



Effect of Theory of Planned Behaviour-Based Structured Education on Knowledge and Interdialytic Weight Gain Among Patients with Chronic Kidney Disease

Diah Setiani¹✉, Rosdiana², Rivan Firdaus¹, Indah Nur Imamah¹, Hesti Prawita Widiastuti¹

¹ Department of Nursing, Politeknik Kesehatan Kemenkes Kalimantan Timur, Samarinda City, East Kalimantan, Indonesia

² Department of Nursing, Inche Abdoel Moeis Regional General Hospital, Samarinda City, East Kalimantan, Indonesia

Info Article

Article History:

Received:

3 May 2026

Accepted:

3 June 2026

Published:

15 June 2026

Keywords:

CKD on HD

End Stage Renal

Disease

TPB-Based

Structured Education

Interdialytic Weight

Gain

Abstract

Globally, CKD and ESRD continue to increase substantially with the majority receiving dialysis treatment, involves an irreversible decline in kidney function so that continuous dialysis is carried out for survival. The success of haemodialysis therapy is highly dependent on patient adherence, especially in controlling interdialytic weight gain (IDWG). Knowledge and behavior patient are required in the control of IDWG. One of the health education models is used to increase knowledge so that it has an impact on health-related behaviour change, namely Planned Behaviour Theory (TPB). This study aimed to determine the effect of Theory Planned Behaviour-based structured education on knowledge of fluid restriction and IDWG reduction in CKD patients on haemodialysis. The research employed a quantitative method design using an quasi-experimental pretest-posttest with a control group design. The population of all patients analyzed at the Inche Abdoel Moeis Regional General Hospital, Samarinda, amounted to 60 respondents, sample technique used purposive sampling (according to the inclusion criteria), each group amounted to 30 respondents (with intervention and control groups). The intervention group received structured education based on the TPB and fluid evaluation monitoring with discussion forums. Intervention groups are given with a frequency of education 2x a week, the duration education was 30 minutes and then total implementation was 4 weeks, used instruments consisting of the SOP for Providing TPB-Based Education, IDWG observation sheets, and questionnaires (the questionnaire validity and reliability Cronbach's Alpha is 0.760). And statistical tests using paired t-tests and independent t-tests. The results of the hypothesis test in the intervention group with the Paired T-test obtained a p value of $0.000 < 0.05$. Meanwhile, in the control group, the p-value was $0.053 > 0.05$. There were significant differences between the intervention and control groups, so it was concluded that there was an effect of TPB-based structured education on knowledge of fluid restriction and IDWG reduction in CKD patients on haemodialysis.

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Corresponding Author:

✉ Diah Setiani

Department of Nursing, Politeknik Kesehatan Kemenkes Kalimantan Timur, Samarinda City, East Kalimantan, Indonesia

Email: diah.poltekeskaltim@gmail.com

1. INTRODUCTION

Chronic Kidney Disease (CKD) is characterized by progressive and irreversible deterioration of kidney function, identified by kidney damage markers or an estimated glomerular filtration rate (eGFR) below 60 mL/min/1.73 m² for more than three months. Progressive CKD may eventually develop into End-Stage Renal Disease (ESRD), a condition requiring renal replacement therapy such as haemodialysis or kidney transplantation for survival. Advanced CKD significantly affects nutritional status, fluid-electrolyte balance, daily functioning, and quality of life, and may increase morbidity and mortality if inadequately managed (Ben Salah et al., 2023; Sarmadi et al., 2025; Vaidya & Aeddula, 2024). Haemodialysis remains one of the most commonly used renal replacement therapies for patients with ESRD. However, successful haemodialysis treatment largely depends on patients' adherence to therapeutic recommendations, particularly fluid intake restrictions. Poor adherence to fluid restriction may lead to excessive Interdialytic Weight Gain (IDWG), a critical indicator reflecting fluid accumulation between dialysis sessions. Ideally, IDWG should remain below 4–4.5% of dry body weight. Elevated IDWG has been associated with adverse outcomes, including hypertension, cardiovascular complications, fluid overload, hospitalization, and increased mortality risk (Alhamad et al., 2023). Based on eGFR values, CKD patients are stratified into five distinct stages (Ben Salah et al., 2023). Advanced stages (3–5) of the disease significantly affect daily activities, nutritional status, fluid and electrolyte balance, and overall health, potentially leading to uremic syndrome and mortality if untreated (Alhamad et al., 2023). ESRD involves an irreversible decline in kidney function, causing continuous dialysis or kidney transplantation for survival. One of the treatments is with Hemodialysis (HD). However, the success of hemodialysis therapy is highly dependent on patients' adherence to fluid and dietary restrictions, particularly in controlling interdialytic weight gain (IDWG). Patients undergoing hemodialysis therapy were measured in weight before and after HD to determine the amount of fluid that entered during the Inter Dialytic Weight Gain (IDWG) period, then IDWG was calculated based on Dry Body Weight (BBK) (Jalalzadeh et al., 2021).

