dx.doi.org/10.7314/APJCP.2014.15.22.9753>.
- Maskarinec, G., Sen, C., Koga, K., & Shannon, M. (2011). Ethnic differences in breast cancer survival: status and determinants. *Womens Health (Lond Engl)*, 7(6):677-687. doi: 10.2217/whe.11.67.
- McQuade, R. M., Stojanovska, V., Raquel, A., Bornstein, J. C., & Nurgali, K. (2016). Chemotherapy-Induced Constipation and Diarrhea: Pathophysiology, Current and Emerging Treatments. *Front Pharmacology*, 7:677-687. doi: <https://doi.org/10.3389/fphar.2016.00414>
- Morrow, P., Broxson, A., Munsell, M., Basen-Enquist, K., Rosenblum, C., Schover, L., & Hortobagyi, G. (2014). Effect of age and race on quality of life in young breast cancer survivors. *Clin Breast Cancer*, 14(2):21-31. doi:10.1016/j.clbc.2013.10.003.
- Mrabti, H., Amzatziren, M., ElGhissassi, I., Bensouda, Y., Berrada, N., Abahssain, H., & Hassan, E. (2016). Quality of life of early stage colorectal cancer patients in Morocco. *BMC Gastroenterology*, 16(131):1-10. doi:10.1186/s12876-016-0538-9.
- Muhamad, N. A., Kamaluddin, M. A., Adon, M. Y., Noh, M. A., Bakhtiar, M. F., Tamim, N. S., & Aris, T. (2015). Survival Rates of Cervical Cancer Patients in Malaysia. *Asian Pacific Journal of Cancer Prevention*. 16(7):3067-72.
- Mukhtar, F., & Oei, T. P. S. (2008). Exploratory and Confirmatory Factor Validation and Psychometric Properties of the Beck Depression Inventory for Malays (Bdi-Malay) in Malaysia. *Malaysian Journal of Psychiatry*. 17(1).
- Mystakidou, K., Tsilika, M. D. E., Parpa, E., Pathiaki, M. (2008). The Relationship Between Quality of Life and Levels of Hopelessness and Depression in Palliative Care. *Depression and Anxiety*. 25:730-736. doi: 10.1002/da.20319.
- Naseri, N., & Taleghani, F. (2012). Social support in cancer patients referring to Sayed Al-Shohada Hospital. *Iran J Nurs Midwifery Res*. 17(4):279-283.

- Natrah, M. S., Ezat, S. W., Syed, M., Rizal, A. M., & Saperi, S. (2012). Quality of Life in Malaysian Colorectal Cancer Patients : A Preliminary Result. *Asian Pacific Journal of Cancer Prevention*, 13:957-962. doi:<http://dx.doi.org/10.7314/APJCP.2012.13.3.95>
- Nausheen, B., Gidron, Y., Peveler, R., & Moss-Morris, R. (2009). Social support and cancer progression: A systematic review. *J Psychosomatic Res*, 67:403-15. doi: 10.1016/j.jpsychores.2008.12.012
- NCCN. (2013). PracticeGuidelines in Oncology: Breast Cancer. Version 3. National Comprehensive Cancer Network (NCCN), Retrieved from [www.nccn.org](http://www.nccn.org)
- NCI. (2009). Common Terminology Criteria for Adverse Events (CTCAE) v4.0. National Institutes of Health, National Cancer Institute (NCI). Retrieved from: [https://evs.nci.nih.gov/ftp1/CTCAE/CTCAE\\_4.03\\_2010-06-14\\_QuickReference\\_5x7.pdf](https://evs.nci.nih.gov/ftp1/CTCAE/CTCAE_4.03_2010-06-14_QuickReference_5x7.pdf)
- NCI. (2015). Nausea and Vomiting in People with Cancer. National Cancer Institute (NCI). Retrieved from: <https://www.cancer.gov/about-cancer/treatment/side-effects/nausea>
- NCI. (2015a). Skin and Nail Changes during Cancer Treatment. National Cancer Institute (NCI). Retrieved from: <https://www.cancer.gov/about-cancer/treatment/side-effects/skin-nail-changes>
- NCI. (2017). Types of Cancer Treatment. National Cancer Institute (NCI). Retrieved from: <https://www.cancer.gov/about-cancer/treatment/types>
- Ng, C. G., Amer-Siddiq, A. N., Aida, S. A., Zainal, N. Z., & Koh, O. H. (2010). Validation of the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) among a group of medical students in Faculty of Medicine, University Malaya. *Asian J. Psychiatry* (2010), 3(1):3-6. doi: 10.1016/j.ajp.2009.12.001.
