

The Effect of Giving Garlic Extract (*Allium Sativum*) on the Scoring of KDQOL-SF 36 Sub-Scale of Physical and Mental Health

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RESEARCH ARTICLE

The Effect of Giving Garlic Extract (*Allium Sativum*) on the Scoring of KDQOL-SF 36 Sub-Scale of Physical and Mental Health in Patients Treating Chronic Hemodialysis at Mohammad Hoesin General Hospital, Palembang

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ABSTRACT

Chronic kidney disease (CKD) patients undergoing hemodialysis have an increase in proinflammatory cytokines. The quality of life of chronic kidney disease patients undergoing hemodialysis is affected by inflammation. Assessment of quality of life in CKD is done using the Kidney Disease Quality of Life Short Form Survey 36 questionnaire (KDQOL SF-36). Garlic (*Allium sativum*) has anti-inflammatory components. This study was conducted to determine the effect of giving garlic extract on the KDQOL score of the physical and mental health subscale at Mohammad Hoesin General Hospital, Palembang. The study was conducted in the Hemodialysis Room of Moh Hoesin General Hospital, Palembang. Department of Internal Medicine, RSUP Dr. Moh Hoesin Palembang met the inclusion criteria consecutively in January 2022. Statistical analysis was carried out using the SPSS version 25.0 program. A total of 40 subjects participated in the study, 60% of whom were male. The mean age in the garlic extract group was 45.5 (28-58), and in the placebo group, 55 (26-59). Characteristics of the KDQOL value of the SF-36 physical health subscale with a value of 45.75 ± 22.08 in the garlic group with a significant increase (p = 0.041), the KDQOL value of the SF-36 mental health subscale with a value of 63.26 ± 20.56 in the group garlic with a significant increase (p=0.001). Garlic extract was shown to reduce the inflammatory process, followed by an increase in the KDQOL SF-36 score on the physical and mental health subscale.

KEYWORDS

Chronic Kidney Disease, Hemodialysis, KDQOL SF-36, *Allium Sativum*

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1. Introduction

According to Kidney Disease Improving Global Outcomes (KDIGO) in 2012, chronic kidney disease is defined as kidney damage and/or a decrease in the Glomerular Filtration Rate (GFR) of less than 60 mL/min/1.73m² for at least three months. (Eknoyan, 2012; Ministry of Health of the Republic of Indonesia, 2017; Suliman et al., 2008). Based on the Indonesian Renal Registry (IRR) report, in 2018, there were 147.340 kidney failure patients undergoing hemodialysis therapy.⁴ In patients with chronic kidney disease (CKD) undergoing hemodialysis, there is an increase in proinflammatory cytokines, including IL6, CRP, TNF- α , and Ferritin (Bacci, 2018).

The quality of life of chronic kidney disease patients undergoing hemodialysis often declines. Assessment of quality of life in chronic kidney disease using the Kidney Disease Quality of Life Short Form survey 36 (KDQOL SF-36) questionnaire consisting of 5 subscales, namely physical health, mental health, the burden of kidney disease, symptoms, and problems, effects on daily life (Wisconsin, 2021; Hays, 1994). The quality of life of patients with chronic renal failure is affected by inflammation and malnutrition (Calendar et al. 2017).

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Garlic contains various bioactive compounds. The main active component of garlic is its organosulfur compound, namely - glutamyl-S-alkyl-cysteine, which can be hydrolyzed and oxidized to produce S-alkyl-cysteine sulfoxide (*alliin*). Garlic extract and its components have biological activities such as anti-inflammatory and antioxidant. (Lestari et al., 2018). In a previous study, the administration of garlic extract to patients with chronic renal failure using continuous ambulatory peritoneal dialysis (CAPD) was shown to decrease the proinflammatory cytokine IL-6. (Wardani, 2022).

This study aims to assess the effect of giving garlic extract on the KDQOL SF-36 score on the physical and mental health subscale in patients undergoing chronic hemodialysis at RSUP Dr. Mohammad Hoesin Palembang.