IDWG is a critical clinical indicator in hemodialysis patients, reflecting fluid intake between dialysis sessions. Ideally, IDWG should remain below 4–4.5% of dry body weight. Excessive IDWG is associated with serious complications such as hypertension, cardiovascular events, fluid overload, and increased mortality. Despite routine education provided in clinical settings, non-adherence to fluid restriction remains high, with more than 60% of patients failing to comply adequately (Bossola et al., 2022). Weight gain has an impact on the patient's daily life, both in terms of the patient's physical, psychological, social relationships, and environment. CKD patients undergoing HD procedures mostly have difficulty controlling fluid intake restriction, leading to therapy failures that can reduce patients' quality of life and increase mortality and morbidity. Therefore, it is necessary to provide education to increase knowledge about fluid intake limits so that it can reduce Inter Dialytic Weight Gain (IDWG) (Jalalzadeh et al., 2021). A big reason why hemodialysis patients don't follow their treatment plans is because they don't have enough knowledge and the way they are taught isn't working well. Traditional ways of teaching don't always take into account how behavior is shaped, which can lead to only small changes in how patients follow treatments. Research indicates that patients often have difficulty adhering to fluid restrictions because they don't fully understand the requirements, feel uncertain about managing their condition, and receive inadequate support to change their behavior (Lily Putri Marito, 2024)

Despite routine patient education in clinical settings, adherence to fluid restriction among haemodialysis patients remains suboptimal. Previous studies reported that more than half of haemodialysis patients experience difficulty adhering to prescribed fluid limitations. Conventional educational approaches often focus on providing information without adequately addressing the psychosocial and behavioral determinants underlying patient adherence. Consequently, improvements in knowledge alone may not translate into sustained behavioral changes. Patients frequently struggle not only because of limited understanding, but also due to low self-confidence, inadequate motivation, perceived barriers, and insufficient social support in implementing fluid restriction behaviors.

Behavioral theory-based interventions have increasingly been recommended to improve health-related behavior outcomes. One widely applied framework is the Theory of Planned Behaviour (TPB), which proposes that behavior is primarily influenced by behavioral intention. Intention itself is determined by three major constructs: attitudes toward behavior, subjective norms, and perceived behavioral control. In patients undergoing haemodialysis, these components may influence adherence behaviors toward fluid restriction. Positive attitudes regarding the benefits of fluid control, support from family and healthcare professionals, and stronger confidence in managing fluid intake may contribute to improved adherence and reduced IDWG. More and more, behavioral theory-based interventions are being advocated for to enhance patient education. One of the most widely used models for predicting and changing health-related behaviors is the Theory of Planned Behaviour (TPB). TPB states that people's intentions shape their actions based on their attitudes, what others expect from them, and how easy they feel about doing the behavior (Kim et al., 2025; Sheikh et al., 2022)