- Ogce, F., Ozkan, S., & Baltarali, B. (2007). Psychosocial stressors, social support and socio demographic variables as determinants of quality of life of Turkish breast cancer patient. *Asian Pac J Cancer Prev*, 8(1):77-82.
- Ooi, A. L., & Mazlina, M. (2013). Functional status and health-related quality of life in patients with primary intracranial tumour. *The Medical Journal of Malaysia*, 68(6):448-452.
- Ooi, S. L., Martinez, M. E., & Li, C. I. (2011). Disparities in Breast Cancer Characteristics and Outcomes by Race/Ethnicity. *Breast Cancer Res Treat*, 127(3). doi:10.1007/s10549-010-1191-6.

- Oztunc, G., Yesil, P., Paydas, S., & Erdogan, S. (2013). Social Support and Hopelessness in Patients with Breast Cancer. *Asian Pacific Journal of cancer Prevention*, 14(1):571-578. doi:http://dx.doi.org/10.7314/APJCP.2013.14.1.571
- Pandey, R. A., Dhungana, G. P., Twi, J. T., Byanju, S., & Khawas, B. (2015). Quality of Life of Patients Undergoing Cancer Treatment in B.P. Koirala Memorial Cancer Hospital, Bharatpur, Chitwan, Nepal. *American Journal of Cancer Prevention*, 3(2):35-44. doi:10.12691/ajcp-3-2-3.
- Pehlivan, S., Ovayolu, O., Ovayolu, N., Sevinc, A., & Camci, C. (2012). Relationship between hopelessness, loneliness, and perceived social support from family in Turkish patients with cancer. *Supportive Care in Cancer*, 20(4):733-9. doi: 10.1007/s00520-011-1137-5.
- Pirri, C., Bayliss, E., Trotter, J., Olver, I. N., Katris, P., Drummond, P., & Bennett, R. (2012). Nausea still the poor relation in antiemetic therapy? The impact on cancer patients' quality of life and psychological adjustment of nausea, vomiting and appetite loss, individually and concurrently as part of a symptom cluster. *Support Care Cancer*, 21(3):735-48.
- Priscilla, D., Hamidin, A., Azhar, M.Z., Noorjan, K., Salmiah, M.S., & Bahariah, K. (2011). The socio-demographic and clinical factors associated with quality of life among patients with haematological cancer in a large government hospital in Malaysia. *Malaysian Journal of Medical Sciences*, 18(3), 49–56.
- Pud, D. (2011). Gender differences in predicting quality of life in cancer patients with pain. *Eur J Oncol Nurs*, 15(5):486-91. doi: 10.1016/j.ejon.2010.12.005.
- Puteh, S. E. W., Saad, N. M., Aljunid, S. M., Manaf, R. A., Sulong, S., Sagap, I., Ismail, F., & Annuar, M. A. M. (2013). Quality of life in Malaysian colorectal cancer patients. *AsiaPacific Psychiatry*, 5(S1):110-117. doi:10.1111/appy.12055.
- Quinten, C., Coens, C., Ghislain, I., Zikos, E., Sprangers, M. A., Ringash, J., & Josep. (2015). The effects of age on health-related quality of life in cancer populations: A pooled analysis of randomized controlled trials using the European Organisation for Research and Treatment of Cancer (EORTC) QLQ-C30 involving 6024 cancer patients. *European Journal of Cancer*, 51(18):2808-2819.
- Rab, F. (2012). Social Support as a determinant of Health Related Quality of Life in Breast Cancer survivors in California. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science. University of Western Ontario. doi:http://ir.lib.uwo.ca/etd/871



- Rahou, B. H., Rhazi, K. E., Ouasman, F., Chakib, N., Bekkali, R., Montazeri, A., & Mesfioui, A. (2016). Quality of life in Arab women with breast cancer: a review of the literature. *Health and Quality of Life Outcomes*, 14:64 doi: 10.1186/s12955-016-0468-9.