2. Methods

2.1 Research Subject

This study used a randomized controlled, double-blind crossover trial design. The study was conducted in the Hemodialysis Room of Dr. Moh Hoesin Hospital Palembang. Data collection was carried out in January 2022. This study was approved by the Medical Research Ethics Committee, Faculty of Medicine, Sriwijaya University, RSUP Dr. Moh. Hoesin Palembang with No. 95/kepkrsmh/2022. Each subject received informed consent before data collection. Inclusion criteria included all chronic hemodialysis patients undergoing routine hemodialysis twice a week with a session duration of 4-5 hours, more than three months, and a maximum of 2 years, aged 18 to 60 years, willing to participate in the study by signing informed consent. The exclusion criteria included patients suffering from an acute infection, receiving steroid therapy, suffering from an autoimmune disease, suffering from fluid overload, being infected with Covid 19, and having a garlic allergy. Each subject was interviewed, and physical examination and quality of life were assessed using the KDQOL SF-36 questionnaire consisting of 5 subscales: physical health, mental health, the burden of kidney disease, symptoms and problems, and influence on daily life.

2.2 Randomization

Sampling was taken by blocking sampling, namely patients who will undergo hemodialysis who meet the inclusion criteria are taken as samples with numbers 1,2,3,4 based on the order in which patients come to the hemodialysis room until they meet the specified number. Then it will be determined whether to enter the garlic extract or the placebo group. Third-party researchers and patients do not know.

2.3 Intervention

All CKD patients undergoing hemodialysis at the RSMH Hemodialysis Unit who meet the inclusion criteria and do not meet the exclusion criteria will be randomized into two groups, namely the group that received garlic extract and the group that received a placebo examination out in stages. Garlic extract (*allium sativum*) is 2x500 mg capsules. In phase I, 20 subjects received garlic extract, and 20 received a placebo and filled out the KDQOL SF-36 questionnaire. Garlic extract was given for six weeks, and the patient again filled out the KDQOL SF-36 questionnaire at the end of week 6. Both groups were washed for two weeks. Phase II crossover was carried out in both groups and received the same treatment as Phase I.

2.4 Statistical Analysis

Processing and analyzing data using the SPSS 25.0 program. Data is presented in the form of tables and graphs. The data is tested to determine whether the distribution is normal or not. If the distribution is normal, then parametric and non-parametric tests are used if the data distribution is not normal. Shapiro Wilk's normality test and Levine's homogeneity test, and if normally distributed, the data will be presented with the mean \pm standard deviation. It will be presented with the median (min-max) if not normally distributed. The bivariate analysis will use a chi-square test on categorical data and a T-test (if normally distributed) or Mann Whitney (if not normally distributed) on categorical and numerical data, then paired T-Test test to see the analysis before and after treatment. The relationship between the independent and dependent variables was considered significant if $p < 0.05$.

3. Results

In Table 1. A total of 40 subjects participated in this study, dominated by 23 men, of which 12 people (60%) received garlic extract, while 17 women, 8 (40%) received garlic extract in phase I. The mean age in the garlic extract group was 45.5(28-58), and in the placebo group, 55(26-59). In the garlic extract group, most of the samples had a high school education and worked in the private sector.

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Table 1. General characteristics of research subjects

	Group			p
	Total (n=40)	Garlic (n=20)	Placebo (n=20)	
Age	48.6 (26-59)	45.5 (28-58)	55 (26-59)	0.001
Gender				
- male	23 (57.5%)	12 (60%)	11 (55%)	
- Woman	17 (42.5%)	8 (40%)	9 (45%)	
Education				
- elementary school	2 (5 %)	-	2 (10 %)	
- Middle School	9 (22.5%)	4 (20%)	5 (25 %)	
- high school	19 (47.5 %)	12 (60%)	7 (35%)	
- College	10 (25 %)	4 (20%)	6 (30 %)	

1
 p: p-value before and after treatment. p': p-value after treatment between groups. a) Paired T-test b) Unpaired T-test, meaning if $p < 0.05$

Characteristics of the KDQOL value of the SF-36 physical health subscale with a value of 45.75 ± 22.08 in the garlic group with a significant increase ($p = 0.041$), the KDQOL value of the SF-36 mental health subscale with a value of 63.26 ± 20.56 in the group garlic with a significant increase ($p=0.001$).