Globally, CKD and ESRD continue to increase substantially. More than 808,000 individuals in the United States live with ESRD, with the majority receiving dialysis treatment (NIDDK, 2023). Based on data from the Indonesian Kidney Registry (IRR) in 2024, CKD ESKD on Chronic HD patients will have 60,034 incidents and a prevalence of 136,793 (Perhimpunan Nefrologi Indonesia, 2024). Proportion of Hemodialysis in the Population Aged ≥ 15 years with Chronic Kidney Disease based on Doctor's Diagnosis by Characteristics (Health Development Policy Agency, 2023). One treatment for CKD in HD is fluid restriction (Hidayati et al., 2025). Adherence to fluid intake restrictions is a very important factor in determining the health level of CKD patients undergoing hemodialysis (Wayunah, 2022). However, despite the increasing burden of haemodialysis patients, interventions targeting behavioral determinants of treatment adherence remain limited, particularly in Indonesian clinical settings. Existing educational interventions mostly emphasize information delivery rather than structured behavioral modification strategies.

Several previous studies have demonstrated that educational and behavioral interventions may improve treatment adherence and reduce IDWG. However, most studies focused on general education or non-theory-based interventions, while evidence specifically examining structured education grounded in TPB among Indonesian haemodialysis populations remains scarce. Furthermore, limited studies have explored how TPB constructs can be systematically incorporated into educational interventions to improve knowledge and promote sustainable behavioral adherence in fluid restriction management. This gap highlights the need for theory-driven educational approaches adapted to local patient populations.

Therefore, the novelty of this study lies in implementing structured education based on the Theory of Planned Behaviour among Indonesian patients undergoing haemodialysis, emphasizing behavioral determinants rather than information transfer alone. This approach is expected to improve patients' knowledge regarding fluid restriction

and support adherence behavior, ultimately reducing Interdialytic Weight Gain (IDWG). Therefore, this study aimed to examine the effect of TPB-based structured education on knowledge regarding fluid restriction and IDWG among CKD patients undergoing haemodialysis.

2. METHOD

This study employed a quantitative approach using a quasi-experimental pretest–posttest control group design. The study was conducted at Inche Abdoel Moeis Regional General Hospital, Samarinda, Indonesia, from August 1 to October 20, 2023. The study population consisted of patients undergoing hemodialysis treatment. Participants were recruited using purposive sampling based on predefined inclusion criteria, resulting in a total sample of 60 respondents. The participants were allocated into an intervention group (n = 30) and a control group (n = 30).

The intervention group received a structured educational program based on the Theory of Planned Behavior (TPB), delivered through a pocketbook and supported by fluid intake monitoring and discussion forums via WhatsApp groups. Educational sessions were conducted twice weekly for 30 minutes per session over a four-week period. The control group received routine education provided by the hospital using flip-chart media.

Data were collected before and after the intervention using an Interdialytic Weight Gain (IDWG) observation form and a structured questionnaire. The questionnaire demonstrated acceptable internal consistency, with a Cronbach's alpha coefficient of 0.760. Prior to enrollment, all eligible participants underwent a screening process to ensure compliance with the inclusion criteria.

Descriptive statistics were used to summarize participant characteristics. Within-group differences between pretest and posttest measurements were analyzed using paired t-tests, while between-group differences were examined using independent t-tests. Statistical significance was established at $p < 0.05$.

Ethical approval was obtained from the Health Research Ethics Committee of the Polytechnic of Health, Ministry of Health, East Kalimantan, Indonesia (No. DP.04.03/7.1/14952/2023). Written informed consent was obtained from all participants prior to data collection.

3. RESULTS AND DISCUSSION

Table 1. Distribution of respondent characteristics.

