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**ANXIETY OF HEMODIALYSIS PATIENT WITH ACCESS ARTERIOVENOUS FISTULA (AV-SHUNT): A QUALITATIVE STUDY**

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**Abstract**

**Background:** Cannulation is an intervention that inserts a needle through the skin into a blood vessel. Av-shunt is the most recommended access for use in the hemodialysis therapy process. Psychosocial problems, especially feelings of anxiety and fear can be felt by patients due to AV-shunt. Anxiety is a scientific attitude experienced by each individual as a form of response in dealing with problems or threats. Vascular access complications may threaten lives and reduce treatment satisfaction and life quality.

**Objectives:** This study aimed to describe hemodialysis patient anxiety with arteriovenous fistula (AV-shunt) access.

**Methods:** A descriptive qualitative study using the in-depth interview method with phenomenology approach. The study was carried out with four informants undergoing hemodialysis in RSUD dr. Haryoto Lumajang. Samples were taken using purposive sampling. Participant statements were recorded using a voice recorder, transcribed, coded, interpreted, and categorized to create a theme.

**Results:** The study results produced three themes: (1) Emotional feeling perceived associated with AV-shunt experience: Anxiety, fear, and helplessness, (2) Physical and physical activity changes: Dark skin, dry skin, limp body, and fatigue, and (3) Patient knowledge regarding av-shunt, i.e., AV-shunt access and based on information sources.

**Conclusion:** Patients with arteriovenous fistula (AV-shunt) access had anxieties caused by cannulation initial pain, fear, and sense of uselessness.

**Keywords:** Arteriovenous fistula, hemodialysis, anxiety.

**INTRODUCTION**

Chronic Kidney Disease (CKD), according to the Nasional Foundation Kidney Disease Outcome Quality Initiative (NKF-KDOQI) is renal function disorders or renal organ damages occurring for three months or more (Mancini, 2016; Mencarelli et al., 2015). Chronic kidney disease is gradual kidney

function reduction, that may continue to final stage kidney failure, requiring substitute interventions such as dialysis, transplantation, and diet and fluid limitation (Kurniawati et al., 2018). Based on World Health Organization (WHO)'s data, there was an increasing kidney disease patient number in 2015 that reached 32% (World Health Organization, 2018).

Chronic kidney disease prevalence in Indonesia is approximately 0.2 percent. According to the data of Indonesian Nephrology Association (PENEFRRI), it was estimated that Indonesian chronic kidney disease patients in 2016 reach 70,000 people and continue to increase by 10% per year.

Chronic kidney disease patients can be treated by hemodialysis therapy (Sitoesmi et al., 2020). Hemodialysis is a medical measure to optimize kidney functions as a part of treatment for chronic kidney disease patients to retain an optimal life quality and exert uremic toxic and regulate the body electrolytes (Baral S, Pant V, 2017; Sitoesmi et al., 2020). Hemodialysis is a treatment for chronic kidney disease patients and the number one choice compared to dialysis peritoneal and kidney transplantation (Wiliyanarti & Muhith, 2019). Hemodialysis is initiated when serum creatinine clearance decreases under 10 mL/minute. It equals serum creatinine concentrations of 80-10 mg/dL (El-Sheikh & El-Ghazaly, 2016). Patients undergoing hemodialysis therapy spend 12-15 hours of dialysis process each week, which each process takes at least 3-4 hours, and each week is divided into two and three sessions (Bossola et al., 2019).

Hemodialysis is a lifelong treatment for chronic kidney disease patients (Firman et al., 2016). Hemodialysis patients will need vascular access to maintain hemodialysis. Arteriovenous fistula/AVF (av-shunt) is a vascular access mostly used in hemodialysis therapy. It aims to ease the long-term hemodialysis therapy, leading to significant reduction of complication levels such as thrombus, infections, and hemorrhage, as seen in other vascular accesses (Harwood et al., 2017). Physical changes associated with hemodialysis include frequent punctures on the arterial skin pigmentation that may trigger adequacy during the hemodialysis process (Drew et al., 2015). Patients undergoing hemodialysis therapy with av-shunt access in a long-term will have anxiety regarding their physical and health conditions that disrupt their

lives. Individuals often have problems in various aspects, one of which is psychological aspect, such as fear and anxiety (Mollaoğlu et al., 2012).

