Original Research

The association among adherence, self-efficacy, and health-related quality of life in cancer patients with oral chemotherapy in Indonesia

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Abstract

Background: Cancer patients undergoing oral chemotherapy are prone to suffer from low medication compliance and poor quality of life. The psychosocial factor of self-efficacy influences medication adherence. However, there is a lack of studies on the relationship between the three in cancer patients taking oral chemotherapy. **Objective:** This study aimed to explore medication adherence, self-efficacy, and health-related quality of life (HRQOL), examine the relationship among these variables, and determine the predictor of medication adherence. **Methods:** This cross-sectional study was conducted at a national cancer center in Indonesia from July 2021 to February 2022. Cancer outpatients aged 18 years or older taking oral chemotherapy capecitabine were included. Patients' socio-demographics, disease, and therapy characteristics were collected from medical records and questionnaires. Adherence, self-efficacy, and HRQOL were measured using self-reported questionnaires. **Results:** The study included 118 patients. The mean adherence score was 92.11% (SD=6.87%), and 79.67% of patients were adherent. The self-efficacy for appropriate medication use score ranged from 61.54 to 100%, with a mean score of 90.39%. The mean global score for HRQOL was 70.13 (SD=19.01). There was a significant positive correlation between medication adherence and self-efficacy (r=0.410, p< 0.001), self-efficacy and physical, role, and cognitive functional (r=0.185, p<0.05; r=0.197, p< 0.05, r=0.221, p<0.05, respectively). Medication adherence was negatively correlated with global quality of life (r=-0.199, p<0.05). This study did not find a correlation between self-efficacy and global quality of life. Multivariate analysis showed that the significant predictors of medication adherence were higher education, shorter duration of treatment, and higher self-efficacy. **Conclusions:** These findings provide valuable insights into patterns and correlations of oral chemotherapy adherence, self-efficacy, and HRQOL in cancer patients. Developing a future program is essential to enhancing cancer patients receiving oral chemotherapy's medication compliance, self-efficacy, and quality of life.

Keywords: adherence; self-efficacy; quality of life; oral chemotherapy; cancer

INTRODUCTION

Oral cytotoxic agents have been overgrown to treat various malignancies.[1] More than 90% of patients prefer oral chemotherapies over intravenous therapy because of greater convenience and autonomy for managing their condition.[2–4] On the other hand, self-administered oral anticancer medication in the home setting is less directly monitored by health care. Adherence is a challenge and increasing concern in oncologic care and research.[5] Several studies have shown that patient adherence to oral chemotherapy agents as therapy for chronic disease varies between 46% and 100%.[6]

Medication adherence is a multifaceted issue and vital to achieving optimal outcome therapy. Suboptimal adherence to oral therapies provides multiple consequences and has been associated with higher relapse and failure therapy, lower survival rate, and higher health cost.[6–10] Medication adherence is influenced by many factors, including patient-related, disease-related, therapy-related, socioeconomic, and healthcare system-related factors.[11]

Psychosocial factors influence medication adherence, including self-efficacy.[12] The concept of self-efficacy was first explained by Bandura, who stated that self-efficacy is an individual's belief in their ability to take specific actions needed to achieve goals.[13] Self-efficacy towards medication refers to the patient's belief in their ability to take medication correctly and appropriately even under challenging conditions, such as when they are away from home, experience side effects, or have many medicines to take.[12,14] Furthermore, self-efficacy is the strongest predictor of changes in health behavior, including medication adherence.[12,14–20] Previous studies have shown that self-efficacy was one of the determinants of medication adherence in patients with chronic diseases.[21]

Self-efficacy also plays a vital role in managing symptoms and maintaining individual functioning. Furthermore, evaluating the level of self-efficacy can predict quality of life. The ability of a person to perform his duties increases the patient's sense of control over life and affects his health-related quality of life (HRQOL).[22] HRQOL refers to patients' perceptions of their own experiences with a condition and how those experiences have affected their quality of life. A person's overall health is represented by their health-related quality of life, a multidimensional concept that includes physical, mental, and

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social health.[22,23]

Medication adherence, self-efficacy, and quality of life evaluation provide essential data on the deficiencies in specific areas which need more serious consideration by the medical care system's staff. Additionally, it can guide cancer patients to develop healthy behaviors, self-care skills, and disease adjustment. This study will be the first in Indonesia to evaluate medication adherence, self-efficacy, and quality of life in cancer patients taking oral chemotherapy.

