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ORIGINAL PAPER

EDUCATIONAL ASSESSMENT OF DIABETICS REQUIRING VASCULAR SURGERY

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Abstract

Aim: Educational assessment involving epistemological, axiological, and technical conditions was demonstrated to be an important part of the educational process of improving the knowledge and behavior of diabetics requiring vascular surgery. *Design:* A quantitative interventional prospective study. *Methods:* The theoretical model of Practical Reasoning of Humanistic Interpretation Method was used to construct the educational assessment. The assessment was followed up by a quantitative interventional prospective study to determine conditions of behavior before and after education. The research sample comprised of diabetics with diabetic foot syndrome (DFS) (n = 52), and with Low Extremities Arterial Disease (LEAD) (n = 48) from the University Hospital in Martin, Slovakia. *Results:* We found no differences in epistemological, axiological, and technical conditions of diabetics with DFS versus LEAD before education. Six months after education, we found significantly better knowledge in patients with DFS. Group education methods, family status, and membership of a diabetics' club were some of the educational assessment factors confirmed as significant following education of both groups. *Conclusion:* Educational assessment based on a theoretical model of practical reasoning and behavior revealed a number of differences and conditions which determined learning and behavior in the case of vascular surgery patients, and, we may assume, others besides.

Keywords: Diabetic Foot Syndrome, educational assessment, Lower Extremity Arterial Disease, Theoretical model of practical reasoning of humanistic interpretation method.

Introduction

DFS and LEAD in their developed form, in which diabetic ulceration occurs, are prevalent, according to several authors, in 3–10% of all diabetics, with a yearly incidence of around 2–4% in high-income countries, and, probably, an even higher incidence in developing countries (Boulton et al., 2005; Bakker et al., 2016). The recurrence of healed ulceration over a span of five years increases to 50–70% of diabetics (Jirkovská et al., 2006; Markowitz et al., 2006; Boulton, 2010). In developed countries diabetes-related complications are the most common cause of lower limb amputations (Martinka, 2013). Lower-limb amputations in 85% of cases are preceded by ulcerations that are potentially curable (Khanolkar, Bain, Stephens, 2008; Krahulec et al., 2013).

On a rational level, diabetics accept the possibility of diabetic ulceration, but emotionally they refuse to believe that such a condition could affect them personally. Individuals do not regard information on preventive care of diabetic foot as important, and should ulcers appear he or she can ignore information regarding their seriousness, and on the need for professional help. It is important to be aware of diabetics' behavior and actions, and also the factors that can exert an influence on patients, such as their attitude, approach to self-care, or to the prevention of complications in terms of sex, gender stereotypes, motivation etc. The aforementioned conditions should be identified, analyzed, interpreted, and integrated into standard nursing care, which means we should first conduct a thorough educational assessment and, subsequently, educate patients (Pokorná, Leaper, 2015). In the case of diabetics, this procedure is known as therapeutic education.

Hood and Llahana (2008) in their report from the meeting from the Federation of European Nurses in Diabetes point out the words of Assal and his colleagues, which criticise the monotonous nature of diabetic educational programmes: "Education requires more work and improvement." According to Assal, the humanities play an important role in the improvement of nursing: "We should avoid the biomedical model" (Hood, Llahana, 2008). Nurses need to engage in a broader health assessment role that facilitates the identification of both specific

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nursing and patient problems (Lillibridge, Wilson, 1999). By means of assessment, nurses collect sufficient data effectively (Avşar, Kaşikçi, 2011).

The great majority of studies on the pathogenesis of diabetic ulcerations list only bodily determinants as the cause of surgery for vascular diseases. This either means that psychosocial determinants are not considered important, or that we do not know how to study them (The 3rd International DAWN Summit: from research and practice to large-scale implementation, 2006). In order to understand them, we should consider psychosocial educational theories and models that form a conceptual basis for clinical practice and for research into patient education (Loveman et al., 2003; Leino-Kilpi et al., 2005; Nadkarni et al., 2011).

