



Concept analysis of adherence to treatment in hemodialysis patients: Using a hybrid model

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Abstract

Background: Treatment adherence (AT) can enhance hemodialysis patients' quality of life and life expectancy. Nurses in the healthcare system can benefit from understanding this concept, its attributes, antecedents, and consequences. This study aims to clarify the concept of AT in hemodialysis patients.

Methods: A three-phase concept analysis was conducted utilizing a hybrid model. In the theoretical phase (First phase), a literature review was conducted using PubMed, Web of Science, ProQuest, EBSCO, Scopus, Google Scholar, SID, and Magiran search engines. In the fieldwork phase (Second phase), semi-structured interviews were conducted with eight patients and nurses. The final analysis (Third phase) combined the results from the previous phases.

Results: The characteristics of treatment adherence include being process-oriented, actively participating in therapy, being patient-centered, accepting responsibility for treatment, and being committed to the treatment process. To understand this concept, antecedents related to the patient, society, and the health care system must be considered. As a result of the emergence of this concept, patients' quality of life has been improved, and healthcare costs have been reduced.

Conclusion: This study provides insight into the characteristics of adherence to treatment and the factors that influence its proper implementation. This program will assist healthcare providers in better understanding this concept and improving their clinical practices for hemodialysis patients.

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Highlights

What is current knowledge?

Many patients with chronic kidney failure undergo hemodialysis. Despite various interventions to improve adherence, these patients still struggle with treatment compliance.

What is new here?

Identifying the antecedents and attributes of adherence to treatment in patients undergoing hemodialysis treatment makes it possible to plan for its improvement and improve their quality of life. Adherence to treatment is a multidimensional concept, and families, patients, and the health care system must be involved to promote it.

Introduction

The rise in chronic illnesses and aging populations has prompted healthcare organizations to focus on these patients (1). The key to successful chronic disease management is adherence to treatment (AT) (2), which is associated with reduced complications, an increased life expectancy, an improved quality of life, and lower healthcare costs (3). A critical component of AT is developing and refining methods for assessing and intervening across various chronic patient groups (2).

In the medical literature, AT is often confused with terms such as "concordance" and "compliance" (3-5), causing confusion and a lack of consensus as to its definition and characteristics. AT is a context-based concept emphasizing the importance of understanding and measuring specific settings (2,6). Cohen et al. (2009) define AT as "persistence in practice and maintenance of desired health behaviors" influenced by social, cultural, and economic factors (7).

There is evidence that AT for chronic illnesses is variable depending on several factors, including the nature of the condition, the complexity of the treatment, the health consequences, lifestyle implications, and long-term consequences (8,9). For example, post-stroke patients are recommended to undergo rehabilitation programs followed by monthly outpatient follow-ups (9,10), while diabetic patients are advised to change their lifestyles and take medications at regular intervals to control their disease (8).

There is a distinct trajectory regarding adherence to treatment (AT) in cases of comorbidity or chronic conditions resulting from underlying health conditions (11,12). Patients with chronic kidney disease (CKD), often caused by non-adherence to treatment regimens, have difficulty adapting to a new lifestyle,

coping with renal replacement therapy (RRT), and managing additional health issues, such as anemia and cardiac problems (13,14).

In CKD, adherence is commonly associated with treating the underlying causes, but this oversimplifies the intricate nature of AT (15). As part of their CKD management, hemodialysis (HD) patients must adhere to dietary restrictions, fluid management, medication plans, and regular facility visits, sometimes thrice weekly (16,17). In HD, adherence is monitored, and underlying diseases and complications associated with the procedure are addressed comprehensively (11). Ignoring these dimensions can lead to severe consequences such as mortality and hospital readmissions (17,18).

Despite interventions for improving adherence to treatment (AT) among hemodialysis patients (19), challenges remain due to a lack of understanding of this concept among nurses (20). A lack of straightforward assessment methods contributes to uncertainty in nursing care strategies (19,21). Furthermore, clinical practice gaps related to AT in HD patients, including medication adherence, dietary restrictions, and fluid intake management, further complicate the situation. In this study, we analyzed "AT in HD patients," utilizing Schwartz-Barkot and Kim's integrated framework to identify defining characteristics of the condition and clarify its meaning. The hybrid model was divided into three phases: theoretical, fieldwork, and integration.

Methods

Study design

Hybrid models are powerful tools for concept analysis because they combine empirical observation with theoretical exploration. Incorporating real-world experiences into definitions and identifying key attributes helps researchers better understand concepts' multifaceted nature. According to Schwartz-Barkot and Kim, the hybrid model consists of three phases: theory, fieldwork, and integration. This concept analysis was conducted between May and August 2024 utilizing Schwartz-Barkot and Kim's hybrid model (22). There were three phases in this model, namely the theoretical, the fieldwork, and the final analysis.

Theoretical phase

As adherence plays a significant role in hemodialysis patients' treatment and is characterized by a lack of clarity in its definitions, dimensions, and characteristics, the abovementioned concept was chosen for analysis. This stage involved identifying related studies and reviewing existing knowledge (From 2012 to 2023 due to the addition of adherence to treatment to MeSH terms in 2018 and the ability to manage data) regarding the studied concept in databases such as PubMed, Web of Science, ProQuest, EBSCO, Scopus, Google Scholar, SID, and Magiran, utilizing keywords "Adherence," "Adherence to Treatment,"

"Medication Adherence," "Hemodialysis Patients," "Continuous Renal Replacement Therapy," "Hemodialysis Renal Dialysis," "Adherence to Therapy," "Patient Compliance," "Concordance," "Regimen Compliance," "Compliance to Treatment," and "Drug Regimen Adherence." Inclusion criteria included full-text articles published in Farsi or English with related keywords in the title, abstract, and keyword list. Since peritoneal dialysis requires no continuous hospital visits and home care patterns vary, all articles about the treatment were excluded. In total, 2224 articles were found, reduced to 23 after reviewing and examining the research objectives and article titles (Figure 1).

