Austin Journal of Nephrology and Hypertension

Open Access

Austin Publishing Group

Research Article

Monitoring of the Renal Function in the Nursing Practice

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Received: January 06, 2023; **Accepted:** February 17, 2023; **Published:** February 24,2023

Abstract

Objective: Verify the effects of intensified and usual clinical nursing monitoring on the quality of life and sedentary lifestyle of hypertensive and diabetic patients in primary care.

Method: A quantitative and quasi-experimental study of time series. The sample this study consisted in 85 users allocated in control (n=45) and experimental (n=40) groups. The intervention was a nursing consultation with biochemical monitoring program.

Results: With the monitoring, laboratory variables in experimental group were controlled, such as serum creatinine (0.82 – 0.79 mg/dL). The control group included 6 (26.09%) patients with renal dysfunction (p=0.001). Sedentary lifestyle was reduced in the experimental group (15.00% to 0.00%). The psychological domain of quality of life presented a better perception in the group without renal dysfunction, when compared to the users with renal dysfunction (80.8 ± 0.19 vs 51.8 ± 0.21, p=0.013).

Conclusion: Results proved to be relevant for the Nursing assistance practice with reduction of sedentary lifestyle and an improvement in quality of life, the modifiable risk factors for kidney diseases.

Keywords: Kidney diseases; Nursing; Primary health care; Quality of life; Sedentary behavior

Introduction

The lack of control persists in the management of patients with diabetes mellitus and arterial hypertension in the primary care (PHC) environment, despite different guidelines and medications has proven to be true. Therefore, implementing a monitoring program through nursing consultations can be a differential and improve self-care [1,2].

Due to overloaded primary care services, efforts are desirable for the development of risk stratification models and monitoring of the health users aiming at effective actions and better Quality of Life (QoL) [3].

Quality of life is a broad and multidimensional concept that generally includes subjective assessments of positive and negative aspects of life and encompasses the physical, psychological and social dimensions that may be affected by the disease and/or ongoing treatment [4]. This holistic conception is the basic foundation that circumscribes nursing care [5].

Therefore, Quality of Life (QoL) has become an important outcome measure to assess the effectiveness of any disease management plan and, when compromised, is associated with an unsatisfactory therapeutic response, such as the development of complications [6], including renal dysfunction.

Within the scope of PHC, health professionals, especially nurses, should offer users educational strategies supported by proposals that emphasize health promotion and prevention of future complications [7,8].

So, establishing models for monitoring and monitoring users by nurses makes it possible to identify risk factors and, consequently, can mitigate clinical worsening [9].

Given the importance of clinical monitoring of hypertensive and diabetic patients in PHC and the literary gaps described on this topic, this study is based on the proposition of comparing an intensified (quarterly) and usual (annual) monitoring program carried out by nurses and their associations with quality of life and sedentary lifestyle, aiming to identify better strategies for qualified and individualized care in the short and long term.

This study aimed to verify the effects of intensified and usual clinical nursing monitoring on the quality of life and sedentary lifestyle of hypertensive and diabetic patients in PHC.

Citation: Lima WL, Duarte TTP, Nava LF, e Magro MCS. Monitoring of the Renal Function in the Nursing Practice. Austin J Nephrol Hypertens. 2023; 10(1): 1104.

Method

Design

A quasi-experimental study of a time series with pre- and post test. It was carried out in a Basic Health Unit (BHU) of Primary Health Care (PHC) in the West region of Brasília, Federal District, Brazil, from 2018 to 2019.

Population and Study Setting

The population this study consisted of 318 health users, of which 76 were diabetic and 242 were hypertensive. The sample was for convenience and consecutive and consisted of 85 users, 45 of the control group and 40 of the intervention group.

Sample size calculation was performed using the IBM SPSS (Statistical Package for the Social Sciences) software, Sample Power version 3.0. There were 32 users per group, adopting $\alpha = 5\%$ and $\beta = 80\%$. Considering 20% of losses, sample size was adjusted for at least 40 users in each group.

Data Collection Protocol

Hypertensive and/or diabetic individuals aged over 18 years old and with preserved cognitive capacity were included. Users who missed nursing consultations, with physical limitations and mobility restrictions were excluded. Losses resulted from death, change of address and discontinuation of follow-up after 10 telephone contact attempts, as shown in (Figure 1).

The intervention was a nursing consultation with biochemical creatinine monitoring, creatinine clearance, glycated hemoglobin and urea of users with arterial hypertension and diabetes mellitus. In the control group, laboratory monitoring was performed as in the traditional model (annual) according to the UBS protocol. The monitoring program was carried out at three (3) time points of the study: at one (1), three (3) and six (6) months.