METHODS

Study Design and Participants

This research is a cross-sectional single-center study conducted at ambulatory care, Dharmais national cancer center, Jakarta. The patient was recruited from July 2021 to February 2022. The inclusion criteria were adult cancer patients (older than 18 years old) taking oral chemotherapy capecitabine for at least one cycle and willing to participate in the study. The respondent will be excluded if they have a history of diseases that can interfere with receiving information, such as Alzheimer's, depression, and anxiety disorders. This research study has been reviewed and approved by the medical research ethics committee of the Dharmais Cancer Hospital (No. 050/KEPK/V/2021).

Procedure

We collected data during patient visits to the hospital pharmacy. Patients who met the inclusion criteria were identified and recruited to participate in the study. All patients provided written informed consent before filling out the questionnaire. The researcher guided and assisted the respondents in answering the questionnaire whenever required.

We collected patients' sociodemographics, including age, gender, marital status, education status, and employment status. We also obtained respondents' disease and therapy characteristics through medical records, including type of cancer, cancer staging, duration of treatment, and cancer duration. The data regarding adherence to medication, self-efficacy, and health-related quality of life was measured through questionnaires.

Instruments

The Oral Chemotherapy Adherence Scale (OCAS). It was specially designed to measure medication adherence for cancer patients. It consists of 19 questions that are assessed in five Likert scales. OCAS has been translated and validated into Bahasa with the internal consistency of Cronbach's alpha 0.675. OCAS consists of 3 subdomains: expected behaviors during treatment, barriers, and behaviors during drug usage. The highest OCAS score was 95, while the lowest score was 19. A score equal to or more than 84 indicates good adherence to oral chemotherapy.[24]

The Self-Efficacy for Appropriate Medication Use Scale (SEAMS). SEAMS consists of 13 questions whose assessment is in three Likert scales. SEAMS measures self-efficacy in chronic illness management while measuring barriers to adherence. SEAMS

has been translated and validated into Bahasa with the internal consistency of Cronbach's alpha 0.890. The highest score was 39, while the lowest score was 13. Higher scores indicate higher levels of self-efficacy for medication adherence. Factor analysis of the SEAMS revealed two dimensions of treatment self-efficacy. The first is self-efficacy for taking medication under challenging circumstances, such as when the patient is busy, away from home, or has a lot of drugs to take. The second is self-efficacy for taking medication in uncertain or changing circumstances, such as when the patient is unsure about taking medicine or changes to the regimen.[8,14]

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30 (EORTC QLQ C30. EORTC QLQ-C30 is a questionnaire specifically developed to assess the quality of life of cancer patients. The assessment of the instrument is in the form of a Likert scale of 1-4 (0 (not at all), 1 (a little bit), 2 (quite a bit), and 3 (very much). It has 30 items, divided into five functioning scales, three symptom scales, six single symptoms, and a 2-item scale for overall health/quality of life. All scores are converted to a scale from 0 to 100. While high scores on the symptom scales indicate poor quality of life, high scores on the functioning measures and the global health scale indicate good quality of life. The Indonesian version was used for this study (Cronbach's alpha 0.901).[25]

Data Analysis

Descriptive analysis was used to describe the proportion of categorical variables. Mean and standard deviation was used to express continued variables. The correlations among medication adherence, self-efficacy, and quality of life of the participants were analyzed using Spearman signed rank. The multivariate logistic regression model was performed to determine the predictor of medication adherence. Variables with a P-value of 0.25 or less in the bivariate analysis were integrated into the multivariate logistic regression model. Odds ratios and 95% confidence intervals were calculated for each variable in the final model. P<0.05 (2-sided) was considered statistically significant in all statistical tests. The statistical analyses were performed with SPSS version 26.

RESULTS

One hundred eighteen patients who met the inclusion criteria participated in the study. The mean age was 54.02 (SD=12.12). The majority were female (60.2%), had married (88.1%), had a secondary educational background (42.4%), and not working (66.1%). The characteristics of respondents based on sociodemographic are shown in Table 1.

