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# Person-centered climate from the perspective of hemodialysis patients and nurses working in hemodialysis units

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## Abstract

**Background:** Person-centered care (PCC) is considered an important component of high-quality care in hemodialysis units. Hemodialysis patients and nurses may have different perceptions of person-centeredness in hemodialysis units. The present study aimed to assess the PCC from the perspective of hemodialysis patients and nurses working in the hemodialysis unit.

**Methods:** This cross-sectional study was performed on 200 patients and 71 nurses working in two hemodialysis units. Data were collected using a demographic questionnaire, person-centered climate questionnaire-patient version (PCQ-P), and person-centered climate questionnaire-staff version (PCQ-S). Data were analyzed by SPSS software (ver. 24) using ANOVA and independent *t*-tests.

**Results:** The mean score of person-centered climate from the patients' view was  $81.49 \pm 7.14$  (Possible score: 17–102). Independent *t*-test showed that the mean total score of PCQ-P in patients undergoing hemodialysis in the Imam Reza Hospital ( $82.26 \pm 7.09$ ) was more than those undergoing hemodialysis in the Sina Hospital ( $78.60 \pm 6.61$ ) ( $P < 0.05$ ). The mean score of the safety subscale showed a statistically significant difference between the two hemodialysis centers ( $P < 0.05$ ). The mean total score of PCQ-S from the nurses' view was  $66.86 \pm 8.07$  out of 84. The mean score of the everydayness subscale showed a statistically significant difference between nurses working in two hemodialysis units ( $P < 0.05$ ).

**Conclusion:** Although the results showed an acceptable score in the person-centered climate questioner, it needs some improvements in the fields of safety and everydayness. The environment of the hemodialysis unit could limit or enhance the implementation of person-centered processes.

**Keywords:** Person-centered care, Person-centered climate, Hemodialysis, Nurses

## Introduction

Chronic kidney disease (CKD) is a worldwide health problem with substantial global mortality and morbidity [1, 2]. Moreover, the prevalence of this disease is increasing in the world, especially in developing countries [3, 4]. Hemodialysis is the most common kidney replacement

therapy in the world and about 90% of patients with ESRD undergo hemodialysis treatment [5, 6]. Although hemodialysis increases patients' survival, it also imposes some complications on these patients [7, 8]. The complications and changes in the patient's life could affect their independence and self-confidence [9] and lead to some physical, psychological, social, and economic problems [10, 11].

A major challenge for healthcare providers is to develop strategies for better understanding and improving the physical and mental health of patients undergoing

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hemodialysis. Moreover, there is growing evidence of the importance of considering the unique perspectives, experiences, and characteristics of each patient in the development of care plans [12–14]. In this regard, person-centered care (PCC), instead of patient-centered care, has been proposed as an effective strategy for providing high-quality health care. [15]. PCC approach is considered holistic care and focuses on the promotion of the individuals' health in all physical, psychological, and social aspects [16]. A person-centered approach focuses on the individual's personal goals, needs, desires, and wants so that they become central to the care delivery. Moreover, in this approach, all care plans are tailored to the individual's preferences and the patient is valued as a person with valuable social relationships [17, 18].

PCC has revolutionized the traditional caring approaches, where the healthcare decisions and plans have been made based on the perspective of healthcare providers rather than patients as a person [19]. In this regard, the world health organization (WHO) has developed a "Person-centered health care" program, taking into account the views of individuals, caregivers, families, and society in healthcare systems [20].

According to the literature review, the main component of person-centered care includes developing goal setting based on the person's preferences, continuing assessment of the person's goals and care plan, active harmonization among all healthcare providers, information sharing and integrated communication, education and supporting of care providers, the person and those important to the person, receiving the feedback from the person and caregivers [15, 21].

The person-centered nursing framework has been developed by McCormack & McCance and emphasizes key factors such as nurses' perception of patients' values and beliefs and the care environment [17]. The care environment has a major influence on the implementation of person-centered nursing and provides the greatest potential for limiting or providing PCC [22]. Brooker highlights the importance of the environment and attention to the views of individuals in providing PCC. She believes that a positive psychosocial environment supports the personality of individuals as valuable individuals regardless of their disease status [23]. Person-centered climate is a physical, psychosocial environment in which person-centered care is performed and consists of three dimensions: safety, everydayness, and hospitality [24]. The safety dimension refers to the availability, responsibility and competence of staff, effective communication with patients, respect for privacy, and cleanliness of the care environment. The everydayness dimension refers to the interesting and beautiful scenes in the environment and allowing patients to talk about daily experiences.

The hospitality dimension focuses on individuals' expectations, preferences, and the amount of acceptance and care. An appropriate person-centered climate could help to maintain an individual's personality and support his or her values and beliefs [25].

In the nursing field, PCC is shown in the form of nurses' interaction with the person and attempts to identify the patients' preferences, background, history, and social status. This information is used as a basis for all processes of care delivery and patient-related decisions makings [26]. In other words, this concept focuses on attempts to understand and use the individual's perspective on the provision of care [27]. Brooker believes that in the PCC approach, patients' needs take precedence over staff needs, and it helps to develop effective steps to promote patient health by considering the individual perspectives and creating a positive care climate [23]. Based on the literature review, there are some major barriers to PCC such as traditional approaches to clinical practice, heavy workload of care providers, misaligned incentives, provider concerns for risk and safety, lack of advance care planning, and lack of continuity in health records [21].

Nurses' work environment is very important for achieving professional nursing goals because this environment affects the behavior of nurses working in the healthcare organization [28]. Nurses play a central role in the health system and are morally and legally responsible for the quality of care they provide to patients, so, it is important to pay attention to nurses' views on their perception of high-quality care [29].

The evidence shows that PCC could have a variety of benefits such as improving the quality of health care, increasing patient safety, reducing costs, and increasing satisfaction of patients, families, and healthcare providers [30, 31]. Moreover, providing this type of care for patients with chronic diseases could lead to a positive patient–nurse relationship, improved patients' outcomes, and their adherence to treatment regimens [32]. PCC also increases the participation of patients and their families in care decisions and improves their knowledge of care [33].

