

## *Psychological determinants of the attitude towards vascular interventions in patients with lower limb ischaemia*

### BACKGROUND

Critical lower limb ischaemia is associated with a 20% annual risk of amputation and death. It is necessary to activate patients' personal resources which comprise mental dispositions needed to effectively cope with the disease. The objective of the study was to evaluate the correlation between the attitude toward the vascular reconstruction and self-efficacy (SE), health locus of control (HLoC) and own life quality (QOL) assessment in patients with critical lower limb ischaemia.

### PARTICIPANTS AND PROCEDURE

The study involved 64 patients with critical lower limb ischaemia (Rutherford 4 and 5), 26 women and 38 men. Four scales were applied during primary admission: the Generalized Self-Efficacy Scale; the Satisfaction with Life Scale; the Multidimensional Health Locus of Control Scale; and the visual scale revealing attitude to vascular reconstruction.

### RESULTS

The attitude to the vascular reconstruction was positive ( $M = 8.50$ ). The lowest grades were given by those hospi-

talised several times during follow-up ( $M = 8.30$ ); women expressed low grades ( $M = 7.71$ ). An overall positive correlation was found between the positive attitude to the surgery and self-efficacy ( $p = .012$ ), internal HLoC ( $p = .041$ ) and external locus ( $p = .026$ ). In the patients who died within six months from baseline assessment, no correlations were found. In subjects with no readmission, a correlation was found between positive attitude to surgery and the external personal HLoC ( $p = .023$ ). In patients with subsequent readmissions, a correlation was found between the originally positive attitude to the surgery and poor self-efficacy ( $p = .009$ ).

### CONCLUSIONS

Patients with weak mental dispositions cannot cope with difficult situations and show a tendency to experience strong emotions, concentrating on their deficiencies, resulting in decreased motivation and feeble engagement in treatment. Poor mental disposition influences the final outcome of the vascular reconstruction.

### KEY WORDS

critical limb ischaemia; personal resources; vascular surgery

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## BACKGROUND

Critical ischaemia of lower extremities is a serious social issue, as it is connected with a 20% annual risk of amputation and a 20% annual risk of death (Farber & Eberhardt, 2016; Norgren et al., 2007). Occurrence of critical ischaemia of lower extremities is estimated to be 500-1000 new cases per one million inhabitants per year (Criqui et al., 1992). Rest pain and presence of necrotic lesions in lower limbs force the patients to undergo aggressive surgical treatment to restore aortic blood flow in lower extremities. Revascularization of lower extremity arteries is connected with a significant (1-10%) risk of serious complications and perioperative death. Moreover, effective revascularization does not always result in saving the threatened limb, so the patient carries the risk of amputation throughout his or her life (Adam et al., 2005; Tunis et al., 1991).

The majority of patients suffering from critical ischaemia of lower extremities are also affected with other diseases of the cardiovascular system. Critical ischaemia of lower extremities tends to be accompanied by concurrent ischaemic heart disease, scattered ischaemic lesions in the brain and hypertension (Aronow & Ahn, 1994; Hirsch et al., 2001). The often identified concurrent diseases include tobacco related neoplasms (Armstrong & Lavery, 1998). Patients with concurrent diabetes constitute the greatest challenge, as in their case the risk of losing a limb is nearly 100 times greater (Moulik et al., 2003; Schilling et al., 2002).

Despite technological progress being made, patients undergoing revascularization are exposed to restenosis in the area of the previously treated vessels (20-70% in five-year follow-up study), and to a 20% risk of developing new lesions in peripheral arteries (in five-year follow-up study) (Matsumura et al., 2013). A patient who regularly returns to the hospital to undergo revascularization realises the risk of recurrence and that each subsequent surgical procedure may fail. This may have an impact on his or her attitude to the surgery (Peters et al., 2019).