Of the 118 patients, 83.9% had colorectal cancer, and 48.4% had stage III. Respondents were mainly in the first year of treatment after a cancer diagnosis. The characteristics of respondents based on therapeutic and disease-related factors are shown in Table 2.

Self-reported adherence ranged from 53.7% to 100%, with a mean of 87.2% (SD=7.2%). Overall, 79.7% of patients were adherent. The reason for compliance errors included forgetting

to take medicine, disrupting taking the drug if they do not remember the timing, and side effects interfering with their medication use.

Table 1. Sociodemographic characteristics of respondents (n = 118)

Variables		n (%)
Age	Mean (SD)	54.02 (12.12)
	50 or less	45 (38.1)
	More than 50	73 (61.9)
Gender	Female	71 (60.2)
	Male	47 (36.7)
Marital status	Single/separated	14 (11,9)
	Married	104 (88.1)
Education	Junior high school and below	35 (29.7)
	High school	50 (42.4)
	Diploma/university	33 (28.0)
Occupation	Unemployed	78 (66.1)
	Employed	40 (33.9)

Table 2. Respondents' characteristics related to disease and therapy (n = 118)

Variable		n (%)
Cancer type	Breast	19 (16.1)
	Colorectal	99 (83.9)
Cancer staging	Stage II	23 (19.5)
	Stage III	57 (48.4)
	Stage IV	38 (32.2)
Duration of cancer	12 months or less	73 (61.9)
	More than 12 months	45 (38.1)
Duration of treatment	6 cycles or less	87 (73.7)
	More than 6 cycles	31 (26.3)

The level of self-efficacy for appropriate medication use ranged from 61.54% to 100%, with an average of 90.39% (SD=10.75%). The lowest self-efficacy was related to the belief in using the drug correctly when the patient did not know how to take the medication, what time to take medicine, and when the drug caused some side effects. Table 3 shows the level of medication adherence and self-efficacy.

The mean of global HRQOL was 70.13 (SD=19.01). The domain with the highest average is the cognitive function, while the lowest was the physical function. On the symptom scale, the highest average score was fatigue, while the lowest were diarrhea and dyspnea domains. The mean of participants' health-related quality of life is presented in Table 4.

Correlations among adherence, self-efficacy, and health-related quality of life

There was a significant positive correlation between medication adherence and self-efficacy (r=0.410, p< 0.001), self-efficacy and physical, role, and cognitive functional (r=0.185, p<0.05;

Table 3. Adherence and Self-Efficacy level of the participants

Variables	n (%)
Adherence	
Mean (SD)	87.5 (6.53)
Adherence (score equal to or more than 84)	94 (79.7)
Not adherence (score less than 84)	24 (20.3)
Range	63-95 (66.32% - 100%)
Self-efficacy for appropriate medication use	
Mean (SD)	35.25 (4.19)
Range	24-39 (61.54% - 100%)

Table 4. EORTC QLQ-C30 mean scores of the participants

Domain	Mean (SD)
Functional scales	
Physical	74.24 (28.84)
Role	76.69 (28.47)
Emotional	85.95 (19.33)
Cognitive	87.29 (19.33)
Social	84.18 (24.83)
Symptom scales	
Fatigue	37.38 (27.63)
Nausea/vomiting	16.10 (23.76)
Pain	31.78 (32.32)
Dyspnea	5.37 (14.43)
Insomnia	25.14 (31.41)
Appetite loss	25.71 (34.15)
Constipation	9.04 (22.08)
Diarrhea	5.93 (17.23)
Financial difficulties	33.33 (34.32)
Global quality of life	70.13 (19.01)

r=0.197, p<0.05' r=.221, p<0.05, respectively). This study found a negative correlation between medication adherence and global quality of life (r=-0.199, p<0.05); self-efficacy and symptoms scales (pain r=-0.182, p<0.05; dyspnea r=-0.285; p<0.001). This study did not find a correlation between self-efficacy and global quality of life.