A structured questionnaire was used to record sociodemographic variables, family history, habits and cardiovascular and renal function. The WHOQOL – BREF (World Health Organization Quality of Life) scale was applied, validated for Brazilian Portuguese, consisting in 26 questions divided into physical, psychological, social relations and environmental domains [10].

To assess physical inactivity, the International Physical Activity Questionnaire (IPAQ) was adopted, consisting of 8 questions and validated for Brazil [11]. Hypertensive and diabetic individuals classified as very active, active, irregularly active and sedentary [11].

The KDIGO classification (Kidney Disease: Improving Global Outcomes) was adopted to assess renal function. Impairment of renal function was defined as an increase in sCr ≥ 1.5 times from baseline [12]. Baseline serum creatinine was based on the lowest value in the period of up to 365 days [13] prior to the Nursing consultation. Urinary volume was not evaluated due to the difficulty in obtaining accurate measurements in the PHC setting.

Systemic blood pressure was measured in the sitting position and after a 5 minutes rest with a P.A.MED® manual sphygmomanometer [14]. Changes were confirmed when the systolic pressure values were <90 mmHg or >40 mmHg and when diastolic pressure was <60 mmHg or >100 mmHg [15].

The nurse researcher to assess postprandial capillary blood glucose used the Active Accu-Chek® device and G-Tech® lancets during the Nursing consultation. For the procedure, a puncture was performed in the digital pulp of one of the fingers with a lancet. The reference value for fasting blood glucose was <100 mg/dL and postprandial <160 mg/dL [15].

To measure body weight and height a Balmak BK300FAN® digital scale was used. Waist circumference (WC) was measured at the end of expiration with a measuring tape graduated in centimeters; the midpoint between the last rib and the iliac crest was identified with the user in the supine position. There was a higher cardiovascular risk for women with waist circumference >80 cm and for men >94 cm [16].

The reference values of laboratory variables followed the institutional protocol of the State Health Department of the Federal District: serum creatinine 0.70 – 1.2 mg/dL, serum urea 10.0 – 50.0 mg/dL, creatinine clearance for women: 88 – 128 mL/min/1.73 m^2 and, for men: 97 – 137 mL/min/1.73 m^2 and glycated hemoglobin (HbA1c): low risk of diabetes, value below 5.7%, increased risk of diabetes, value between 5.7% and 6.4%, and diabetic for values over 6.4% [15].

Data Collection Procedures

Phase I: Group meetings were held with the hypertensive and diabetic patients being monitored by the BHU to survey their health conditions. During the meeting, participants were divided into control and experimental groups based on a numerical code created by the researcher and a form was applied to identify current clinical and social history, user knowledge about chronic non-communicable diseases (NCDs), their complications and control strategies. This strategy allowed a targeted approach and individualized orientation in Nursing consultations. The meeting lasted an average of 50 minutes.

Phase II: For the intervention group, a Nursing consultation was carried out (quarterly), with an average duration of one hour. Physical examination, anthropometric measurements, hemodynamic measurements (blood pressure) and biological measurements (capillary blood glucose), family and social history (sedentary lifestyle, quality of life), habits, guidance and referral for laboratory collection of biological material were performed (serum creatinine, fasting blood glucose, glycated hemoglobin, 24-hour urine proteinuria, 24-hour urine creatinine clearance). The same procedure was adopted for the control group, with the exception of the evaluation of laboratory variables, which was performed only once during the monitoring period, according to the usual strategy adopted in the protocol in primary care.

Phase III: Three months after the first consultation, the Nursing consultation was repeated for both groups, although the laboratory control period was different between the groups.

Phase IV: In the sixth month of follow-up, the Nursing consultation was repeated for evaluation, guidance and monitoring of the clinical profile of both groups. The investigation on quality of life and sedentary lifestyle was carried out in all Nursing consultations using the WHOQOL – BREF and IPAQ scales.

Statistical Analysis

In the descriptive analysis, the characterization variables were used as absolute and relative frequencies. To describe and compare the items of the constructs, in addition to the measures of position, central tendency and dispersion, a 95% bootstrap percentile confidence interval was used.

The descriptive analysis was performed by means or summary (mean and median) and dispersion (standard deviation and 25th and 75th percentiles) measures. To test normality, the Kolmogorov Smirnov test was performed and, as appropriate, the Mann-Whitney, Chi-Square and Fisher's Exact tests were adopted. The sensitivity test was performed to reduce confusion bias. Results with p≤0.05 were considered significant. The R statistical program (version 3.6.1) was adopted for data analysis.