This study examined this process by testing a framework called the Theoretical Model of practical reasoning, according to the method of humanistic interpretation. It is a method of forming a methodology for social sciences and humanities. Via the method of humanistic interpretation, we can cooperate with patients to analyze their thoughts and actions, and identify possible problems and their causes. The first thing to do during the reconstruction of rational participants' practical thinking is to determine their motivation. Then we clarify epistemological, axiological, and technical conditions. The participants/patients are rational humans able to work with their knowledge if the following three conditions are fulfilled: a) epistemological conditions, which means that the goal can be realized and is in accordance with evidence-based practice, and patients have the most up-to-date knowledge about, for example, self–management of diabetes, screening of his/her feet, care of feet etc.; b) axiological conditions, that is, if the goal is reasonable to patients and suits their needs, values norms and ideals, for example, the awareness of self-care responsibilities, health as the highest value in their lives etc.; c) technical and technological conditions, which means the presence of tools (if patients have a glucometer, insulin pen, personal weight, mirror to observe their feet etc.) and means of action (e.g. skills to use a glucometer, observe feet etc.). Patients then analyze the options and try to choose the best way of achieving their objective. They decide to act. The conclusion of practical reasoning is not the action itself, but the participants' conscious decision to act. In order to do that, patients need a sufficient amount of ambition and willpower, and they assess whether they have the requisite tools, means, and practical experience to take action. Only then (unless they are thwarted from doing so by an unprecedented situation) do patients fulfill their objective (Figure 1) (Černík, 1999; Černík, Viceník, Višňovský, 2000).

Aim

The aim was to identify the epistemological, axiological, and technical conditions for rational actions in patients with type 2 diabetes (DFS, LEAD), to study their motivational premises. We also wanted to identify differences between patients with DFS and LEAD according to their age, gender, education, social status, length of illness, and/or membership of independent diabetics' clubs, in relation to the monitored variables of the scheme of rational participants'/patients' practical thinking. With the data gathered we sought to determine how educational programmes influence patients' knowledge and behavior.

Methods

Design

We carried out a quantitative interventional (uncontrolled) study using educational assessment according to the Theoretical Model of Practical Reasoning of Humanistic Interpretation Method (the reconstruction of rational actors'/patients' practical thinking) (Figure1). We specified three research areas in our study: 1) educational assessment (using the method of humanistic interpretation as a means of systematic assessment in the educational process); 2) determinants of education affecting the learning process; 3) evaluation of the effectiveness of vascular surgery patients' education.

Sample

Patients were identified and randomly selected from the University Hospital's healthcare system using an administrative database. The research sample comprised vascular surgery patients diagnosed with chronic complications of type 2 diabetes – DFS and LEAD. Patients from almost all of Slovakia, mainly from the northern and central regions, are hospitalized and undergo vascular surgery. We assessed their eligibility and obtained their written consent to the research. Cognitive functions were evidenced by healthcare documentation, confirming patients were without any cognitive impairment. The overall number of respondents (n = 100) had an average age of 61.08 years (± 6.54 years). We divided the respondents into two groups: group I with DFS (n = 52), and group II with LEAD (n = 48). Regarding surgical diagnoses, we concentrated on mapping the treatment of ischemia, as well as diabetic foot syndrome, repeated revascularizations,

