INTRODUCTION

Chronic kidney disease (CKD) has been one of the main health problems affecting various populations globally. The prevalence and the cost of treatment are dramatically increasing. It refers to the aberration of kidney function, evident for more than 3 months, that affects health and could eventually progress to end-stage renal disease (ESRD). Advanced CKD can be managed though renal replacement therapy (RRT) which involves renal transplantation, hemodialysis (HD), and peritoneal dialysis.

One of the mentioned managements is HD therapy. Although evidences suggest that it is beneficial, it is considered to be an expensive and burdensome therapy for patients with ESRD. There were also identified challenges and issues among patients who were on a long-term dialysis therapy. Increased dependence on caregivers and interference in personal, family, and social life were few of these challenges, which cause stress and affect the total well-being and quality of life among ESRD patients.

According to the Palestinian Health Information Center, in 2003, 255 patients from the West Bank were under the dialysis treatment. In 2010, this figure dramatically increased to 800 patients. In 2016, the number of patients receiving dialysis services in hospitals in the West Bank was 1119 on a
regular basis with a total of 147,494 HD. In fact, ESRD is rapidly increasing among Palestinian, and it is a common health problem and the eighth leading cause of death in Palestine.\[10]\n
These patients diagnosed with ESRD were exposed to different levels and various types of stress, which is also determined by their coping mechanisms. Poor coping and ineffective stress resolution could aggravate the current medical condition and is potentially fatal.\[11]\n
Knowledge of the most stressors facing HD patients is beneficial for nurses and other members of the health-care team in developing their plan of care and case management. Evidence shows that this particular area of inquiry contributes to the improvement of the quality of life, minimizing potential complications of this disease, and survival of these people and decreases cost, so it is worth to determine the possible causes of stress among HD patients in the North of the West Bank, Palestine.

Moreover, only limited studies are available in Palestine, and there is some inconsistency even in conducted studies. In these patients, identifying and introducing stressor factors is the first step of intervention and planning.\[10,11]\nTherefore, assessing physiological and psychosocial stressors will provide inputs to social health and planning to support Palestinian HD patients.

METHODS

This study is a quantitative, descriptive, cross-sectional design. Data collection took place from January to March 2016 in three governmental hospitals and one private hospital in the North of the West Bank, Palestine. The institutional review board only allowed the researchers to conduct their entire data collection procedure for 2 months due to human protection and logistical issues.

Of all ESRD patients (379) who underwent HD in four included hospitals, 120 HD patients of total 379 were included in the study using the convenient sampling method.

HD Stressor Scale (HSS) was adopted to measure the stressors among HD patients. The HSS was developed by Baldree et al. to measure the level of stress experienced by HD patients. It consisted of 32-items that describe the stressors which HD patients mostly face in their life. The items consisted of a 4-point Likert scale that ranged from 1 to 4 which denoted the severity of stress experienced. The 32-items scale was grouped into two stressor subscales: “psychosocial (25-items) stressors” and “physiological (7-items) stressors.”\[12]\n
Face-to-face interview using a structured questionnaire has been used to fulfill the questionnaire which consisted of two parts: the first part included demographic profile such as gender, age, and dialysis duration and the second part contained HSS.

The questionnaire was translated into Arabic which was the participants’ mother-tongue language using the Brislin back-translation method, the most frequently used and accepted method for effective translation equivalence of instruments. The method began with a bilingual expert translating the instrument from English into Arabic with consultations from an expert panel to ensure clarity, detect linguistic mistakes, and ensure cross-cultural equivalence. Then, a blind back-translation from Arabic to English was undertaken by another bilingual translator. Consequently, no issues and errors were found when the back-translated version was compared with the English version.

The internal consistency Cronbach’s alpha for the total HSS scale from previous studies was 0.89, indicating good internal reliability.\[12\] A pilot study was conducted with ten HD patients to identify potential problem, clarity of questions translation, understanding of questionnaire, and time duration to accomplish the questionnaire. The pilot sample was excluded from the total sample, and the time required to complete the questionnaire was 20–30 min.

The Statistical Package for the Social Sciences (IBM Middle East FZ-L.L.C, Riyadh, Saudi Arabia) was used to statistically analyze the data. Both t-test and ANOVA were used to test the relationship between stress types and demographic characteristics.