The importance of the PCC approach for CKD patients has been emphasized in the literature review [15, 34]. PCC could be effective for improving the self-management programs and health status of CKD patients [35]. According to the literature review, patients' participation in care planning could increase the likelihood of achieving care goals [36, 37]. The literature review shows that patients undergoing hemodialysis are willing to participate in shared decision making with healthcare providers for care planning and clinical decisions [37, 38]. Considering that the dialysis process has a profound effect on the patient's life, the assessment of the patient's attitude

and experiences on PCC can be effective in improving the patient's well-being and their quality of care [39]. To further promote PCC, stakeholders, kidney disease foundations, and healthcare professionals should support the care plans which is in line with person-centered approaches [40]. Results of a study aimed to develop PCC in hemodialysis wards showed that developing PCC in hemodialysis wards promotes the alignment of hemodialysis care with the goals and priorities identified by the patients [41].

In Iran, most of the hemodialysis centers is located in the governmental hospitals affiliated to ministry of health. The cost of dialysis is free for patients and the insurances pay the cost of dialysis. More than 95% of patients with CKD in our country is going HD usually three times a week.

Although CKD patients need more comprehensive care, the available evidence suggests that most patients who require hemodialysis do not receive PCC [42]. PCC has been studied in some chronic diseases; however, the literature review shows that there are few studies on person-centered care among CKD patients on hemodialysis. Moreover, to the best of our knowledge, there are a knowledge gap in comparison of PCC from the perspective of dialysis patients and healthcare providers. Therefore, it is necessary to study assess both patients' and staff's perspectives on PCC. Hemodialysis patients and nurses may have different perceptions of person-centeredness in hemodialysis units. Therefore, the main research question was: What are the viewpoint of hemodialysis patients and nurses on the PCC. Then, comparison of the mean score of PCC was done based on the demographic characteristics of the participants.

## Methods

### Design

This is a cross-sectional study that was performed on 200 patients undergoing hemodialysis and 71 nurses working in the hemodialysis units of Imam Reza and Sina Hospitals, Tabriz, Iran. The relevant guidelines for cross-sectional studies (STROBE Statement) were used for all methods of the study.

### Sample and setting

This study was done in two hospitals affiliated with Tabriz University of Medical Sciences, Iran. Both hospital are educational hospital affiliated to Tabriz University of Medical Sciences which provide services to the hemodialysis patients. Krejcie & Morgan's sampling formula was used to determine the sample size [43]. The total patient population of these two dialysis center were 418 (339 patients were undergoing HD in the Imam Reza and 79 patients in the Sina hospital). Therefore, the sample size

was calculated as 200 HD patients by using the following formula. Confidence interval was considered as 95%:

$$n = \frac{(\chi^2)(N)(P)(1 - P)}{[(d^2)(N - 1) + (\chi^2)(P)(1 - P)]}$$

Since 81% of population were undergoing dialysis in the Imam Reza dialysis center, 81% of samples ( $n=162$ ) were recruited from this center. Other 19% of samples ( $n=38$ ) were recruited from the Sina hemodialysis center based on the stratified random sampling method. Therefore, a total of 200 hemodialysis patients were selected in this study.

The total number of nurses working in these two dialysis centers was 86 (71 nurses in Imam Reza hospital and 15 nurses in Sina Hospital). Since the population of nurses were small, we invited all nurses to participate in the study. Finally, a total of 71 nurses participated in the present study (response rate: 83%), of whom 60 nurses were from Imam Reza (AS) Hospital and 11 from Sina Hospital. The response rate of HD patients was 95%.

Participants were selected using a random sampling method. Inclusion criteria for patients included patients aged over 18 years and undergoing hemodialysis at least 3 times a week for more than three months. Patients with peritoneal dialysis or kidney transplantation were excluded from the study. Moreover, patients with severe mental or cognitive disorders were excluded from the study. Inclusion criteria for nurses included all nurses who were working fulltime in the hemodialysis department for at least six months. Dialysis nurses working in other wards or working in part time were excluded from the study. Eligible patients and nurses entered the study after obtaining their informed consent and explaining the study objectives to them.

### Data collection

Data were collected from September to November 2020. Data collection was carried out using a demographic information questionnaire, person-centered climate questionnaire-patient version (PCQ-P), and person-centered climate questionnaire-staff version (PCQ-S). PCQ-P was developed by Edvardsson et al. in 2008 [24]. This questionnaire assesses the person-centered climate from the patients' perspective. It consists of 17 items with three domains: safety (questions 1–10), everydayness (questions 11–14), and hospitality (questions 15–17). The answers are based on the six-point Likert scale: Strongly disagree (1), Disagree (2), Relatively disagree (3), Relatively agree (4), Agree (5), and Completely agree (6). Therefore, the total score of the instrument ranged from 17 to 102. The higher scores indicate a better PCC climate. The validity and reliability of this instrument have

been investigated by Edvardsson et al. [24] and its reliability has been reported using Cronbach's alpha of 0.93 for the whole instrument, which indicates the acceptable reliability of the scale. Cronbach's alpha of the above instrument in the present study has been reported as 0.87.

PCQ-S was developed by Edvardsson et al. in 2009 [44]. This questionnaire consists of 14 items which are answered based on a 6-point Likert scale similar to PCQ-P. This instrument consists of three subscales: Safety, everydayness, and community. The safety subscale (questions 1–5) refers to the environmental safety, competence, and interpersonal skills of staff. The everydayness (questions 6–10) refers to the positive daily experiences and cleanliness of the environment, and the last domain refers to the community (questions 11–14) and maintenance of a relationship between the patient with family members, relatives, and staff during hospitalization. Therefore, the possible total score of PCQ-S ranged from 14 to 84, with higher scores indicating a higher PCC level. Its reliability has been reported to be 0.88 using Cronbach's alpha, which indicates the high reliability of the scale [44].

The Persian versions of the PCQ-P and PCQ-S questionnaires were used in the study. For this purpose, the forward–backward method was used. After forward translating of the questionnaires by an expert in the field of English and Persian language, the questionnaire was back-translated from the Persian to English by another bilingual person. Then, the Persian version was given to ten expert (6 professors of the faculty of Nursing and Midwifery and 4 nurses working in the dialysis field) to comment on the scale. The item content validity index (I-CVI) of the final version of the scales ranged from 0.85 to 0.93 and the scale content validity index (S-CVI) ranged from 0.80 to 0.97, which indicated a high content validity. The Cronbach's alpha coefficient of PCQ-P and PCQ-S questionnaires was 0.93 and 91, respectively.

#### Data analysis

The collected data were analyzed using ANOVA and independent *t*-test in SPSS ver. 24. Data are shown in tables with using descriptive analysis such as mean  $\pm$  standard deviation. *P*-value  $< 0.05$  was set as significance level.