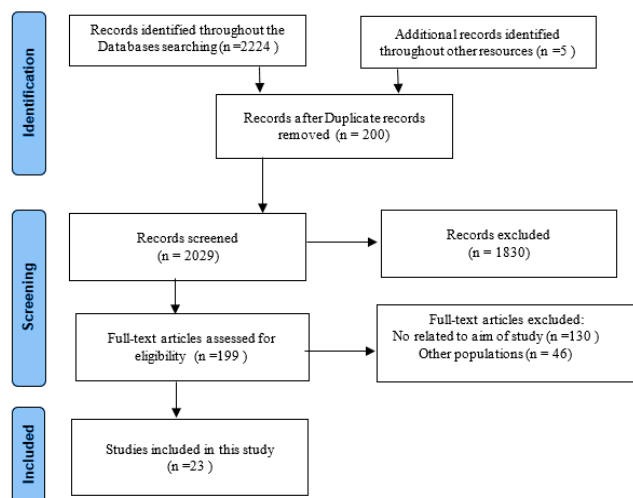


Figure 1. Flow diagram of the present study.

Fieldwork phase

The study collected qualitative data from HD patients and nurses at Shahrekord Hajar Hospital, Iran. For nurses, the inclusion criteria included a bachelor's degree or higher and six months of experience in an HD ward. For patients, the inclusion criteria included a minimum of six months of HD treatment. A purposeful sampling process was used to select participants for the study. The research team selected the first participant based on the participant's experience and willingness to participate. For a wide range of experiences, maximum variation in sampling was used. The study involved eight participants, including four nurses (Three clinical nurses and one head nurse), four patients, and two family members.

Data collection

Ten semi-structured in-depth interviews were conducted with ten participants. The time and location of the meeting were coordinated in advance according to the participants' preferences. A brief explanation of the research was provided to the participants before the interview began, and their written consent was obtained. Interviews began and continued according to the interview guide prepared by the research team. Questions were specifically designed for each participant's role. For instance, clinical nurses were asked, "What factors influence AT in HD patients?" and the question was posed to hemodialysis patients: "What changes did you notice when strictly adhering to the therapeutic care instructions?" We asked the patients' families: "What are your understandings of the concept of adherence to treatment in patients, and how do they demonstrate it?" As a result of participant responses, the following questions were formulated differently. After each interview, the interviewer was asked, "Is there anything else you would like to add?". Depending on the participant's preferences, the interview lasted between 45 and 60 minutes.

Data analysis

This study analyzed the data using the five stages of Graneheim and Lundman's conventional content analysis. As a first step, the recorded interviews were transcribed verbatim. The transcripts were read several times to fully comprehend the meaning of the interviews. The interview text was read, abstracted, and coded into meaning units. The main context and the whole meaning were considered when coding and labeling meaning units. The codes were compared based on differences and similarities and sorted into categories. The tentative categories were discussed by the research team and revised. Lastly, themes were formulated from the latent content of the categories. Interviews continued until no new categories or relevant themes were identified, and the categories evolved in conceptualization (23).

Rigor

The four Lincoln and Guba (1985) principles of credibility, confirmability, dependability, and transferability were utilized to ensure rigor (24). Credibility was enhanced through maximum variation sampling, prolonged engagement (5 months), triangulation, and member checks. Confirmability was achieved by accurately documenting all research stages for external review. Dependability was enhanced by recording, transcribing, and analyzing the data immediately after collection. The transferability of the results was addressed by providing detailed descriptions of the participants' experiences and characteristics.

Final analysis phase

During the final analysis phase, all research team members compared the results from the theoretical and fieldwork phases to define an integrated concept (22). This process entailed integrating the theoretical underpinnings with empirical observations to identify the concept's antecedents, attributes, and consequences. Ultimately, this integrative approach led to formulating a novel definition that encapsulated the concept's essence.

Results

Theoretical phase

At the theoretical phase, attributes, antecedents, and consequences of the "AD in HD patients" concept were collected from various databases and sources.

Meanings derived from the literature review

There are a variety of meanings associated with AT, depending on the source. Webster's dictionary defines it as "fidelity through steady or faithful attachments" (2). Taber's Medical Dictionary describes it as "the degree to which a patient's behavior is in accordance with medical advice" (25). The World Health Organization comprehensively describes it as encompasses medication intake, dietary choices, and lifestyle adjustments aligned with a healthcare provider's recommendations (26).

AT, which means loyalty, has historical roots in the 15th century and is also rooted in English, French, and Latin (2). The Oxford Dictionary defines it as "behaving according to a set of rules or following a set of beliefs" (27).

The terms "concordance" and "compliance" have been used interchangeably. Compliance refers to patients following the instructions of healthcare professionals (28). "Compliance" is replaced by "adherence" in Tetorn (1990), who views non-adherence as a conscious refusal to comply. In contrast to "concordance," AT is designed to reduce power imbalances in the doctor-patient relationship (29). Diet, medication, lifestyle choices, promotion of independence, self-determination, and prevention of disease recurrence are all included in this concept (26).

Adherence is influenced by various factors, including health conditions, individual characteristics, cultural behaviors, and treatment duration (30). No uniform definition applies to all patients, especially those with chronic conditions, underscoring the dynamic nature of AT. There are various AT forms, including medication adherence and physical activity adherence (31).

AT is a process for enhancing quality of life and well-being that involves actively maintaining a treatment regimen that is beneficial to the patient and accepted by them (32). HD patients must adhere to dietary restrictions, fluid restrictions, consistent medication intake, and regular attendance in dialysis sessions (33,34).

