Statistical Impact of Educational Attainment on Changing the Lifestyle of Hemodialysis Patients

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Abstract –**Education provides patients with useful information, essential for living in specific situations of life. The purpose of this article was to prove statistically that supporting patients with the appropriate source of information might cause changes in their lifestyle. Better knowledge helps patients to follow the necessary guidelines while living with hemodialysis. The efficient outcome depends on the changes, that appear in the patient's behaviour. Knowledge helps to easier adjustment to the new situation. The efforts of the staff, taking care of such patients are directed to improve their quality of life. The final aim is to achieve emotional support and patients' self -management.**

Keywords – **patients, hemodialysis, education, statistical study**

1. Introduction

Receiving a long-term hemodialysis treatment requires constant educational support of patients. Important features are: their experience, psychological maturity, employment, the right to lead a fulfilling social life, their chronic renal illness and the necessity to visit a dialysis unit three times a week to perform sessions.

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All the features mentioned above worsen the patients' daily routine.

Life with hemodialysis requires following special guidelines that ensure good quality and fulfilment of patients' life. Adjusting to dialysis treatment is a long-term process, requiring a lot of efforts and will.

It is proved that dialysis patients live longer if they are more acquainted with their disease and the regimen they need to follow. A lot of studies have been conducted in regards with the attainment of knowledge. They showed that patients, undergoing hemodialysis were not entirely aware of the quality of life during their treatment [8], [12]. They did not feel prepared to start dialysis treatment and were not acquainted enough with the forthcoming things [14]. In order to achieve a better quality of life, they need to acquire and expand their knowledge constantly in regards with the methods of treatment, diet regimen and rehabilitation. Other studies have proved that better knowledge of the disease could improve treatment compliance and the quality of life with hemodialysis [7], [10], [11].

Not all patients, starting hemodialysis treatment are acquainted with the procedure itself and the restrictions it sets. From January 2019 to December 2021, 1023 patients have received dialysis treatment in the Dialysis Centre at "Kaneff" University Hospital, town of Ruse. 11,5% of the new patients were aware of the dialysis procedure and the health requirements. Furthermore, the period coincided with the worsening epidemiological situation and impact of Covid 19. Focusing the society on the pandemics and neglecting other diseases might be the reason for the low percentage rate of those who have been prepared for the forthcoming dialysis procedure. 908 patients have received dialysis treatment from January 2016 to December 2018. The percentage rate was higher (15.1%), but still insufficient. Patients, beginning dialysis treatment, who are not prepared with the new situation have worse clinical results and damaged somatic state of health, in comparison with those who have been introduced with it in advance. It was proved that if old patients on dialysis had not

been introduced with the treatment in advance or had not been directed to a nephrologist on time, had to stay in hospital for a longer period of time, had high mortality-rate [13], [1] and worse quality of life [10]. The quality of life is related to preserved social activity, well-being and healthcare [15]. For that reason, an appropriate education is required, according to patients' needs, caused by the end stage of their chronic kidney disease.

2. Exposition

Education is a way to acquire knowledge in order to achieve self-efficacy and changes in lifestyle. It also helps to improve self-care and self-management and to exercise control over the disease, which is very important for patients, receiving a dialysis treatment [3], [5], [16]. The feeling to be in control of the situation helps to overcome the side effects of the chronic disease [2], [4].On the other hand, having a chronic disease requires special education of patients in order to achieve optimal quality of life and preserving health for a longer period of time [6].

Participating actively in educational sessions is a prerequisite for the patients to apply what they have learnt. Such education makes patients feel more confident that they can control their lives and improve their self-confidence [6], [9]. The unusual place, where hemodialysis sessions are performed (dialysis centre) may be stimulating, encouraging and motivating for them to improve their quality of life. The education itself depends on the stage of kidney failure and the individual state of health of each patient.

The present study aimed to prove statistically the correlation between the educational program and the changes that appeared in the lifestyle of hemodialysis patients.

A total of 66 patients, receiving chronohemodialysis treatment participated in the study – 40 male and 26 female patients; at the average age of 59,5. Half of the respondents (50,8%) graduated from secondary education. The educational program was performed in 13 consecutive lectures. In the beginning and at the end of the trial a questionnaire was made in order to establish the changes that occurred in the lifestyle. Participation in the trial was voluntary, by completing the questionnaire cards which were anonymous.

The data was processed by IBM SPSS Statistics software for Windows. Correlation analysis for evaluating the correlation between the studied indexes was applied. The correlations with a high rate of statistical reliability P≥95% were considered. Kendall's r– coefficients, based on the method "against each other" were calculated.