- Ramadas, A., Qureshi, A. M., Dominic, N. A., Botross, N. P., Riad, A., Arasoo, V. J. T., Elangovan, S. (2015). Socio-Demography and Medical History as Predictors of Health-Related Quality of Life of Breast Cancer Survivors. *Asian Pac J Cancer Prev*, 16(4):1479-1485. doi:http://dx.doi.org/10.7314/APJCP.2015.16.4.1479
- Rasool-Hassan, B. A. (2012). Main Critical Side Effects Associated Chemotherapy Used in Cancer Treatment. *Pharmaceut Anal*, 3(5):1. doi:10.4172/2153-2435.1000e113
- Reddy, P. K., Prasad, A. L., Sumathy, T. K., & Reddy, R. V. (2017). Nail changes in patients undergoing cancer chemotherapy. *International Journal of Research in Dermatology*, 3(1):49-54. doi:10.18203/issn.2455-4529.IntJResDermatol20164785.
- Redhwan, A., Idris, M. M., Zaleha, M., Robert, C., Fuad, I., & Sami, R. (2008). Quality Of Life Among Women With Breast Cancer From Universiti Kebangsaan Malaysia Medical Centre Malaysia. *Journal of Community Health*, 14(2):46-55.
- Richardson, G., & Dobish, R. (2007). Chemotherapy induced diarrhea. *Journal of Oncology Pharmacy Practice*, 181-198. doi:10.1177/1078155207077335
- Rowland, JH, Mariotto A, Alfano, CM. (2011). Survivors:United States, 2007. Morbidity and Mortality Weekly Report. Centers for Disease Control and Prevention. 60(9):269-272. Retrived from : <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6009a1.htm>
- Ruan, Y. P., & Zhang, W. Y. (2008). Correlation of fever to infection in patients with chemotherapy-induced neutropenia. *Chinese Journal of Cancer*, 27(8):879-81.
- Sahin, Z. A., Tan, M., & Polat, H. (2013). Hopelessness, Depression and Social Support with End of Life Turkish Cancer Patients. *Asian Pacific Journal of Cancer Prevention*, 14(5):2823-2828.
- Saleha, S. B., Shakeel, A., Shumaila, E., Shazia, R., Rashid, R., & Ibrahim, M. (2010). An Assessment of Quality of life in breast cancer patients using EORTC. *Iranian J Cancer Prev*, 3(2):98-104.
- Salonen, P., Tarkka, M. T., Lehtinen, P. L., Koivisto, A. M., Aalto, P., & Kaunonen, M. (2012). Effect of social support on changes in quality of life in early breast cancer patients: a longitudinal study. *Scandinavian journal of Caring Sciences*, 27(2):396-405. doi: 10.1111/j.1471-6712.2012.01050.x.

- Shi, R. I., Qu, N., Lu, Z. W., Liao, T., Gao, Y., & Ji, Q. H. (2016). The impact of marital status at diagnosis on cancer survival in patients with differentiated thyroid cancer. *Cancer Medicine*, 5(8):2145-54. doi: 10.1002/cam4.778.
- Singh, H., Kaur, K., Banipal, R. P., Singh, S., & Bala, R. (2014). Quality of Life in Cancer Patients Undergoing Chemotherapy in a Tertiary Care Center in Malwa Region of Punjab. *Indian Journal of Palliative Care*, 20(2):166-122. doi: 10.4103/0973-1075.132627.
- Sinno, M. H., Coquerel, Q., Boukhattala, N., Coeffier, M., Gallas, S., Terashi, M., & Fetissoff, S. O. (2010). Chemotherapy-induced anorexia is accompanied by activation brain pathways signaling dehydration. *Physiol Behav.*, 101(5):639-48. doi:http://dx.doi.org/10.1016/j.physbeh.2010.09.016.
- Smith, S. K., Crespi, C. M., Petersen, L., Zimmerman, S., & Ganz, P. A. (2010). The impact of cancer and quality of life for posttreatment non-Hodgkin lymphoma survivors. *Psycho-Oncology*, 19(12):1259-67. doi: 10.1002/pon.1684.
- Stein, A., Voigt, W., & Jordan, K. (2010). Chemotherapy-induced diarrhea: pathophysiology, frequency and guideline-based management. *Therapeutic Advances in Medical Oncology*, 2(1): 51-63. doi: 10.1177/1758834009355164.