RESULTS

Patients’ characteristics

Table 1 shows that 64.2% of the HD patients were male and 36.7% of them were in the age groups of 40–49 and 50–65 years. Regarding their duration of treatment, 43.3% of them had a period of <3 years, while 8.3% of them had it from 6 to 8 years.

Hemodialysis stress scale results

Table 2 shows the mean, standard deviation (SD), percentage, and level of agreement of HD patients on the stress scale. The total mean score was 2.59, which revealed big agreement (65.0%) in using by HD patients. Regarding HSS items, the percentage for the highest item according to the total scale “Limits on time and place for vacation” was rated as most (84.2%) troublesome stressors items. According to the subscales, in physiological stress subscale, “Feeling tired” was rated as most (76.1%) troublesome stressors items, followed by “Loss of body function” (75.6%), while the stress item with the lowest score was “Arterial and venous stick” (58.2%).

Table 3 reveals that psychosocial stress subscale items “Limits on time and place for vacation” were rated as most (84.2%) troublesome stressors items, followed by decrease in sexual derive (82.3%), while the stress item with the lowest score was dependency on nurses and technicians (58.2%).
The relation between stressor types according to HD patients showed that the mean score of stressors for male was $2.64 \pm 0.44$ and for female was $2.52 \pm 0.52$, with no significant difference ($t = 1.34, P = 0.18$). Regarding the stressor subscale, the mean score of physiological stressors for male was $2.60 \pm 0.64$ and for female was $2.74 \pm 0.69$, while the mean score of psychosocial stressors for male was $2.66 \pm 0.46$ and for female was $2.53 \pm 0.54$, with no significant difference.

The relation between stressor type and age illustrated that the mean score for stress scale was 2.62 for the age group of 40–49 years and 2.53 for the age group of 18–30 years, with no significant difference ($F = 0.19, P = 0.90$). Regarding the stress subscale, the mean score of physiological stressors was 2.72 for the age group 50–65 years, while for psychosocial stressors, the mean score was 2.66 for the age group of 40–49 years, with no significant difference.

The relation between stressor types and duration of treatment illustrated that the mean score of stress scale for the duration of treatment from 3 to 5 years was 2.735 and for the duration of treatment from 6 to 8 years was 2.338, with significant difference for the duration of treatment from 3 to 5 years ($F = 3.05, P = 0.001$). Regarding the stress subscale, the mean score of physiological stressors was 2.85 for the duration of treatment from 9 years and more, with no significant difference. While for psychosocial stressors, the mean score was 2.80 for the duration of treatment from 3 to 5 years and 2.220 for the duration of treatment from 6 to 8 years, with significant difference for the duration of treatment from 3 to 5 years ($F = 4.40, P = 0.006$).

**DISCUSSION**

The study results revealed that about two-third of the HD patients were experienced mild-to-moderate level of total stress, but physiological stress was slightly more ($2.65 \pm 0.66$) stressful than psychosocial once ($2.62 \pm 0.48$); similar findings were found in a study done by Mok and Tam, and they reported that the mean score for the physiological stressors was 1.50 (SD = 0.63) and for the psychosocial stressors was 1.30 (SD = 0.58). In addition, the study done by Hsiu et al. (2014) found that patients had more physiological stressors than psychosocial stressors. In contrast, Ahmad and Al Nazly found that psychosocial stressors were more prominent than physiological stressors.

The findings of the current study illustrated that the stress item with the highest percentage (84.2%) was limits on time and place for vacation, which was similar to other studies. This could be related to the intensive treatment hours/week that make patients unable to travel couple a day and lack of recreation places for spending vacation due to the restriction on travelling in the West Bank of Palestinian Authority.

The second source of stress (82.3%) was decrease in sexual desires, which was in agreement with studies that found sexual dysfunction prevalence among predialysis patients (9%) and higher prevalence among dialysis patients (90%) of either sex. On the other hand, the results were different from Shinde and Mane results that found mild stress according to a decrease in sexual derives among HD patients.