Multivariate Analysis of Quality of Life

The associated factors of adherence based on multivariate logistic regression analysis are shown in Table 6. The bivariate analysis identified five factors influencing adherence with p < 0.250. These factors included level of education, type of cancer, length of treatment, length of cancer, and self-efficacy. Two factors remained in the final logistic regression model after backward selection. The result showed that higher education, shorter treatment, and higher self-efficacy significantly improved medication adherence.

Table 5. Correlations analysis among adherence, self-efficacy, and health-related quality of life

Variables	Adherence	Self-efficacy
Adherence	1	0.410**
Self-efficacy	0.410**	1
Global quality of life	-0.199*	0.079
Functional scale		
Physical	0.006	0.185*
Role	-0.043	0.197*
Emotional	0.007	0.125
Cognitive	0.035	0.221*
Social	-0.166	0.131
Symptom scales		
Fatigue	0.043	-0.144
Nausea/vomiting	0.077	-0.032
Pain	-0.012	-0.182*
Dyspnea	-0.080	-0.286**
Insomnia	-0.048	-0.003
Appetite loss	0.126	-0.041
Constipation	-0.058	-0.125
Diarrhea	0.104	0.028
Financial difficulties	0.124	0.170
*p<.05, **p<0.001		

Table 6. The associated factors of medication adherence

Variables	β	OR	95% CI	p
Education				0.033
Education (1)	0.851	2.341	0.755-7.255	0.141
Education (2)	2.074	7.957	1.644-38.514	0.010
Length of therapy	-1.805	0.165	0.055-.0496	0.001
Self-efficacy	.132	1.141	1.022-1.274	0.019

DISCUSSION

The study explored medication adherence, self-efficacy, and health-related quality of life, examined the relationship among these variables, and determined the predictor of medication adherence. Adherence is a multifactorial issue that is difficult to measure accurately. However, adherence has been identified as critical when assessing outcomes in individual patients and clinical trials. Self-efficacy is essential when evaluating medication adherence.[14] Self-efficacy levels can be used to predict quality of life. When patients can fulfill their obligations, they feel more in control of their life and quality.[22] Cancer patients are generally expected to be very compliant because cancer is a serious and life-threatening illness with a poor prognosis. Knowledge about the reasons for non-adherence is essential for developing strategies to improve adherence.[26]

This study measured adherence by self-reporting using oral chemotherapy adherence scales (OCAS). The finding exhibited that mean self-reported adherence either as monotherapy or combination regimen was 92.11%, and 78.9% of patients were adherent. Several previous studies showed similar results even though using different measuring instruments. A study published by Winterhalder et al. reported that 91% of patients did not record any intake mistakes according to their diary entries.[27] A study by Zahrina et al. also highlighted that most respondents adhered to capecitabine with a mean attendance score of 96.1% based on a self-reported questionnaire.[28] The other studies that used the MEMS to measure adherence rate showed that 78% of patients had a lower average adherence level for capecitabine,[29] 79.5% of patients had an adherence score equal to or more than 90%,[30] overall adherence was 90.5%.[31]

Most reasons for non-compliance in this study were forgetting to take medicine, disrupting taking the drug if they do not remember the timing, and side effects interfering with their medication use. Forgetfulness is a widely reported factor that causes non-adherence. It is more socially acceptable to report than intentional behaviors (i.e., missing or altering a dose).[32] Previous studies showed that forgetting is the most common reason for non-adherence.[1,17,33] Combining written and oral instructions are preferable to only oral one for reminding patients to take their medication [34] A behavioral intervention has been addressed by unintentional non-adherence, including memory cues and coordinating the drug with meals or daily rituals. Besides, reminder packaging strategies such as prefilled boxed or foiled-blister packs have enhanced medication adherence.[35] Medication adherence has also improved significantly due to technology, such as electronic mail, mobile phone reminders, and audiovisual or text messaging.[2,10,17,36] Furthermore, pharmacists must discuss with patients for investigating and giving recommendations about the problems they face regarding remembering to take their medication.