Ethical Considerations

Observing Resolution 466/2012, this study was approved by the Research Ethics Committee of the Foundation for Teaching and Research in Health Sciences; all the participants signed the Free and Informed Consent Form.

Results

In the 45 users in the Control Group (CG) and 40 users of the intervention group (EG), predominance of the female gender (70.6%), arterial hypertension (92.9%), and mean age of 56 ± 11 years old was observed, with age over 60 years old being verified in 24.7%. Smoking and alcoholism were denied by 51.58% vs. 60.63%.

Among the men in the intervention group, greater reduction of waist circumference from consultation 1 to consultation 3 (17.95% vs 8.00%) was observed; while, in women, it practically remained the same (75.00% vs 76.00%). Similarly, greater reductions in the smoking habit (27.27%, 15.38%) vs (8.89%, 12.12%) and in sedentary lifestyle (20.00%; 8.00%) vs (33.33%; 21.21%) were observed in the intervention group when compared to the control group. Adjustment of the body mass index was slightly higher in the intervention group in relation to the control group [(37.50%; 32.00%) vs (33.33%; 30.30%)] from the first to the third Nursing consultation.

The reduction of post-prandial capillary blood glucose was higher in the control group (from 143.04 mg/dl to 118.50 mg/dl), unlike the intervention group (125.63 mg/dl to 148.92 mg/dl). Mean weight was reduced in the intervention and control groups (70.99 kg; 69.66 kg) vs (70.32 kg; 68.80 kg) in time.

Throughout the monitoring, control of some laboratory variables was attained in the intervention group, such as serum creatinine (0.82 – 0.79 mg/dL) and creatinine clearance (99.1 – 102.0 mL/min/1.73 m^2), even though some parameter did not present the same performance, such as glycated hemoglobin (6.17% – 6.50%) and serum urea (32.38 – 33.00 mg/dL), which evolved with certain level of worsening. The parameters rose in the control group, although they still remained in the normal range, such as serum creatinine (0.90 – 0.97 mg/dl). Renal function, especially in the experimental group, remained stabilized, while in the control group it showed a decline, but still within normal limits, as shown in (Table 1).

The difference among the users of the control group, 6 (26.09%), who evolved to renal dysfunction was significant in relation to the intervention group (p=0.001). The health condition of the users of the intervention groups was predominantly self-reported as good, while the control group users reported it as regular during monitoring. The active status was highlighted by the control group from nursing consultation 1 to consultation 3 (27.91%, 30.30%); proportionally, the same behavior was observed in the intervention group (20.00%, 24.00%). Sedentary lifestyle remained in expressive decline in the intervention-group (15.00%, 0.00%) in relation to the control group (32.56%, 15.15%), as shown in (Table 2).

Table 1: Renal function expressed through creatinine clearance.

Frequency		Control Group		Intervention Group	
	n	(CrCl) mL/min Median (25-75)	n	(CrCl) mL/min Median (25-75)	p-value[1]
Consultation 1	23	85.9 (79.3 – 105.5)	40	99.0 (81.0 – 113.6)	0.130
Consultation 2	14	79.6 (72.1 – 95.6)	36	100.4 (81.9 – 119.9)	0.020
Consultation 3	12	74.0 (67.1 – 98.4)	22	104.7 (90.2 – 116.2)	0.008

[1]Mann-Whitney test; CrCl - Creatinine clearance.
Note: It was not possible to calculate CrCL for all the patients due to absence of records.

Regarding quality of life in the physical domain, the aspect that presented the best response was daily activity (4.00 ± 1.21). In the psychological domain, spirituality stood out (4.45 ± 0.91); whereas in the social relations domain, personal relationships (4.32 ± 0.91) was notable and, in the environmental domain, the best result was identified in the environment aspect (4.14 ± 1.06). Even so, the users self-reported that quality of life (3.06 ± 0.90) and satisfaction in relation to health (3.15 ± 0.91) were preserved.

A minority of users with renal dysfunction (2.86%, p=0.147) self-declared as retirees. The group with renal dysfunction considered themselves active in a lower percentage (18.18%) when compared to the group without renal dysfunction (81.82%), although this difference has not shown statistical significance (p=0.067).

Age was higher in the individuals without renal dysfunction when compared to those with dysfunction (57.94 vs 49.83 years old; p=0.05), but the number of cigarettes smoked was higher in the group with renal dysfunction (1.33 vs 0.59 cigarettes; p=0.51).