The analysis was made according to the questions from the questionnaire cards, in which variable quantities were compared for convenience, determined as X1, X2, ..., X10:

✓ X1Amount of daily fluid intake;
✓ X2 Consumption of smoked meat and nuts;
✓ X3 Control of thirst;
✓ X4 Vascular access care;
✓ X5 Vascular access dysfunction;
✓ X6 Communication with friends and relatives;
✓ X7 Hobbies;
✓ X8 Activeness;
✓ X9 Performance of everyday activities.
✓ X10 Quality of life.

In such studies, determining the existing correlations between the included variables and the level of their significance was considered.

The absolute number of relations, established by the method "against each other" and their dependency (** - significant correlation in P = 99 % and * - significant correlation in P = 95 %) in the researched group in the beginning and at the end of the period was presented by the corresponding correlation matrix, where the empirical values of Kendall's coefficient were given.

If the empirical value of Kendall's coefficient is less than its critical one, e.g. if $|r_{em}| < r_{cr}$, in this case the zero hypothesis is accepted and the coefficient is considered to be statistically insignificant. Otherwise, if $|r_{em}| > r_{cr}$, then the zero hypothesis is rejected and the coefficient is considered to be significant.

The amount of data is too big to be presented in details and for that reason only those correlations were shown in which statistically significant difference was determined.

Only significant coefficients were considered important according to the statistical analysis. In the beginning of the period the number of significant correlations was 10, but at the end it was 15.

The comparative analysis showed that at the end of the period, 6 of the established significant correlations became stronger. A change was noticed in the strength of correlation between practising a hobby (X7) and events of vascular access dysfunction (X5), where the coefficient of correlation increased from 0,258 to 0,562 (Table 1.).

Table 1. Correlation between practising a hobby and behaviour in case of a vascular access dysfunction

		X5/before	X5/after
X7	Pearson Correlation	,258**	,562**
	Sig. (2-tailed)	0	0
	N	66	66

Performing a favourite activity may force the site with vascular access construction, which may cause AV fistula/protesis dysfunction. So, the patients are given instructions and recommendations to choose the most appropriate activities for them and to take care of their vascular access. After completing the educational sessions, patients are able to deal with these criteria.

Similar changes were noticed while performing basic daily activities (X9) and events of vascular access dysfunction (X5) with an increasing coefficient of correlation from 0,285 to 0,380 (Table 2.).

Table 2. Correlation between performing common everyday activities and events of vascular access dysfunction

		X5/before	X5/after
X9	Pearson Correlation	,285**	,380**
	Sig. (2-tailed)	0	0
	N	66	66

Performing everyday activities may cause vascular access dysfunction. The appropriate planned behaviour is important in such situations, e.g. urgent consultation with a vascular surgeon. After analyzing the received data, it was concluded that the patients knew how to react in case of vascular access dysfunction. On the other hand, the ability to perform such activities before starting hemodialysis had positive impact on patient's activeness.

Table 3. Correlation between performing common everyday activities and patient's activeness

		X8/before	X8/after
X9	Pearson Correlation	,943**	,970**
	Sig. (2-tailed)	0	0
	N	66	66

Doing the same everyday activities as before the kidney disease, preserves the patient's activeness. It is seen in Table 3., that there is a strong correlation between both items even before the study. The increased values at the end of the study show positive effect on the performed activities.

Patients, undergoing hemodialysis should follow a special dietary regimen. And even they do so, they might be tempted sometimes. In order to resist, they need to apply strong will and self - control. If they break the diet, they might get complications. Eating processed meats and nuts is the main mistake they make.

There is also a strong statistical correlation between consumption of smoked meat and nuts and the need to drink water (Table 4.).

Table 4. Correlation between the control of thirst and the consumption of smoked meat and nuts

		X2/before	X2/after
X3	Pearson Correlation	0,194	,270*
	Sig. (2-tailed)	0,119	0,028
	N	66	66

Better knowledge helps patients to be able to restrict foods high in potassium and sodium and thus, to regulate the extreme thirst and to decrease the fluid intake per day. The eating plan that should be followed is limited, but it is in accordance with the common healthy eating. Following a meal plan benefits patient's overall well-being and reduces complications, associated with hemodialysis treatments.

The proper function of the vascular access is essential.

Table 5. Correlation between vascular access care and events of vascular access dysfunction

		X4/before	X4/after
X5	Pearson Correlation	0,172	,439**
	Sig. (2-tailed)	0,168	0
	N	66	66

Vascular access is a hemodialysis patient's lifeline. Both health care professionals and patients should observe and take care of it. It was found out that the conducted study contributed to improvement of cares which directly correlated with the proper actions, taken by a patient in case of vascular access dysfunction (see Table 5.).

Staying engaged and active after starting dialysis procedure has a strong impact on the patient's overall condition.