## Results

### Background characteristics of the patients

There is no missing data in the dialysis nurses. Two HD patients responded less than 50% of the questions of the scales, these scales were excluded from the analysis. The presents study was carried out on 200 hemodialysis patients referred to two dialysis centers (Imam Reza

(AS) Hospital and Sina Hospital) affiliated to Tabriz University of medical sciences. The mean age of the participants was  $56.55 \pm 13.46$  years and the majority of them (89%) were married. The mean duration of hemodialysis treatment was  $3.18 \pm 3.46$  years. The majority of patients (77.5%) undergo hemodialysis three times a week. Concerning CKD etiology, hypertension (40.5%) and diabetes (13%) were the most common causes of CKD. Most of the patients lived in the city (94%). The largest number of patients undergoing hemodialysis (45%) had a monthly income of 10 to 20 million Rials (Table 1).

### Patients' perception on person-centered climate

Table 2 shows the mean score of the subscales of person-centered climate from the perspective of hemodialysis patients. The mean total score of PCC climate from the patients' perspective was  $81.49 \pm 7.14$  (the possible score range: 17–102). The results of the study showed no significant difference in the mean PCC climate scores in terms of sex, treatment duration, marital status, job, income, and the number of dialysis sessions per week ( $P > 0.05$ ).

**Table 1** Demographic characteristics of patients (N = 200)

| Variables                              |                    | N = 200           |
|--|--------------------|-------------------|
|  |                    | Mean $\pm$ SD     |
| Age (years)                            |                    | 56.55 $\pm$ 13.46 |
| Duration of dialysis treatment (month) |                    | 3.18 $\pm$ 3.46   |
|  |                    | N(%)              |
| Gender                                 | Male               | 141(70.5%)        |
|  | Female             | 59(29.5%)         |
| Marital status                         | Single             | 10(5%)            |
|  | Married            | 178(89%)          |
|  | Divorced           | 12(6%)            |
| Education level                        | Illiterate         | 50(25%)           |
|  | Elementary school  | 51(25.5%)         |
|  | Junior High school | 26(13%)           |
|  | Diploma            | 54(27%)           |
|  | University         | 19(9.5%)          |
| Living in                              | Urban              | 188(94%)          |
|  | Rural              | 12(6%)            |
| Income                                 | < 50 US dollars    | 28(14%)           |
|  | 50–100 US dollars  | 90(45%)           |
|  | 100–150 US dollars | 56(28%)           |
|  | > 150 US dollars   | 26(13%)           |
| Hemodialysis per week                  | Two session        | 45(22.5%)         |
|  | Three session      | 155(77.5%)        |
| Etiology of Chronic kidney disease     | Hypertension       | 81(40.5%)         |
|  | Diabetes Mellitus  | 26(13%)           |
|  | HTN&DM             | 52(26%)           |
|  | Glomerulonephritis | 5(2.5%)           |
|  | Polycystic         | 13(6.5%)          |
|  | Nephrolithiasis    | 7(3.5%)           |
|  | Trauma             | 2(1%)             |
|  | unknown            | 14(7%)            |
| Hospital                               | Imam Reza          | 162(81%)          |
|  | Sina               | 38(19%)           |

**Table 2** Mean score of Person-centered climate by subscales from the perspective of hemodialysis patients (N = 200)

| Subscales of PCQ-P                             | Mean ± Sd    |
|--|--------------|
| A climate of safety (score from 10 to 60)      | 52.37 ± 4.67 |
| A climate of everydayness (score from 4 to 24) | 16.28 ± 2.34 |
| A climate of hospitality (score from 3 to 18)  | 12.86 ± 1.44 |
| Total (score from 17 to 102)                   | 81.49 ± 7.14 |

However, the mean score of the safety subscale showed a statistically significant difference between the two hemodialysis centers ( $P < 0.05$ ). Independent *t*-test showed that the mean score of safety ( $52.72 \pm 4.61$ ) and everydayness ( $16.69 \pm 2.29$ ) scores among patients undergoing hemodialysis in the dialysis unit of Imam Reza Hospital was higher than the scores of safety ( $50.97 \pm 4.69$ ) and everydayness ( $14.63 \pm 1.78$ ) of Sina Hospital. Also, the mean total score of PCC climate from the perspective of patients on hemodialysis in Imam Reza Hospital ( $82.26 \pm 7.09$ ) was higher than patients in Sina Hospital ( $78.60 \pm 6.61$ ) ( $P < 0.05$ ). However, there was no significant difference between the two hemodialysis centers in terms of the mean score of the hospitality subscale ( $P > 0.05$ ).

Pearson correlation test showed an inverse and significant relationship between the patients' age and the mean score of safety subscale ( $r = -0.20$ ,  $P < 0.05$ ). There was no significant relationship between the patients' age with other domains and the total score of the PCC-p ( $P > 0.05$ ) (Table 3).

**Background characteristics of the nurses**

The majority of nurses were female (87.3%) and most of them were married (70.4%). Also, most of the nurses working in the hemodialysis units (84.5%) had rotating shifts. About 95.8% of nurses had a bachelor's degree in nursing (Table 4).

**Table 4** Demographic characteristics of Nurses (N = 71)

| Variables                           |                     | N = 71       |
|-------------------------------------|---------------------|--------------|
|                                     |                     | Mean ± SD    |
| Age (years)                         |                     | 37.82 ± 7.80 |
| Duration of work experience (month) |                     | 12.93 ± 6.80 |
|                                     |                     | N(%)         |
| Gender                              | Male                | 9(12.7%)     |
|                                     | Female              | 62(87.3%)    |
| Marital status                      | Single              | 21(29.6%)    |
|                                     | Married             | 50(70.4%)    |
| Education level                     | Bachelor of Science | 68(95.8%)    |
|                                     | Master of Science   | 3(4.2%)      |
| Type of shift                       | Fixed               | 11(15.5%)    |
|                                     | Rotation            | 60(84.5%)    |

**Table 5** Mean score of Person-centered climate by subscales from the perspective of hemodialysis Nurses (N = 71)

| Subscales of PCQ-5                             | Mean ± Sd    |
|--|--------------|
| A climate of safety (score from 5 to 30)       | 25.87 ± 2.81 |
| A climate of everydayness (score from 5 to 30) | 22.10 ± 4.35 |
| A climate of community (score from 4 to 24)    | 18.89 ± 3.05 |
| Total (score from 14 to 84)                    | 66.86 ± 8.07 |

