



# Predictors of Happiness Among Hemodialysis Patients in Qazvin-Iran

Seyedeh Ameneh Motalebi<sup>1</sup>, Bahareh Yousefi<sup>2</sup>, Fatemeh Hosseinpour<sup>2</sup> and Seyedezhahra Hosseinigolafshani<sup>1,\*</sup>

<sup>1</sup>Social Determinants of Health Research Center, Research Institute for Prevention of Non Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>2</sup>Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran

\*Corresponding author: Social Determinants of Health Research Center, Research Institute for Prevention of Non Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran. Email: z.hoseinigolafshani@qums.ac.ir

Received 2023 August 01; Revised 2023 December 25; Accepted 2024 March 08.

## Abstract

**Background:** The enhancement of happiness in patients undergoing hemodialysis is positively associated with improved physical and mental health outcomes.

**Objectives:** This study was conducted to identify predictive factors of happiness among a group of Iranian hemodialysis patients.

**Methods:** In 2021, a descriptive study was carried out involving 200 hemodialysis patients from a center in Qazvin province, Iran. The census method was utilized to select eligible patients. Data collection was conducted using a socio-demographic checklist, the Oxford Happiness Questionnaire, and Snyder's Hope Scale. A multivariate regression model was employed to ascertain the predictors of happiness.

**Results:** The average age of the patients was  $59.23 \pm 14.43$ , with an age range from 18 to 86 years. The majority were male ( $n = 122$ , 61.0%) and married ( $n = 134$ , 67.0%). A significant portion of the patients (69%,  $n = 138$ ) reported moderate levels of happiness. The study also discovered that educational level ( $\beta = 0.248$ ,  $P \leq 0.001$ ), marital status ( $\beta = -0.268$ ,  $P \leq 0.001$ ), adequacy of hemodialysis ( $\beta = 0.268$ ,  $P \leq 0.001$ ), and hope ( $\beta = 0.231$ ,  $P \leq 0.001$ ) were significant predictors of happiness in patients undergoing hemodialysis.

**Conclusions:** The findings indicate that the majority of hemodialysis patients in Qazvin experience a moderate level of happiness. Factors such as hope, educational level, marital status, and adequacy of hemodialysis were linked to their happiness. These insights can inform health strategies developed by decision-makers aimed at enhancing the happiness of this patient group.

**Keywords:** Happiness, Hemodialysis, Hope, Chronic Kidney Disease, Hemodialysis Adequacy

## 1. Background

Chronic kidney disease (CKD) is a progressive and irreversible decline in renal function (1). Worldwide, the prevalence of CKD is estimated at 242 per one million people, with an annual increase of about 8% (2). In Iran, Dehghani et al. found that among 9781 participants aged 30 to 73 years old, the prevalence of CKD was 27.5% (3). Hemodialysis stands as the most common form of kidney replacement therapy globally (4). Approximately 90% of patients with CKD rely on dialysis to sustain life (5). The dialysis process significantly impacts patients' physical and psychological well-being and daily functioning (6). Happiness appears to play a key role in managing the complications of chronic illnesses (7).

Happiness, a crucial aspect of mental health, significantly influences personality development (8). It encompasses a range of emotions and cognitive

assessments of life, reflecting the extent to which an individual views their quality of life positively (9). Happiness is vital for effectively dealing with daily challenges and has numerous benefits (10), including a positive outlook on life, enhanced self-concept, increased vitality, psychological well-being, and improved social and physical performance (11).

Hemodialysis patients often face various physical and psychological challenges in their daily lives (12). Previous research has shown positive associations between higher levels of subjective happiness and increased life satisfaction, a sense of humor, and reduced depression among these patients (13). Mehrabi and Ghazavi noted a significant influence of happiness on stress, anxiety, and depression in hemodialysis patients (14). Furthermore, studies have indicated that individuals with higher happiness levels tend to display greater creativity, adaptability, and hopefulness (15, 16).

Hope plays a crucial role in helping patients with chronic diseases adapt and persevere (17). It acts as a buffer, mitigating the impact of psychological difficulties on quality of life, with more hopeful individuals experiencing less anxiety and a better quality of life (18). For patients undergoing hemodialysis, hope for the future can improve various aspects of their quality of life (19). Snyder highlighted that fostering hope is an effective strategy for improving the quality of life of those living with chronic illnesses (20). Hope motivates patients to adhere to their treatment plans, including invasive procedures, lifestyle changes, and ongoing painful therapies (21).