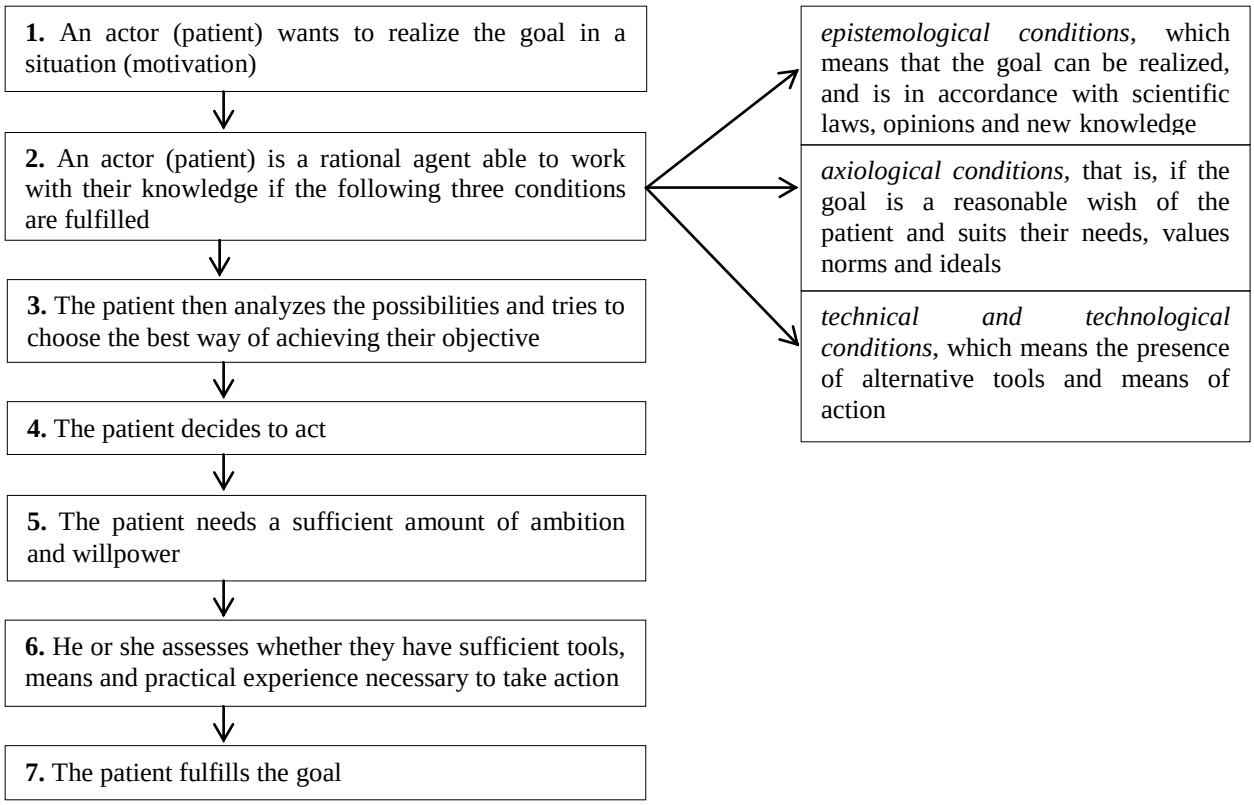

Figure 1 Theoretical Model of Practical Reasoning of Humanistic Interpretation Method (the reconstruction of the rational actor's practical thinking)

and visits to vascular clinics. We defined the risk factors of LEAD diabetics. The duration of the patients' DM in our sample spanned from 1 to 35 years, with the average duration being 13.12 (SD ± 8.03) years.

Data collection

In order to collect empirical data in clinical practice, we used content analysis of the data in the patients' medical documentation, structured dialogues, and structured observation as our main research tools. After educating the patients (over six months) we used content analysis of their medical documentation and an individual questionnaire.