Identifying the attributes of AT in HD patients

A literature review identified four categories and 10 subcategories of attributes of adherence (AT) in HD patients.

1. Active participation

Active participation is one of the fundamental characteristics of AT in patients with chronic kidney disease. The patient is encouraged to take an active role in their care and treatment, engage with their healthcare team, be involved in their care processes, and exert control over their treatment regimen (35,36).

1.1. Patient-healthcare team interactions

Patient and healthcare team communication is essential for addressing concerns and enhancing AT through tailored education and treatment plans (37). Grandinetti's study (2018) revealed that patient choice, control, and interactive communication were positively associated with acceptance and adherence among HD patients (37). Due to the chronic nature of their condition, active engagement is fundamental for gaining a better understanding of AT regimens, recognizing risks, and establishing a foundation for bolstering AT (38).

Patients who proactively participate in their treatment plan can articulate their challenges, enabling healthcare providers to provide tailored solutions and support, resulting in enhanced AT and improved health outcomes (38,39).

1.2. Patient's active engagement

HD patients' self-care participation significantly impacts AT (38). Howren et al. (2017) noted that active engagement in treatment decisions, education, and addressing patient concerns promote AT and ownership over health. Doing so raises awareness about adhering to HD treatment regimens, deepens understanding, and reinforces responsibility (36).

1.3. Empowerment through control

Managing HD effectively requires maintaining control over the treatment regimen (40). According to Howren et al. (2017), healthcare providers are essential in crafting patient-centric treatment plans, involving patients in decision-making, and fostering adherence to treatment (36). Regular communication, education, and information regarding risks and positive outcomes enhance control over illness and promote AT (41). Patients with HD who are empowered and well-informed are more likely to actively participate in their care and adhere to the recommended treatment regimen.

2. Responsibility

Another characteristic identified among patients is their "responsibility". HD patients who can regulate their care regimen and exercise discretion in managing it demonstrate aspects of AT (2,42). As a result, patients should be willing to take responsibility and make lifestyle changes aligned with treatment requirements.

2.1. Self-regulation

Self-regulation involves understanding and managing behavior and responding appropriately to circumstances. Melastuti et al. (2022) highlighted that encouraging patients to monitor health parameters empowers them to make informed decisions, enhancing AT (43). Patients with self-regulatory potential can collaborate with healthcare professionals to identify objectives, prioritize, and employ problem-solving skills to enhance adherence, thereby bolstering AT (44).

2.2. Autonomy in therapeutic care

Attributing autonomy to HD patients enhances their satisfaction with the treatment process. Patient discretion allows tailoring of treatment according to preferences, lifestyle, and individual needs, thus reflecting the patient's values. The personalized approach increases the likelihood of AT and fosters a long-term commitment to the treatment process. Empowering patients can enhance their adherence to their regimen (45).

3. Commitment to treatment.

Commitment to treatment is a prominent aspect of the literature on AT, encompassing subcategories such as following healthcare provider recommendations, sustained action, and embracing limitations (42,46). According to Chironda and Bhengu's study (2016), self-care abilities and active adherence are pivotal factors defining AT (47).

3.1. Following health care provider recommendations

Adhering to healthcare providers' recommendations is essential for HD patients to foster their commitment to treatment. An effective patient-provider relationship and utilizing positive reinforcement, collaborative decision-making techniques, and similar approaches are pivotal in initiating and sustaining AT (48).

3.2. Sustained action

Continually engaging in the treatment regimen is crucial for the success of AT in HD patients (43). AT is achieved through implementing well-structured routines, creating a supportive environment, and adapting to a new lifestyle (18). A consistent schedule for HD sessions, medication administration, and dietary restrictions allows seamless integration of AT into daily life. Therapeutic care continuity can be reinforced using calendars and similar aids (49).

3.3. Embracing limitations

Embracing therapeutic regimen constraints involves finding solutions to align with and adapt to limitations, thereby optimizing AT. By providing support and cooperation, healthcare providers and HD patients can achieve the best treatment outcomes and prepare patients for a new lifestyle (50,51).

4. Process-oriented

The last characteristic of adherence (AT) in HD patients is its "process-oriented" nature.

4.1. Multidimensionality and complexity

The concept of AT in HD patients is multi-dimensional. CKD patients must navigate a complex network of treatment and self-management, considering treatment complexities, lifestyle adjustments, emotional and cognitive influences, cultural factors, and health literacy (3,13). Healthcare providers need a comprehensive and personalized approach to address these factors. This can be achieved through patient education, emotional support, individualized treatment plans, and ongoing communication (44).

4.2. Requirement for maturation

AT is dynamic and evolving, with patients progressing from acceptance to adherence (48). Adherence levels vary depending on factors such as educational background, continuity of treatment, access to support systems, and adaptive mechanisms (41). There is evidence that the history of HD treatment can influence adherence levels, with patients showing higher adherence under conducive conditions (42,46).

Working definition

Based on the characteristics discussed above, the following is a comprehensive working definition of AT in HD patients:

"AT is a dynamic concept which focuses on the individual needs of HD patients. The patient's sense of responsibility is derived from his or her commitment to therapeutic care behaviors and active engagement in the treatment process. CKD patients can benefit from AT by actively participating in their treatment planning, gaining essential insight into their condition, and collaborating with their treatment team."