This might be that the sexual dysfunction is much more common in patients with ESRD than in the general population due to the nature of the disease such as anemia and uremia which are the organic factors that affect the erectile function.
dysfunction in addition to anxiety, fatigue, and a low self-esteem that also contribute to the decrease of sexual desire. In addition, feeling tired was rated a top-five stressors, which is consistent with other studies.\cite{12,21-26}

Table 3: Psychosocial stressors among hemodialysis patients

| The order | Number | Items                                         | Mean±SD       | Percentage | Agreement |
|-----------|--------|----------------------------------------------|---------------|------------|-----------|
| 23        | 8      | Limits on time and place for vacation        | 3.36±1.10     | 84.2       | Very big  |
| 12        | 9      | Decrease in sexual derive                    | 3.29±0.94     | 82.3       | Very big  |
| 9         | 10     | Limitation of food                          | 3.08±0.95     | 77.1       | Big       |
| 22        | 11     | Transportation to and from the unit          | 3.05±1.20     | 76.3       | Big       |
| 31        | 12     | Decreased ability to have children           | 3.03±1.10     | 75.9       | Big       |
| 32        | 13     | Length of treatment                         | 2.92±1.16     | 73.2       | Big       |
| 11        | 14     | Interference with job                        | 2.88±1.22     | 72.2       | Big       |
| 13        | 15     | Limitation of physical activity             | 2.76±1.10     | 69.2       | Big       |
| 10        | 16     | Limitation of fluid                         | 2.75±1.25     | 68.9       | Big       |
| 18        | 17     | Uncertainty about the future                 | 2.70±1.20     | 67.5       | Big       |
| 29        | 18     | Feelings related to treatments example; (feeling cold) | 2.70±1.14     | 67.5       | Big       |
| 8         | 19     | Decrease in social life                      | 2.66±1.11     | 66.7       | Big       |
| 21        | 20     | Cost of treatment/transportation to treatment/or other cost factors | 2.64±0.97     | 66.2       | Big       |
| 14        | 21     | Sleep disturbances                           | 2.62±1.09     | 66.0       | Big       |
| 20        | 22     | Limited in style of clothing                 | 2.59±1.28     | 64.8       | Big       |
| 28        | 23     | Fear of being alone                          | 2.50±1.18     | 62.7       | Big       |
| 24        | 24     | Frequent hospital admission                  | 2.5±1.15      | 62.5       | Big       |
| 15        | 25     | Changes in family responsibilities           | 2.39±1.21     | 59.9       | Middle    |
| 17        | 26     | Reversal in family roles with the children   | 2.34±1.23     | 58.5       | Middle    |
| 30        | 27     | Boredom                                      | 2.21±1.35     | 55.4       | Middle    |
| 19        | 28     | Changes in body appearance                   | 2.15±1.22     | 54.0       | Middle    |
| 16        | 29     | Reversal in family role with spouse          | 2.06±1.22     | 51.7       | Middle    |
| 27        | 30     | Dependency on physicians                     | 1.90±1.11     | 47.7       | Middle    |
| 25        | 31     | Dialysis machine and/or equipment            | 1.84±1.17     | 46.2       | Middle    |
| 26        | 32     | Dependency on nurses and technicians         | 1.80±1.12     | 45.0       | Middle    |
|           |        | Total mean scale 2                          | 2.62±0.48     | 65.6       | Big       |
|           |        | Total scale mean                            | 2.59±0.47     | 65.0       | Big       |

SD: Standard deviation

The least stressful scale items were dependency on nurses and technicians (45%), dialysis machine and/or equipment (46.2%), and dependency on physicians (47.4%); these results were different from Shinde and Mane\cite{20} results which found that 86.7% of patients encountered stress of being dependent to hospital staff.

These results might have related to recurrent patients’ visit to the hospital for treatment that might increase the relationship between the team staff and patients and make them more familiar to each other, so patients will not feel stressed in demanding and requesting from the nurses or physicians.

According to the stress types and gender, the mean score of stressors types for male was 2.64 ± 0.44 and for female was 2.52 ± 0.52, with no significant difference ($P = 0.182$). In agreement to this study, a longitudinal study by Welch and Austin\cite{27} compared the stressors reported by 41 men and 45 women on HD and found that no gender differences were identified in the most highly rated stressors. In addition, the study done by Tu et al.\cite{14} found no gender differences in the coping strategies and level of stress of these patients, with an exemption among female patient who experienced more psychosocial stressors. On the other hand, Yeh and Chou.\cite{28} found that women experienced a higher level of stress in response to physical problems, while men experienced a higher level of stress in terms of reproductive system functioning.