Structured dialogue

The structured dialogue was constructed according to the model of the humanistic interpretation method – rational participants' practical judgment scheme. The objective was to identify the epistemological (patients' theoretical knowledge), axiological (needs, interests, values, norms, ideals). and technical or technological conditions of the education (tools, means, external conditions). The interview contained closed, open, and scale-based questions that were divided into eight problem areas: diabetic diet, pharmacotherapy, monitoring of glycaemia, acute complications, chronic complications, care of diabetic foot, determinants affecting the learning process, and learning barriers. The types of questions aimed at identifying the factors affecting the learning process were of two types: demographic questions (occupation, education, working and social status, relationships, and family status), and problem-related questions (language problems, problems with speech, hearing problems or problems with vision, a lowered ability to read or write, orientation problems, and changes in cognitive functions). We sought to determine patients' preferred teaching methods, and their preferred organizational form of education. The second part of the interview was aimed at the assessment of the axiological conditions of education: we inquired about patients' customs, cultural traditions, spirituality, religious beliefs, interests, willingness and motivation to learn (the need to learn, the willingness to accept information and to acquire manual skills, motivation, will, energy), and their negative emotions (fear, anxiety,

anger, helplessness, the feeling of guilt, suffering, and depression).

Structured observation

Structured observation was used as an additional collection method of empirical information. We used diabetic foot screening according to the nursing protocol for diabetic foot screening (the sensitivity of the nursing protocol is 84.8% and the specificity is 79.4%), and we added the factors affecting the learning process (Nemcová et al., 2006).

After-education questionnaire – education effectiveness evaluation (after six months)

The after-education questionnaire was composed of three parts: 1) epistemological conditions (questions regarding knowledge); 2) technical and technological conditions; 3) axiological conditions and factors affecting the learning process.

Data analysis

PASW Statistics software was used for statistical processing and the evaluation of data and hypotheses. We used the following methods of inductive statistics: One Way ANOVA, test of the importance of the differences between averages, test F-statistics on a 5% level of importance ($p < 0,05$), correlation Eta coefficient (η), Eta coefficient squared (η^2), Cramer contingent V coefficient, Chi-quadrant independence test, Pearson's correlation coefficient, couple t-test, MANOVA test (Multivariate Analysis of Variance).

Results

The reconstruction of practical judgment of patients with chronic complication of diabetes

1. Epistemological conditions

In the analysis of the epistemological conditions according to surgical diagnosis no difference in the level of knowledge was reported between the patients with DFS and those with LEAD ($p = 0.095$). Using statistical analysis of the knowledge level of respondents, we identified important differences in terms of gender, with women demonstrating greater knowledge ($p = 0.008$) (Table 1).

Table 1 Summative educational assessment in relation to surgical diagnosis and gender

	Surgical diagnosis			Gender		
	DFS (n = 52) mean ± SD	**LEAD (n = 48) mean ± SD**	**p***	**male (n = 53) mean ± SD**	**female (n = 47) mean ± SD**	**p***
Epistemological**	55.77 ± 19.60	62.74 ± 21.69	0.095	53.99 ± 20.74	64.89 ± 19.56	**0.008**
Axiological***						
traditions	47.60 ± 41.50	50.00 ± 36.83	0.761	47.17 ± 37.87	50.53 ± 40.88	0.670
spirituality	56.81 ± 43.45	50.00 ± 45.25	0.589	41.41 ± 42.73	64.89 ± 42.88	**0.008**
religious beliefs	53.37 ± 42.88	50.52 ± 43.91	0.589	36.32 ± 40.89	69.68 ± 38.99	**0.000**
interests	43.27 ± 37.74	61.46 ± 40.92	**0.023**	56.13 ± 39.19	47.34 ± 41.12	0.277
Technical and technological****	60.66 ± 15.64	56.53 ± 14.55	0.176	58.40 ± 14.79	58.99 ± 15.79	0.848
Motivation	80.77 ± 23.54	85.94 ± 25.74	0.297	83.96 ± 25.05	82.45 ± 24.40	0.761
Willpower	62.50 ± 34.12	62.50 ± 37.54	1.000	60.85 ± 36.53	64.36 ± 34.87	0.625
Willingness	77.88 ± 16.68	82.20 ± 16.01	0.190	78.38 ± 17.28	81.73 ± 15.39	0.310
Negative emotions	38.26 ± 23.05	33.18 ± 22.67	0.270	36.25 ± 22.57	35.33 ± 23.49	0.842