Previous studies examining the factors correlated with happiness among hemodialysis patients have yielded contradictory findings. While some research has indicated no significant associations between happiness and clinical or sociodemographic variables, other studies have identified significant relationships between happiness and factors such as age, clinical work experience, gender, and marital status (17, 22).

## 2. Objectives

Given the disparity and mixed outcomes in existing literature, this study was initiated to uncover predictors of happiness in this patient demographic, aiming to illuminate an area in need of further exploration.

## 3. Methods

### 3.1. Study Design

This descriptive and cross-sectional study was conducted to identify predictive factors of happiness among hemodialysis patients.

### 3.2. Study Setting

The study took place in the dialysis department of Bu-Ali Sinai Hospital in Qazvin, located in the northern part of Iran. As the largest referral center in the province, this dialysis center has 40 active beds and serves 846 hemodialysis patients of all ages from various parts of Qazvin province.

### 3.3. Participants

Two hundred patients from the dialysis department of Bu-Ali Sinai Hospital were selected via a census sampling method based on specific inclusion and exclusion criteria. Participants were required to be willing to participate, aged over 18 years, and have been undergoing hemodialysis for a minimum of six months. Patients with psychological issues, as noted in their medical records, were excluded.

### 3.4. Sample Size

With a type I error of 0.05 (confidence level of 95%) and a type II error of 0.1, the sample size was determined using the following formula, and accounting for a potential non-response rate of 10%, the final sample size was established at 200.

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2}{w^2} + 3$$

$$= \frac{(1.96 + 1.28)^2}{(-0.24)^2} + 3$$

$$= 185$$

### 3.5. Instruments

Data collection employed a demographic and clinical characteristics questionnaire, the Oxford Happiness Questionnaire, and Snyder's Hope Scale. The demographic and clinical characteristics checklist covered variables such as age, gender, living arrangement, educational level, marital status, employment status, financial status, frequency of dialysis per week, KT/V (dialysis adequacy), and history of hypertension, diabetes mellitus, and kidney transplantation. This questionnaire was developed based on existing literature. Face and content validity were assessed by 12 academic members from the critical care department of Qazvin University of Medical Sciences.

The parameter Kt/V measures the efficacy of a hemodialysis session (dialysis adequacy) by identifying the effective removal of a specific solute (clearance K) resulting from a given treatment (characterized by time t) in a patient (with a specific volume of distribution V for the solute). The Daugirdas formula was employed for Kt/V calculation in this research (23).

The Oxford Happiness Questionnaire, developed by Hills and Argyle (24), assesses an individual's happiness through 29 items. Responses are provided on a four-point Likert scale, ranging from a (0) to d (25), with the total score on the questionnaire ranging from 0 to 87. Scores between 40 and 42 are considered indicative of happiness. The psychometric properties of this questionnaire have been validated in a previous study in Iran (26).

Snyder's Hope Scale, developed by Snyder et al. in 1991 (27), evaluates hope in individuals aged over 15 years. It includes 12 items, answered on a five-point Likert scale from totally disagree to totally agree. The scale has two subscales: Agency (items 2, 9, 10, and 12) and pathway (items 1, 4, 7, and 8) thinking. Items 3, 5, 7, and 11 serve as distractors to obscure the scale's content. Scores range from 8 to 64, with higher scores indicating greater levels of hope. The scale has been validated for use in Persian (28).

### 3.6. Data Collection

Data were collected from April to May 2021. The main researcher, along with two trained assistants, distributed questionnaires among eligible patients across all weekdays and different shifts, during hemodialysis sessions. Researchers answered any questions from patients at the time of completing the questionnaires, which were then collected.

### 3.7. Statistical Analysis

Data analysis was conducted using SPSS 20.0. Descriptive statistics, including means and standard deviations (SD) for quantitative data and frequencies and percentages for qualitative data, were utilized. The Pearson correlation coefficient and Spearman's correlation were used to identify variables associated with happiness for continuous and categorical variables, respectively. Univariate regression models were initially run to determine predictor factors of happiness and significant variables were subsequently included in a multivariate regression model. The significance level was set at  $P < 0.05$ .