Anxiety is a scientific attitude experienced by each individual as a response to overcome problems or threats (Rodrigues et al., 2018). The complexity emerging during the therapy will generate anxiety on patients. The psychological aspect from av-shunt utilization for hemodialysis therapy to minimize anxiety is a patient treatment element to be solved (Shahnavazi et al., 2018). Anxiety is an impact of threats on self-esteem or self-identity that are fundamental for individual's presence (Academic et al., 2015). Anxiety is a common reaction perceived on diseases known as a threat: general threats on life, health, and body entirety. In this case, for patients using av-shunt in hemodialysis therapy (Baleegh et al., 2019).

Several studies suggested that chronic kidney disease patients undergoing hemodialysis mostly experienced anxiety caused by access, negative thoughts, and death threats (Santoso, 2018). Another study also stated that chronic kidney disease patients had anxiety with hemodialysis therapy that affected their life quality and hemodialysis therapy adequacy (Cohen et al., 2016). Excessive anxiety can affect the patient's psychological condition worsening, this has an impact on the patient's health condition. Severe anxiety conditions the patient's feels dizzy, can't sleep (insomnia), frequent urination, diarrhea, feeling to helplessness, confusion and disorientation.

The preliminary study results conducted in RSUD dr. Haryoto Lumajang on a brief interview with four hemodialysis patients with av-shunt access demonstrated that patients experienced various kinds of anxiety, deterioration of physical condition, and despair towards treatment process. The researcher also noted that the patient's intervention had not yet penetrated the psychological aspects, such as conducting support groups and psychological education. Based on the results of the preliminary study, the study conducted in-depth interviews with patients with the aim of

knowing the complaints felt by patients so that they could improve the treatment process and the patient's quality of life. This study aimed to describe the anxiety patients with arteriovenous fistula (AV-shunt) access in RSUD dr. Haryoto Lumajang.

## **METHODS**

### *Study Design*

In this study, a qualitative study with phenomenology approach was used. Informants recruited in the study were four chronic kidney disease patients undergoing hemodialysis with av-shunt access to provide in-depth illustrations regarding anxiety in hemodialysis patients with av-shunt access.

### *Setting*

The study was carried out in November 2020 at RSUD dr. Haryoto Lumajang.

### *Research Subject*

The data collection process was carried out during the covid-19 pandemic, so that the research process was allowed in a short time and was accompanied by a clinical instructor in the hemodialysis room. This is done to minimize the risk of transmission of COVID-19. The data collection in the study was conducted by performing in-depth interviews with four informants. The sample used is the patient selected by the researcher and has the appropriate criteria. In the choice of people, the researcher was assisted by clinical instructor (CI). The inclusion criteria were chronic kidney disease patients undergoing hemodialysis with av-shunt access at RSUD dr. Haryoto Lumajang. Patient selection is assisted by clinical instructors with cooperative and >18 years more effective conditions. The inclusion criteria in this study were patients with complications of other diseases and conditions that did not allow them to participate.

### *Data Collection*

Data were collected using the interview guideline. In-depth interviews were performed on informants to analyze and explore anxiety on

hemodialysis patients with arteriovenous fistula (av-shunt) access. There were 14 question items employed in the interview guideline. Interviews were conducted in person and accompanied by clinical instructor (CI). The interview was made by the researcher himself by consulting the supervisor and conducting an expert on one of the nurses in the hemodialysis room in another hospital and tested on one patient to find out whether the question could be understood.

### *Data Analysis*

The data analysis was carried out using the Milles and Huberman model consisting of three steps. The first step was the data reduction to summarize. Therefore, interview results must be recorded in detail (create interview transcripts). Data reduction means to summarize, select principle things, focus on important matters, find a theme and data pattern obtained. Second, data presentation in this qualitative study used a descriptive method, illustrating themes achieved in words. Third, conclusion drawing from obtained data, categorizing them, finding a theme and pattern, then drawing a conclusion.

