

# Integrating Family-Based Science Education to Support Patient Resilience: A Study on Hemodialysis Patients in Pidie Regency

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**Abstract:** Chronic kidney disease is one of the health problems that has been widespread and reaches 5-10% of the human population. According to data from the Basic Health Research (Riskesdas) in 2018, the prevalence of chronic kidney disease in Indonesia is around 0.2%, with the highest prevalence in Central Sulawesi at around 0.5%. The treatment procedure for kidney failure is a kidney transplant or hemodialysis therapy. However, due to the difficulty of finding a kidney donor, hemodialysis therapy is an option. This therapy is a dialysis therapy that is done twice a week. This makes patients have psychological disorders such as stress, depression, anxiety disorders, and even suicidal thoughts. This disorder will certainly affect the patient's level of resilience, so it is necessary to have science education provided by the families in the form of health literacy, treatment knowledge, and emotional support to increase the patient's self-resilience. The research method used is a quantitative method by using cross sectional, namely data observation is carried out at one time. The research data were obtained through a questionnaire consisting of a family science education questionnaire and patient resilience. The results showed that the existence of science education provided by families in the form of health literacy, treatment knowledge, and emotional support plays a critical role in enhancing patients' resilience during hemodialysis. A good level of resilience in patients can improve the quality of life and physical activity of patients.

**Keywords:** Chronic kidney disease; Homodialysis; Resilience; Science education

## Introduction

Chronic kidney disease is a widespread health problem that affects 5-10% of the world's population. Chronic kidney disease is a progressive and irreversible disruption of kidney function that leads to end-stage disease and death. In its worst condition, the body fails to maintain metabolism and fluid and electrolyte balance (Muttuqin & Sari, 2011). The World Health Organization (WHO) stated that the growth in the number of kidney failure sufferers in 2013 had increased by 50% from the previous year (Mckeon et al., 2022).

According to data from the Basic Health Research (Riskesdas) in 2018, the prevalence of chronic kidney disease in Indonesia is around 0.2%. The highest

prevalence is in Central Sulawesi at 0.5%, followed by Aceh, Gorontalo, and North Sulawesi each at 0.4%. While East Nusa Tenggara, South Sulawesi, Lampung, West Java, Central Java, DI Yogyakarta, and East Java each at 0.3%.

Treatment procedures that can be used to improve the patient's condition are hemodialysis therapy (blood dialysis) and kidney transplantation. However, the cost of kidney transplant surgery is quite expensive, and it is difficult to find a kidney donor, so the most widely used method is hemodialysis therapy. Hemodialysis therapy can help improve the patient's body homeostasis. Still, it does not replace other kidney functions, so to maintain life, patients must undergo hemodialysis at least twice a week throughout their lives (Roesli, 2008). Problems that

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patients may face include financial shortages, work being threatened because of frequent holidays, decreased libido, depression due to chronic diseases suffered, hopelessness, disappointment with their condition, and fear of death. All of these problems faced by patients can cause psychological problems where patients live their lives in a state of depression and stress due to the process they undergo, unlike normal humans in general (Alfiyanti et al., 2014). According to Gabrielle Macaron (2013) in her research, out of 51 samples of chronic kidney disease patients undergoing hemodialysis, 45% experienced anxiety, 50% experienced depression, and 37% experienced suicidal thoughts. This makes it important for patients to have good resilience. Resilience is a condition where patients can accept themselves and have the spirit to be able to recover from the disease they suffer from. Good resilience can help the effectiveness of the treatment they undergo.

Science education is important to be given to hemodialysis patients. The family who are the closest people to the patient have a role to play in providing science education. Forms of science education that can be given include health literacy, treatment knowledge, and emotional support. Health literacy can be implemented in science education by providing understanding and comprehension to patients about the kidney disease they suffer from, treatment methods, and care. Research by (Alonso et al., 2017) explains that low health literacy makes it difficult for patients to interpret and apply educational messages from health workers. The next science education that can be provided by the family is treatment knowledge. The family can help patients understand the hemodialysis process, including how it works, the frequency of treatment, and what to expect during treatment sessions (Amungulu et al., 2023). Emotional support from family is very important. Family can help patients cope with stress and emotional burden due to chronic illness, which can improve mental health and quality of life of patients (Moradi et al., 2024).

Based on the description above, the researcher interested in analyze the correlation between science education by families and resilience patients in the process of therapy hemodialysis at RSUD. Tgk Chik Di Tiro Sigli Regency Pidie.