**Nurses' perception on person-centered climate**

In this study, the person-centered climate was assessed from the perspective of hemodialysis nurses too. The mean total score of PCQ-S from their perspective was  $66.86 \pm 8.07$  (the possible score range = 14–84) (Table 5). The mean total score of PCC climate showed no statistically significant difference between nurses working in two hemodialysis units. Moreover, the mean total score PCC climate was not significantly different in terms of variables such as nurses' sex, age, marital status, work experience, employment status, and working shifts ( $P > 0.05$ ). However, the comparison of the mean score

**Table 3** Comparison of mean score of PCQ-P based on Patients characteristics (N = 200)

| Variables             |               | Safety       |                              | Everydayness |                            | Hospitality  |                            | Total        |                             |
|-----------------------|---------------|--------------|------------------------------|--------------|----------------------------|--------------|----------------------------|--------------|-----------------------------|
|                       |               | Mean ± SD    | P-value                      | Mean ± SD    | P value                    | Mean ± SD    | P-value                    | Mean ± SD    | P value                     |
| Gender                | Male          | 52.64 ± 4.72 | $P = 0.20^a$                 | 16.37 ± 2.31 | $P = 0.43^a$               | 12.98 ± 1.37 | $p = 0.08^a$               | 81.94 ± 7.07 | $P = 0.18^a$                |
|                       | Female        | 51.68 ± 4.49 | $t = 1.28$                   | 16.08 ± 2.43 | $t = 0.79$                 | 12.59 ± 1.57 | $t = 1.74$                 | 80.36 ± 7.25 | $t = 1.35$                  |
| Hemodialysis per week | Two session   | 53.30 ± 4.04 | $P = 0.14^a$                 | 16.43 ± 2.24 | $P = 0.64^a$               | 13.11 ± 1.28 | $P = 0.18^a$               | 82.78 ± 6.44 | $P = 0.17^a$                |
|                       | Three session | 52.10 ± 4.82 | $t = 1.49$                   | 16.24 ± 2.39 | $t = 0.47$                 | 12.78 ± 1.48 | $t = 1.33$                 | 81.09 ± 7.31 | $t = 1.35$                  |
| Hospital              | Imam Reza     | 52.72 ± 4.61 | $P = 0.03^a$                 | 16.69 ± 2.29 | $P = 0.0001^a$             | 12.83 ± 1.49 | $P = 0.50^a$               | 82.26 ± 7.09 | $P = 0/005^a$               |
|                       | Sina          | 50.97 ± 4.69 | $t = -2.08$                  | 14.63 ± 1.78 | $t = -5.16$                | 13.00 ± 1.25 | $t = 0.66$                 | 78.60 ± 6.61 | $t = -2.86$                 |
| Age (years)           |               | 52.37 ± 4.67 | $P = 0.006^b$<br>$r = -0.20$ | 16.28 ± 2.34 | $P = 0.59^b$<br>$r = 0.03$ | 12.86 ± 1.44 | $P = 0.58^b$<br>$r = 0.04$ | 81.49 ± 7.14 | $P = 0.16^b$<br>$r = -0.10$ |

<sup>a</sup> Independent *t*-test; <sup>b</sup> Pearson correlation test

of everydayness subscale showed a statistically significant difference between two dialysis centers ( $P < 0.05$ ); the mean of everydayness subscale from the perspective of nurses working in the hemodialysis unit of Imam Reza Hospital ( $22.74 \pm 4.29$ ) was higher than the counterparts in the Sina Hospital ( $18.73 \pm 3.00$ ) (Table 6).

**Discussion**

Person-centered care (PCC) is one of the main determinants of care quality in clinical settings [45–47]. The care environment is also important for hemodialysis patients who spend a significant part of their time in these centers. Although the care environment is considered as one of the most important aspects of PCC, a literature review shows that there have been few studies on this concept especially among patients undergoing hemodialysis. The aim of the present study was to investigate the viewpoints of both hemodialysis patients and nurses working in the hemodialysis unit about PCC climate.

Based on the results of the study, the mean total score of PCC climate from the patients’ point of view was  $81.49 \pm 7.14$  out of 102, which indicates the high PCC climate in hemodialysis wards of the studied units. Kobrai-Abkenar et al. [48] conducted a study to evaluate the PCC climate among patients admitted to internal medicine, surgery, and ENT wards. The mean total score of PCC in these units was  $80.46 \pm 5.62$  which is similar to our results.

The results revealed a significant difference in the mean score of safety, everydayness domains, and the total score of PCC-P climate instruments between two dialysis hospitals. In other words, the mean score of PCC-P among patients on hemodialysis in Imam Reza Hospital was higher than patients undergoing hemodialysis in Sina Hospital. It seems that the reason for these differences is due to differences in the structure, physical space, and facilities of these two dialysis centers. The hemodialysis unit of Imam Reza hospital is the largest dialysis center in Iran with a total of 122 hemodialysis

beds and with an area of 8400 square meters which was established in 2016. It is one of the best-equipped centers in Iran in terms of physical space, lighting, the distance between beds, equipment, and facilities. A total of 350 patients undergoes hemodialysis in this center. In contrast, the Sina dialysis center is a small dialysis center with an old building that has 15 active beds and only 85 patients undergo hemodialysis in this center.

Based on the literature review, the hemodialysis patients’ safety is the basis for providing high-quality care [49], and improving the safety of these patients is one of the main goals of the healthcare system [50]. On the other hand, creating an environment in which patients feel safe requires the collaboration of all healthcare professionals [51].

According to the literature review, patients’ sense of safety refers to the feeling of freedom, security, and recovery during the process of receiving care and consists of items of trust in nurses, healthcare providers’ knowledge, and the presence of the family [52]. Wassenaar et al. [53] mentioned other aspects of nursing care such as monitoring the patient’s condition, allocating time to communicate and providing information, and interaction with patients as the activities that can help to create a sense of safety in the patients.

In a qualitative study, Lovink et al. [54] investigated the experiences of patients undergoing hemodialysis on safety. According to their results, the majority of patients regarded the factors such as highly skilled and knowledgeable nurses, physical presence and availability of nurses, personal attention, and having good therapeutic communication with patients as important factors of feeling safe emotionally and physically.

Most of the patients undergoing hemodialysis in Sina Hospital have high risks in terms of physical safety due to improper structure of the ward, being on the underground floor, absence of an emergency exit for emergencies, using old hemodialysis devices, and the lack of adequate space between the beds.