### *Trustworthiness*

This study utilized a record media of hand phone and microphone for both researcher and participants. It aims to clarify the sound during interviews to ease the researcher in transcribing the interview. In the interview process, researchers and patients are in a special room that has been provided, so that the process cannot be known by other patients. The process of interviewing one patient with another patient on a different day.

### *Ethical Consideration*

The researcher had acquired an ethics permit for the study. Ethical clearance for the study was obtained by the researcher from Universitas Diponegoro with Number.129/EC/KEPK.Kep/IX/2020, approved in 30 September 2020. The study process had acquired permission from the hospital.

## RESULTS

### *Characteristics of Respondents*

The study was carried out in November 2020. It was conducted on four chronic kidney disease patients undergoing hemodialysis with av-shunt access at RSUD dr. Haryoto Lumajang. Male participants were three and female participant was one with age range of 45-60 years. Participant education were one undergraduate, two high school graduates, and one elementary school graduate. Participant occupations were one entrepreneur and three farmers. All participants were Muslim and Javanese.

### *Themes*

The study results found three theme categories: (1) Emotional feeling perceived associated with av-shunt experience, (2) physical and physical activity changes, and (3) patient knowledge regarding av-shunt. Data were obtained from interviews as follow:

### *Emotional feeling perceived with AV-shunt experience*

Three sub-themes discovered and stated by participants in this theme are:

#### *Anxiety*

Anxiety was proposed by four participants. All participants experienced anxiety, shaking, and cold sweat during av-shunt puncture in hemodialysis therapy. These reactions were present because participants perceived extreme pain during the puncturing process. participant reactions were revealed in these excerpts:

P1: "I am worried because the treatment is complicated."

P2: "I am shaking every time my hand is going to be punctured. I always have cold sweat and body went limp."

"...holding my kid's hands."

P3: "anxious, worried, I thought even manual is painful, let alone using av-shunt."

"I am always nervous before the puncture. My mind goes everywhere (expressing hand gestures)"

P4: "...I think that manual is painful already, it must hurt more with av-shunt because it goes deeply."

#### *Fear*

Another feeling perceived by participants was fear because av-shunt punctures will create pain during the hemodialysis process from the beginning to the end. This reaction was revealed from these excerpts:

P1: "well, I am scared. I got punctured twice a week."

P2: "scared, I am really scared. My pain tolerance is low, I can't handle pain well. I said that before it was installed."

P3: "afraid. I was thinking that manual is painful. I can't imagine how av-shunt feels like."

P4: "I am nervous, scared. I'm terrified by looking at it."

#### *Sense of uselessness*

Four participants stated sense of uselessness where they wanted to be free from hemodialysis routine but could not. Participants considered their lives depend on hemodialysis machine until uncertain period.

P1: "Surrender and sincere, it is what should be done."

P2: "sometimes I am sad that I have to go on hemodialysis and puncture my hands numerous times."

It hurts (pointing hands with installed av-shunt). I sometimes think, oh Allah, when will this end? When my condition drops, I really surrender."

P3: "it is useless to have a life like this. I am tired and bored but I have to continue the hemodialysis."

"...I believe in God's will."

P4: "I depend my life on my families, father and mother. They drive me to school, get me my HD, and practically every things."

#### *Physical and physical activity changes*

There were two themes revealed by participants, namely:

### *Dark skin and foreign body protrusion*

Four participants asserted that their skin got darker, especially in the av-shunt area, puncture marks were present, and uncomfortable because of protrusions from the av-shunt assembly. Generally, patients with regular HD will experience changes in their skin color and several physical organs. When participants were in the HD room, these conditions were not major obstructions because they were in the same environment. However, it was different when patients were in the general environment, causing patients to feel insecure and worse than others.

P1: "Here, my hands have lumps (showing the hand with installed av-shunt).

"...itchiness on the left side, then move to the right side..."

P2: "fall outs, black spots, but they are not itchy. But I have many swelling in my body."

P3: "sometimes itchy in this area (pointing to the av-shunt area)"

"...dry skin"

P4: "my skin feels scaly, and this av-shunt installation looks lumpy."