Characteristic	Intervention Groups		Control Group	
	N	%	N	%
Gender				
Man	12	40	18	60
Woman	18	60	12	40
Age (Years)				
<20	0	0	1	3.3
20-44	6	20	8	26.7
45-65	24	80	20	66.7
>65	0	0	1	3.3
Education				
SD	8	26,7	3	10
SMP	5	16,7	6	20
High School/ Vocational School	7	23,3	11	36.7

PT	9	30	9	30
Not in school	1	3,3	1	3.3
Work				
Housewives	14	46.7	10	33.3
Private	4	13.3	14	46.7
Self employed	8	26.7	5	16.7
Student	4	13.3	1	3.3
HD frequency 2 times a week	30	100	30	100
Long Time in HD				
< 1 Year	12	40	14	46.7
1- 2 Years	12	40	13	43.3
3-4 Years	5	16.7	4	10
> 4 Years	1	3.3	0	0
Total	30	100	30	100

Table 1 shows that the gender characteristics of the respondents in the intervention group are mostly female as many as 18 people (60%), while in the control group, most of the respondents are male, as many as 18 people (60%). Based on the age characteristics of the respondents, in the intervention group, almost all respondents were 45-65 years old, as many as 24 people (80%), while in the control group, most of the respondents were 45-65 years old, as many as 20 people (66.7%). The frequency distribution based on religion in almost all groups of respondents was Muslim as many as 28 people (93.3%) in the intervention group and 29 people (96.7%) in the control group. Frequency distribution based on education, almost half of the respondents studied up to higher education as many as 9 people (30%) while in the control group almost half of the respondents took education up to high school/vocational school, as many as 11 people (36.7%). Frequency distribution based on occupation, in the control group almost half of the respondents, as many as 14 people (46.7%) were housewives, in the intervention group almost half of the respondents, as many as 14 people (46.7%) were private workers. Frequency distribution based on HD frequency per week all respondents in the intervention and control groups (100%) underwent HD twice weekly. Frequency distribution based on the length of time in the intervention group as many as 12 people (40%) have undergone HD for 1-2 years and in the control group as many as 14 people (46.7%) have undergone HD for < 1 year.

Table 2. Knowledge and IDWG: in the intervention group and the pretest and posttest control group.

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Knowledge				
Intervention	45,7	12,33	70,5	12,59
Control	44,3	12,97	49,1	13,6
IDWG				
Intervention	5.80	0,89	3,87	0,52
Control	5,57	0,89	5,20	0,78

Table 2 shows that the pretest value of knowledge in the intervention group of almost all respondents, namely 25 people (83.3%), had a knowledge score of 45.7. In the control group, almost all respondents, namely 26 people (86.7%), had knowledge with a score of 44.3. While the posttest in the knowledge assessment, the intervention group of most respondents, namely 21 people (70%), had a knowledge score of 70. In the control group,

almost all respondents, namely 26 people (86.7%), had knowledge of 65.1. The IDWG pretest value in the intervention group of most respondents, namely 17 people (56.7%), has an IDWG value of 5.80. In the control group, most of the respondents, namely 16 people (53.3%), had an IDWG value of 5.57. Meanwhile, the posttest on the IDWG assessment showed that in the intervention group, most of the respondents, namely 16 people (53.3%), had an IDWG value of 3.87. In the control group, most of the respondents, namely 19 people (63.3%), had an IDWG value of 5.20.

Table 3. Difference test of knowledge pre and posttest mean in intervention group and control group.

Dependent Variable	Intervention		Control	
	Mean	P	Mean	P
Knowledge				
Pretest	45.7	0.000	44.3	0.053
Posttest	70.5		49.1	

Table 3 shows that structured education based on the Theory of Planned Behavior succeeded in significantly increasing the knowledge of hemodialysis patients compared to pre-intervention conditions. This difference in average knowledge is statistically significant between pre-intervention and post-intervention scores (p-values of $0.000 < 0.05$). This indicates that educational interventions not only improve information but also result in a noticeable change in understanding in patients.

The Theory of Planned Behaviour is a social psychology model developed by Icek Ajzen, which is used to understand and predict human behavior based on three main constructs, namely Attitude towards the behavior, Subjective norms and Perceived behavioural control (Kagee & Freeman, 2025). These three constructs influence behavioral intent, which is a strong determinant of a person's actual actions. This theory also explains how patient information and beliefs are related to attitudes and self-control in performing certain healthy behaviors such as self-management in hemodialysis therapy (Kagee & Freeman, 2025).