**Method**

The research methods used are quantitative with use cross-sectional, where time measurement/ observation of variable data independent and dependent data is done one time at a time. Research data was collected through a questionnaire created based on a review from the studies library. The questionnaire was

made into two types: questionnaire science education family and questionnaire self-resilience. The questionnaire science education family contains 20 questions consisting of instrumental support questions 1-5, support informational 6-10, support assessment 11-15, and support emotional 16-20. The next questionnaire, resilience self, contains 25 statements consisting of statement rejection found in 1-5, statement angry at 7-10, statement bid 11-15, statement depression 16-20, and statements acceptance 21-25.

The quality of the research instrument is analyzed by conducting validity and reliability tests. Validity tests are conducted on each questionnaire item by comparing the calculated r value and the table r value with  $df = n-2$  and sig 5%. The instrument is considered valid when the table r value < calculated r (Efriani et al., 2023). The results of the validity test analysis are as follows:

**Table 1.** The results of the validity test analysis

Instrument	Correlation value		Result
	(Pearson Correlation)	r Tabel	
DK 1	0.828	0.632	Valid
DK 2	0.841		Valid
DK 3	0.710		Valid
DK 4	0.806		Valid
DK 5	0.873		Valid
DK 6	0.701		Valid
DK 7	0.748		Valid
DK 8	0.766		Valid
DK 9	0.854		Valid
DK 10	0.671		Valid
DK 11	0.938		Valid
DK 12	0.856		Valid
DK 13	0.897		Valid
DK 14	0.825		Valid
DK 15	0.923		Valid
DK 16	0.939		Valid
DK 17	0.739		Valid
DK 18	0.910		Valid
DK 19	0.900		Valid
DK 20	0.889		Valid

Next, for reliability analysis, it is done by comparing the r value of the results with the r table. The r table value used is 0.05. The following are the results of the instrument reliability test:

**Table 2.** Reliability Test Result

Cronbach's Alpha	N of Items
.768	21

The r value of the results > r table in the family support questionnaire, namely 0.768 > 0.05, so the questionnaire is reliable.

Sample in this study is taken with the purposive sampling method, namely the technique of choosing a

sample between populations based on researchers who can represent characteristics of a population that has been known previously (Nursalam, 2013). Criteria respondents needed are patients who routinely undergo hemodialysis, awareness components, age >17 years, and already undergoing hemodialysis >1 week up to >3 years.

Data analysis was performed with analysis univariate and bivariate analysis. Univariate used to describe characteristics from every variable research (Notoatmodjo, 2018). Analysis bivariate aiming to know the existence combination between two variables, namely science education with resilience patients (Notoatmodjo, 2018). The statistical test used is a 3x2 chi-square table with value  $\alpha = 0.05$ . If the p-value < 0.05, then there is a meaningful relationship (significance) between science education families to resilience patients. On the other hand, if the p-value is > 0.05, then No There is a connection between science education family with resilience patients. The flowchart of the research stages follows:

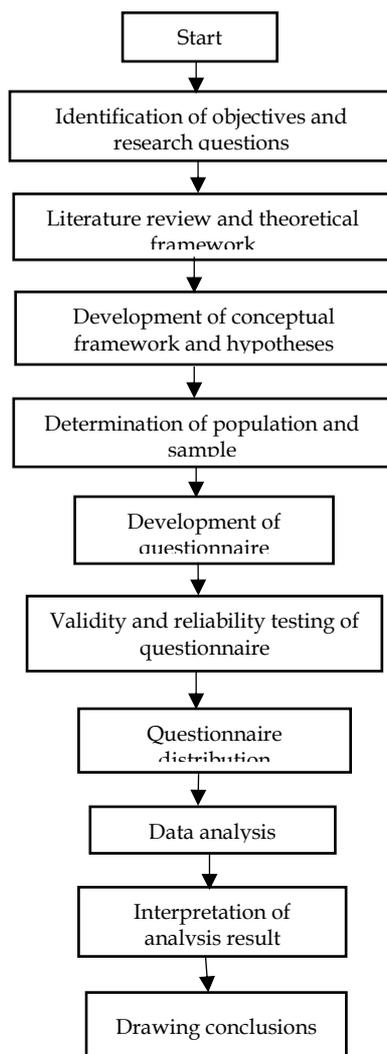


Figure 1. The flowchart of the research stages

## Result

### Demographic data Respondent

Demographic data respondents who are patients from therapy hemodialysis are as follows:

Table 3. Distribution demographic data frequency Respondent

Characteristics Respondent	Frequency	Percentage (%)
<b>Age</b>		
1. 26-45 years	8	14.5
2. 46-65 years	21	38.2
3. > 65 years	26	47.3
Amount	55	100
<b>Gender</b>		
1. Man	37	67.3
2. Woman	18	32.7
Amount	55	100
<b>Work</b>		
1. Civil servant	8	14.5
2. Non-Civil servant employees	10	18.2
3. Trader/ Others	22	40.0
4. Doesn't work	15	27.3
Amount	55	100
<b>Education</b>		
1. Elementary school/ equivalent	16	29.1
2. Junior High School/ Equivalent	11	20.0
3. High School/ Equivalent	19	34.5
4. Higher education	9	16.4
Amount	55	100

The data above show that the majority of Respondents aged more than 65 years (47.3%), type sex male (67.3%), have worked as traders / others (40%), and graduated from high school / equivalent (34.5%).

### Distribution of data frequency science education family to the patient

Following is the distribution data frequency support science family to the patient

Table 2. Distribution frequency science education family respondents

Support Family	Frequency	Percentage (%)
Good	22	40.0
Enough	20	36.4
Not enough	13	23.6
Amount	55	100

The table above shows that the majority of patients—as many as 40% of the total patients – get education and good science from their families.

*Distribution data frequency resilience patient*

Following is the distribution data frequency from level resilience patient to therapy. He underwent hemodialysis :

**Table 3.** Distribution frequency resilience patient

Resilience self	Frequency	Percentage (%)
Good	29	52.7
Not good	26	47.3
Amount	55	100

Based on the data in the table, it can be known that the majority of patients have a good level of resilience, namely as many as 29 patients from a total of 55 patients.

*Tabulation data cross between family science education with patient resilience*

**Table 4.** Tabulation cross between science education family with resilience self-patients in the Hemodialysis Room

Science education family	Resilience				Total	P-Value
	Good		Not good			
	f	%	f	%	f	%
Good	15	68.2	7	31.8	22	100.0
Enough	12	60.0	8	40.0	20	100.0
Not enough	2	15.4	11	84.6	13	100.0
Total	29		26			0.000

Based on the table data above, it can be known that patients who receive education in science from their family have good resilience self, where the patient can accept the condition as a sufferer disease kidney chronicle that will always depend on hemodialysis throughout their life, namely as many as 15 people (68.2%). Furthermore, respondents who did not get support from family dominant No can accept themselves as sufferers' disease kidney chronicle who will always depend on hemodialysis throughout their life as feel No satisfied namely as many as 11 people (84.6%). Based on statistical test results obtained, that P  $\alpha$ value < (0.05) is 0.000, so there is a significant relationship between support family with reception self-patient.

*Discussion*

*Family science education in patients undergoing hemodialysis at Tgk Chik Di Tiro Regional Hospital*

Based on the results of research in Table 2, it is known that the family science education obtained by the patient is in the category of Good. Namely, as many as 22 patients (40.0%) received science education from their families. Science education in the form of support and an objective family that accompanies the patient moment undergoing the healing process will impact Good for improving the health status patient thus matter his with patients undergoing hemodialysis. Patients who are accompanied by family moment hemodialysis therapy will feel calm, comfortable, and stronger accept condition his physical so, which positively impacts positive towards the healing process of the patient.

Science education aims to give the need psychosocial members of the family. For example,

develop self-positive, a sense of belonging, mutual support, a sense of meaning, and resource affection. Individuals who get high support will more successfully face and overcome the problems they face compared to individuals who do not get support from other people like family (Cumayunaro, 2018).

Involvement of family in science education and care for patients undergoing hemodialysis has a significant impact on patients. The impact on the patient is as follows:

a. Compliance and complications patient

Family science education can increase patients' compliance with the treatment they are undergoing and reduce the effects of general side effects during dialysis, such as chest pain, nausea, pain in the head, and problems with blood pressure (Bahramnezhad et al., 2015).

b. Promotion sport

Science education, including film-based education, can push the trend of sports patients' frequent hemodialysis ignored, whereas it is important to increase the functional and quality of life of patients (Kontos et al., 201).

c. Retrieval decision

The involvement of the family in educating science patients about abouhemodialysis therapy can influence the choice of the patient's method of dialysiandas, emphasizing the importance of supporting the family in the decision-making process (Senghor, 202).