**Table 6** Comparison of mean score of PCQ-S based on Nurses characteristics (N = 71)

| Variables     | Safety    |                      | Everydayness |                      | Community   |                      | Total       |                      |             |
|---------------|-----------|----------------------|--------------|----------------------|-------------|----------------------|-------------|----------------------|-------------|
|               | Mean ± SD | P-value <sup>a</sup> | Mean ± SD    | P-value <sup>a</sup> | Mean ± SD   | P-value <sup>a</sup> | Mean ± SD   | P-value <sup>a</sup> |             |
| Gender        | Male      | 27.0001 ± 2.45       | $P = 0.19$   | 22.22 ± 3.11         | $P = 0.93$  | 19.78 ± 4.26         | $P = 0.35$  | 69.00 ± 5.12         | $P = 0.39$  |
|               | Female    | 25.69 ± 2.84         | $t = 1.30$   | 22.08 ± 4.53         | $t = 0.09$  | 18.76 ± 2.85         | $t = 0.94$  | 66.53 ± 8.43         | $t = 0.85$  |
| Type of shift | Fixed     | 26.54 ± 3.01         | $P = 0.39$   | 22.45 ± 4.50         | $P = 0.77$  | 19.00 ± 3.16         | $P = 0.89$  | 68.00 ± 8.09         | $P = 0.61$  |
|               | Rotation  | 25.74 ± 2.78         | $t = 0.87$   | 22.03 ± 4.36         | $t = 0.29$  | 18.87 ± 3.05         | $t = 0.13$  | 66.64 ± 8.13         | $t = 0.51$  |
| Hospital      | Imam Reza | 25.82 ± 2.92         | $P = 0.78$   | 22.74 ± 4.29         | $P = 0.004$ | 18.98 ± 3.06         | $P = 0.54$  | 67.60 ± 8.08         | $P = 0.09$  |
|               | Sina      | 26.09 ± 2.26         | $t = 0.29$   | 18.73 ± 3.003        | $t = -2.96$ | 18.36 ± 3.07         | $t = -0.62$ | 63.18 ± 7.29         | $t = -1.68$ |

<sup>a</sup> Independent t-test

In a study on factors affecting the safety of patients undergoing hemodialysis, Nobahar et al. [50] found that organizational policies are one of the most important and challenging barriers to patients' safety in hemodialysis units. Making incorrect organizational decisions regarding the location of the hemodialysis ward in the hospital, the number of beds, and the distance between hemodialysis beds could lead to impaired patient safety.

The results of the present study showed a significant negative relationship between patients' age and the mean score of the safety domain. However, there was no significant relationship between age and other domains of PCC climate and the total score of the PCC-p. Studies have shown that some elderly patients express insecurity about the fear of falling due to dizziness or weakness, vision impairment, low mobility, and lack of family members to help them inside the ward [49, 55]. Therefore, it seems that these factors could decrease the safety of old patients.

In this regard, Moran et al. [56] conducted a study to investigate the interaction between nurses and patients undergoing hemodialysis. The results showed that nurses rarely communicate with patients and mainly pay attention to the physical and technical aspects of care, which are not consistent with the results of the present study. In another study on the experiences of hemodialysis patients of PCC, Lewis et al. [57] showed limited evidence of PCC in hemodialysis wards and some organizational and individual barriers attributed to this issue.

The results showed a better score of everydayness subscale for patients admitted to Imam Reza Hospital compared with patients in Sina Hospital. This dimension focuses on the availability of interesting and beautiful scenes to watch, the calm and quiet climate similar to the climate of the house, allowing the patients to talk about daily experiences, positive thoughts, and removing unpleasant thoughts. Also, the total score of PCQ-P among patients undergoing hemodialysis in Imam Reza Hospital was higher than patients undergoing hemodialysis in Sina Hospital. It seems that watching beautiful scenes has positive effects on people's morale and increases patients' tolerance while spending time in the dialysis ward.

It seems that the good structure of the hemodialysis unit of Imam Reza Hospital such as the presence of beautiful scenes, large windows and the use of natural light during the daytime compared with Sina Hospital could attribute to the higher score of PCQ-P. Moreover, most patients admitted to the hemodialysis units of Sina Hospital referred to the absence of beautiful sceneries, paintings with natural images, artificial flowers, as well as the lack of proper lighting and ventilation as the barriers which reduce the everydayness feelings.

In a study of environmental psychology, McAndrew [58] showed that watching natural scenes reduces stress, evokes positive emotions and mood, and can accelerate the recovery process. In another study on the effect of the presence of indoor and outdoor plants in the medical center of cancer patients on the quality of treatment of cancer patients, Alitajer et al. [59] showed that patients are interested in the presence of natural elements and scenes in the hospital environment and reported that it helps them to relieve the physical symptoms, to reduce stress or improve the feeling of well-being. Patients, moreover, preferred to be in a better room with a large window overlooking the green plants, which would reduce depression and improve their morale. In other words, the PCC climate is interrelated with the appropriate landscape of the interior structure of the care environment. The similarity between the present study, which was performed on patients undergoing hemodialysis, and the study by Alitajer et al., which was performed on cancer patients, is that both studies were performed on chronic patients. In a recent study on older patients' perceptions of the PCC climate in a long-term care center in Ireland, Kelly et al. [60] found that everydayness was a significant aspect of PCC for the residents of the nursing home.

A previous study by Kobrai-Abkenar et al. [48] using the PCQ-P found that "in assessing the quality of health care from the patient's perspective, physical environmental factors such as well-groomed staff, neat and clean hospital environment, modern medical equipment, harmonious physical layout and appropriate signage, and the presence of windows are important. In addition to the known evidence that physical environmental factors such as a harmonious physical layout, appropriate signage, and windows are important in assessing the quality of health care from the patient's perspective," the PCQ-P items "a place where the staff talk to me (the patient) in a way that I can understand" and "a place where the staff make efforts to make me feel comfortable" scored high. This suggests the importance of staff recognizing patients' needs and problems in a timely manner and addressing patients' concerns and anxieties.

In a recent study, Kwame & Petrucka [61] developed a model for person-centered care entitled "Person-centered care and communication continuum model". They suggested that nurses and other healthcare providers should develop meaningful relationships with patients and their caregivers, understand patients' needs, problems, concerns, and use open-ended questions to encourage the patients or their caregivers to express their thoughts and preferences about the care situation.

The results of the present study showed that the mean score of the everydayness domain in the Dialysis Center

of Sina Hospital, which is a smaller center with more limited physical space, was lower than Imam Reza Dialysis Center. In a study on residents of long-term care centers in Norway, Bergland et al. [62] showed that the everydayness score in care centers with a smaller space was lower than larger centers; this result is consistent with the results of the present study. This finding may be attributed to the fact that large care centers have more space, which allows people to have more positive daily experiences.