Case study

Model case

The case of a 65-year-old man who has recently been referred to an HD center due to CKD that requires replacement of renal function is presented. According to his latest clinic visit, he had gained 3 kg between HD sessions, had a blood pressure of 172/94 mmHg, and had a creatinine level of 4.9 mg/dL. The medical team, including a doctor and a nurse, discussed managing his condition. The decision involved three weekly HD sessions and lifestyle changes, including exercise, dietary modifications, fluid control, and adherence to the dialysis schedule. In addition to regular monitoring, a follow-up clinic visit was scheduled a month later. In the follow-up, the patient reported adhering to medication, exercising, adjusting his work schedule, eating a low-sodium diet, and drinking fluids based on his urine output. He participated in a weekly educational program

to enhance his knowledge of CKD management. He had a blood pressure of 136/80, a weight loss of 2.73 kg, and a creatinine level of 2.3 mEq/L. It was expressed to the patient that he was committed to maintaining these changes.

Fieldwork phase

Four nurses, four patients, and two families participated in the study's second phase; the average age of the patients was 65, and the average age of the nurses was 38 (Table 1).

The study's results revealed five categories and 15 subcategories. The main categories were process orientation, active engagement in therapeutic care, patient-centered approach, taking responsibility for treatment, and commitment to the care process (Table 2).

Table 1. Characteristics of the participants

Participants	Variables		N
Patient (P)	Age (Year) (Mean± SD)	65.23 ±18.24	
	Gender	Male	2
		Female	2
	Educational level	Uneducated	1
		Elementary	1
		Secondary	2
	Occupation	Employed	1
		Unemployed	3
	Marital status	Married	3
		Not married	1
Duration of HD (Year) (Mean± SD)		8.17±2.13	
Vascular access	Permanent	4	
	Temporary	0	
Nurse (N)	Age (Year) (Mean± SD)	38.24±4.32	
	Gender	Male	2
		Female	2
	Educational level	Bachelor's degree	3
		Master's degree	1
	Position	Clinical nurse	3
		Head nurse	1
Work experience (Year) (Mean± SD)		6.32±3.22	
Family (F)	Age (Year) (Mean± SD)	42±12.6	
	Gender	Male	1
		Female	1

Integration Phase

In analyzing the literature review and fieldwork, the characteristics of AT in HD patients were described as "process-oriented, active participation in therapeutic care, patient-centered, accepting responsibility for the treatment, commitment to the care process" (Table 3, Figure 2). Therefore, the following operational definition can be provided:

"In HD patients, AT is a multifaceted, patient-centered process that relies on a patient's willingness to participate in the therapeutic care process actively. One of its most significant attributes is the patient's active participation in the therapeutic care process."

Antecedents of AT

According to the study's findings, AT in HD patients depends upon antecedents, which can be divided into three categories: patient-related, community, and healthcare system factors (Figure 2).

Patient-related antecedents included acceptance of the nature of chronic diseases, knowledge, education level, health literacy, experience with complications, aspiration for a kidney transplant, and individual self-evaluation. Higher education and transplant aspirations are often associated with increased AT (35,43). A higher level of health literacy facilitates lifestyle adjustments (3,37). In the field, Participant 5 mentioned, "reproductive age or family responsibility is associated with improved adherence." Participant 3 mentioned, "I am literate, I read the dialysis manual, I calculate nutrition, and I am concerned about my health."

Social factors included physical and psychological support, socioeconomic assistance, social stigmas, and Iranian food culture. Strong support networks, conflict resolution, and psychological support improve acceptance and performance (52-54). The stigma associated with HD treatment can undermine AT (55). Participant 7 stated, "I lost my job due to dialysis; no one wants us." Participant 4 stated, "Children's support encourages me to avoid complications."

Healthcare system-related factors include supportive policies, specific theories, workforce, staff training, and patient follow-up. Health insurance coverage and special patient categorization can improve living conditions, thereby encouraging AT (46). Participant 7 stated, "Insurance covers the cost of medication, which helps ease concerns." Participant 3 stated, "I appreciate Ms.who educates us; she is very knowledgeable."

Consequences of AT

AT has two main consequences in HD patients. The first concerns the patient, and the second concerns the healthcare system (Figure 2).

Several patient-related outcomes have been identified, including increased social participation, increased self-confidence, increased self-efficacy, enhanced decision-making skills, increased patient commitment, improved communication skills, improved physical and mental performance, increased responsibility, reduced disease recurrence, enhanced disease control, improved adaptability skills, and reduced patient social isolation (43,56).

The nurse on the HD ward stated, "Patients who adhere to their treatment often experience positive outcomes and require fewer dialysis sessions."

Participant 3 added, "I feel better when I adhere to my treatment plan, attend appointments punctually, and feel more valued."

An organizational consequence includes increased job satisfaction for healthcare professionals, higher patient satisfaction, reduced treatment costs, and decreased mortality rates. Participant 2 stated, "Patients adhering to treatment require fewer sessions, avoid emergency appointments, and streamline the process in general."