According to the stressors and duration of treatment, a significant difference was found between psychosocial stressors and the duration of treatment. The mean score of a stress scale for the duration of treatment from 3 to 5 years was 2.73 and for the duration of treatment from 6 to 8 years was 2.338, with significant difference for the duration of treatment from 3 to 5 years ($P = 0.031$). Lok\cite{25} reported weak-to-moderate positive relationships between patients’ length of time on HD and their total stressor ($r = 0.35$) and psychosocial stressor ($r = 0.44$) scores, and he suggested that people stress levels tended to increase the longer they were on dialysis, but in this study, a negative correlation was found, patients who were on dialysis on duration of treatment...
from 3 to 5 years reported significantly higher levels of stress than who spent a long time on dialysis or new on dialysis. In agreement, Tu et al.\textsuperscript{[14]} found that a lower level of stress was experienced among those patients who undergo longer HD therapy sessions.

This may have resulted from prolonged time on dialysis that makes adjustment and adaptation, even more acceptance increased to the situation because little or nothing could be done; according to the new dialysis, some of the patients may still not oriented to the consequences of dialysis or still in denial phase. While Cristóvão\textsuperscript{[29]} reported no correlation between individuals’ length of time on HD and their stress.

These conflicting findings may be attributable to the differences in the age range of participants as well as the range of treatment time from research to others.

Study limitation
This study was based in the North of the West Bank, Palestine, and will only interview HD patients in the region which makes it less generalizable for other regions in Palestine. Moreover, the use of convenient sampling strategy introduces selection bias, which may impact generalizability of the results.

CONCLUSIONS
HD treatment is a stressful experience. Any patient regardless of their gender, age, and duration of treatment may experience physiological and psychosocial stressors. Most of these patients felt tiredness, experienced loss of body function, perceived HD to cause limited time and place for vacation, and decreased their sexual drives. There were no significant differences between participants according to their age and gender in all stress types, but the higher mean score of physiological stressors was among female, and the one of the psychosocial stressors was higher among males, and there were significant differences between the psychosocial stressors and duration of treatment.

Recommendations
The authors recommend that future research should be directed at detecting the predisposing factors that lead the HD patients to be variant in experiencing the intensity of stress and coping strategies used; in addition, mental health professional should increase attention, especially to the needs and stressors that HD patients face.

Consent
Permissions and signed consent obtained from each participant after assuring them about the privacy and confidentiality of the information.

Acknowledgments
The authors would like to acknowledge An-Najah National University and Palestinian Ministry of Health for supporting this work. HD department nurses and HD patients are acknowledged for their cooperation during the sample collection.

Financial support and sponsorship
This project was funded by the authors.

Conflicts of interest
There are no conflicts of interest.