Each time the patient's limb or life is at risk, it is necessary to activate his or her personal resources which comprise mental dispositions needed to effectively cope with a difficult situation in life, i.e. fighting a chronic disease (Antonovsky, 1984; Baum & Stewart, 1990; Steunenberg et al., 2016). The resources include particularly important dispositions such as self-efficacy and internal health locus of control, as they enable patients to cope with the stress related to the disease. A similar role is played by the desired life quality, which is both the cause and result and which reinforces the self-efficacy and internal health locus of control. The concept of self-efficacy, introduced to psychology by Albert Bandura (1977, 1982) refers to one's conviction of having capabilities

to achieve one's goals, i.e. to implement tasks even in unforeseeable and stressful conditions. Health locus of control is understood as a generalised expectation that any events in life are a result of either external forces or one's own efforts and personal control (Rotter, 1966). Internal health locus of control is connected with taking personal responsibility for one's health. It may also happen that any given person shows an external health locus of control, thus indicating one's dependence either on other people's (especially health professionals') influence or on one's fate or chance (Wallston & Wallston, 1982; Wallston et al., 1994). As for their life quality assessment, it relates to a set of factors such as physical health, mental state, degree of independence, relations with the people around them, and functioning in their social and occupational roles (Pavot & Diener, 2008; Peterman & Cella, 2000).

The described psychological categories underlie the mechanisms of coping with life challenges such as a disease and a decision on undergoing surgery. Therefore, we decided: 1) to assess the correlation between the attitude to the surgery and self-efficacy, health locus of control and own life quality assessment in all patients with lower limb ischaemia; 2) 6 months after surgery, to extract and compare the results of the patients during that period regarding death and reinterventions.

## PARTICIPANTS AND PROCEDURE

### PARTICIPANTS

With consent granted by the Research Ethics Committee (approval number: 55/14), the research study was conducted from May to the end of September 2014, involving 64 patients with critical lower limb ischaemia (Rutherford 4 and 5), including 26 women and 38 men, aged from 33 to 86 ( $M = 65.94$ ,  $SD = 9.37$ ). Among them, 24 patients had concurrent diabetes (10 women and 14 men). The assessing psychologist selected all patients with leg-threatening limb ischaemia who were admitted on one selected day of the week. All patients were able to give informed consent to the assessment. No cognitive assessment between the diabetic and non-diabetic groups was made prior to inclusion in the study. The data on other concomitant diseases were not collected.

### MEASURES

In view of the purpose of the study and heterogenous group of patients, 4 simple scales were applied, which were completed – with the help of the researcher – by the patients awaiting elective revascularisation in the clinical hospital during primary admission.

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1. *Generalized Self-Efficacy Scale* (GSES; Schwarzer & Jerusalem, 1995; Polish adaptation by Juczyński, 2001), comprising 10 statements and measuring the level of general personal conviction regarding the individual's efficacy in handling tough situations.
2. *Satisfaction with Life Scale* (SWLS; Diener et al., 1985; Polish adaptation by Juczyński, 2001), composed of 5 statements and measuring the generalised feeling of satisfaction with life so far.
3. *Multidimensional Health Locus of Control Scale* (MHLC; Wallston et al., 1978; Polish adaptation by Juczyński, 2001), composed of 18 statements and aimed at specifying their expectations in three aspects of health locus of control. Thus, the study participant indicates whether their own health is controlled: 1) by them (internal aspect); 2) by other individuals, especially health professionals (external personal aspect); 3) by fate/chance (external impersonal aspect).
4. A simple scale was applied to find the attitude to the surgery, where -10 stands for the maximally negative attitude, 0 for neutral, and +10 for maximally positive.

Scales 1, 2, 3 were used for measuring mental dispositions (self-efficacy, health locus of control, life quality assessment), and scale 4 to specify the kind and intensity of one's attitude to the surgery. The statistical analysis of the results was performed using IBM SPSS Statistics 22 software. To assess the normality of distribution of the analysed variables, the Shapiro-Wilk test was used. To determine the strength of correlation between the variables, Pearson's correlation coefficient ( $r$ ) was applied.

## RESULTS

Six months after primary admission the following outcomes were noted: a) died - 4 persons, b) no readmission during follow-up - 43 persons, c) returned to the reinterventions several times - 17 persons.

It was found that during primary admission on average the attitude to the surgery was highly positive ( $M = 8.50$ ) at the whole group level as well as in relation to men and women. The lowest grades were given by those hospitalised several times ( $M = 8.30$ ), and particularly low grades came from women ( $M = 7.70$ ), whereas the patients who were hospitalised only once assessed their attitude to the surgery similarly as the whole group ( $M = 8.60$ ), and particularly high grades were given by women ( $M = 9.10$ ).