Table 2. Categories and subcategories emerging from data analysis

Categories	Subcategories	Example of meaning units
1. Being process-oriented	Multidimensionality and complexity	"Adherence is not straightforward; it is more like a tangled ball of yarn, especially for elderly patients." N2
	Dynamism	"I have changed since accepting my condition. I recognize that something has changed. I am nurturing it like a child." P1
	Context-based	"It's hot, miss, it's summer, I can't resist doogh. Trust me, my phosphorus levels go up, but I can't resist. If you were here, you would understand; we always have buttermilk and yogurt on the table..." P3 "A little bit of it is due to the conditions in our city, the high altitude, unintentional heart problems, and higher salt consumption." F2
2. Active engagement in the therapeutic care	Communication with the therapeutic care team	"... Since I am able to communicate more easily with the staff, I am better able to control my weight." P2
	Interaction with family and support systems	"Patients with jobs or dialysis associations tend to be in better health." N1 "During the COVID-19 pandemic, my son was upset, and I gained weight." P4
	Feeling in control of treatment	"Patients adhering to the criteria become key partners, understanding interventions and maintaining dialysis without complications, ultimately becoming eligible for transplantation." N3
3. Patient-centered approach	Integration into the treatment team	"I see improvement when I am treated as a member of the team. The doctor gives me the opportunity to express my opinions and asks for my input." P4
	Exercise of the right to choose	"Patients here are free to choose their bed or even the type of dialysis machine they use," N2
4. Accepting responsibility for treatment	Treatment self-regulatory	"Being on dialysis for six years has taught me to be punctual, how to conduct myself, and what steps to follow." P1
	Treatment self-efficacy	"I can do it. I can lose weight. It is not as difficult as giving birth. I know I can." P2
	Treatment autonomy	"I should have the freedom to choose, the right to voice my opinions, and the right to be acknowledged." P3
	Preventing and managing complications	"Patients with higher levels of adherence avoid complications and crises by notifying their doctor immediately of any need for tests." N4
5. Commitment to the care process	Accepting medical care recommendations	"Dialysis is an integral part of my life, and I have embraced it." P3
	Accepting the limitations of the care regimen	"Those who initially resist eventually accept the necessity of adhering." N2 "My patient has learned everything, she says to herself, 'Don't eat it; it's not good for me to eat it.'" F1
	Self-care	"I consume enough protein and adjust my fruit intake according to my potassium levels." P3 "Patients adept at expressing themselves during dialysis typically maintain better health and experience fewer side effects." N4

Table 3. The results of the theoretical, fieldwork, and integration phases

Theoretical phase	Field work phase	Integration phase	
		Category	Subcategories
Process-oriented <input type="checkbox"/> Multidimensionality and complexity <input type="checkbox"/> Requirement for Maturation	Being process oriented <input type="checkbox"/> Multidimensionality and complexity <input type="checkbox"/> Dynamism <input type="checkbox"/> Context-based	Process oriented	<input type="checkbox"/> Multidimensionality and complexity <input type="checkbox"/> Dynamism <input type="checkbox"/> Context-based <input type="checkbox"/> Requirement for maturation
Active participation ▪ Patient-healthcare team interactions ▪ Patient's active engagement ▪ Empowerment through control	Active engagement in care <input type="checkbox"/> Communication with the care team <input type="checkbox"/> Interaction with family and support systems <input type="checkbox"/> Feeling in control of treatment	Active participation in the care	<input type="checkbox"/> Communication with the care team <input type="checkbox"/> Interaction with family and support systems <input type="checkbox"/> Empowerment through control
-	Patient-centered approach <input type="checkbox"/> Integration into the team <input type="checkbox"/> Exercise of the right to choose	Being patient-centered	<input type="checkbox"/> Integration into the treatment Team <input type="checkbox"/> Exercise of the right to choose
Responsibility <input type="checkbox"/> Self-regulation <input type="checkbox"/> Autonomy in the care	Accepting responsibility for treatment <input type="checkbox"/> Treatment self-regulatory <input type="checkbox"/> Treatment self-efficacy <input type="checkbox"/> Treatment autonomy <input type="checkbox"/> Preventing and managing complications	Accepting responsibility for treatment	<input type="checkbox"/> Treatment self-regulatory <input type="checkbox"/> Treatment self-efficacy <input type="checkbox"/> Treatment autonomy <input type="checkbox"/> Preventing and managing complications
Commitment to treatment <input type="checkbox"/> Following Healthcare Provider recommendations <input type="checkbox"/> Sustained action <input type="checkbox"/> Embracing Limitations	Commitment to the care process <input type="checkbox"/> Accepting medical care recommendations <input type="checkbox"/> Accepting the limitations of the care regimen <input type="checkbox"/> Self-care	Commitment to the care process	<input type="checkbox"/> Following healthcare provider recommendations <input type="checkbox"/> Sustained action <input type="checkbox"/> Accepting the limitations of the care regimen <input type="checkbox"/> Self-care