Table 2. Characteristics of KDQOL SF-36 Physical and Mental Subscales

	group						p'
	Garlic			Placebo (n=40)			
	Before	After	p	Before	After	P	
Physical Health	35.41 ± 22.08	45.75 ± 25.73	0.041 ^a	48.75 ± 23.81	46.02 ± 25.12	0.14 ^a	0.011 ^b
Mental Health	52.70 ± 21.46	63.26 ± 20.56	0.001 ^a	68.5 ± 19.7	65.20 ± 19.23	0.002 ^b	0.03 ^b

1
 p: p value before and after treatment. p': p-value after treatment between groups. a) Paired T-test b) Unpaired T-test, meaning if $p < 0.05$

4. Discussion

The mean age of chronic kidney disease (CKD) patients undergoing chronic hemodialysis is (48.6) years, with the majority being male. The mean age of CKD patients with chronic hemodialysis in this study was different from those conducted in Palembang (40.1), Bali (51.8), Medan (37), and Brazil (41.03). The difference in age in the placebo group ($p = 0.001$) was signed between the garlic extract group and the placebo group, but patients would have a crossover so that all subjects would receive the same treatment.

In the study of Muhar A et al. (2020), it was found that there was an increase in inflammation in CKD patients undergoing hemodialysis, namely an increase in the proinflammatory cytokine IL-6. The increase in proinflammatory cytokines correlated with decreased SF-36 KDQOL score. With significant results on the physical and mental health subscale ($p=0.047$). In the study of Wardani NWS et al. (2022), it was found that IL-6 levels ≥ 47.21 pg/mL had a poor quality of life as indicated by the KDQOL score < 60 compared to patients with IL-6 ≤ 47.21 pg/mL with the result meaningful ($p= 0.015$) (Wardani, 2020).

In the study of MR Bacci et al. (2018), it was found that there was a negative correlation between the increase in pro-inflammatory cytokines IL6, CRP, TNF-, and Ferritin and the KDQOL score SF-36. On the physical health subscale, there is a moderate correlation. The higher the levels of pro-inflammatory cytokines, the lower the quality of life. On the mental subscale, there is a mild negative correlation (Eknoyan, 2013).

In the study of Kendenan M et al. (2019), it was found that CKD patients with continuous ambulatory peritoneal dialysis (CAPD) were given treatment with garlic extract 2x500 mg for 6 weeks compared to placebo, which resulted in a significant decrease in IL-6 ($p = 0.005$) (Kendenan, 2021).

In this study, the results followed the hypothesis that garlic extract could reduce the inflammatory process, followed by an increase in the KDQOL score of SF-36 in CKD. On the physical health subscale in the garlic extract group, there was an increase in the SF-36 KDQOL score, whereas, in the placebo group, there was a decrease in the SF-36 KDQOL score. On the mental subscale in the garlic extract group, there was an increase in the SF-36 KDQOL score, whereas, in the placebo group, there was a decrease in the SF-36 KDQOL score. Following previous studies that the SF-36 KDQOL score is influenced by inflammation, patients undergoing hemodialysis will experience an activation process of proinflammatory cytokines, including IL6, CRP, TNF- α , and Ferritin. Garlic extract has been shown to act as an anti-inflammatory. According to a study by Kendenan M et al. (2019), one of the proinflammatory cytokines, IL-6, was decreased. Following MR Bacci et al. (2018) research, patients with high levels of IL-6 further reduce the SF-36 KDQOL score. This study proved it by an increase in the KDQOL SF-36 score on the physical and mental health subscale after giving garlic extract 2x500 mg for six weeks. It is estimated that there will be a decrease in proinflammatory cytokine levels.

5. Conclusion

Chronic kidney disease (CKD) patients undergoing hemodialysis have an increase in proinflammatory cytokines. The quality of life of chronic kidney disease patients undergoing hemodialysis is affected by inflammation. Assessment of quality of life in CKD is done using the Kidney Disease Quality of Life Short Form Survey 36 questionnaire (KDQOL SF-36). Garlic (*Allium sativum*) has anti-inflammatory components. This study was conducted to determine the effect of giving garlic extract on the KDQOL score of the physical and mental health subscale at Mohammad Hoesin General Hospital, Palembang. CKD patients undergoing hemodialysis have proinflammatory cytokine activation. Increased levels of proinflammatory cytokines can reduce the SF-36 KDQOL score. The administration of garlic extract was shown to reduce the inflammatory process, followed by an increase in the KDQOL SF-36 score on the physical and mental health subscale.

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