For the totality of patients, a strong, statistically significant and positive correlation was found between the positive attitude to the surgery and self-efficacy ( $p = .012$ ), internal health locus of control ( $p = .041$ ) and its external locus ( $p = .026$ ). The other correlations proved to be statistically insignificant. In

the case of the patients who died within six months from the baseline study, no statistically significant correlations were found. As for the patients who were hospitalised once within that period, a correlation was found between the positive attitude to the surgery and the external personal health locus of control ( $p = .023$ ). The other correlations proved to be statistically insignificant. Regarding the patients who were hospitalised several times within that period, a correlation was found between the originally positive attitude to the surgery and self-efficacy ( $p = .009$ ). The other correlations proved to be statistically insignificant, as presented in Table 1.

## DISCUSSION

The study results show that in the case of patients with lower limb ischaemia who make decisions on surgery, special attention must be paid to their personal resources, especially mental dispositions such as self-efficacy and health locus of control, and, in that context, to their relations with the attending physician and other members of the therapeutic team. This is because it has been proved that the patients' assessment of their pro-health actions expressed by their attitude to the surgery is the more positive, the higher their self-efficacy and internal health locus of control are. At the same time it was found that a positive attitude to the surgery depends on the level of trust to health professionals and other significant persons (family), i.e. on external health locus of control. Similar results were obtained in other research studies (Ruffin et al., 2012; Rzepa & Stanisić, 2012; van Dijk et al., 2013; Zotti et al., 2007).

These findings were confirmed by subsequent analyses carried out 6 months after performing the baseline study. It turned out that among the patients who had successfully completed their surgical treatment, as they were not hospitalised in the said period, their positive attitude to the surgery mainly depended on their trust in the medical staff (external health locus of control). It also turned out that the patients who had returned to the clinical hospital originally had related their positive attitude to the surgery mainly to their self-efficacy, without referring to such an important personal resource as health locus of control. Finally, as for the patients who died within 6 months from the surgery, it turned out that during the baseline study they did not strengthen their attitude to the surgery by activating any mental dispositions. The status of a patient with critical limb ischaemia cannot be compared to other life-threatening diseases such as stroke (Xu et al., 2021). The high possibility of readmission should also be taken into account in the psychological assessment of the patients.

It can be assumed that preoperative psychological assessment may identify the group of patients with

**Table 1**

*Main psychological factors contributing attitude to surgery in patients with lower limb ischaemia (categorised results)*

Psychological factor/Attitude	Total	Deceased	One hospitalisation	Multiple hospitalisations
<b>Self-efficacy</b>				
Pearson correlation	.32	.00	.23	.62
Significance (2-tailed)	.010	1.00	.117	.009
<i>N</i>	64	4	43	17
<b>Internal locus of control</b>				
Pearson correlation	.26	.54	.28	.16
Significance (2-tailed)	.040	.457	.059	.540
<i>N</i>	64	4	43	17
<b>External locus of control</b>				
Pearson correlation	.28	.71	.33	.01
Significance (2-tailed)	.026	.293	.023	.957
<i>N</i>	64	4	43	17
<b>Locus – fate/chance</b>				
Pearson correlation	-.01	.38	-.07	.22
Significance (2-tailed)	.903	.616	.624	.388
<i>N</i>	64	4	43	17
<b>Quality of life</b>				
Pearson correlation	.03	-.71	-.05	.37
Significance (2-tailed)	.799	.295	.723	.140
<i>N</i>	64	4	43	17

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critical limb ischaemia, being at risk of early failure of the primary intervention. Most likely poor personal resources may induce poor compliance with the postoperative medication and training programme, resulting in reintervention or death. These findings should be confirmed in a larger group of patients.

These findings may be explained by the correlation of the said dispositions with a strong motivation to improve one's health status, built on its accurate cognitive evaluation, reinforced with an appropriate medical diagnosis (Heszen & Sęk, 2007; Kościelek, 2010).

Concluding our study results, we would like to emphasise some study limitations: mainly the explorative character of the study with a heterogeneous group of patients regarding age and concomitant disease. However, the present study should ease the communication pathway between the medical professional and patient with limb-threatening ischaemia.

## CONCLUSIONS

Patients with weak mental dispositions cannot cope with difficult situations and show a tendency to experience strong emotions, concentrating on their deficiencies. This approach results in decreased motivation and thus feeble engagement in personal health problems, as was found in the case of the deceased patients.