Table 6. Correlation between communication with friends and relatives and vascular access dysfunction

		X5/before	X5/after
X6	Pearson Correlation	,277*	,392**
	Sig. (2-tailed)	0,024	0,001
	N	66	66

Preserving social well being and daily routine the same as they have been before the end stage of the chronic kidney disease is very important for the patient to overcome the negative feelings and

rejection. Vascular access dysfunction affects dialysis patients' psychological, physical and emotional state of health. For that reason, patients with chronic renal failure need support and care. Communication with friends and relatives contributes to their resocialization, creates sense of completeness and if any problem occurs they do not feel alone, but they get necessary support and assistance. Communication with friends and relatives and the proper behaviour in case of vascular access dysfunction appeared to be strongly dependent at the end of the study and thus, it proved to be effective (see Table 6.).

Table 7. Correlation between activity and communication with friends and relatives

		X6/before	X6/after
X8	Pearson Correlation	,275*	,544**
	Sig. (2-tailed)	0,026	0
	N	66	66

Communication and meeting friends and relatives give a positive effect on patients, on their activeness and the way they take care of themselves (Table 7.). Such social contacts have positive effect on the patients, make their lives worth living, help to overcome self-isolation and improve vitality.

Table 8. Correlation between activity and hobbies

		X7/before	X7/after
X8	Pearson Correlation	,269**	,525**
	Sig. (2-tailed)	0,026	0
	N	66	66

Spending more time on hobbies, the feeling of being vital, energetic and fulfilled by performing everyday activities contribute to better quality of life on hemodialysis. The analyzed data showed that patients increased their activities in the spare time and became more active in doing different things (Table 8.).

Table 9. Correlation between quality of life and amount of daily fluid intake

		X1/before	X1/after
X10	Pearson Correlation	0,13	,263*
	Sig. (2-tailed)	0,299	0,033
	N	66	66

High fluid intake by patients with kidney failure may lead to hyperhydration, fluid retention in the body and a lot of other complications. Fluid control is a control of the condition and this means living a better quality of life. The studied criteria X1 (amount of fluid intake per day) in most cases appeared to be difficult to control by the patients, especially during the so called adjusting to the sessions period. Some of them say that they cannot control the sense of thirst. The analyzed data from the questionnaire showed that patients could significantly improve and control successfully the need to take fluids (see Table 9.).

Table 10. Correlation between quality of life and performance of common activities of daily living

		X9/before	X9/after
X10	Pearson Correlation	,423**	,704**
	Sig. (2-tailed)	0	0
	N	66	66

Quality of life in chronically ill patients has been described a lot and it is really important. Standard indicators of the quality of life include:

- ✓ Life satisfaction;
- ✓ Prosperity;
- ✓ Adequate standard of living;
- ✓ Good overall health;
- ✓ Good physical and social activity;
- ✓ Autonomy and independence;
- ✓ Coping with the challenges in daily life;
- ✓ Other indicators.

And there are a lot of other indicators. The main thing is that despite their disability, an individual should live a complete and meaningful life, even if it seems hopeless. Visiting a dialysis unit three times a week is a burden to the patients and their families and assistants. It is important for them to integrate their condition successfully into their daily routine and make their lives complete. In order to improve the patients' quality of life, they should follow a proper dietary and active regimen, preserve their energy, meet friends, practise favourite hobbies, selfcare and independence. Data in Table 10. shows that the performed study was highly efficient and participants in the study have improved their quality of life as they continued to perform their everyday activities the same way they have done before dialysis.

It was found in the performed statistical analysis, that the relative parts changed into improvement of the patient's overall condition. Those changes have been proved by using Pearson's criteria (χ^2-criteria) in accordance with the common procedure for accepting or rejecting the working hypothesis. For the empiric feature we got 16,65, but the amount of the theoretical feature was 16,01, determined by a definite risk for a mistake α=0,01, bilateral critical sphere α=0,025 and a rate of freedom k=7.

χ^2_{emp}=16,65>χ^2_T=16,01, therefore, we rejected the zero hypothesis and accepted the alternative, which said that the education helped to improve energy, social activity and better quality of life of hemodialysis patients.

3. Conclusion

After analyzing the references and the statement, mentioned above, we may conclude that life with hemodialysis needs time to adjust and to accept the new circumstances. Preliminary preparation, knowledge and skills are required in order to deal with the different situation in regards with the treatment. Education helps patients to acquire useful information, which is applicable in the daily living with concrete life circumstances. The efficient outcome depends on the changes, that appear in patient's behaviour. In a long – term period, knowledge helps to easier adjustment to the new situation and increases motivation of life. Acquiring practical knowledge and skills about life on hemodialysis prepares patients for efficient control of any life situation. Providing organized and targeted information is a process in which the patient plays the main role. The final aim is to achieve independence and not to rely on friends and relatives in performing basic everyday activities. That makes their lives complete and worth living. People with chronic diseases sometimes feel helpless and worried about the future. Patients' independency, their knowledge and skills about life with hemodialysis help to positive attitude towards the treatment and their future life.