In a cross-sectional study on patients' perceptions of PCC climate in a Saudi public hospital, Al-Sahli et al. [63] showed a low everydayness score ( $73 \pm 9.988$ ) which is lower than the score obtained in our study. Similar to our findings, younger patients reported more PCC than older patients.

Based on the results, the mean total score of PCQ-S from the perspective of hemodialysis nurses was  $66.86 \pm 8.07$ . The results showed a similar safety score for nurses working in hemodialysis units of both hospitals. This domain focuses on the level of nurses' perception of patients' safety, sharing information with patients, and receiving psychosocial support from colleagues. Based on the results, it can be said that the staff had a different view of the safety climate as compared to the patients. The safety climate in the studied hospitals was favorable from the perspective of nurses working in hemodialysis wards. In a study in the hemodialysis wards of the United States, Garrick et al. [49] (2012) showed that staff reported a higher safety level compared to patients, which is consistent with our study.

It was found that the mean score of the everydayness subscale from the perspective of nurses working in the hemodialysis ward in Sina Hospital was lower than nurses working in Imam Reza Hospital. Research has shown that the healthcare environment affects not only the well-being of the patients, but also it could affect on the staff (nurses and physicians) who work in these environments [64]. In a Cross-sectional explorative study on Swedish nurses, Lehluante et al. [65] found a positive significant association between the nurses' perceived psychosocial climate of the units and their satisfaction with care and work. In a study on staffs' perceptions of the PCC climate in nursing homes in Norway, Bergland et al. [66], found that staff working in smaller care centers with fewer residents viewed these centers as more person-centered than the larger centers. Staff working in smaller units seem to have more opportunities to get to know people and provide PCC. This study also showed higher everydayness and person-centeredness scores for the elderly residing in nursing homes that had gardens and natural views. In another study on staff and residents' perceptions of person-centered climate in a nursing home in China,

Yang et al. [67] showed that nursing home residents and staff have different views of PCC. They also found that the PCC level perceived by staff was significantly higher than that of residents, regardless of the size of the center. Residents of nursing homes also reported higher levels of PCC climates than those in small homes, especially in the safety and everydayness domains. From the staff perspective, there was no statistically significant difference in the PCC climate level based on the size of the nursing home. In another study on the priorities of the self-management support program for chronic kidney patients in Australia, Havas et al. [35] showed that the self-management support program should be tailored to the patients' needs and priorities.

The results of our study showed that the mean total score of the community from the perspective of nurses working in hemodialysis wards was  $18.89 \pm 3.05$  out of 24. Nurses' perceptions of patients' relationships with staff, family members, relatives, and visitors during the hospitalization period are evaluated in this subscale. In a study conducted in the United States by Ciufo et al. [68], the results showed that nurses regarded open and flexible visits as beneficial for patients and families. Moreover, considering the different contexts of each patient and his/her family, healthcare providers should support the presence of the family according to the needs and desires of the individual and family.

### Limitations

This study has some limitations. We only studied the person-centered climate within two dialysis centers affiliated with the teaching hospitals. Therefore, it is suggested to compare this phenomenon in other private dialysis centers. Moreover, we tried to remove the sampling bias by using the stratified sampling method. However, it may occur because the large number of patients were selected from one hospital which its physical structure is different from other old hospital. This study is a quantitative study that used a questionnaire for data collection. It seems that future studies may provide more in-depth insights in this area by using a qualitative approach.

### Conclusion

Although the results showed an acceptable score in the person-centered climate questioner, it needs some improvements in the fields of safety and everydayness. According to the results, the environment of the hemodialysis unit such as structure, physical space, and facilities could limit or enhance the implementation of person-centered processes. Therefore, it is suggested to pay more attention to the importance of PCC in dialysis centers, and practical strategies should be designed and implemented to strengthen the person-centered approach in



hemodialysis centers. The results of this study highlights the importance of person-centered care in the clinical settings such as the dialysis units. This study was done on HD patients and nurses. It is suggested to do a study by considering the experience of patients' family and other healthcare providers such as physicians. Moreover, conducting a qualitative studies in the future studies could provide in-depth information in the field of person-centered care.

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#### Author contributions

SA, MG, KP participated in study conception and design. SA collected the data. Data analysis and drafting of the article were done by SA, MG, KP. All authors reviewed the manuscript. All authors read and approved the final manuscript.

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#### Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

#### Declarations

##### Ethics approval and consent to participate

The approval of present study was obtained from the Regional Medical Ethics Committee of Tabriz University of Medical Sciences (code: 1399.898). The objectives of the study were explained to all participants and they entered the study after obtaining a written informed consent from all subjects or from a parent and/or the legal guardian. All participants were also assured of the confidentiality of their information.

##### Consent for publication

Not Applicable.

##### Competing interest

There are no conflicts of interest.