TPB-based education is effective in improving knowledge, attitudes, intentions and behaviors in various health contexts even though it is not specific to hemodialysis. In complementary feeding nutrition interventions, TPB-based education significantly increased maternal knowledge of nutrition and theoretical constructs such as attitudes and intentions (Rachmah et al., 2023). In the context of oral cancer prevention in adult female populations, TPB education improves knowledge, attitudes, subjective norms, and behavioral control, as well as preventive behaviors after intervention versus control (Lily Putri Marito, 2024; Najafi et al., 2023).

According to the researchers, structured education is not just about conveying static information, but is designed to shape confidence, positive attitudes, and awareness of patients' self-control over the management of their condition. This facilitates the internalization of information, so that knowledge is not only quantitatively enhanced, but also understood more deeply in the context of relevant health behaviors. Increasing knowledge is one of the important prerequisites in order to influence healthy behaviors and actions in chronic patients such as hemodialysis. TPB supports the understanding that when patients understand better, their attitudes and intentions towards adaptive behavior also tend to improve. In the SDG approach, educational modules or sessions are usually designed to target psychosocial constructs (attitudes, subjective norms, perceived control), rather than simply conveying facts. This supports the hypothesis that education

that is organized based on theory produces more profound knowledge changes than conventional counseling.

Table 4. Difference Test of IDWG pre and posttest mean in intervention group and control group.

Dependent Variable	Intervention		Control	
	Mean	P	Mean	P
IDWG				
Pretest	5.80	0.001	5.57	0.082
Posttest	3.87		5.20	

Table 4 shows that in the intervention group, p-values of $0.001 < 0.05$ were obtained. Based on these values, it can be concluded that there is a significant difference in the average IDWG between pre and post structured education interventions based on Theory of Planned Behaviour. Meanwhile, in the control group, p-values were $0.082 > 0.05$, based on these values, it can be concluded that there is no significant difference in IDWG between pre and post in the control group.

Evidence from the literature suggests that strategies based on behavioral theories such as TPB tend to be more effective in modifying health behaviors than educational approaches without a theoretical foundation, as theory provides a framework for understanding the psychological variables that influence behavioral intentions and actions (Ajzen & Schmidt, 2020). The effectiveness of structured education in reducing IDWG can be explained by its ability to improve self-efficacy and behavioral control. Patients who receive individualized education are more inclined to feel self-assured with fluid intake and dehydration (Rosdiana et al., 2018).

A meta-analysis evaluating various educational, cognitive, or behavioral interventions in hemodialysis patients found that educational and behavioral approaches significantly reduced IDWG, albeit by a relatively small effect magnitude (approximately -0.15 kg) compared to the non-intervention group (Bossola et al., 2022). Cognitive behavioural therapy can reduce IDWG in hemodialysis patients. TPB that can be applied in the treatment adherence of elderly hemodialysis patients TPB that can be applied in the treatment adherence of elderly hemodialysis patients (Kim et al., 2025). Adherence to fluid restriction during hemodialysis is not a simple matter, but rather influenced by the beliefs of patients, their social environment, and their perceived ability to control their behavior. The components are addressed by TPB-based education, which modifies patients' attitudes towards fluid restriction, reinforces positive social support (subjective norms), and enhances perceived behavioral control (Sheikh et al., 2022). Also, the fact that this study focused on a "structured" and "theoretical TPB" education is an explanation for the increase in knowledge. In contrast to traditional education, TPB-based interventions aim to systematically influence cognitive and motivational domains. The results of a randomized controlled trial indicate that nurse-led education using TPB can enhance treatment adherence, indicating the value of applying behavioral theory to patient education. This is in line with other research findings (Saeed & Qassim Baktash, 2026).