The psychological domain was significantly better for the health of the group without renal dysfunction when compared to those with renal dysfunction (80.8 ± 0.19 vs 51.8 ± 0.21, p=0.013). The perception of the physical domain was reported as impaired by the users with and without renal dysfunction (45.0 ± 0.46 vs 45.0 ± 0.22, p=0.972). Social relations and the environment were reported as better by the group without renal dysfunction, as shown in Table 3.

By analyzing the domains of the Quality of Life Scale, it was observed that the intervention and control groups showed a better perception of the psychological domain for quality of life throughout time in the activities of daily living. The activities related to the physical and environmental domains referring to quality of life were self-reported as impaired, mainly by the users of the control group, as was the case in the social relations domain in the intervention group (Figure 2).

Discussion

When comparing the effect between the two nursing monitoring strategies (usual vs intensified) in hypertensive and diabetic patients being followed up in Primary Health Care (PHC), there was a better response to interventions in the intensified monitoring group (intervention group) due to greater control of some modifiable factors, risk factors for renal dysfunction, such as weight, BMI and smoking. The care orientations pro-

Table 2: Evolution profile of sedentary lifestyle.

Variable		Intervention Group						Control Group					
		Cons. 1		Cons. 2		Cons. 3		Cons. 1		Cons. 2		Cons. 3	
		N	%	N	%	N	%	N	%	N	%	N	%
Has some paid work	Retired	13	32.5	10	27.78	6	24	12	26.67	12	29.27	11	33.33
	No	11	27.5	12	33.33	8	32	17	37.78	16	39.02	11	33.33
	Yes	16	40	14	38.89	11	44	16	35.56	13	31.71	11	33.33
Your health	Excellent	4	10	0	0	0	0	2	4.55	0	0	0	0
	Very good	2	5	1	2.78	0	0	1	2.27	1	2.5	2	6.25
	Good	20	50	26	72.22	16	64	19	43.18	16	40	13	40.63
	Regular	12	30	8	22.22	7	28	18	40.91	20	50	16	50
	Bad	2	5	1	2.78	2	8	4	9.09	3	7.5	1	3.13
Level of physical activity	Active	8	20	10	27.78	6	24	12	27.91	11	28.21	10	30.3
	Irregularly Active A	8	20	5	13.89	3	12	6	13.95	7	17.95	6	18.18
	Irregularly Active B	7	17.5	11	30.56	9	36	4	9.3	7	17.95	9	27.27
	Very active	11	27.5	7	19.44	7	28	7	16.28	3	7.69	3	9.09
	Sedentary	6	15	3	8.33	0	0	14	32.56	11	28.21	5	15.15

[1]Mann-Whitney test; Cons. - Consultation.

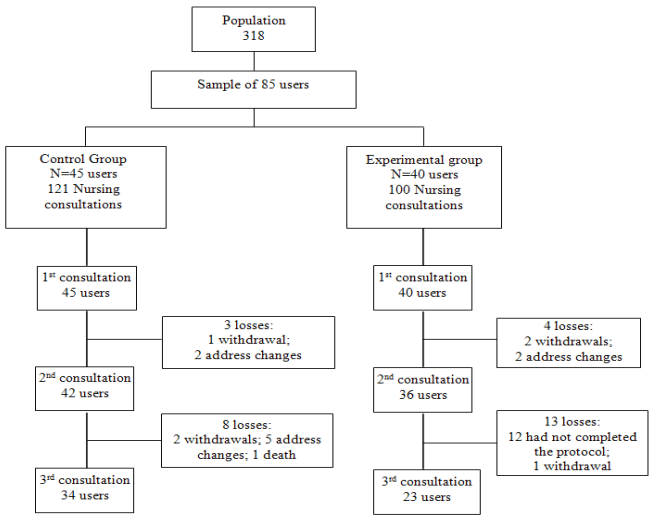

Figure 1: Flowchart showing the distribution of the assisted users.

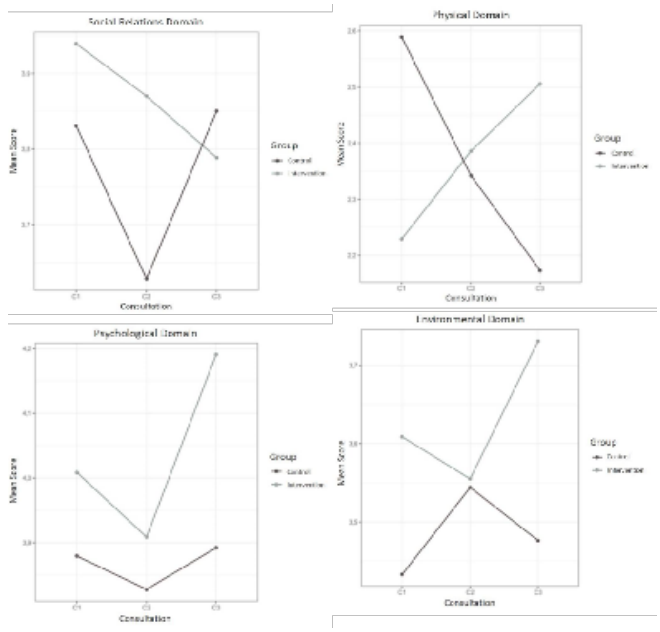

Figure 2: Variation of the quality of life indicators in time.

vided during the Nursing consultations resulted in a reduction in sedentary lifestyle and an improvement in the quality of life in both groups.