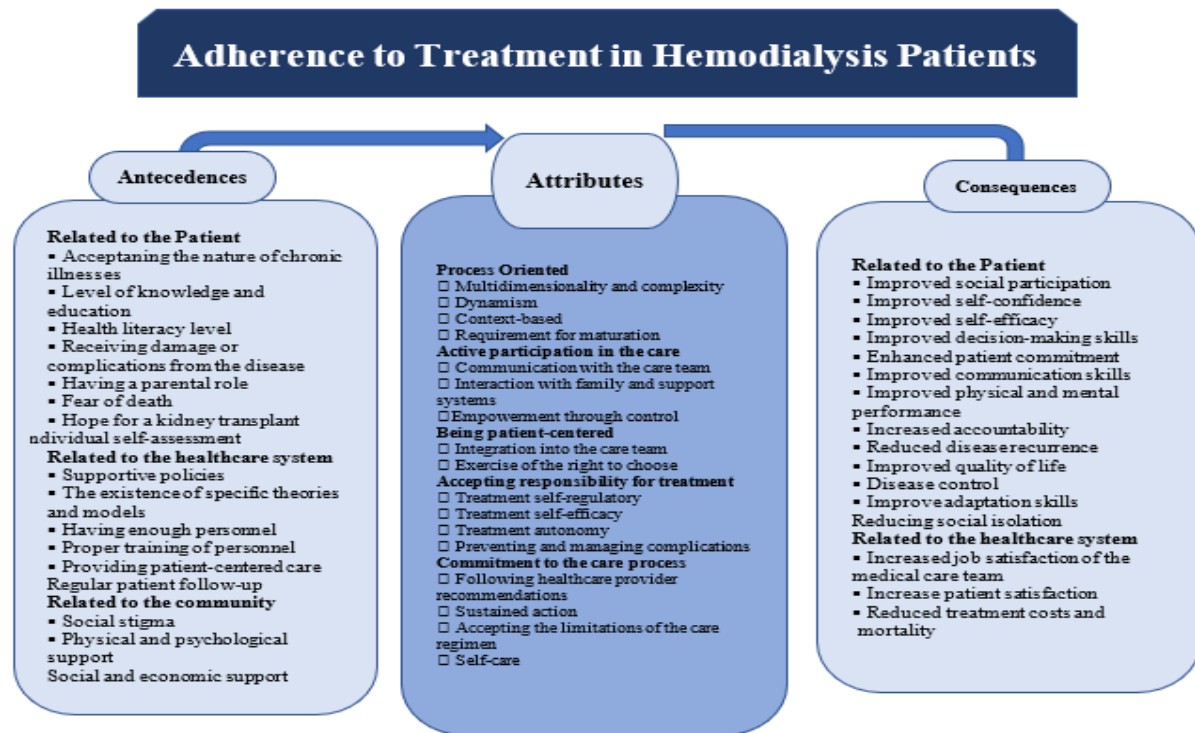


Figure 2. The conceptual model of the adherence to treatment in hemodialysis patients concept

Discussion

This study identified five characteristics of AT in HD patients: "Process-oriented, active participation in care, patient-centered, accepting responsibility for the treatment, and commitment to the care process."

"Process-oriented" refers to individuals transitioning from accepting dialysis to adhering wholeheartedly, emphasizing the unique dimensions of adherence in HD patients (48,49). "A patient-centered approach" emphasizes the importance of individualized approaches within HD units, tailoring treatment decisions daily based on the patient's needs and enhancing AT (44).

"Active participation in care" is essential for achieving AT. By participating in treatment decisions, HD patients are empowered by routine ward visits to assist them in achieving their unique level of engagement (10,30).

"Commitment to the care process" refers to an attitude characterized by a sense of personal responsibility for maintaining health, which can lead to improved adherence, quality of life, and positive health outcomes (51,57).

AT, "accepting responsibility for treatment," entails acknowledging the consequences of individual actions, motivating patients to lead healthier lives, and increasing their commitment to the treatment process. Higher levels of responsibility are correlated with increased acceptance and adherence among HD patients (19,31,47).

This study employed a hybrid concept analysis method to better understand adherence to treatment (AT) in Iranian hemodialysis (HD) patients. It aimed to identify the factors influencing AT behavior among Iranian patients by combining theoretical and empirical approaches. The findings of this study can provide a foundation for future research to explore the determinants of AT in this population further. However, the study was limited by the restricted access to all relevant literature and the exclusion of non-Persian and non-English language studies, which may have impacted the comprehensiveness of the analysis.

Conclusion

This research defined characteristics of AT in HD patients, providing a foundation for healthcare assessment and application in this population. The antecedents identified can give insight into the development of AT strategies. Based on these findings, future research should focus on developing effective health interventions, enhancing the quality of care, and improving quality of life, thereby mitigating the financial burdens associated with non-AT treatments. The authors wish to extend their sincere gratitude to the patients who participated in this study and freely shared their experiences and opinions. Additionally, we want to acknowledge the cooperation of the hospital officials at Hajar Hospital.

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None.

Ethical statement

The present study was approved by the Ethics Committee of the University of Rehabilitation Sciences and Social Health (Project number 2988 and ethical code: IR.USWR.REC.1403.007). In this study, the researcher adhered to ethical considerations such as maintaining the confidentiality of participants' names, recording interviews, obtaining informed written consent, and allowing participants to withdraw from the study at any time.

Conflicts of interest

The authors declare that they have no competing interests.

Author contributions

FMS and LRV made significant contributions to the design of the review protocol. LRV and HKh developed the search strategy and drafted the initial protocol. KNT conducted the searches and was responsible for data selection and extraction. LRV and FMS were involved in data analysis and the interpretation of the results. LRV, FMS, and KNT collaborated on drafting, revising, and approving the final manuscript.

References

- Institute for Health Metrics and Evaluation. Global Burden of Disease Collaborative Network, Global Burden of Disease Study 2019 (GBD 2019) Results. 2020. [View at Publisher] [Google Scholar]
- Lyu C-M, Zhang L. Concept analysis of adherence. *Front Nurs*. 2019;6(2):81-6. [View at Publisher] [DOI] [Google Scholar]
- Gardner CL. Adherence: a concept analysis. *Int J Nurs Knowl*. 2015;26(2):96-101. [View at Publisher] [DOI] [PMID] [Google Scholar]
- Fernandez-Lazaro CI, García-González JM, Adams DP, Fernandez-Lazaro D, Mielgo-Ayuso J, Caballero-Garcia A, et al. Adherence to treatment and related factors among patients with chronic conditions in primary care: a cross-sectional study. *BMC Fam Pract*. 2019;20(1):132. [View at Publisher] [DOI] [PMID] [Google Scholar]
- Snowden A, Martin C, Mathers B, Donnell A. Concordance: a concept analysis. *J Adv Nurs*. 2014;70(1):46-59. [View at Publisher] [DOI] [PMID] [Google Scholar]
- Landier W. Adherence to oral chemotherapy in childhood acute lymphoblastic leukemia: an evolutionary concept analysis. *Oncol Nurs Forum*. 2011;38(3):343-52. [View at Publisher] [DOI] [PMID] [Google Scholar]