**One Way ANOVA, test of the importance of the differences between averages on a 5% level of importance ($p < 0,05$); **epistemological conditions (knowledge); ***axiological conditions; ****technical and technological conditions; DFS – diabetic foot syndrome; LEAD – lower extremities arterial disease*

The knowledge level of patients with diabetes duration of ten years or less, as well as that of patients who had had diabetes for longer than 10 years, was the same and did not fulfill the minimum (60% success rate). There also seems to be no significant relationship between the respondents' age and the variables monitored in this study. Nor did the study find any important results in the knowledge level of the respondents (before the educational process) which would have been influenced by their previous education. The study also tried to determine if there was a relationship between the respondents' knowledge level and their repeated hospitalizations for vascular surgery. ANOVA showed ($p = 0.008$) a relationship between hospitalization (in the past twelve months) and the respondents' knowledge (Table 2).

2. Axiological conditions

Regarding axiological conditions, statistically significant differences were noted in the field of spiritual values ($p = 0.033$). Patients with DF grant greater importance to spirituality. Both groups

Table 2 Summative educational assessment in relation to repeated hospitalisations and membership of self-help clubs

	Repeated hospitalisations (for last 12 month)				Membership of self-help clubs		
	never (n = 21) mean ± SD	1 time (n = 55) mean ± SDs	2 times or more (n = 24) mean ± SD	p*	no (n = 79) mean ± SD	yes (n = 21) mean ± SD	p*
Epistemological**	69.05 ± 18.10	59.30 ± 21.84	50.00 ± 16.86	**0.008**	56.09 ± 20.97	70.51 ± 16.06	**0.004**
Axiological***							
cultural traditions	54.76 ± 39.23	42.73 ± 38.69	57.29 ± 39.34	0.232	45.57 ± 38.97	60.71 ± 38.38	0.116
spirituality	57.14 ± 45.51	48.18 ± 44.58	58.33 ± 42.77	0.560	51.90 ± 44.18	54.76 ± 45.15	0.793
religious beliefs	67.86 ± 39.64	45.91 ± 44.57	52.08 ± 40.99	0.140	50.32 ± 42.46	58.33 ± 46.32	0.452
interests	72.62 ± 34.37	49.09 ± 41.10	52.00 ± 40.15	**0.019**	45.25 ± 40.44	77.38 ± 27.28	**0.001**
Technical and technological****	56.71 ± 14.56	57.77 ± 15.81	62.50 ± 14.20	0.359	58.52 ± 15.22	59.31 ± 15.45	0.833
Motivation	91.67 ± 12.08	78.64 ± 29.43	86.46 ± 18.03	0.090	80.70 ± 26.54	92.86 ± 11.57	**0.044**
Will	66.67 ± 32.91	63.18 ± 35.96	57.29 ± 37.93	0.668	60.13 ± 36.80	71.43 ± 29.88	0.198
Willingness	86.11 ± 12.66	78.79 ± 17.37	77.25 ± 16.34	0.144	77.63 ± 17.06	88.69 ± 9.87	**0.006**
Negative emotions	34,69 ± 33,83	33,83 ± 23,01	41,37 ± 20,55	0,396	37,93 ± 22,11	27,89 ± 24,85	0,074

**One Way ANOVA, test of the importance of the differences between averages on a 5% level of importance (p < 0,05); **epistemological conditions (knowledge); ***axiological conditions; ****technical and technological conditions*

of patients (DFS, LEAD) placed health and family at the top of their value hierarchy.

Differences in interests were recorded in the vascular surgery patients group (p = 0.023). After analyzing the differences between men and women in terms of axiological conditions and their values and ideas, statistically significant differences were found in the field of spiritual values (p = 0.008), religion (p = 0.000), and children and their well-being (p = 0.05). In the three mentioned fields, women had a higher average score, demonstrating that they attribute greater importance to these values than men.