### 3.8. Ethical Considerations

After discussing the study's aims and sampling methods with the nurse managers of the selected hospital, the necessary permissions were obtained. Sampling permission was given to the head nurse, along with the required explanations. Ethical approval was granted by the Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1399.516).

## 4. Results

In this study, the average age of participants was 59.23 years, with a standard deviation of 14.43, and ages ranged from 18 to 86 years. The majority of participants were male ( $n = 122$ , 61.0%) and married ( $n = 134$ , 67.0%). Over one-third of the participants were illiterate ( $n = 72$ , 36.5%), and more than half reported having a low financial status ( $n = 105$ , 52.5%). Hypertension was prevalent among the majority ( $n = 164$ , 82.0%), and 60.5% ( $n = 121$ ) did not achieve satisfactory hemodialysis adequacy. The participants' demographic characteristics are detailed in [Table 1](#).

According to the findings, most respondents had moderate levels of happiness ( $n = 138$ , 69%), while only 18.5% ( $n = 37$ ) experienced high or very high levels of happiness. Additionally, 12.5% ( $n = 25$ ) of the patients reported low levels of happiness. The average happiness score was 33.16, with a standard deviation of 10.64.

**Table 1.** Participants' Demographic Characteristics

Variables and Categories	Values <sup>a</sup>
<b>Sex</b>	
Female	78 (39.0)
Male	122 (61.0)
<b>Living arrangement</b>	
Alone	20 (10.0)
With family	180 (90.0)
<b>Educational level</b>	
Illiterate	72 (36.5)
Under diploma	77 (38.5)
Diploma and higher	50 (25.0)
<b>Financial status</b>	
Poor	105 (52.5)
Average	66 (33.0)
Good	29 (14.5)
<b>Employment status</b>	
Unemployed	51 (25.5)
Employed	9 (4.5)
Retired	42 (21.0)
Housewife	61 (30.5)
Nongovernmental	37 (18.5)
<b>Marital status</b>	
Single	18 (9.0)
Married	134 (67.0)
Widowed	48 (24.0)
<b>Number of dialysis (per week)</b>	
Twice	10 (5.0)
Three times	190 (95.0)
<b>Hypertension</b>	
No	36 (18.0)
Yes	164 (82.0)
<b>Diabetes mellitus</b>	
No	83 (51.5)
Yes	117 (58.5)
<b>Kt/V</b>	
No	121 (60.5)
Yes	79 (39.5)

<sup>a</sup> Values are expressed as No (%).

### 4.1. Correlated Factors of Happiness

To examine the relationships between variables, both Pearson correlation coefficient and Spearman's

correlation analyses were conducted. The results of these analyses are presented in [Table 2](#).

**Table 2.** Associations of Happiness with Other Variables in This Study

Variables	R	P-Value
Sex	0.012	0.865
Living arrangement	0.245	0.000
Educational level	-0.281	0.000
Financial status	0.302	0.000
Employment status	0.241	0.001
Marital status	-0.281	0.000
Location	-0.242	0.001
Number of dialysis (per week)	-0.083	0.241
Kidney transplantation	0.075	0.290
Hypercholesterolemia	-0.235	0.001
Hypertension	-0.147	0.038
Diabetes mellitus	-0.195	0.006
Kt/V	0.274	0.000
Hope	0.388	0.000

#### 4.2. Predictors of Happiness

The multivariate analysis model indicated that marital status, educational level, Kt/V, and hope were significant predictors of happiness ([Table 3](#)). Participants living alone reported lower levels of happiness compared to those living with their families. Additionally, participants with educational achievements (under diploma, diploma, and higher degrees) were happier than illiterate participants. Those with satisfactory hemodialysis adequacy also reported higher levels of happiness compared to their counterparts. Furthermore, higher levels of hope ( $\beta = 0.231$ , 95% CI = 0.24 to 0.78,  $P \leq 0.001$ ) and higher Kt/V ( $\beta = 0.268$ , 95% CI = 3.38 to 8.26,  $P \leq 0.001$ ) were associated with increased happiness. Ultimately, these variables explained 47.2% of the variance in happiness among hemodialysis patients.

## 5. Discussion

This study aimed to identify the predictors of happiness among hemodialysis patients. A significant portion of the patients (69%,  $n = 138$ ) reported a moderate level of happiness. Moreover, the findings indicated that educational level, marital status, hemodialysis adequacy, and hope were significant predictors of happiness in this patient group.