7. Cohen SM. Concept analysis of adherence in the context of cardiovascular risk reduction. *Nurs Forum*. 2009;44(1):25-36. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
8. Bivins BL, Bivins LM, Owusu B, editors. *A Concept Analysis: Adherence in Type 2 Diabetes*. University of the Philippines: International Forum for Nursing and Healthcare; 2020. [[View at Publisher](#)] [[Google Scholar](#)]
9. Berek P, Siswanto B, Irawati D. Adherence of Hypertensive Clients: A Concept Analysis. *Nur Primary Care*. 2022;6(3):1-5. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
10. Pishkhani MK, Dalvandi A, Ebadi A, Hosseini MA. Adherence to a Rehabilitation Regimen in Stroke Patients: A Concept Analysis. *Iran J Nurs Midwifery Res*. 2020;25(2):139-45. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
11. Noce A, Canale MP, Capria A, Rovella V, Tesaro M, Splendiani G, Annicchiarico-Petruzzelli M, Manzuoli M, Simonetti G, Di Daniele N. Coronary artery calcifications predict long term cardiovascular events in non-diabetic Caucasian hemodialysis patients. *Aging (Albany NY)*. 2015;7(4):269-79. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
12. Tonelli M, Wiebe N, Guthrie B, James MT, Quan H, Fortin M, et al. Comorbidity as a driver of adverse outcomes in people with chronic kidney disease. *Kidney Int*. 2015;88(4):859-66. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
13. Umeukeje EM, Ngankam D, Beach LB, Morse J, Prigmore HL, Stewart TG, et al. African Americans' Hemodialysis Treatment Adherence Data Assessment and Presentation: A Precision-Based Paradigm Shift to Support Quality Improvement Activities. *Kidney Med*. 2021;4(2):100394. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
14. Rafiee Vardanjani L, Parvin N, Mahmoodi Shan G. The effects of an individual, multistep intervention on adherence to treatment in hemodialysis patients. *Disabil Rehabil*. 2016;38(8):768-72. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
15. Parker JR. Use of an Educational Intervention to Improve Fluid Restriction Adherence in Patients on Hemodialysis. *Nephrol Nurs J*. 2019;46(1):43-7. [[View at Publisher](#)] [[Google Scholar](#)]
16. Teong LF, Khor BH, Ng HM, Sahathevan S, Purba KR, Narayanan SS, et al. Effectiveness of a Nutritional Mobile Application for Management of Hyperphosphatemia in Patients on Hemodialysis: A Multicenter Open-Label Randomized Clinical Trial. *J Pers Med*. 2022;12(6):961. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
17. Ebrahim M, Baloochi Beydokhti T, Akbari A, Soleimani Moghaddam R. Effect of Family-Centered Empowerment Model on Diet Adherence in Hemodialysis Patients. *J Shahid Sadoughi Univ Med Sci*. 2022;29(12):4393-404. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
18. Danielson E, Melin-Johansson C, Modanloo M. Adherence to Treatment in Patients with Chronic Diseases: From Alertness to Persistence. *Int J Community Based Nurs Midwifery*. 2019;7(4):248-57. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
19. Kim H, Jeong IS, Cho MK. Effect of Treatment Adherence Improvement Program in Hemodialysis Patients: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*. 2022;19(18):11657. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
20. Snyder RL, Jaar BG, Lea JP, Plantinga LC. Association of Patient-Reported Difficulty with Adherence with Achievement of Clinical Targets Among Hemodialysis Patients. *Patient Prefer Adherence*. 2020;14:249-59. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
21. Kim Y, Evangelista LS, Phillips LR, Pavlish C, Kopple JD. The End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ): testing the psychometric properties in patients receiving in-center hemodialysis. *Nephrol Nurs J*. 2010;37(4):377-93. [[View at Publisher](#)] [[PMID](#)] [[Google Scholar](#)]
22. Schwartz-Barcott D. An expansion and elaboration of the hybrid model of concept development. *Concept Development in Nursing Foundations, Techniques, and Applications*; 2000. p.129-59 [[View at Publisher](#)] [[Google Scholar](#)]
23. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*. 2004;24(2):105-12. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
24. Lincoln YS. *Naturalistic inquiry*. London: sage; 1985. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
25. Venes D. *Taber's cyclopedic medical dictionary*. Philadelphia: FA Davis; 2017. [[View at Publisher](#)] [[Google Scholar](#)]
26. Burkhardt PV, Sabaté E. Adherence to long-term therapies: evidence for action. *J Nurs Scholarsh*. 2003;35(3):207. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
27. Simpson JA, Weiner ES. *The Oxford english dictionary*. Oxford: Clarendon Press; 1989. [[View at Publisher](#)] [[Google Scholar](#)]
28. Ingram TL. Compliance: a concept analysis. *Nurs Forum*. 2009;44(3):189-94. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
29. Thorne SE. Constructive noncompliance in chronic illness. *Holist Nurs Pract*. 1990;5(1):62-9. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
30. Bissonnette JM. Adherence: a concept analysis. *J Adv Nurs*. 2008;63(6):634-43. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
31. Souza AC, Borges JW, Moreira TM. Quality of life and treatment adherence in hypertensive patients: systematic review with meta-analysis. *Rev Saude Publica*. 2016;50:71. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
32. Jneid S, Jabbour H, Hajj A, Sarkis A, Licha H, Hallit S, et al. Quality of Life and Its Association With Treatment Satisfaction, Adherence to Medication, and Trust in Physician Among Patients With Hypertension: A Cross-Sectional Designed Study. *J Cardiovasc Pharmacol Ther*. 2018;23(6):532-42. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
33. Bosworth H. *Improving patient treatment adherence: A clinician's guide*. Berlin: Springer; 2010. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
34. Brown MT, Bussell JK. Medication adherence: WHO cares? *Mayo Clin Proc*. 2011;86(4):304-14. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
35. Dsouza B, Prabhu RA, Unnikrishnan B, Shetty A, Reshmi B. A Qualitative Study on Factors Affecting Adherence Among Indian Haemodialysis Patients at a Tertiary Teaching Hospital of Southern India. *Journal of Health Management*. 2019;21(3):417-26. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
36. Howren MB, Cozad AJ, Christensen AJ. The interactive effects of patient control beliefs on adherence to fluid-intake restrictions in hemodialysis: Results from a randomized controlled trial. *J Health Psychol*. 2017;22(13):1642-51. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
37. Grandinetti A. Treatment Adherence in Young Adults Receiving Kidney Replacement Therapy: A Patient Perspective. *Clin J Am Soc Nephrol*. 2018;13(11):1613-4. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
38. Szu LY, Tsao LI, Chen SC, Ho ML. Self-Participation Experiences among Well-Adapted Hemodialysis Patients. *Healthcare (Basel)*. 2021;9(12):1742. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
39. Mahjubian A, Bahraminejad N, Kamali K. The Effects of Group Discussion Based Education on the Promotion of Self-Management Behaviors in Hemodialysis Patients. *J Caring Sci*. 2018;7(4):225-32. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
40. Geldine CG, Bhengu B, Manwere A. Adherence of adult Chronic Kidney Disease patients with regard to their dialysis, medication, dietary and fluid restriction. *Research Journal of Health Sciences*. 2017;5(1):3-17. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
41. Sousa H, Ribeiro O, Christensen AJ, Figueiredo D. Mapping Patients' Perceived Facilitators and Barriers to In-Center Hemodialysis Attendance to the Health Belief Model: Insights from a Qualitative Study. *Int J Behav Med*. 2023;30(1):97-107. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
42. Gudynaite M, Kasperaviciute V, Rimsevicius L, Miglinas M, Perminas A. Associations of illness perception and treatment adherence in a cohort of patients on chronic hemodialysis in Nephrology Dialysis Transplantation. 2017;32:iii714. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
43. Melastuti E, Nursalam N, Sukartini T, Putra MM, Adiutama NM. Self-care Adherence in Hemodialysis Patients: A Structural Equation Modeling. *Open Access Macedonian Journal of Medical Sciences*. 2022;10(B):1107-12. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
44. Daniels GB, Robinson JR, Walker CA. Adherence to Treatment by African Americans Undergoing Hemodialysis. *Nephrol Nurs J*. 2018;45(6):561-8. [[View at Publisher](#)] [[PMID](#)] [[Google Scholar](#)]
45. Huang JY, Chen HM. [Concept analysis of medication adherence in patients with chronic disease]. *Hu Li Za Zhi*. 2014;61(3):112-8. Chinese [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
46. Vélez-Vélez E, Bosch RJ. Illness perception, coping and adherence to treatment among patients with chronic kidney disease. *J Adv Nurs*. 2016;72(4):849-63. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
47. Chirona G, Bhengu B. Contributing factors to non-adherence among chronic kidney disease (CKD) patients: a systematic review of literature. *Medical & Clinical Reviews*. 2016;2(4):29. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
48. Guzmán-Carrillo KY, González-Betanzos F, Rivera-Heredia ME, Salazar-Garza ML, Montes-Delgado R, Aguirre-Martínez JI. Adherence to treatment in children with chronic renal failure: Inclusion of the psychologist to the interdisciplinary team. *Saude e Sociedade*. 2021;30(3):e200809. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
49. Tohme F, Mor MK, Pena-Polanco J, Green JA, Fine MJ, Palevsky PM, et al. Predictors and outcomes of non-adherence in patients receiving maintenance hemodialysis. *Int Urol Nephrol*. 2017;49(8):1471-9. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
50. Musavi Ghahfarokhi M, Mohammadian S, Mohammadi Nezhad B, Kiarsi M. Relationship between spiritual health and hope by dietary adherence in haemodialysis patients in 2018. *Nurs Open*. 2019;7(2):503-11. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
51. Sulistyaningsih DR, Nurachmah E, Yetti K, Priyo Hastono S. The experience of adherence among hemodialysis patients undergoing therapeutic regimen: a qualitative study [version 1; peer review: 1