3. Technical and technological conditions

Evaluation of the whole sample group (DFS, LEAD, where n = 100) indicated that the technical and technological conditions were statistically important. The study revealed a significant relationship between the duration of patients' diabetes and technical and technological conditions (p = 0.015). The study also identified the positive influence of patients' membership of clubs on their level of knowledge (p = 0.004), motivation (p = 0.006), and interests (p = 0.001). The study found considerable differences in preferences for certain teaching methods, with women preferring reading (p = 0.05) and dialogue (p = 0.029). Results concerning the preference for an organizational form of education in terms of gender are insignificant.

4. Willingness, motivation, emotions

We did not observe any difference in the willingness and motivation to learn (in order to prevent diabetes-related complications) in terms of surgical diagnosis. In addition, no differences were found in terms of gender. The influence of a performed surgical procedure, or the extent of this procedure, was reflected in the occurrence of negative emotions (fear, anxiety, anger, helplessness, feeling of guilt, suffering, depression) (p = 0.002) (Table 3).

However, education revealed its importance as a factor that influences willingness and motivation to learn, and was higher amongst university graduates (p = 0.023). There is also a significant relationship between patients' family status and their willingness and motivation to learn how to prevent diabetes-related complications (p = 0.001). Widowed patients displayed the lowest level of willingness and desire to learn.

Table 3 The occurrence of negative emotions (fear, anxiety, anger, helplessness, feeling of guilt, suffering, depression) in relation to surgical procedure

surgical procedure	n	mean ± SD	level of significance
without surgery	36	25.44 ± 20.29	
state of the amputation digit	20	43.54 ± 18.30	P** = 0.002
state of the amputation TMT*, cruris	14	41.88 ± 23.75	Eta*** = 0.373
state of the bypass	30	42.47 ± 24.58	
total	100	35.82 ± 22.9	

**TMT – transmetatarsalis; **One Way ANOVA, test of the importance of the differences between averages on a 5% level of importance (p<0,05); ***Eta – the correlation between the numerical and categorical variable*

Achieving educational goals / education effectiveness evaluation

Six months after the study was conducted, 65 respondents provided feedback. Patients who had or had experience of DFS (n = 32) showed far better knowledge results than patients with LEAD (n = 33). No significant results in the relationship between ulceration and the usage of appropriate and inappropriate tools during leg treatment were noted. Those patients educated in a group achieved a higher score for willingness and motivation to learn than those educated individually (p = 0.001). After six months, in terms of surgical diagnosis, significant changes had occurred (DFS, LEAD) in the hierarchical position of the value termed "personal happiness," referring to an individual's sense of happiness. In terms of gender, the hierarchical place of the value called "children and their well-being" changed in women's hierarchy of values. After six months, clinical parameters, such as objective indicators of the effectiveness of education (weight, BMI, blood pressure), changed positively in comparison with the time before education. After education, we noted a statistically important reduction in weight (p = 0.047), BMI (p = 0.018), and positive changes in blood pressure, both systolic (p = 0.000) and diastolic (p = 0.000). The figure for glycated haemoglobin decreased but was of no statistical significance.

Discussion

By detailed analysis of human reasoning, we assessed the reasons for diabetics' actions according to the humanistic interpretation method (epistemological, axiological, technical and technological conditions, willingness, motivation, emotions), obtaining significant results with our sample of respondents. We discovered the specific factors which influence the educational process, including motivation to achieve profitable outcomes. We noted factors in terms of duration of diagnosis of DM 2 type, gender, family status, level of education, repeated hospitalization, and surgical intervention in our sample of diabetics (n = 100) with DFS and LEAD.