Science education that can be given to families is in the form of approach multidisciplinary, support long term, and customization. Education with approach

multidisciplinary and multidimensional is important. For optimizing results, maintaining patients, patients, and supporting power (Cicala et al., 2024). Ongoing support is required to maintain benefit intervention science education from time to time (Sotoudeh et al., 2019). Education program science must be in accordance with the needs and preferences of specific patients and families To ensure relevance and effectiveness (St. Clair Russell & Boulware, 2018).

Enter science education in patients daily routine undergoing maintenance hemodialysis can done by applying some of the following strategies:

a. Programs and Resources Power Education

- 1) Implementing a family-centered education program can increase the quality of life for patients and caregivers in a significant way. This program can cover various aspects of hemodialysis, including the science behind the treatment, dietary needs, and management fluid (Farahani et al., 2016; Sotoudeh & Alavi, 2023).
- 2) Adapting education to the needs and preferences of specific patients can increase learning results. This approach ensures that information is relevant and interesting, making it easier for patients and families to understand and apply draft scientific-related hemodialysis (Sajjadi et al., 2024).

b. Learning methods interactive

- 1) Using various methods, such as Teach-back, a method that patients and families repeating information obtained with they own language, can strengthen understanding and memory of material draft. This method is known to increase the self-management and literacy of health patients (Liu et al., 2024).
- 2) Education provided in video form can make it easier for patients to understand the material. Video is also an effective and interesting medium. The patients can increase their quality of life and retention of knowledge in patients (Fashafsheh et al., 2025).

c. Routine integration daily

- 1) Integrate science education into daily activities by explaining the principles of science behind treatment and care for patients. For example, discussing how machine dialysis filters blood can make the process more relevant and easy to understand (Cicala et al., 2024).
- 2) Family plays a role in giving support that can increase health, such as proper nutrition and management fluids, as well as explaining the science behind recommendations. Approach This can reduce the burden of maintenance and

improvement results for patients (Hayati et al., 2023; Parker, 2019).

*Patients' resilience undergoing hemodialysis at Tgk Chik di Tiro Regional Hospital*

Based on the research results in Table 3, it is known that patient's self-resilience are dominant in the category Good, namely as many as 29 patients (52.7%). Patients self-resilient are able to accept their condition as well as adapt and rise from their illness. It is also Good That they can mentally, emotionally, or behaviorally maintain strength and optimism (Kroshus et al., 2021).

Research results are supported by research that found 85.4% of patients with hemodialysis get closer self to God and pray as coping patients who experience chronic disease. Individuals who get social support will feel more accepted by the environment, so that individual the capable of accepting themselves with good, able to face various incidents in their lives, and able to control their emotions. In contrast, individuals who have the reception self-category will look at self they low and feel anxious, angry, and depressed (Amirkhani et al., 2021). Reception self can also determine the resolution process problems faced by patients. If the patient receives a good life and social support from family, so patient will have a strategy and manage more problems positively (Walker, 2023).

Patients undergoing hemodialysis face a number of challenges, physical and psychological, so resilience becomes a factor in the welfare and compliance treatment of patients in a comprehensive way (EY Kim et al., 2019). Several factors affect the resilience of patients, as follows:

a. Welfare, psychological, and spiritual health

- 1) The level of welfare and high psychological and spiritual health influence resilience and compliance treatment positively (Duran et al., 2020; Ebrahimi et al., 2021; Saedi et al., 2024).
- 2) Training resilience can reduce stress and anxiety in patients, which can increase their resilience (Amirkhani et al., 2021).

b. Support social family

- 1) Support social and resilient families plays a role in increasing resistance. Studies reveal that support social can increase resilience in the family and resilience psychologically tall from time to time (Wang et al., 2024).
- 2) System supporters include family and network social workers, who are very important for helping patients overcome the demands of hemodialysis (EY Kim et al., 2018).

- c. Quality life
- 1) A good level of resilience in patients influences the quality of their lives. This is associated with health and more physical and mental Good that can increase the quality of their life in a way overall (García-Martínez et al., 2021; Tsanasidis et al., 2025).
  - 2) Intervention, especially with the method of ongoing care, can significantly increase the resilience and resistance of patients to hemodialysis (Mosavi et al., 2024).
- d. Handling strategies
- 1) Effective handling strategies are important in building resilience. Therapy with mandala coloring has proven effective in increasing welfare psychology and mechanisms of patient care hemodialysis (Özer et al., 2024).
  - 2) Patients who apply coping strategies actively, such as looking for social support and maintaining view optimistic, tend to show more resilience (EY Kim et al., 2018; Özer et al., 2024).