The majority of patients expressed low to moderate levels of happiness (81.5%,  $n = 163$ ), potentially due to the challenges of undergoing dialysis several times a week, consuming large quantities of medication, facing economic burdens, and experiencing reduced social interactions. These factors align with previous research highlighting the impact of hemodialysis on patients' lives and psychological stressors that may diminish well-being and quality of life ([13](#), [29](#)). Bautovich et al. also noted that depression is a common issue among CDK patients and is associated with a significant risk of adverse outcomes ([30](#)).

Marital status emerged as a significant happiness predictor among hemodialysis patients. Studies by Strobel et al. and Stack and Eshleman suggest that married individuals report higher happiness levels ([31](#), [32](#)), whereas Sheikhmoonesi et al. ([33](#)) found no significant correlation between happiness and marital status among medical students. The positive effect of marriage on happiness could be attributed to the sense of belonging and emotional support that married individuals experience, potentially leading to a depression-free state and improved quality of life ([34](#), [35](#)). Moreover, married individuals may face less life pressure than their single or widowed counterparts ([36](#)). It's important to note that marriage's impact on quality of life can vary across different societies, influenced by cultural and social conditions.

Educational level played a significant role in predicting happiness, with higher education levels associated with increased happiness, whereas lower education levels, especially among illiterate individuals, corresponded with reduced happiness levels. This is consistent with findings from Saavedra and Azizi et al. ([37](#), [38](#)), which showed a significant association between happiness and educational level. Higher education fosters a unique mental capability that helps individuals better manage concerns related to hemodialysis, thereby enhancing their happiness.

Hope was identified as a strong predictor of happiness among hemodialysis patients, with studies by Farnia et al. ([39](#)), Billington et al. ([40](#)), and Rahimpour et al. ([41](#)) highlighting hope's role as a protective factor against anxiety and depression. Higher hope levels contribute to improved mood and mental well-being, helping hemodialysis patients cope with existential challenges and distress by fostering optimism about the future. Hopeful patients are more likely to employ problem-solving skills effectively ([42](#), [43](#)). Pasyar et al. further confirmed hope as a powerful coping strategy in patients with chronic diseases, enabling them to navigate the challenges associated with their condition effectively.

**Table 3.** Predictors for Happiness Among Patients Undergoing Hemodialysis

Variables	Mean $\pm$ SD	Adjusted $\beta$	Adjusted P-Value (95% CI)
<b>Marital status</b>			
Single	30.67 $\pm$ 7.95	-0.268	0.000 (-14.61, -5.29)
Married	36.17 $\pm$ 10.28	-	-
Widow	25.71 $\pm$ 8.53	-0.144	0.050 (-7.16, -0.001)
<b>Employment status</b>			
Unemployed	28.70 $\pm$ 12.32	-	-
Employed	37.11 $\pm$ 8.62	0.029	0.697 (-5.49, 8.19)
Housewife	32.38 $\pm$ 8.65	0.069	0.351 (-1.76, 4.93)
Retired	32.88 $\pm$ 9.80	0.104	0.332 (-2.79, 8.19)
Nongovernmental	39.81 $\pm$ 9.34	0.182	0.093 (-0.84, 10.78)
<b>Educational level</b>			
Illiterate	26.79 $\pm$ 9.43	-	-
Under diploma	35.10 $\pm$ 8.96	0.167	0.029 (0.37, 6.93)
Diploma and higher	39.46 $\pm$ 9.91	0.248	0.010 (1.45, 10.73)
<b>Financial status</b>			
Low	30.25 $\pm$ 9.66	-	-
Middle	35.86 $\pm$ 11.58	-0.034	0.749 (-5.44, 3.92)
High	37.55 $\pm$ 8.82	-0.089	0.38 (-8.70, 3.35)
<b>Living arrangement</b>			
Alone	25.40 $\pm$ 7.92	0.005	0.934 (-4.34, 4.73)
With family	34.02 $\pm$ 10.52	-	-
<b>Location</b>			
City	34.50 $\pm$ 10.33	-	-
Village	28.11 $\pm$ 10.40	-0.062	0.329 (-4.85, 1.63)
<b>Hypertension</b>			
No	37.58 $\pm$ 12.97	-	-
Yes	32.19 $\pm$ 9.83	-0.080	0.188 (-5.53, 1.09)
<b>Diabetes mellitus</b>			
No	35.71 $\pm$ 11.53	-	-
Yes	31.35 $\pm$ 9.61	-0.047	0.46 (-3.73, 1.72)
<b>Hypercholesterolemia</b>			
No	34.97 $\pm$ 10.51	-	-
Yes	29.48 $\pm$ 10.01	-0.055	0.413 (-4.21, 1.73)
<b>Kt/V</b>			
No	30.79 $\pm$ 10.18	0.268	0.000 (3.38, 8.26)
Yes	36.80 $\pm$ 10.37	10.37	
Age (range: 18 – 86 years)	59.23 $\pm$ 14.43	-0.098	0.255 (-0.97, 0.05)
Hope (range: 31 - 64)	46.43 $\pm$ 4.81	0.231	0.000 (0.24, 0.78)