## REFERENCES

- Adam, D. J., Beard, J. D., Cleveland, T., Bell, J., Bradbury, A. W., Forbes, J. F., Fowkes, F. G., Gillespie, I., Ruckley, C. V., Raab, G., Storkey, H., & BASIL trial participants (2005). Bypass versus angioplasty in severe ischaemia of the leg (BASIL): Multicentre, randomised controlled trial. *Lancet*, 366, 1925–1934. [https://doi.org/10.1016/S0140-6736\(05\)67704-5](https://doi.org/10.1016/S0140-6736(05)67704-5)

- Antonovsky, A. (1984). The sense of coherence as a determinant of health. In: J. D. Matarazzo & N. E. Miller (Eds.), *Behavioral health* (pp. 114–129). John Wiley.
- Armstrong, D. G., & Lavery, L. A. (1998). Diabetic foot ulcers: Prevention, diagnosis and classification. *American Family Physician*, *57*, 1325–1338.
- Aronow, W. S., & Ahn, C. (1994). Prevalence of coexistence of coronary artery disease, peripheral arterial disease, and atherothrombotic brain infarction in men and women > or = 62 years of age. *The American Journal of Cardiology*, *74*, 64–65. [https://doi.org/10.1016/0002-9149\(94\)90493-6](https://doi.org/10.1016/0002-9149(94)90493-6)
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*, 122–147. <https://doi.org/10.1037/0003-066X.37.2.122>
- Bandura, A. (1977). *Social learning theory*. Prentice Hall Inc.
- Baum, S. K., & Stewart, R. B., Jr (1990). Sources of meaning through the lifespan. *Psychological Reports*, *67*, 3–14. <https://doi.org/10.2466/pr0.1990.67.1.3>
- Criqui, M. H., Langer, R. D., Fronek, A., Feigelson, H. S., Klauber, M. R., McCann, T. J., & Browner, D. (1992). Mortality over a period of 10 years in patients with peripheral arterial disease. *The New England Journal of Medicine*, *326*, 381–386. <https://doi.org/10.1056/NEJM199202063260605>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, *49*, 71–75. [https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Farber, A., & Eberhardt, R. T. (2016). The current state of critical limb ischemia: a systematic review. *JAMA Surgery*, *151*, 1070–1077. <https://doi.org/10.1001/jamasurg.2016.2018>
- Heszen, I., & Sęk, H. (2007). *Psychologia zdrowia* [Psychology of health]. Wydawnictwo Naukowe PWN.
- Hirsch, A. T., Criqui, M. H., Treat-Jacobson, D., Regensteiner, J. G., Creager, M. A., Olin, J. W., Krook, S. H., Hunninghake, D. B., Comerota, A. J., Walsh, M. E., McDermott, M. M., & Hiatt, W. R. (2001). Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA*, *286*, 1317–1324. <https://doi.org/10.1001/jama.286.11.1317>
- Juczyński, Z. (2001). *Narzędzia pomiaru w promocii i psychologii zdrowia* [Measurement tools in health promotion and health psychology]. Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.
- Kościelak, R. (2010). Poczucie umiejscowienia kontroli i przekonania o własnej skuteczności w zdrowiu i chorobie [Health locus of control and self-efficacy in health and illness]. *Impuls*.
- Matsumura, J. S., Yamanouchi, D., Goldstein, J. A., Pollock, C. W., Bosiers, M., Schultz, G. A., Scheinert, D., & Rocha-Singh, K. J. (2013). The United States study for evaluating endovascular treatments of lesions in the superficial femoral artery and proximal popliteal by using the Protégé Ever-Flex nitinol stent system II (Durability II). *Journal of Vascular Surgery*, *58*, 73–83.e1. <https://doi.org/10.1016/j.jvs.2012.12.066>
- Moulik, P. K., Mtonga, R., & Gill, G. V. (2003). Amputation and mortality in new-onset diabetic foot ulcers stratified by etiology. *Diabetes Care*, *26*, 491–494. <https://doi.org/10.2337/diacare.26.2.491>
- Norgren, L., Hiatt, W. R., Dormandy, J. A., Nehler, M. R., Harris, K. A., Fowkes, F. G., & TASC II Working Group (2007). Inter-society consensus for the management of peripheral arterial disease (TASC II). *Journal of Vascular Surgery*, *45*, S5–S67. <https://doi.org/10.1016/j.jvs.2006.12.037>
- Pavot, W., & Diener, E. (2008). The Satisfaction with Life Scale and the emerging construct of life satisfaction. *The Journal of Positive Psychology*, *3*, 137–152. <https://doi.org/10.1080/17439760701756946>
- Peterman, A. H., & Cella, D. (2000). Quality of life. In A. I. Kazdin (Ed.), *Encyclopedia of Psychology* (pp. 491–495). American Psychological Association.
- Peters, C., de Vries, J., Steunenberg, S. L., Ho, G. H., Lodder, P., & van der Laan, L. (2019). Is there an important role for anxiety and depression in the elderly patients with critical limb ischemia, especially after major amputation? *Annals of Vascular Surgery*, *58*, 142–150. <https://doi.org/10.1016/j.avsg.2018.10.045>
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, *80*, 1–28. <https://doi.org/10.1037/h0092976>
- Ruffin, R., Ironson, G., Fletcher, M. A., Balbin, E., & Schneiderman, N. (2012). Health locus of control beliefs and healthy survival with AIDS. *International Journal of Behavioral Medicine*, *19*, 512–517. <https://doi.org/10.1007/s12529-011-9185-2>
- Stanisić, M., & Rzepa, T. (2012). Attitude towards one's illness vs. attitude towards a surgical operation, displayed by patients diagnosed with asymptomatic abdominal aortic aneurysm and asymptomatic internal carotid artery stenosis. *International Angiology*, *31*, 376–385.
- Schillinger, M., Exner, M., Mlekusch, W., Rumpold, H., Ahmadi, R., Sabeti, S., Haumer, M., Wagner, O., & Minar, E. (2002). Vascular inflammation and percutaneous transluminal angioplasty of the femoropopliteal artery: association with restenosis. *Radiology*, *225*, 21–26. <https://doi.org/10.1148/radiol.2251011809>
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy Scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: a user's portfolio. Causal and control beliefs* (pp. 35–37). NFER-Nelson.
- Steunenberg, S. L., Raats, J. W., Te Slaa, A., de Vries, J., & van der Laan, L. (2016). Quality of life in patients suffering from critical limb ischemia. *Annals of Vas-*