### *Daily activities*

Four participants perceived that after undergoing hemodialysis, they were tired during daily activities. They could not perform heavy duties; hence, some participants reduced their works and some even stopped working. Participants stated that they were easily exhausted when performing house chores and required multiple resting periods, as explained below:

P1: "my hands are stiff (installed with av-shunt) because I should not move for over 2 months."

"...easily exhausted during activities, overtime will exhaust me."

"it feels incomplete because I often use one hand. Tried to lift a box, could not make it, dropped the box."

P2: "I have stopped working."

"...sweeping, washing dishes, all mild duties."

"I feel limp when I get tired. I am suffocated."

P3: "limp and easily exhausted." "it is limited, I cannot lift heavy things."

P4: "I am still working but very limited. I cannot be too exhausted, especially because the hand with av-shunt should be maintained."

### *Patient knowledge regarding AV-shunt*

Four participants asserted that at the beginning of av-shunt installation, they had no idea about the access, use, and benefits of av-shunt. Participants understood av-shunt after requesting explanations from physicians and nurses clearly to decide the av-shunt installation. It is explained below:

P1: "I had no idea, I asked other patients."

"...the nurses did not explain. They said that using av-shunt will be great to enlarge the vessels, eliminate pain during punctures."

P2: "from the nurses." (the nurse explains when the patient asks)

P3: "I do not know. Dr.x told me that av-shunt will help me."

P4: "the nurses told me back then."

## **DISCUSSION**

Hemodialysis therapy is a longlife treatment for chronic kidney disease patients. Patients with hemodialysis therapy are recommended to use vascular access to help the efficiency and adequacy of hemodialysis therapy (Moist et al., 2013; Sultan et al., 2012). However, vascular access is an invasion to patient body, often perceived as the cause of abnormal and disfigured appearances. The access may inhibit patients to perform normal activities in daily life, and patients should seek alternative ways to perform activities and duties in their lives. This condition often causes patients to have poor psychological problems. Anxiety and fear from av-shunt utilization usually occur on several patients undergoing hemodialysis. Av-shunt access is a visual reminder of the patient's disease and it increases anxiety regarding the life continuity. Complication experiences and preventions of av-shunt access are some anxiety and obstruction sources encountered by patients. Patients experience anxiety concerning the

future, sense of vulnerability, and recognition of complication potentials from av-shunt access failure (Taylor et al., 2016). Complications that often occur from AV shunt are: Thrombosis with or without thrombophlebitis, swelling, bruising and infection.

Chronic diseases requiring continuous or lifelong treatments cause patients to feel the sense of uselessness, leading to anxiety and negative thoughts regarding their conditions. Anxiety and fear commonly occur in the adaptation process between patients and chronic conditions (Rajan & Subramanian, 2016). Patients with arteriovenous fistula (av-shunt) installation on hemodialysis therapy can trigger anxiety due to several reasons, e.g., fear on the puncture pain of av-shunt and complications after av-shunt installation such as hematoma, stenosis, thrombosis, ischemia, and infection. Anxiety occurs as a result of threats on self-esteem or self-identity, which are fundamental for individual presence (Harwood et al., 2017). Anxiety is a common reaction perceived on diseases known as a threat: general threats on life, health, and body entirety. In this case, for patients using av-shunt in hemodialysis therapy (Baleegh et al., 2019). The level of severe anxiety in patients can be minimized by providing clear support and education regarding the installation of av-shunts such as the benefits, treatment and effects that may arise as a result of av-shunts. Patients with a long period of using an av-shunt experience a mild level of anxiety, where this condition arises when an av-shunt will be inserted during hemodialysis therapy.

Another problem encountered by patients is physiological problems. Generally, hemodialysis therapy will pose changes on the integument system, marked by darkening skin color (Falodun et al., 2011). Skin hyperpigmentation is a common finding in patients with final-stage kidney diseases. Uneven pigmentation appears as spots caused by irregular melanin buildups in cells, darkening the skin (Falodun et al., 2011). Physical appearance changes on patients with hemodialysis vary from one to another. Several

patients have paler, dryer, and scallier skins. Problems that arise during hemodialysis therapy with av-shunt such as failure to puncture the av-shunt access or bleeding after the puncture is performed. This can cause the patient's level of anxiety to increase, where the patient feels fear and confusion. Management when bleeding occurs when punctured on the av-shunt access is to stop the bleeding immediately, which is treated with pressure over the bleeding area. Installation of tourniquets should not be carried out because it can damage the collateral system that is also blocked.