According to the researchers, TPB-based educational interventions not only convey factual information, but also systematically target Changes in patients' attitudes towards fluid restriction (e.g. through an understanding of risks and benefits). Strengthening positive social norms (support from medical personnel, family, or fellow patients). Increased perceived behavioral control, which is the patient's confidence that they are able to implement appropriate fluid-restriction behaviors. This set of changes contributed to a stronger intention to control fluid intake, which was reflected in the decrease in IDWG after

the intervention. A lower IDWG after the intervention marked that the patient not only understood the theoretical importance of fluid restriction, but also applied it in daily life. This shows the success of the intervention at the level of real behavior change, not just an increase in knowledge. However, it is important to recognize that IDWG is influenced not only by education, but also by other factors such as individual preferences, social environment, family support, hemodialysis facilities, and comorbidities. Therefore, interventions structured education TPB-based are expected to be part of a multidisciplinary strategy to change patient behaviour especially CKD on HD patients in an ongoing manner.

4. CONCLUSION

TPB-based structured education effectively improved patients' knowledge regarding fluid restriction and reduced Interdialytic Weight Gain (IDWG) among CKD patients undergoing hemodialysis. Beyond improving knowledge outcomes, these findings suggest that educational interventions grounded in behavioral theory may facilitate sustainable behavior changes by addressing patients' attitudes, subjective norms, and perceived behavioral control related to fluid restriction adherence.

From a practical perspective, TPB-based structured education has the potential to be integrated into routine hemodialysis nursing care as a systematic educational strategy to enhance patient adherence and self-management. Incorporating behavioral theory into nursing interventions may provide a more comprehensive approach than conventional education by targeting psychosocial determinants influencing treatment behaviors.

However, the present study was conducted in a single-center setting with a relatively limited sample size. Therefore, future studies should employ multicenter randomized controlled designs involving larger and more diverse populations to further validate the effectiveness, generalizability, and long-term impact of TPB-based educational interventions among patients undergoing hemodialysis.

5. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the management and healthcare professionals of the Hemodialysis Unit at Regional Public Hospital Inche Abdul Moies Samarinda for their valuable support, cooperation, and facilitation during the data collection process of this study. The authors also extend their appreciation to all patients with chronic kidney disease undergoing hemodialysis who willingly participated and contributed meaningful information to this research. The authors gratefully acknowledge the support from Poltekkes Kemenkes Kaltim for providing research facilities, academic guidance, and administrative assistance throughout the study. This research was self-funded by the authors, and no external financial support was received. The authors also appreciate the contributions of clinical experts and academic reviewers whose constructive feedback has significantly improved the quality of this manuscript.

REFERENCES

- Ajzen, I., & Schmidt, P. (2020). *Changing behavior using the theory of planned behavior. the handbook of behavior change* (pp. 17–31). Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108677318.002>
- Alhamad, M. A., Almulhim, M. Y., Alburayh, A. A., Alsaad, R. A., Alhajji, A. M., Alnajjar, J. S., ... & Almulhim, M. (2023). Factors affecting adherence to hemodialysis therapy among patients with end-stage renal disease attending in-center hemodialysis in Al-Ahsa Region, Saudi Arabia. *Cureus*, 15(10), 1-11. <https://doi.org/10.7759/cureus.46701>