cular Surgery, 36, 310–319. <https://doi.org/10.1016/j.avsg.2016.05.087>

- Tunis, S. R., Bass, E. B., & Steinberg, E. P. (1991). The use of angioplasty, bypass surgery, and amputation in the management of peripheral vascular disease. *The New England Journal of Medicine*, 325, 556–562. <https://doi.org/10.1056/NEJM199108223250806>
- van Dijk, T. K., Dijkshoorn, H., van Dijk, A., Cremer, S., & Agyemang, C. (2013). Multidimensional health locus of control and depressive symptoms in the multi-ethnic population of the Netherlands. *Social Psychiatry and Psychiatric Epidemiology*, 48, 1931–1939. <https://doi.org/10.1007/s00127-013-0678-y>
- Wallston, K. A., Stein, M. J., & Smith, C. A. (1994). Form C of the MHLC scales: a condition-specific measure of locus of control. *Journal of Personality Assessment*, 63, 534–553. [https://doi.org/10.1207/s15327752jpa6303\\_10](https://doi.org/10.1207/s15327752jpa6303_10)
- Wallston, K. A., & Wallston, B. S. (1982). Who is responsible for your health? The construct of health locus of control. In G. S. Sanders & J. Suls (Eds.), *Social psychology of health and illness* (pp. 65–95). Erlbaum.
- Wallston, K. A., Wallston, B. S., & DeVellis, R. (1978). Development of the Multidimensional Health Locus of Control (MHLC) Scales. *Health Education Monographs*, 6, 160–170. <https://doi.org/10.1177/109019817800600107>
- Xu, D., Chu, X., Wang, K., Wei, L., Xu, Y., Huang, X., Li, J., Xu, L., Yin, L., Liu, H., Liu, X., Leng, H., Xue, Q., Peng, M., Jia, L., & Wang, H. (2021). Potential factors for psychological symptoms at three months in patients with young ischemic stroke. *BioMed Research International*, 2021, 5545078. <https://doi.org/10.1155/2021/5545078>
- Zotti, A. M., Balestroni, G., Cerutti, P., Ferrario, S. R., Angelino, E., & Miglioretti, M. (2007). Application of the General Perceived Self-Efficacy Scale in cardiovascular rehabilitation. *Monaldi Archives for Chest Disease*, 68, 178–183. <https://doi.org/10.4081/monaldi.2007.451>

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