- approved, 1 not approved]. F1000Research;2020. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
52. Zhang N, Lai F, Guo Y, Wang L. Status of and Factors Influencing the Stigma of Chinese Young and Middle-Aged Maintenance Hemodialysis Patients: A Preliminary Study. *Front Psychol.* 2022;13:873444. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
 53. Capistrano RdL, Sousa ARd, Araújo IFM, Almeida ES, Menezes HFd, Silva RA, et al. Stigma perceived by men on hemodialysis. *Acta Paul Enferm.* 2022;35. [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
 54. Rafiee-Vardanjani L, Shirozhan S, Noorian K, Nemati S, doosti-irani M. Lived experiences of patients receiving hemodialysis during the COVID-19 pandemic: A qualitative study. *Journal of Qualitative Research in Health Sciences.* 2024 [In Press] [[View at Publisher](#)] [[DOI](#)] [[Google Scholar](#)]
 55. Lee EJ, Chang AK, Chung YC. Socioecological Factors Affecting Fluid Restriction Adherence Among Korean Patients Receiving Hemodialysis: A Qualitative Study. *J Transcult Nurs.* 2021;32(3):239-47. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
 56. Cardol CK, Boslooper-Meulenbelt K, van Middendorp H, Meuleman Y, Evers AWM, van Dijk S. Psychosocial barriers and facilitators for adherence to a healthy lifestyle among patients with chronic kidney disease: a focus group study. *BMC Nephrol.* 2022;23(1):205. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]
 57. Schellartz I, Ohnhaeuser T, Mettang T, Scholten N. The role of personal attitudes of control and responsibility for the uptake of peritoneal dialysis- a national survey among dialysis patients. *BMC Nephrol.* 2021;22(1):107. [[View at Publisher](#)] [[DOI](#)] [[PMID](#)] [[Google Scholar](#)]

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