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#### References

- Bikbov B, Purcell CA, Levey AS, Smith M, Abdoli A, Abebe M, Adebayo OM, Afarideh M, Agarwal SK, Agudelo-Botero M. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2020;395(10225):709–33.
- Rysz J, Gluba-Brzózka A, Rysz-Górzyńska M, Franczyk B. The role and function of HDL in patients with chronic kidney disease and the risk of cardiovascular disease. *Int J Mol Sci*. 2020;21(2):601.
- Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, Hobbs FR. Global prevalence of chronic kidney disease—a systematic review and meta-analysis. *PLoS ONE*. 2016;11(7): 158765.
- James SL, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, Abbas-tabar H, Abd-Allah F, Abdela J, Abdelalim A. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):1789–858.
- Nguyen DB, Arduino MJ, Patel PR. Hemodialysis-associated infections. *Chronic Kidney Dis Dial Transpl*. 2019;25(389):410.
- Ahmadpour B, Ghafourifard M, Ghahramanian A. Trust towards nurses who care for haemodialysis patients: a cross-sectional study. *Scand J Caring Sci*. 2020;34(4):1010–6.
- Ghafourifard M, Mehrzade B, Hassankhani H, Heidari M. Hemodialysis patients perceived exercise benefits and barriers: the association with health-related quality of life. *BMC Nephrol*. 2021;22(1):1–9.
- Lopes AA, Lantz B, Morgenstern H, Wang M, Bieber BA, Gillespie BW, Li Y, Painter P, Jacobson SH, Rayner HC. Associations of self-reported physical activity types and levels with quality of life, depression symptoms, and mortality in hemodialysis patients: the DOPPS. *Clin J Am Soc Nephrol*. 2014;9(10):1702–12.
- Jansen DL, Rijken M, Heijmans M, Boeschoten EW. Perceived autonomy and self-esteem in Dutch dialysis patients: the importance of illness and treatment perceptions. *Psychol Health*. 2010;25(6):733–49.
- Valsaraj BP, Bhat SM, Latha K. Cognitive behaviour therapy for anxiety and depression among people undergoing haemodialysis: a randomized control trial. *J Clin Diagn Res JCDR*. 2016;10(8):VC06–10.
- Hamidi M, Roshangar F, Khosroshahi HT, Hadi H, Ghafourifard M, Sarbakhsh P. Comparison of the effect of linear and step-wise sodium and ultrafiltration profiling on dialysis adequacy in patients undergoing hemodialysis. *Saudi J Kidney Dis Transpl Off Publ Saudi Center Organ Transpl Saudi Arabia*. 2020;31(1):44–52.
- Evangelidis N, Tong A, Manns B, Hemmelgarn B, Wheeler DC, Tugwell P, Crowe S, Harris T, Van Biesen W, Winkelmayer WC. Developing a set of core outcomes for trials in hemodialysis: an international Delphi survey. *Am J Kidney Dis*. 2017;70(4):464–75.
- Tong A, Manns B, Hemmelgarn B, Wheeler DC, Evangelidis N, Tugwell P, Crowe S, Van Biesen W, Winkelmayer WC, O'Donoghue D. Establishing core outcome domains in hemodialysis: report of the standardized outcomes in nephrology-hemodialysis (SONG-HD) consensus workshop. *Am J Kidney Dis*. 2017;69(1):97–107.
- Ghafourifard M, Zamanzadeh V, Valizadeh L, Rahmani A. Compassionate nursing care model: results from a grounded theory study. *Nurs Ethics*. 2022;29(3):621–35.
- Morton RL, Sellars M. From patient-centered to person-centered care for kidney diseases. *Clin J Am Soc Nephrol*. 2019;14(4):623–5.
- Zhao J, Gao S, Wang J, Liu X, Hao Y. Differentiation between two healthcare concepts: Person-centered and patient-centered care. *J Nurs*. 2016;2352:398–402.
- McCormack B, McCance TV. Development of a framework for person-centred nursing. *J Adv Nurs*. 2006;56(5):472–9.
- Wilberforce M, Challis D, Davies L, Kelly MP, Roberts C, Clarkson P. Person-centredness in the community care of older people: a literature-based concept synthesis. *Int J Soc Welf*. 2017;26(1):86–98.
- Morgan S, Yoder LH. A concept analysis of person-centered care. *J Holist Nurs*. 2012;30(1):6–15.
- Organization WH: World report on ageing and health: World Health Organization; 2015.
- Butler D, Frieder M, Gibbs N, Henry M. Person-centered care: a definition and essential elements. *J Am Geriatr Soc*. 2016;64(1):15–8.
- Browall M, Koinberg I, Falk H, Wijk H. Patients' experience of important factors in the healthcare environment in oncology care. *Int J Qual Stud Health Well Being*. 2013;8(1):20870.
- Brooker D: Person-Centred Dementia Care: Making Services Better: Jessica Kingsley Publishers; 2006.
- Edvardsson D, Sandman PO, Rasmussen B. Swedish language person-centred climate questionnaire—patient version: construction and psychometric evaluation. *J Adv Nurs*. 2008;63(3):302–9.
- Edvardsson JD, Sandman PO, Rasmussen BH. Sensing an atmosphere of ease: a tentative theory of supportive care settings. *Scand J Caring Sci*. 2005;19(4):344–53.
- Landers MG, McCarthy GM. Person-centered nursing practice with older people in Ireland. *Nurs Sci Q*. 2007;20(1):78–84.
- Edvardsson D, Winblad B, Sandman P-O. Person-centred care of people with severe Alzheimer's disease: current status and ways forward. *Lancet Neurol*. 2008;7(4):362–7.
- Rathert C, May DR. Health care work environments, employee satisfaction, and patient safety: care provider perspectives. *Health Care Manage Rev*. 2007;32(1):2–11.