(44).

Based on the findings of this study, hemodialysis adequacy emerged as another predictor of happiness. Hasani et al. observed that patients with higher dialysis adequacy exhibited better psychological conditions compared to their counterparts (45). Al Awwa and Jallad also noted a significant inverse relationship between depression and hemodialysis adequacy (46). Optimal hemodialysis adequacy, leading to reduced accumulation of metabolites in the body and improved electrolyte balance, may contribute to more stable moods in patients.

One limitation of this study is its cross-sectional design, which constrains our ability to establish causal relationships between variables. Despite the study being conducted entirely on a voluntary basis with assurances of confidentiality, there remains a possibility that participants' responses could be biased, especially when providing sensitive information about their conditions. This is a common limitation of self-report questionnaires, where there might be a risk of receiving inaccurate responses.

### 5.1. Conclusions

The study found that most hemodialysis patients in Iran experience a moderate level of happiness. It also identified several factors that influence happiness among hemodialysis patients, including marital status, education level, hope, and hemodialysis adequacy, as significant predictors. These findings offer valuable insights for policy-makers and health managers to enhance the happiness of this patient group. Future research should aim to develop effective interventions to promote the mental health and happiness of hemodialysis patients.

### Acknowledgments

We would like to thank the university authorities and the patients who participated in this study.

### Footnotes

**Authors' Contribution:** SZHG and SAM conceived and designed the research method and helped to draft the manuscript. BU and FH collected the data. SAM performed the statistical analysis. SZHG and SAM revised the manuscript. All authors read and approved the final manuscript.

**Conflict of Interests:** The authors declare that they have no competing interests.

**Data Availability:** The datasets used during the current investigation are available from the corresponding author upon reasonable request.

**Ethical Approval:** This study was approved by the Ethics Committee of Qazvin University of Medical Sciences (IR.QUMS.REC.1399.516). All methods were carried out in accordance with relevant guidelines and regulations.

**Funding/Support:** This study was supported by the research department of Qazvin University of Medical Science.

**Informed Consent:** Before data collection, written informed consent form was obtained from all the participants or their legal guardian.