Population intervention projects, such as this study, have been pointed out as fundamental in PHC in order to promote behavioral changes and to reduce the risk factors based on a better control of chronic Non-Communicable Diseases (NCDs), such as diabetes mellitus and arterial hypertension and their complications. Acknowledgedly, when there is progress in the work of a multidisciplinary team, whether through the inclusion of educational or similar processes, the potential to enhance self-care in health is increased [17]. PHC stands out in this setting for offering holistic and continuous care, which is recommended for this group of patients and enhanced by the support to self-care and quality of life [18].In this context, kidney diseases significantly add up to multimorbidity [19] and have been indicated as a concern for public health since, although controllable, they are not curable [20]. The reductions in weight, smoking habit and sedentary lifestyle, among the modifiable risk factors for renal dysfunction in the users, show the efficacy of a monitoring program for maintaining better care, early detection of adverse events, and improvement in health conditions [21].

Quality of Life (QoL) represents an important health perception measure, in addition to a multidimensional construct recognized as an indicator that encourages health promotion actions [22]. We verified that there was difference between the psychological perception and quality of life between the users with and without renal dysfunction (p=0.013). In this scenario, the work in a multidisciplinary team is recognized as a fundamental organizational proposal that allows obtaining better results in the health care process, as it contributes to health care based on necessary orientations and recommendations for self-care [23].

Nursing consultations in PHC and the work of the multidisciplinary team favor the possibility to analyze the clinical profile (laboratory and hemodynamic) and enables early referral of

users with NCDs and renal dysfunction to the nephrologist, aiming at better prognoses, based on the articulation of actions and on the modification of the potential risk factors [24]. The above can be evidenced in our findings, when a satisfactory evolution of the hemodynamic conditions and laboratory variables is identified, especially in the renal biochemical markers (serum creatinine and creatinine clearance) of the users throughout the monitoring in the Nursing consultations, especially in the group with the intensified strategy.

In the clinical practice, these biomarkers, especially creatinine, even though it is widely used in the assessment of renal function, have a late characteristic for the identification of kidney injury, since changes in glomerular filtration do not cause its immediate increase [25]. In this context, lack of knowledge about the change in these biomarkers by the Nursing team, when present, can worsen health users' evolution, especially in those with NCDs, and delay the identification of renal impairment, which reinforces the need for knowledge and professional training [9].

It is known that the Glomerular Filtration Rate (GFR)/creatinine clearance is a marker of renal dysfunction and a standard measure to assess renal function because it reflects the speed at which a substance is cleared by the kidneys [26]. In this study, decline/worsening of GFR was progressively observed in the control group (conventional monitoring), differently from the intervention group (intensified monitoring), where satisfactory control of this biomarker was observed with a significant difference between both groups in the second (p=0.02) and third (p=0.008) consultations.

The monitoring performed to investigate kidney disease allowed identifying that the intervention group evolved throughout time with no renal function impairment, which was not observed in the control group. This difference was significant (p=0.001), highlighting the efficacy of the monitoring proposal with intensified laboratory control, established as an intervention strategy during the development of this study.

The limitations of this study are related to the non-adherence of the study participants to the Nursing consultations and to the conduction of the laboratory tests during the study follow up period. In general, such findings evidence that the intensified quarterly monitoring program, developed in this study with hypertensive and diabetic users of PHC, pointed out contributions for a better control of the modifiable risk factors and even the prevention of renal impairment, which represents an alert to the need to bridge the gaps in care based on systematized actions targeted at restoring health with quality. Decision power based on orientations by health professionals, especially by nurses, has an impact on safety and care.

Conclusions

The intensification of the quarterly nursing follow-up program in PHC in hypertensive and diabetic patients contributed to a better control of modifiable risk factors for kidney diseases, such as weight, body mass index and smoking, as well as to the prevention of renal impairment. The orientation provided during the Nursing consultations resulted in a reduction in sedentary lifestyle and an improvement in the quality of life.

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