Insecurities are experienced and revealed by patients with hemodialysis. One of the insecurity sources in patients is fistula or access installation. The av-shunt access is one of the most recommended access for hemodialysis patients. It facilitates the long-term hemodialysis therapy and leads to a significant reduction of complication levels, such as thrombus, infections, and hemorrhage, as seen in other vascular accesses (Harwood et al., 2017). Access installation in hemodialysis therapy also has negative impacts on individual conditions. Patients perceive body image disorders and consider to have an abnormal body due to body function loss, the presence of foreign thing installed continuously on the body, and perception of having an impaired body. These conditions occur simultaneously with the procedure, illustrating a failure form in the patient's body. Therefore, individuals may experience physical turbulences such as extreme pain during puncture on vascular access in hemodialysis process, psychological disorders such as fear, anxiety, shaking, and crying in their lives. Patients may retract themselves from the family or surrounding environment and fail to perform social activities (Mollaoğlu et al., 2012).

Kidney has a crucial function in human body, i.e., to filter blood from metabolism residuals. Impairment or disorders in kidney functions may generate problems on the body's ability and strength that disrupt daily activities (Firman et al., 2016). Hemodialysis patients

often feel exhausted in conducting daily activities, and the av-shunt access installed limit their activities. It impacts the ability to perform daily duties because of the reduced functional capacity. Hemodialysis patients with av-shunt access should limit their activities, particularly the heavy ones.

The av-shunt access installation has positive and negative impacts on hemodialysis patients. Education from health workers are required to improve patient knowledge. The patient's education is a vital component in treatment quality (Chiou & Chung, 2012).

Education concerning fistula improves information about fistula treatment and reduces anxiety on patients undergoing hemodialysis. It is necessary to provide education for patients regularly, because it can increase the orientation level on diseases and interventions on patients (Moist et al., 2013; Mollaoğlu et al., 2012). Time and appropriateness of information are essential for the therapy continuity. Relevant information should be obtained before patients determine the subsequent step and identify supporting sources to reduce decision-making uncertainties and avoid conflicts and regrets after making the decision (Chiou & Chung, 2012). Patients with a higher understanding level of av-shunt utilization may ease the therapy efficient and improve the efficiency. It is primarily associated with the less complication level that may occur.

## **CONCLUSION**

Anxiety is a feeling commonly perceived by patients in terminal conditions. Patients with arteriovenous fistula (av-shunt) installation on hemodialysis therapy may have anxiety, and for many patients, pain anticipation before cannulation triggers anxiety. Emotional feelings and turmoil experienced by patients are related to cannulation initial pain, fear, and sense of uselessness.

Physical and physical experience changes perceived by patients with av-shunt access are processes from access treatment and the patient's body functional deterioration. These

changes can impact daily life. Common physical changes on hemodialysis patients are darkening skin color and lumps due to the av-shunt access installation.

Patient knowledge prior to the treatment is important. Physicians and healthcare workers have an essential role to provide education for patients. Patient knowledge is vital for the hemodialysis therapy continuity with av-shunt access.

## **SUGGESTIONS**

The study results can be utilized as a material to improve healthcare service insights to discover anxiety on hemodialysis patients using av-shunt. The number of samples used was small because the research process was carried out during the covid-19 pandemic where only limited time was given by the hospital.

The study can be continuing on a quantitative or mix-method study to discover the anxiety level of hemodialysis patients with av-shunt access to improve the healthcare service quality with use a larger sample and explore more interesting topics such as the role of the family in providing psychological support for patients.

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## **DECLARATION OF CONFLICTING INTEREST**

The authors have consented and no conflicting interests.

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## AUTHOR CONTRIBUTION

**Siti Nafisah:** Arrange research implementation, conduct literature review, collect data, compile manuscripts.

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