- Swathi, B., Bhavika, D., & Begum, N. (2015). Adverse drug reaction profiles of commonly used platinum compounds in cancer chemotherapy. *International Journal of Basic & Clinical Pharmacology*, 4(2). doi:10.5455/2319-2003.ijbcp20150421.
- Taheri, A., Ahadi, H., Kashani, F. L., & Kermani, R. A. (2014). Mental hardness and social support in life satisfaction of breast cancer patients. *Procedia - Social and Behavioral Sciences*. 159:406 – 409. doi: 10.1016/j.sbspro.2014.12.397
- Toptas, T., Yildiz, I., Yildiz, M., Varol, U., Bayoglu, I. V., & Ozguroglu, M.. (2014). Quality-of-Life in Turkish Cancer Patients: The Impact of Sociodemographic Characteristics, Medical History, and Management. *International Journal of Hematology and Oncology*, 24(1):23-9. doi:10.4999/uhod.13061
- The Star. (2014). Rise in cancer deaths in Malaysia. The star. Retrieved from: <https://www.thestar.com.my/news/community/2014/02/18/rise-in-cancer-deaths-in-msia-conference-and-expo-this-saturday-to-educate-public-on-how-to-deal-wit/>
- The Star. (2016). About 100,000 Malaysians suffer from cancer each year. The Star. Retrieved from: <https://www.thestar.com.my/news/nation/2016/04/03/about-100000-malaysians-suffer-from-cancer-each-year/>
- Thomas, D., Hinds, G., & Valencia. (2008). Malignancy and cancer treatment-related hair and nail changes. *Dermatol Clin*, 26(1):59-68. doi:https://doi.org/10.1016/j.det.2007.08.003.

- Thun, M. (2007). *Epidemiology of cancer*. Cecil Medicine. 23rd edition, L. Goldman, & D. Ausiello, Eds. Philadelphia: Pa: Saunders Elsevier.
- Tianhong, L., & Roman, P. (2009). Skin toxicities associated with epidermal growth factor receptor inhibitors. *Targ Oncol*, 4:107–119. doi: 10.1007/s11523-009-0114-0.
- Torre, L. A. (2015). *Global Cancer Statistics, 2012*. American cancer Society, 65(2):87-108.
- Trueb, R. M. (2010). Chemotherapy-induced hair loss. *Skin Therapy Lett*, 15(7):5-7.
- Usta, Y. Y. (2012). Importance of Social Support in Cancer Patients. *Asian Pacific Journal of Cancer Prevention*, 13(8):3569-72.
- Ustundag, S., & Zencirci, A. D. (2015). Factors affecting the quality of life of cancer patients undergoing chemotherapy: A questionnaire study. *Asia Pacific Journal of Oncology Nursing*, 2(1):17-25.
- Vadhan-Raj, S. (2009). Management of chemotherapy-induced thrombocytopenia: current status of thrombopoietic agents. *Semin Hematol*, 46(1 Suppl 2):S26-32. doi: 10.1053/j.seminhematol.2008.12.007.
- Veetil, S. K., Lim, K. G., Chaiyakunapruk, N., Ching, S. M., & Abu Hassan, M. R. (2017). Colorectal cancer in Malaysia: Its burden and implications for a multiethnic country. *Asian Journal of Surgery*, 40:481-9. doi: <http://dx.doi.org/10.1016/j.asjsur.2016.07.005>.
- Velikova, G., Awad, N., Coles-Gale, R., Wright, E.P., Brown, J. M., & Selby, P, J, T. (2008). The clinical value of quality of life assessment in oncology practice-a qualitative study of patient and physician views. *Psychooncology*, 17(7):690-8.. doi: 10.1053/j.seminhematol.2008.12.007.
- Wart, H. V., Stuiver, M. M., Harten, W. H., & Geleijn, E. (2015). Effect of Low-Intensity Physical Activity and Moderate- to High-Intensity Physical Exercise During Adjuvant Chemotherapy on Physical Fitness, Fatigue, and Chemotherapy Completion Rates: Results of the PACES Randomized Clinical Trial. *American Society of Clinical Oncology*, 33(17):1918-27. doi:10.1200/JCO.2014.59.1081.
- Wagner, L., & Lacouture, M. (2007). Dermatologic toxicities associated with EGFR inhibitors: the clinical psychologist's perspective. Impact on health-related quality of life and implications for clinical management of psychological sequelae. *Oncology (Williston Park)*, 21:34-36.