In the context of education of patients with DFS and LEAD, the relevant results are related to the impact of motivation on patient behavior. It is motivation and motivational premises that form a key part of the assessment of the Theoretical Model of Practical Reasoning of Humanistic Interpretation (the reconstruction of rational actors'/patients' practical thinking). The educational assessment of diabetics with DFS and LEAD revealed the determinants of patients' motivation to improve attitudes, and increase their knowledge and willingness to change their behavior, resulting in their adherence to and compliance with therapy, thus preventing possible future problems. Individuals decide to carry out an action by certain means if they have enough will to act on their conscious decisions (Černík, Viceník, Višňovský, 2000). There are, however, significant differences between individuals, and nurses should understand the role of individual motivational determinants, and accept them in order to encourage the desired behavior from the patient. Individuals find it an effort to achieve their long-term goals, and their focus and self-control weaken. At this point, the difference between independent and dependent actions comes into play. Dependence is manifested at its peak when individuals act under external pressure, and when their action stems from a decision that is not their own, and that they do not necessarily agree with. This partly explains diabetics' actions – often they do not have sufficient ambition and willpower, and act dependently, under pressure, because "they are told to do so".

Motivation is a complex variable that integrates the action of human personality resources (needs, interests, values) with the influence of external sources of protection, whether accidental or intentional (educational environment, family and society-wide). These motivational resources can be stable, long-term or variable, short-term. The internal characteristics of motivation are more stable sources for learning which are developed over time (Marušincová, Kollárik, 2003). We confirmed in our study that the level of participants' education is an important factor in their willingness and motivation to learn. The respondents with higher education achieved significantly better results. The higher level of willingness and motivation among university-educated individuals is connected with higher personal characteristics (needs, interests, values) compared to respondents with only elementary or secondary education. An important part of human personality is level of mental ability (intelligence), which cannot be seen in isolation from other personality characteristics, such as will and emotions (Vymětal, 2003). We confirmed that patients with higher education are aware of the seriousness of their condition, although in the area of knowledge we did not establish differences in the level of education of patients.

The lowest level of willingness and motivation was seen in widowed individuals. The death of a partner is one of the most traumatic experiences in life (Renzetti, Curan, 2005). After the death of a partner, the widowed person may lose financial security. A study by Tomita et al. (2015) reported marital

status to be an important factor in diabetic foot, while other authors describe marital status as an important factor in the progression of diabetic complications and the risk of amputation (Yekta et al., 2011; Tol et al., 2012).

Membership of self-help groups had a positive impact on motivation, willingness, and interest and knowledge, as we identified in our study. Similar results exist in other research studies (Nguyen et al., 2008a; Nguyen et al., 2008b), in which the various benefits of diabetics´ clubs (economic, social, legal, emotional, technical assistance and support etc.) are described.

The results confirmed our assumption that group education is a significant motivational element. By means of group education, we made use of the patients who had already had experience of ulceration. Working in a group is more natural, corresponds to patients' basic psychological needs, and encourages activity (Mensing, Norris, 2003; Tang, Funnell, Anderson, 2006). Education of diabetics with DFS or LEAD is very challenging for nurses, especially if the patients must endure a long-term healing process, or if their treatment results in amputation. The range of surgical interventions have an impact on diabetics' negative emotions (fear, anxiety, anger, helplessness, guilt, suffering) and emotional tuning. Diabetics in contact with other diabetic patients with amputated limbs experience increased anxiety regarding the possibility of amputation. The long-term psychological burden linked to DFS can lead to the development of maladaptive reactions, symptoms of anxiety and depression (Lustman, Clouse, 2005; Petrak, Herpertz, 2009; Schram, Baan, Pouwer, 2009; Peyrot et al., 2013), adaptation disorders, and anxiety and rage disorders. In some it can even leads to suicide attempts (Ceretta et al., 2012). Uncertainty, the body's integrity being put in danger, and the fear of having a limb amputated act as a significant psychological burden. Naturally they give rise to, negative emotions, and individuals might consider their situation impossible to resolve, and thus become unable to take action (Gurková, Žiaková, Čáp, 2011; Miertová, 2015). Stress-induced immune deregulation could potentially increase the risk of serious infectious complications of foot ulceration, possibly resulting in lower limb amputation (Christian et al., 2006; Vileikyte, 2007).