*Correlation between family science education with resilience patient who undergo hemodialysis at Tgk Chik di Tiro Regional Hospital*

Based on the results research in Table 4 can know that the respondents who received a science education from their family majority can accept themselves as sufferers' disease kidney chronicle who will always depend on hemodialysis throughout their lives, namely as many as 15 people (68.2%). Furthermore, respondents who did not get a science education from family dominant No can accept themselves as sufferers' disease kidney chronicle that will always depend on hemodialysis throughout their life as feel not satisfied as many as 11 people (84.6%). Based on results statistical test results obtained, the  $P \alpha$ value  $< (0.05)$  is 0.000, so there is a significant relationship between family support and patient self-acceptance.

The results of this study cannot yet conclude the effect of gender on patient resilience. This is because the samples used do not have the same number comparison. However, several studies have shown that gender can affect patient resilience, such as research conducted by (Acciari et al., 2019) which explains that male patients with Crohn's disease have higher levels of resilience characterized by better psychological well-being and resilience than female patients.

Table 4 also shows a p value of 0.000. This value indicates that the study is considered statistically significant, which means that there is no element of chance so that the results of the study are considered valid. Based on this analysis, it can be ascertained that science education by the family provides significant

benefits for patients. Science education that can be provided by the family as the closest person to the patient is health literacy, treatment knowledge, and social support.

In principle, there is such a strong relationship between family and health status. Member his family Because family has a role important in every aspect of maintenance until phase rehabilitation. There is support family is the very influential treatment of various types of chronic disease, and support family can influence members' mental health his family (Wang et al., 2024)

Accompanied patient's family moment hemodialysis therapy will feel calmer, comfortable, and more strong accept condition his physical so impact positively towards the healing process patient (Moradi et al., 2024). Other studies show that the more science education accepts family, the better reception to self in patients undergoing hemodialysis. Patients with reception good do not care about what other people say about themselves, do not compare themselves with others, feel comfortable, have enthusiasm, and feel valuable (Cicala et al., 2024).

Relevance between education, science, family, and resilience patient own lots of aspects and involves a number of elements contributing key to well-being and capability to adapt the patient in a way whole. Element key from the science education family is as follows:

- a. Giving science education related diseases, choice of treatment, and the prognosis is very important For making the families participate actively in the care and making the right decision so it can increase the resilience of patients (Kucukakgun & Can, 2023; Kuo, 2024).
- b. Emotional support from family members is important in helping the patient deal with stress and emotional burdens. Science education in the form of emotional support strategies can significantly increase the patient's resilience (Sihvola et al., 2023).
- c. Teach skills to manage self-importance For managing chronic disease. Skills This helps patients maintain control of their health and those who are components important to resilience (Economou et al., 2019; Sihvola et al., 2023).

The impacts given by the existence of good resilience in patients' hemodialysis are as follows:

- a. Science education by family increases mechanism Handling by providing tools and strategies for managing stress and difficulties, which leads to improved resilience in patients (Shorbagi, 2024).
- b. Educational programs science by effective families increase cohesiveness and communication in the family. More functions Good support resilience patients by creating a supportive and fulfilling environment understanding (GM Kim et al., 2019; Shi et al., 2024).

- c. Giving science education can reduce the burden of maintenance of patients as well as increase the resilience of patients. When Power Medical gets good information and support, Power Medical will give more care and lead to improved results and maintenance of patients (Kuang et al., 2023; Wasmani et al., 2022).

## Conclusion

Based on the description above, the education in science family holds a role important for the resilience of patients with failing kidneys that must undergo hemodialysis therapy. Science education that can give is in the form of support as well as knowledge or introduction about disease and the therapy he underwent. Research results disclose that patients tend to manage their emotions as well as accept themselves when they get full support from their families.

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## Conflicts of Interest

The authors declare no conflict of interest.

## Author Contributions

Conceptualization, K. and Id.; methodology, Y.; software, Is.; validation, Is, and F.R.; formal analysis, K.; investigation, K and Id.; resources, Y.; data curation, F.R.; writing – review and editing, K., Id., and Y. All authors have read and agreed to the published version of the manuscript.

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