- Ben Salah, G., Farooqui, M., Salem Alshammari, M., Elghazali, A., Kassem, L., Ibrahim, N., ... & Rasheed, M. K. (2023). Prevalence, types and disclosure of complementary and alternative medicine (CAM) use among chronic kidney disease (CKD) patients in Saudi Arabia. *Journal of pharmaceutical policy and practice*, 16(1), 89. <https://doi.org/10.1186/s40545-023-00589-2>
- Bossola, M., Pepe, G., Antocicco, M., Severino, A., & Di Stasio, E. (2022). Interdialytic weight gain and educational/cognitive, counseling/behavioral and psychological/affective interventions in patients on chronic hemodialysis: a systematic review and meta-analysis. *Journal of Nephrology*, 35(8), 1973-1983. <https://doi.org/10.1007/s40620-022-01450-6>
- Health Development Policy Agency. (2023). *Indonesian Health Survey 2023*. Jakarta: Health Development Policy Agency.
- Hidayati, W., Ermawati, E., Firdaus, I. N., Lestariningsih, L., & Kristina, T. N. (2025). Fluid restriction adherence in hemodialysis patients using the ESRD-AQ: A multicenter study. *The Journal of Palembang Nursing Studies*, 4(1), 41–50. <https://doi.org/10.55048/jpns155>
- Jalalzadeh, M., Mousavinasab, S., Villavicencio, C., Aameish, M., Chaudhari, S., Baumstein, D., & Villavicencio, C. A. (2021). Consequences of interdialytic weight gain among hemodialysis patients. *Cureus*, 13(5), 1-9. <https://doi.org/10.7759/cureus.15013>
- Kagee, A., & Freeman, M. (2025). *Mental health and physical health. International Encyclopedia of Public Health* (pp. 213–223). Elsevier. <https://doi.org/10.1016/B978-0-323-99967-0.00085-5>
- Kim, Y. W., Choi, G. W., & Chang, S. J. (2025). The effect of cognitive behavioural therapy on interdialytic weight gain in hemodialysis patients: A systematic review and meta-analysis. *Collegian*, 32(3), 163–173. <https://doi.org/10.1016/J.COLEGN.2025.04.002>
- Lily Putri Marito. (2024). The influence of education based on self-efficacy theory on Interdialytic Weight Gain (IDWG) in the hemodialysis unit. *International Journal of Health and Medicine*, 1(3), 69–77. <https://doi.org/10.62951/ijhm.v1i3.38>
- Najafi, S., Mohammadkhah, F., Harsini, P. A., Sohrabpour, M., & Jeihooni, A. K. (2023). Effect of educational intervention based on theory of planned behaviour on promoting preventive behaviours of oral cancer in rural women. *BMC Women's Health*, 23(1), 249. <https://doi.org/10.1186/s12905-023-02411-2>
- NIDDK. (2023). *Kidney disease statistics for the United States [Internet]*. National Institute of Diabetes and Digestive and Kidney Diseases. Retrieved from <https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease>
- Perhimpunan Nefrologi Indonesia. (2024). *17th Annual report of Indonesian renal registry english*. Jakarta: Perhimpunan Nefrologi Indonesia.
- Rachmah, Q., Astina, J., Atmaka, D. R., & Khairani, L. (2023). The effect of educational intervention based on theory of planned behavior approach on complementary feeding: a randomized controlled trial. *International journal of pediatrics*, 2023, 1-11. <https://doi.org/10.1155/2023/1086919>
- Rosdiana, I., Cahyati, Y., & Hartono, D. (2018). The effect of education on interdialytic weight gain in patients undergoing hemodialysis. *Malaysian Journal of Medical Research (MJMR)*, 2(4), 16-21. <https://doi.org/10.31674/mjmr.2018.v02i04.002>
- Saeed, Z., & Baktash, M. Q. (2026). The role of nurse-led health education in enhancing treatment adherence among hemodialysis patients: A Randomized Controlled Trial. *Malaysian Journal of Nursing (MJN)*, 17(4), 47-57. <https://doi.org/10.31674/mjn.2026.v17i04.005>

- Sarmadi, S., Sanaie, N., & Zare-Kaseb, A. (2025). Comparing the effects of interactive and conventional video education on activation, treatment adherence, and weight changes in dialysis patients: A randomized clinical trial protocol. *Plos One*, 20(10), 1-17. <https://doi.org/10.1371/journal.pone.0334498>
- Sheikh, V., Barati, M., Khazaei, S., & Jormand, H. (2022). Factors related to treatment adherence behaviors among old-age hemodialysis patients in Hamadan, Iran: the application of the extended theory of planned behavior during Covid-19 pandemic. *BMC Nephrology*, 23(58), 1-9. <https://doi.org/10.1186/s12882-022-02694-x>
- Vaidya, S. R., & Aeddula, N. R. (2024). *Chronic kidney disease [Internet]*. Treasure Island (FL): StatPearls Publishing. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK535404/>
- Wayunah, W. (2022). Self-efficacy and compliance fluid intake restriction as a determinant of the interdialytic weight gain (IDWG) level. *Journal of Nursing Care*, 5(1), 21-29. <https://doi.org/10.24198/jnc.v5i1.36233>