REFERENCES
1. Hill NR, Fatoba ST, Oke JL, Hirst JA, O’Callaghan CA, Lasserson DS, et al. Global prevalence of chronic kidney disease – A systematic review and meta-analysis. PLoS One 2016;11:e0158765.
2. Mushi L, Marschall P, Fleša S. The cost of dialysis in low and middle-income countries: A systematic review. BMC Health Serv Res 2015;15:506.
3. Papadakis E. Approach of Patients With Kidney Disease and Patients With Beta-Thalassemia in a General Hospital in Crete and Investigation of Their Quality of Life (Doctoral Dissertation, Thesis). Available from: http://mph.med.uoc.gr/files/Dissertations/Papadakis%20evag_2010.pdf. [Last accessed on 2012 May 19].
4. Chapter 1: Definition and classification of CKD. Kidney Int Suppl (2011) 2013;3:19‑62.
5. Levey AS, Coresh J. Chronic kidney disease. Lancet 2012;379:165‑80.
6. Karopadi AN, Mason G, Rettore E, Ronco C. Cost of peritoneal dialysis and haemodialysis across the world. Nephrol Dial Transplant 2013;28:2533‑69.
7. Lin CC, Lee BO, Hicks FD. The phenomenology of deciding about hemodialysis among Taiwanese. West J Nurs Res 2005;27:915‑29.
8. Surrlena H, editor. Handbook for Brunner and Suddarth’s Textbook of Medical-Surgical Nursing. Philadelphia: Lippincott Williams & Wilkins; 2010.
9. Blake C, Cobb MB, Cassidy A, O’Meara YM. Physical function, employment and quality of life in end-stage renal disease. J Nephrol 2000;13:142‑9.
10. Palestinian Ministry of Health. PHHC, Health Annual Report. Nablus: Palestinian: Palestinian Ministry of Health; 2013.
11. Finkelstein FO, Finkelstein SH. Depression in chronic dialysis patients: Assessment and treatment. Nephrol Dial Transplant 2000;15:1911‑3.
12. Baldree KS, Murphy SP, Powers MJ. Stress identification and coping patterns in patients on hemodialysis. Nurs Res 1982;31:107‑12.
13. Mok E, Tam B. Stressors and coping methods among chronic hemodialysis patients in Hong Kong. J Clin Nurs 2001;10:503‑11.
14. Tu HY, Shao JH, Wu FJ, Chen SH, Chuang YH. Stressors and coping strategies of 20‑45‑year‑old hemodialysis patients. Collegian 2014;21:185‑92.
15. Ahmad MM, Al Nazly EK. Hemodialysis: stressors and coping strategies. Psychol Health Med 2015;20:477‑87.
16. Cinar S, Barlas GU, Alpar SE. Stressors and coping strategies in hemodialysis patients. Pak J Med Sci 2009;25:447‑52. Available from: http://www.pjms.com.pk/issues/aprjun209/pdf/22.article21.pdf. [Last cited 2019 Jul 18].
17. Logan SM, Pelletier-Hibbert M, Hodgins M. Stressors and coping of in-hospital haemodialysis patients aged 65 years and over. J Adv Nurs 2006;56:382‑91.
18. Leny NB. Sexual adjustments to maintenance dialysis and renal transplantation. National survey by questionnaire. Preliminary results. Trans Am Soc Artif Int Organs 1973;19:143.
19. Procci WR, Goldstein DA, Adelstein J, Massry SG. Sexual dysfunction in the male patient with uremia: A reappraisal. Kidney Int 1981;19:317‑23.
20. Shinde M, Mane SP. Stressors and the coping strategies among
patients undergoing hemodialysis. Int J Sci Res 2014;3:266-76. Available from: https://www.researchgate.net/profile/Mahadeo_Shinde4/publication/265784617_Stressors_and_the_Coping_Strategies_among_Patients_Undergoing_Hemodialysis/links/5422db500cf290c9e3add7ca.pdf. [Last cited 2019 Jul 18].

21. Bihl MA, Ferrans CE, Powers MJ. Comparison stressors and quality of life of dialysis patients. ANNA J 1988;15:27-37.

22. Eichel CJ. Stress and coping in patients on CAPD compared to hemodialysis patients. ANNA J 1986;13:9-13.

23. Gurklis JA, Menke EM. Identification of stressors and use of coping methods in chronic hemodialysis patients. Nurs Res 1988;37:236-9, 248.

24. Gurklis JA, Menke EM. Chronic hemodialysis patients’ perceptions of stress, coping, and social support. ANNA J 1995;22:381-8.

25. Lok P. Stressors, coping mechanisms and quality of life among dialysis patients in Australia. J Adv Nurs 1996;23:873-81.

26. Welch JL, Austin JK, Frauman AC. Factors associated with treatment-related stressors in hemodialysis patients/Research critique/Investigator’s response. Nephrol Nurs J 1999;26:318. Available from: https://link.galegroup.com/apps/doc/A55127339/AONE?u=googlescholar&sid=AONE&xid=b6ac066. [Last cited 2019 Jul 18].

27. Welch JL, Austin JK. Stressors, coping and depression in haemodialysis patients. J Adv Nurs 2001;33:200-7.

28. Yeh SC, Chou HC. Coping strategies and stressors in patients with hemodialysis. Psychosom Med 2007;69:182-90.

29. Cristóvão F. Stress, coping and quality of life among chronic haemodialysis patients. EDTNA ERCA J 1999;25:35-8, 44.