### References

1. Lopez-Novoa JM, Martinez-Salgado C, Rodriguez-Pena AB, Lopez-Hernandez FJ. Common pathophysiological mechanisms of chronic kidney disease: therapeutic perspectives. *Pharmacol Ther.* 2010;**128**(1):61-81. [PubMed ID: 20600306]. <https://doi.org/10.1016/j.pharmthera.2010.05.006>.
2. Saran R, Robinson B, Abbott KC, Agodoa LY, Bhawe N, Bragg-Gresham J. Erratum Regarding "US Renal Data System 2017 Annual Data Report: Epidemiology of Kidney Disease in the United States" (Am J Kidney Dis. 2018;**71**[3][suppl 1]:Svii,S1-S676). *Am J Kidney Dis.* 2018;**71**(4):501. [PubMed ID: 29579418]. [PubMed Central ID: PMC6608572]. <https://doi.org/10.1053/j.ajkd.2018.03.001>.
3. Dehghani A, Alishavandi S, Nourimajalan N, Fallahzadeh H, Rahmanian V. Prevalence of chronic kidney diseases and its determinants among Iranian adults: results of the first phase of Shahedieh cohort study. *BMC Nephrol.* 2022;**23**(1):203. [PubMed ID: 35681145]. [PubMed Central ID: PMC9185869]. <https://doi.org/10.1186/s12882-022-02832-5>.
4. Taherkhani M, Mohammadi F, Rashvand F, Motalebi SA. Predictors of Perceived Caregiving Burden among Caregivers of Elderly Dialysis Patients. *Salmand.* 2022;**16**(4):482-97. <https://doi.org/10.32598/sija.2021.2778.4>.
5. Rehman IU, Khan TM. Epidemiology of Chronic Kidney Diseases (CKD) in Malaysia and Pakistan, Pathophysiology of CKD-Associated Pruritus and Other CKD-Associated Dermatological Disorders. *Progress In Microbes & Molecular Biology.* 2020;**3**(1). <https://doi.org/10.36877/pmmb.a0000063>.
6. Filipic T, Bogataj S, Pajek J, Pajek M. Physical Activity and Quality of Life in Hemodialysis Patients and Healthy Controls: A Cross-Sectional Study. *Int J Environ Res Public Health.* 2021;**18**(4). [PubMed ID: 33670745]. [PubMed Central ID: PMC7922560]. <https://doi.org/10.3390/ijerph18041978>.
7. Mahama F. Comparing the Impact of Biopsychosocial Factors on the Subjective Well-Being (SWB) of Older Adults 50 Years and Over in the United States. Southern Connecticut State University; 2021.
8. Frad Tabatabaei M, Raghbi M. Effect of happiness training in depression, anxiety, and quality of life among hemodialysis patients. *Journal of Research and Health.* 2017;**7**(4):935-43.
9. Diener E. Subjective Well-Being. *The Science of Well-Being.* 2009. p. 11-58. [https://doi.org/10.1007/978-90-481-2350-6\\_2](https://doi.org/10.1007/978-90-481-2350-6_2).
10. Ritika Y, Dr. Gopal Chandra M. Effects of Happiness on Mental Health. *International Journal of Indian Psychology.* 2015;**2**(3). <https://doi.org/10.25215/0203.085>.
11. Mehrdadi A, Sadeghian S, Direkvand-Moghadam A, Hashemian A. Factors Affecting Happiness: A Cross-Sectional Study in the Iranian