Side effects are also one of the reported reasons for non-adherence. The low reporting of drug side effects to doctors, nurses, or pharmacists often triggers patients' desperation to comply with their medication. An association between the number and severity of adverse events and the tendency of patients to stop cancer chemotherapy has been reported [28,36–39]. Education and implementation of early and aggressive adverse effect prevention and management strategies by pharmacists may help maximize patient adherence.[10]

In terms of self-efficacy, this study found that the level of self-efficacy for appropriate medication use among participants was good. It concluded that there is a positive relationship between adherence and self-efficacy. Reviews on the association between medication adherence and self-efficacy have been conducted, with consistent findings reported.[22,40] The social cognitive theory states that people who have higher levels of self-efficacy are more likely to engage in a particular behavior, such as taking medication results in patients being more affected and last longer in following medication regimens properly.[13,41–44] Awareness of SE levels may aid health professionals in identifying patients who require additional self-management support. Providing self-management support for

chronic disease has been hailed as a hallmark of good care.[44]

This study also demonstrated a positive correlation between self-efficacy and functional scale, including physical, role, emotional, cognitive, and social functional, and a negative correlation in symptoms scale. Although relatively low, these correlations are in the expected direction and are in keeping with the findings of others.[45] The literature showed different results regarding self-efficacy and global quality of life [22,40,46-48]. This study did not find a relationship between self-efficacy and global quality of life.

There was a contrary finding to previous literature showing a positive correlation between medication adherence and quality of life.[49-51] This study found a negative relationship between medication adherence and quality of life. Our study uniquely considers the broad effect of medication adherence for patients undergoing oral cancer treatment. We approached this study with the awareness that we did not have insight into whether medication adherence was different in the presence of oral cancer treatment. A surprising finding in our study was that patients with higher adherence levels were lower quality of life. It may indicate the severity or number of adverse drug reactions that differentiates HRQOL. Determining this relationship in claims data is complex but warrants further consideration. Given this study's cross-sectional nature, it is impossible to identify a relationship's causal chain. However, patients with lower quality of life may be higher compliant with medication regimens because their cancer-related symptoms or adverse drug reactions are common during cancer treatment. Additional knowledge regarding the purpose and nature of this association could help providers better understand how to motivate self-management regarding adverse drug reactions while undergoing cancer treatment to promote or preserve HRQOL.

Based on multivariate logistic regression analysis, the level of adherence was affected by educational level, duration of treatment, and self-efficacy. Evidence from other studies also showed that higher education is associated with higher adherence.[52,53] There is a tendency that the higher the education level, the more complaint. It may be due to a relationship between education level and health literacy. Health literacy measures an individual's capacity to obtain, process, and understand basic health information and services needed to make informed health decisions.[9] People with higher levels of education are better able to read and fully understand the information and instructions provided by health education materials.[54] People with higher levels of health literacy increase the possibility of communication between patients and their healthcare providers. This interaction may result in better health outcomes and behaviors.[55] Another critical issue is the duration of treatment. We found a tendency for higher adherence with a shorter period of therapy. A previous study showed inline results that patients with more than six months of treatment have higher non-adherence related to forgetting to take the medication.[56]

The limitations of this study are single-center, small sample size, only including one OAA, and using self-reported so that the results of this study cannot be generalized. Even though the questionnaires were anonymous, the results may not accurately reflect the respondents' behavior. Furthermore, the self-reported approach is prone to mistakes due to poor patient recall or the patient's reluctance to disclose non-compliance. Multi-measure is recommended strategy for future studies in measuring adherence. Another area for improvement was that this study was cross-sectional, so we did not consider variations in patient response.

CONCLUSION

These findings provide valuable insights into adherence, self-efficacy, and quality of life patterns in cancer patients taking oral chemotherapy. Developing future programs are necessary to improve medication adherence, self-efficacy, and quality of life in Indonesian cancer undergoing oral chemotherapy. Further research is needed to identify potential causal mechanisms for these relationships. In addition, healthcare providers should be aware of specific areas that need more serious consideration, which would help identify patients who need enhanced self-management support.

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AUTHOR CONTRIBUTION

Conception and design the study: AWP, SAK, MJF; Analysis and interpretation of the data: AWP, SAK, MJF. Drafting of the article: AWP, SAK; Critical revision of the article for important intellectual content: AWP, SAK, MJF; Final approval of the article: AWP, SAK, MJF; Provision of study materials: AWP, SAK; Administrative, technical, or logistic support: AWP, SAK; Collection and assembly of data: AWP.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest. The funder has no role or influence in the study design, collection, analysis, or interpretation of data.

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