- Weeks, J. C., Catalano, P. J., Cronin, A., Finkelman, M. D., Mack, J. W., Keating, N. L., & Schrag, D. (2012). Patients' Expectations about Effects of Chemotherapy for Advanced Cancer. *The new England Journal of Medicine*, 367:1616-1625.



- Weis, J. (2011). Cancer-related fatigue: prevalence, assessment and treatment strategies. *Expert Rev Pharmacoecon Outcomes Res*, 11(4):441-6. doi:10.1586/erp.11.44
- WHO.(1997). WHOQOL: Measuring Quality of Life. World Health Organization. Retrieved from: <http://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/>
- WHO. (2014). Cancer. World Health Organization. Retrieved from: [http://www.who.int/cancer/country-profiles/mys\\_en.pdf](http://www.who.int/cancer/country-profiles/mys_en.pdf)
- WHO. (2017). Cancer. World Health Organization. Retrieved from: <http://www.who.int/mediacentre/factsheets/fs297/en/>
- Wong-Kim, E. C., & Bloom, J. R. (2005). Depression experienced by young women newly diagnosed with breast cancer. *Psychooncology*, 14(7):564-73.
- Wu, X. D., Qin, H. Y., Zhang, J. E., Zheng, M. C., Xin, M. Z., Liu, L., & Zhang, M.-F. (2015). The prevalence and correlates of symptom distress and quality of life in Chinese oesophageal cancer patients undergoing chemotherapy after radical oesophagectomy. *European Journal of Oncology Nursing*, 19(5):502-8. doi: 10.1016/j.ejon.2015.02.010.
- Xiao, C., Miller, A. H., Felger, J., Mister, D., Liu, T., & Torres, M. A. (2016). A prospective study of quality of life in breast cancer patients undergoing radiation therapy. *Advances in Radiation Oncology*, 1(1):10-16.
- Yan, B., Yang, L. M., Hao, L. P., Yang, C., Quan, L., Wang, L. H., & Yuan, J. M. (2016). Determinants of Quality of Life for Breast Cancer Patients in Shanghai, China. *Journal Plos One*, 11(4):1-14. doi:10.1371/journal.pone.0153714
- Yang, B., Jacobs, E. J., Gapstur, S. M., Stevens, V., & Campbell, P. T. (2015). Active Smoking and Mortality Among Colorectal Cancer Survivors: The Cancer Prevention Study II Nutrition Cohort. *J Clin Oncol*, 33:885-893. doi: 10.1200/JCO.2014.58.3831
- Yeager, C., & Olsen, E. (2011). Treatment of chemotherapy-induced alopecia. *Dermatol Ther*, 24 (4):432-42. doi:10.1111/j.1529-8019.2011.01430.x
- Yildirime, Y., Serto, O. O., Uyar, M., & Uslu, R. (2009). Hopelessness in Turkish cancer inpatients: the relation of hopelessness with psychological and disease-related outcomes. *European Journal of Oncology Nursing*, 13(2):81-6. doi: 10.1016/j.ejon.2009.01.001.
- Yusuf, A., Hadi, I. S., Mahamood, Z., Ahmad, Z., & Keng, S. L. (2013). Quality of life in Malay and Chinese women newly diagnosed with breast cancer in Kelantan, Malaysia. *Asian Pacific Journal of Cancer Prevention*, 14(1):435-440.

- Zhang, J., Gan, L., Wu, Z., Yan, S., Liu, X., & Guo, W. (2016). The influence of marital status on the stage at diagnosis, treatment, and survival of adult patients with gastric cancer: a population-based study. *Oncotarget*, 8(14):22385-22405. doi: 10.18632/oncotarget.7399.
- Zhou, E. S., Penedo, F. J., Lewis, J. E., Rasheed, M., Traeger, L., Lechner, S., Soloway, M., Kava, B. R., & Antoni, M. H. (2010). Perceived stress mediates the effects of social support on health-related quality of life among men treated for localized prostate cancer. *J. Psychosom. Res.*, 69(6):587-90. doi: 10.1016/j.jpsychores.2010.04.019.
- Zimet, G.D., Dahlem, N.W., Zimet, S.G. & Farley, G.K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 52, 30-41.