- Youth. *J Clin Diagn Res.* 2016;**10**(5):VC01-3. [PubMed ID: 27437333]. [PubMed Central ID: PMC4948509]. <https://doi.org/10.7860/JCDR/2016/17970.7729>.
12. Dashti A, Shahgholian N, Mafi M, Goudarzi F, Hoseinigolafshani S. How to increase dialysis adequacy; A randomized clinical trial. *Journal of Nephropathology.* 2019;**9**(1):e09. <https://doi.org/10.15171/jnp.2020.09>.
13. Mota Sousa LM, Antunes AV, Alves Marques-Vieira CM, Lopes Silva PC, Martins de SousaValentim OM, Guerreiro José HM. Subjective wellbeing, sense of humor and psychological health in hemodialysis patients. *Enfermería Nefrológica.* 2019;**22**(1):34–41. <https://doi.org/10.4321/s2254-28842019000100006>.
14. Mehrabi Y, Ghazavi Z, Shahgholian N. Effect of fordyce's happiness program on stress, anxiety, and depression among the patients undergoing hemodialysis. *Iranian journal of nursing and midwifery research.* 2017;**22**(3):190–4.
15. Veenhoven R. *Conditions of happiness.* Springer Science & Business Media; 2013.
16. Poursina M, Ahmadi KH, Shafiabadi A. The impact of happiness on anxiety, academic achievement and parent-child relationships in teenage girls. *J Family Res.* 2013;**10**(3):41–54.
17. Oshvandi K, Amini S, Moghimbeigi A, Sadeghian E. The Effect of a Spiritual Care on Hope in Patients Undergoing Hemodialysis: A Randomized Controlled Trial. *Current Psychiatry Research and Reviews.* 2020;**16**(1):68–75. <https://doi.org/10.2174/2666082216666200316142803>.
18. Ben-Arye E, Ben-Arye Y, Barak Y. Eva Between Anxiety and Hope: Integrating Anthroposophic Music Therapy in Supportive Oncology Care. *Health Psychol Res.* 2015;**3**(3):2199. [PubMed ID: 26973967]. [PubMed Central ID: PMC4768529]. <https://doi.org/10.4081/hpr.2015.2199>.
19. Alshraifeen A, Al-Rawashdeh S, Herth K, Alnuaimi K, Alzoubi F, Khraim F, et al. The association between hope and quality of life in haemodialysis patients. *Br J Nurs.* 2020;**29**(21):1260–5. [PubMed ID: 33242282]. <https://doi.org/10.12968/bjon.2020.29.21.1260>.
20. Snyder CR. *Handbook of hope: Theory, measures, and applications.* Academic press; 2000.
21. Moreira RA, da Silva Borges M, Moura AL. The hope of patients undergoing hemodialysis and peritoneal dialysis. *Multidisciplinary Experiences in Renal Replacement Therapy.* 2022:27.
22. Siqueira J, Fernandes NM, Moreira-Almeida A. Association between religiosity and happiness in patients with chronic kidney disease on hemodialysis. *J Bras Nefrol.* 2019;**41**(1):22–8. [PubMed ID: 30421782]. [PubMed Central ID: PMC6534031]. <https://doi.org/10.1590/2175-8239-jbn-2018-0096>.
23. Daugirdas JT. Second generation logarithmic estimates of single-pool variable volume Kt/V: an analysis of error. *J Am Soc Nephrol.* 1993;**4**(5):1205–13. [PubMed ID: 8305648]. <https://doi.org/10.1681/ASN.V451205>.
24. Hills P, Argyle M. The Oxford Happiness Questionnaire: a compact scale for the measurement of psychological well-being. *Personality and Individual Differences.* 2002;**33**(7):1073–82. [https://doi.org/10.1016/s0191-8869\(01\)00213-6](https://doi.org/10.1016/s0191-8869(01)00213-6).
25. Willmot DR. White lesions after orthodontic treatment: does low fluoride make a difference? *J Orthod.* 2004;**31**(3):235–42. discussion 202. [PubMed ID: 15489367]. <https://doi.org/10.1179/146531204225022443>.
26. Liaghatdar MJ, Jafari E, Abedi MR, Samiee F. Reliability and validity of the Oxford Happiness Inventory among university students in Iran. *Span J Psychol.* 2008;**11**(1):310–3. [PubMed ID: 18630671]. <https://doi.org/10.1017/s1138741600004340>.
27. Snyder CR, Harris C, Anderson JR, Holleran SA, Irving LM, Sigmon ST, et al. The will and the ways: development and validation of an individual-differences measure of hope. *J Pers Soc Psychol.* 1991;**60**(4):570–85. [PubMed ID: 2037968]. <https://doi.org/10.1037/0022-3514.60.4.570>.
28. Kermani Z, Khodapanahi M, Heidari M. Psychometrics features of the Snyder Hope Scale. *J Applied Psychol.* 2011.
29. Alshelleh S, Alhawari H, Alhourri A, Abu-Hussein B, Oweis A. Level of Depression and Anxiety on Quality of Life Among Patients Undergoing Hemodialysis. *Int J Gen Med.* 2023;**16**:1783–95. [PubMed ID: 37193250]. [PubMed Central ID: PMC10183175]. <https://doi.org/10.2147/IJGM.S406535>.