Given the fact that the incidence of DFS is 1.6 times higher in men (Martinka, 2008) we tried to determine a possible difference in rational behaviour in terms of gender. Based on our experience of clinical practice, we assumed that these differences were determined by a different attitude to the illness, value hierarchy, and the different sociocultural role of men and women. In order to explain the differences according to gender, several theories were proposed. One concentrated on division of labor, namely women's primary responsibility for the well-being of their family and child care. Religious activities, such as attending church, are seen as a continuation of household responsibilities, as women have more time for religious activities than men. The differences in terms of gender are also found in interaction and communication, which form the basis of the learning process (Poněšický, 2003; Vymětal, 2003).

After assessment of patients' health state, we followed an educational plan to educate patients. This was constructed on the basis of motivational theories, by which we respected the importance of learning and remembering (Bigge, Shermis, 2004; Driscoll, 2005). Motivation was based on recommendations for motivation of patients according to Rankin, Stallings, London (2005), Richards, Sayward (2006), Prochaska and DiClemente's stages of change model in motivation (1983), as well as activating forms of education (Petlák, Komora, 2003) and motivational methods of education according to Belz, Siegrist (2001).

Six months later, the evaluation of education was completed. We noted a higher level of knowledge in the sample of patients with DFS, whereas the level of motivation was higher in patients with LEAD. We might assume that patients with DFS had better knowledge because they were educated and stayed at home where relatives could regularly emphasize and remind them of this knowledge to help them. The higher motivation of patients with LEAD confirmed the effectiveness of education according to motivation theory, by which we respected individual conditions underpinning willingness to comply with therapy, thus preventing possible future problems. In addition to our own, the results of several studies have indicated that patients' motivation, and motivational interviewing can be effective methods of education for type 2 diabetics. Such education is valuable for diabetes management and leads to improvements in foot care (Majerníková, 2011), self-management, psychological outcomes, HbA1c control and weight loss (Calhoun et al., 2010; Chen et al., 2012)

Conclusion

The study examined the areas of educational assessment using the method of human interpretation via the scheme of practical judgment of a rational patient. The study identified the differences between

diabetics with DFS and LEAD that should be taken into account in the educational process. The study elaborated a list of determinants that should be considered in the educational process of a patient with type 2 diabetes in order to strengthen patients' motivation, influence their willingness, attitudes, compliance with treatment or prevention of DFS, and thus change their behaviour.

Practical implications

Based on the statistical results of the study we recommend the following as contents of educational assessment: 1) assessment of level of knowledge and skills; 2) values, ideas, norms and beliefs; 3) means, tools, and external conditions that are necessary to achieve the educational goals; 4) willpower, willingness, motivation to learn (compliance/adherence); 5) negative emotions (fear, anger, helplessness, feelings of guilt, suffering, depression); 6) age, gender, educational level, social status; 7) duration of diabetes, repeated hospitalizations, membership in an independent club for diabetics. The method of evaluating diabetics' educational needs that we propose is of an interdisciplinary nature.

Study limitations

One of the limits of this study is its design: it would have been advisable to carry out a controlled study. This study only included diabetics with vascular diseases.

Ethical aspects and conflict of interest

The implementation of the research followed approval by the ethics committees of Comenius University Bratislava, Jessenius Faculty of Medicine, and University Hospital Martin. All participants provided us with informed consent.

The author declares no conflict of interest.

Author contributions

Concept and design of the study (EH, JN), data collection (EH, JN), patient's education (EH), data analysis and interpretation (EH, JN), manuscript draft and critical revision of the manuscript (EH, JN, KZ), final approval of the manuscript (EH, JN, KZ).

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