The received results from the study showed that the performed concentrated study changed and improved patients' knowledge and skills. The acquired information changed significantly their behaviour and thus had positive effect on their way of life.

Better knowledge increases patients' motivation to follow the necessary guidelines for life with hemodialysis. Medical stuff plays a significant role while performing these activities. It should support and motivate patients to be more active. The efforts of the staff, taking care of such patients are directed to improve their quality of life. The final aim is to achieve emotional support and patients' self - management.

References

[1]. Chan, M. R., Dall, A. T., Fletcher, K. E., Lu, N., & Trivedi, H. (2007). Outcomes in patients with chronic kidney disease referred late to nephrologists: a meta-analysis. *The American journal of medicine*, *120*(12), 1063-1070.

[2]. Chen, W. C., Lin, C. C., Wu, C. C., & Song, Y. C. (2021). Psychometric testing of the hemodialysis self-management instrument (HDSMI-18): A confirmatory factor analysis. *Nursing Open*, *8*(5), 2832-2839.

[3]. Costantini, L. (2006). Compliance, adherence, and self-management: is a paradigm shift possible for chronic kidney disease clients?. *CANNT Journal= Journal ACITN*, *16*(4), 22-26.

[4]. Curtin, R. B., Mapes, D., Schatell, D., & Burrows-Hudson, S. (2005). Self-management in patients with end stage renal disease: exploring domains and dimensions. *Nephrology Nursing Journal*, *32*(4).

[5]. Curtin, R. B., Walters, B. A., Schatell, D., Pennell, P., Wise, M., & Klicko, K. (2008). Self-efficacy and self-management behaviors in patients with chronic kidney disease. *Advances in chronic kidney disease*, *15*(2), 191-205.

[6]. Greta, K., Daniela, D., Irina, H., & Despina, G. (2015). Position of the nurse in prevention of chronic diseases. *Научни трудове на Съюза на учените–Пловдив. Серия Г: Медицина, фармация и дентална медицина*, *18*, 15-18.

[7]. Idier, L., Untas, A., Koleck, M., Chauveau, P., & Rascle, N. (2011). Assessment and effects of Therapeutic Patient Education for patients in hemodialysis: a systematic review. *International Journal of Nursing Studies*, *48*(12), 1570-1586.

[8]. Kurella Tamura, M., & Periyakoil, V. S. (2013). The patient perspective and physician's role in making decisions on instituting dialysis. *Nephrology Dialysis Transplantation*, *28*(11), 2663-2666.

[9]. Lii, Y. C., Tsay, S. L., & Wang, T. J. (2007). Group intervention to improve quality of life in haemodialysis patients. *Journal of clinical nursing*, *16*(11c), 268-275.

[10]. Mendelssohn, D. C., Malmberg, C., & Hamandi, B. (2009). An integrated review of" unplanned" dialysis initiation: reframing the terminology to" suboptimal" initiation. *BMC nephrology*, *10*(1), 1-8.

[11]. Polikandrioti, M., Koutelekos, I., Vasilopoulos, G., Babatsikou, F., Gerogianni, G., Zyga, S., & Panoutsopoulos, G. (2017). Hemodialysis patients' information and associated characteristics. *Materia socio-medica*, *29*(3), 182.

[12]. Poorgholami, F., Javadpour, S., Saadatmand, V., & Jahromi, M. K. (2016). Effectiveness of self-care education on the enhancement of the self-esteem of patients undergoing hemodialysis. *Global Journal of Health Science*, *8*(2), 132.

[13]. Roy, D., Chowdhury, A. R., Pande, S., & Kam, J. W. (2017). Evaluation of unplanned dialysis as a predictor of mortality in elderly dialysis patients: a retrospective data analysis. *BMC nephrology*, *18*(1), 1-6.

[14]. Song, M. K., Lin, F. C., Gilet, C. A., Arnold, R. M., Bridgman, J. C., & Ward, S. E. (2013). Patient perspectives on informed decision-making surrounding dialysis initiation. *Nephrology Dialysis Transplantation*, *28*(11), 2815-2823.

[15]. Staykova, S., & Petrov, P. (2020). Biomarkers And Quality Of Life In Patients With Chronic Kidney Disease. *Actual Nephrology*, *14*(1), 17-24.

[16]. Wu, S. F. V., Hsieh, N. C., Lin, L. J., & Tsai, J. M. (2016). Prediction of self-care behaviour on the basis of knowledge about chronic kidney disease using self-efficacy as a mediator. *Journal of clinical nursing*, *25*(17-18), 2609-2618.