29. Tafreshi MZ, Pazargadi M, Saeedi ZA. Nurses' perspectives on quality of nursing care: a qualitative study in Iran. *Int J Health Qual Assur*. 2007. <https://doi.org/10.1108/09526860710754389>.
30. Carlström ED, Ekman I. Organisational culture and change: implementing person-centred care. *J Health Organ Manag*. 2012;26(2):175–91.
31. van den Pol-Grevelink A, Jukema JS, Smits CH. Person-centred care and job satisfaction of caregivers in nursing homes: a systematic review of the impact of different forms of person-centred care on various dimensions of job satisfaction. *Int J Geriatr Psychiatr*. 2012;27(3):219–29.
32. Blaum CS, Rosen J, Naik AD, Smith CD, Dindo L, Vo L, Hernandez-Bigos K, Esterson J, Geda M, Ferris R. Feasibility of implementing patient priorities care for older adults with multiple chronic conditions. *J Am Geriatr Soc*. 2018;66(10):2009–16.
33. Pirhonen L, Bolin K, Olofsson EH, Fors A, Ekman I, Swedberg K, Gyllenstein H. Person-centred care in patients with acute coronary syndrome: cost-effectiveness analysis alongside a randomised controlled trial. *PharmacoEcon-open*. 2019;3(4):495–504.
34. Freidin N, O'Hare AM, Wong SP. Person-centered care for older adults with kidney disease: core curriculum 2019. *Am J Kidney Dis*. 2019;74(3):407–16.
35. Havas K, Douglas C, Bonner A. Person-centred care in chronic kidney disease: a cross-sectional study of patients' desires for self-management support. *BMC Nephrol*. 2017. <https://doi.org/10.1186/s12882-016-0416-2>.
36. Brinkman-Stoppelenburg A, Rietjens JA, Van der Heide A. The effects of advance care planning on end-of-life care: a systematic review. *Palliat Med*. 2014;28(8):1000–25.
37. Luckett T, Sellars M, Tieman J, Pollock CA, Silvester W, Butow PN, Detering KM, Brennan F, Clayton JM. Advance care planning for adults with CKD: a systematic integrative review. *Am J Kidney Dis*. 2014;63(5):761–70.
38. Ghodsian S, Ghafourifard M, Ghahramanian A. Comparison of shared decision making in patients undergoing hemodialysis and peritoneal dialysis for choosing a dialysis modality. *BMC Nephrol*. 2021;22(1):1–9.
39. Salehitali S, Ahmadi F, Dehkordi AH, Noorian K, Fereidooni-Moghadam M, Zarea K. Progressive exhaustion: a qualitative study on the experiences of Iranian family caregivers regarding patients undergoing hemodialysis. *Int J Nurs Sci*. 2018;5(2):193–200.
40. Chan CT, Blanketstijn PJ, Dember LM, Gallieni M, Harris DC, Lok CE, Mehrotra R, Stevens PE, Wang AY-M, Cheung M. Dialysis initiation, modality choice, access, and prescription: conclusions from a kidney disease: improving global outcomes (KDIGO) controversies conference. *Kidney Int*. 2019;96(1):37–47.
41. Dorough A, Forfang D, Murphy SL, Mold JW, Kshirsagar AV, DeWalt DA, Flythe JE. Development of a person-centered interdisciplinary plan-of-care program for dialysis. *Nephrol Dial Transpl* 2020:1–10.
42. Bear RA, Stockie S. Patient engagement and patient-centred care in the management of advanced chronic kidney disease and chronic kidney failure. *Can J Kidney Health Dis*. 2014;1:24–7.
43. Krejcie RV, Morgan DWJE. Measurement p: determining sample size for research activities. *Educ Psychol Meas*. 1970;30(3):607–10.
44. Edvardsson D, Sandman P-O, Rasmussen B. Construction and psychometric evaluation of the Swedish language person-centred climate questionnaire—staff version. *J Nurs Manag*. 2009;17(7):790–5.
45. Berghout M, Van Exel J, Leensvaart L, Cramm JM. Healthcare professionals' views on patient-centered care in hospitals. *BMC Health Serv Res*. 2015;15(1):1–13.
46. Hamovitch EK, Choy-Brown M, Stanhope V. Person-centered care and the therapeutic alliance. *Commun Ment Health J*. 2018;54(7):951–8.
47. Sharp S, McAllister M, Broadbent M. The vital blend of clinical competence and compassion: how patients experience person-centred care. *Contemp Nurse*. 2016;52(2–3):300–12.
48. Kobrai-Abkenar F, Pourghane P, Jafarzadeh-Kenarsari F, Roushan ZA, Edvardsson D. Psychometric properties of the Persian language person-centered climate questionnaire—patient version (PCQ-P). *Heliyon*. 2020;6(10): e05154.
49. Garrick R, Klinger A, Stefanich B. Patient and facility safety in hemodialysis: opportunities and strategies to develop a culture of safety. *Clin J Am Soc Nephrol*. 2012;7(4):680–8.
50. Nobahar M: Factors affecting the safety of hemodialysis' patients in dialysis ward and their strengthening strategies. *Koomesh* 2016:547–562.
51. Vaismoradi M, Salsali M, Turunen H, Bondas T. Patients' understandings and feelings of safety during hospitalization in Iran: a qualitative study. *Nurs Health Sci*. 2011;13(4):404–11.
52. Mollon D. Feeling safe during an inpatient hospitalization: a concept analysis. *J Adv Nurs*. 2014;70(8):1727–37.
53. Wassenaar A, Schouten J, Schoonhoven L. Factors promoting intensive care patients' perception of feeling safe: a systematic review. *Int J Nurs Stud*. 2014;51(2):261–73.
54. Lovink MH, Kars MC, de Man-van Ginkel JM, Schoonhoven L. Patients' experiences of safety during haemodialysis treatment—a qualitative study. *J Adv Nurs*. 2015;71(10):2374–83.
55. Abdel-Rahman EM, Turgut F, Turkmen K, Balogun R. Falls in elderly hemodialysis patients. *QJM Int J Med*. 2011;104(10):829–38.
56. Moran A, Scott PA, Darbyshire P. Communicating with nurses: patients' views on effective support while on haemodialysis. *Nurs Times*. 2009;105(25):22–5.
57. Lewis RA, Benzie KM, MacRae J, Thomas C, Tonelli M. An exploratory study of person-centered care in a large urban hemodialysis program in Canada using a qualitative case-study methodology. *Can J Kidney Health Dis*. 2019;6:1–15.
58. McAndrew F. *Environmental Psychology* (Gh. Mahmoudi, Trans). Tehran. In.: Vania Publications; 2016.
59. Alitajer S, Mostaghimi P. Increasing the quality of life: effects of indoor and outdoor plants in the medical center of cancer patients. *Payavard Salamat*. 2016;10(3):276–89.
60. Kelly F, Reidy M, Denieffe S, Madden C. Older adults' views on their person-centred care needs in a long-term care setting in Ireland. *Br J Nurs*. 2019;28(9):552–7.
61. Kwame A, Petrucka PM. A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward. *BMC Nurs*. 2021;20(1):158.
62. Bergland Å, Hofoss D, Kirkevold M, Vassbø T, Edvardsson D. Person-centred ward climate as experienced by mentally lucid residents in long-term care facilities. *J Clin Nurs*. 2015;24(3–4):406–14.
63. Al-Sahli B, Eldali A, Aljuaid M, Al-Surimi K. Person-centered care in a tertiary hospital through patient's eyes: a cross-sectional study. *Patient Prefer Adherence*. 2021;15:761.
64. Tanja-Dijkstra K, Pieterse ME. Psychologically mediated effects of the physical healthcare environment on work-related outcomes of healthcare personnel. *Cochrane database of systematic reviews* 2010(12).
65. Lehluate A, Nilsson A, Edvardsson D. The influence of a person-centred psychosocial unit climate on satisfaction with care and work. *J Nurs Manag*. 2012;20(3):319–25.
66. Bergland Å, Kirkevold M, Edvardsson D. Psychometric properties of the Norwegian Person-centred Climate Questionnaire from a nursing home context. *Scand J Caring Sci*. 2012;26(4):820–8.
67. Yang Y, Li H, Xiao LD, Zhang W, Xia M, Feng H. Resident and staff perspectives of person-centered climate in nursing homes: a cross-sectional study. *BMC Geriatr*. 2019;19(1):1–10.
68. Ciuffo D, Hader R, Holly C. A comprehensive systematic review of visitation models in adult critical care units within the context of patient- and family-centred care. *Int J Evid Based Healthc*. 2011;9(4):362–87.

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