30. Bautovich A, Katz I, Smith M, Loo CK, Harvey SB. Depression and chronic kidney disease: A review for clinicians. *Aust N Z J Psychiatry.* 2014;**48**(6):530–41. [PubMed ID: 24658294]. <https://doi.org/10.1177/0004867414528589>.
31. Strobel M, Tumasjan A, Sporrlé M. Be yourself, believe in yourself, and be happy: self-efficacy as a mediator between personality factors and subjective well-being. *Scand J Psychol.* 2011;**52**(1):43–8. [PubMed ID: 20497398]. <https://doi.org/10.1111/j.1467-9450.2010.00826.x>.
32. Stack S, Eshleman J. Marital Status and Happiness: A 17-Nation Study. *Journal of Marriage and the Family.* 1998;**60**(2). <https://doi.org/10.2307/353867>.
33. Sheikhmoonesi F, Zarghami M, Khademloo M, Alimohammadi MM. Happiness and associated demographic factors among medical students of Mazandaran University of Medical Sciences, 2010. *Journal of Mazandaran University of Medical Sciences.* 2013;**22**(97):132–7.
34. Kao TW, Lai MS, Tsai TJ, Jan CF, Chie WC, Chen WY. Economic, social, and psychological factors associated with health-related quality of life of chronic hemodialysis patients in northern Taiwan: a multicenter study. *Artif Organs.* 2009;**33**(1):61–8. [PubMed ID: 19178442]. <https://doi.org/10.1111/j.1525-1594.2008.00675.x>.
35. Han KT, Park EC, Kim JH, Kim SJ, Park S. Is marital status associated with quality of life? *Health Qual Life Outcomes.* 2014;**12**:109. [PubMed ID: 25104276]. [PubMed Central ID: PMC4148557]. <https://doi.org/10.1186/s12955-014-0109-0>.
36. Kowal M, Coll-Martin T, Ikizer G, Rasmussen J, Eichel K, Studzinska A, et al. Who is the Most Stressed During the COVID-19 Pandemic? Data From 26 Countries and Areas. *Appl Psychol Health Well Being.* 2020;**12**(4):946–66. [PubMed ID: 32996217]. [PubMed Central ID: PMC7537225]. <https://doi.org/10.1111/aphw.12234>.
37. Saavedra JE. Socio-demographic factors and early life events associated with happiness in adults of Metropolitan Lima. *Rev Peru Med Exp Salud Publica.* 2020;**37**(1):42–50. [PubMed ID: 32520190]. <https://doi.org/10.17843/rpmpesp.2020.371.4580>.
38. Azizi M, Mohamadian F, Ghajarieah M, Direkvand-Moghadam A. The Effect of Individual Factors, Socioeconomic and Social Participation on Individual Happiness: A Cross-Sectional Study. *J Clin Diagn Res.* 2017;**11**(6):VC01–4. [PubMed ID: 28764272]. [PubMed Central ID: PMC5535462]. <https://doi.org/10.7860/JCDR/2017/24658.9982>.
39. Farnia F, Baghshahi N, Zarei H. The effectiveness of group hope therapy on happiness in hemodialysis patients. *Nursing Midwifery J.* 2016.
40. Billington E, Simpson J, Unwin J, Bray D, Giles D. Does hope predict adjustment to end-stage renal failure and consequent dialysis? *Br J Health Psychol.* 2008;**13**(Pt 4):683–99. [PubMed ID: 17958929]. <https://doi.org/10.1348/135910707X248959>.
41. Rahimipour M, Shahgholian N, Yazdani M. Effect of hope therapy on depression, anxiety, and stress among the patients undergoing hemodialysis. *Iran J Nurs Midwifery Res.* 2015;**20**(6):694–9. [PubMed ID: 26793255]. [PubMed Central ID: PMC4700689]. <https://doi.org/10.4103/1735-9066.170007>.
42. Vadaei S, Sahebazzamani M, Moghadam LF. Evaluation of mental health and hope in dialysis patients. *Iranian Journal of Rehabilitation Research in Nursing.* 2019;**6**(2):132–9.
43. Yucens B. The association between hope, anxiety, depression, coping strategies and perceived social support in patients with chronic kidney disease. *Dusunen Adam: The Journal of Psychiatry*

- and Neurological Sciences. 2019. <https://doi.org/10.14744/dajpns.2019.00006>.
44. Pasyar N, Rambod M, Jowkar M. The Effect of Peer Support on Hope Among Patients Under Hemodialysis. *Int J Nephrol Renovasc Dis.* 2020;**13**:37–44. [PubMed ID: [32214839](https://pubmed.ncbi.nlm.nih.gov/32214839/)]. [PubMed Central ID: [PMC7078768](https://pubmed.ncbi.nlm.nih.gov/PMC7078768/)]. <https://doi.org/10.2147/IJNRD.S240756>.
  45. Hasani J, Yazdani-charati J, Espahbodi F, Jafari H. Relationship of dialysis adequacy with depression and anxiety in hemodialysis patients. *J Health Research In Community.* 2020;**6**(2):52–60.
  46. Al Awwa IA, Jallad SG. Prevalence of Depression in Jordanian Hemodialysis Patients. *Iranian Journal of Psychiatry and Behavioral Sciences.* 2018;**12**(2). <https://doi.org/10.5812/ijpbs.11286>.