MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY STATE UNIVERSITY
ACADEMIC AND RESEARCH MEDICAL INSTITUTE

Eastern Ukrainian Medical Journal

116, Kharkivska st., Sumy 40007, Ukraine eumj.med.sumdu.edu.ua
e-mail: eumj@med.sumdu.edu.ua ISSN: 2663-5909 (print)/2664-4231 (online)

How to cite: Trishch V. Psychological aspects of the quality of life of men with orgasmic dysfunction. *East Ukr Med J.* 2026;14(1):89-96. DOI: https://doi.org/10.21272/eumj.2026;14(1);89-96

ABSTRACT

Volodymyr Trishch
https://orcid.org/0000-0001-6569-0258
Department of Postgraduate Surgery and Urology of Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

PSYCHOLOGICAL ASPECTS OF THE QUALITY OF LIFE OF MEN WITH ORGASMIC DYSFUNCTION

Aim: to analyze the quality of life and aspects of mental health in men with orgasmic dysfunction, in particular, the development of anxiety and depressive disorders.

Materials and Methods. An observed case-control study was conducted. The main group consisted of 20 men with orgasmic dysfunction, and the control group consisted of 200 practically healthy men. Standard questionnaires were used to assess quality of life and psychological characteristics: Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF), Oxford Happiness Inventory (OHI), Hospital Anxiety and Depression Scale (HADS).

Results. It was found that orgasmic dysfunction in men is accompanied by a significant decrease in quality of life (by 40.0%), the main components of which are dissatisfaction with sexual life (95.0% of respondents), mood (55.0%), leisure time (50.0%) and general physical condition (25.0%). Men with orgasmic dysfunction are characterized by an extremely low level of integral happiness index OHI (13.8% [10.3–17.8] out of a maximum of 100%) against the background of 100% prevalence of severe depression and the presence of mild in 35.0% and moderate anxiety in 65.0%. It was proved that in case of orgasmic dysfunction in men, there is a negative strong correlation (r_s= -0.85, $p<0.05$) between the integral happiness index OHI and anxiety and a negative moderate correlation (r_s= -0.52, $p<0.05$) between the integral happiness index OHI and depression.

Conclusions. In the management of orgasmic dysfunction in men, psychological assistance aimed at correcting depression and anxiety and improving the quality of life of patients should be an obligatory component.

Keywords: orgasmic dysfunction, anxiety, depression, integral happiness index, organization of sexological and psychological care.

Corresponding author: *Volodymyr Trishch, Department of Postgraduate Surgery and Urology of Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine*
e-mail: trishchv@gmail.com

РЕЗЮМЕ

Володимир Тріщ
https://orcid.org/0000-0001-6569-0258
Кафедра хірургії післядипломної освіти та урології, Івано-Франківський національний медичний університет, м. Івано- Франківськ, Україна

ПСИХОЛОГІЧНІ АСПЕКТИ ЯКОСТІ ЖИТТЯ ЧОЛОВІКІВ З ОРГАЗМІЧНОЮ ДИСФУНКЦІЄЮ

Мета: проаналізувати якість життя та аспекти психічного здоров'я у чоловіків з оргазмічною дисфункцією, зокрема, розвиток тривожних та депресивних розладів.

Матеріали та методи. Провели аналітичне ретроспективне епідеміологічне дослідження типу «випадок-контроль». Основну групу склали 20 осіб чоловічої статі з оргазмічною дисфункцією, контрольну – 200 практично здорових чоловіків. Для оцінки якості життя та психологічних характеристик використали стандартні опитувачі: Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF), Oxford Happiness Inventory (OHI), Hospital Anxiety and Depression Scale (HADS).

Результати. Встановлено, що оргазмічна дисфункція у чоловіків супроводжується значним зниженням якості життя (на 40,0%), основними складовими якого є незадоволеність статевим життям (95,0% опитаних), настроєм (55,0%), проведенням вільного часу (50,0%) та загальним фізичним станом (25,0%). Чоловіки з оргазмічною дисфункцією характеризуються вкрай низьким рівнем індексу щастя OHI (13,8% [10,3–17,8] із максимально можливих 100%) на тлі 100% поширеності важкого ступеня депресії та наявності у 35,0% легкого ступеня і у 65,0% – помірного ступеня тривоги. Доведено, що при оргазмічній дисфункції у чоловіків існує зворотній сильний взаємозв'язок індексу щастя з тривогою (r_s= –0,85) і зворотній середньої сили – з депресією (r_s= –0,52).

Висновки. В менеджменті оргазмічної дисфункції у чоловіків обов'язковою складовою повинна бути психологічна допомога, спрямована на корекцію депресії, тривоги і на поліпшення якості життя пацієнтів.

Ключові слова: оргазмічна дисфункція, тривога, депресія, індекс щастя, організація сексологічної та психологічної допомоги.

Автор, відповідальний за листування*: Володимир Тріщ, Кафедра хірургії післядипломної освіти та урології, Івано-Франківський національний медичний університет, м. Івано- Франківськ, Україна*
e-mail: trishchv@gmail.com

INTRODUCTION

Sexual health is an integral part of the social and economic development of communities and countries, as it is essential for the physical, mental health and well-being of individuals, couples and families.

One of the sexual dysfunctions (SD) in men is orgasmic dysfunction (OD), which is based on delayed orgasm or anorgasmia. In the American classification of sexual dysfunctions, which is presented in the Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition – DSM-5) provides the following criteria for male orgasmic disorder (Male Orgasmic Disorder [formerly Inhibited Male Orgasm]: persistent or recurrent delay or absence of orgasm after the normal phase of sexual arousal during sexual activity, persisting for at least 6 months, causing significant distress [1].

Due to the fact that most men cannot differentiate between ejaculation and orgasm, there is no objective data on the prevalence of orgasm disorders [2].

According to epidemiological studies conducted in the United States, from 5 to 14% of men reported some difficulty in achieving orgasm and 8% of men were unable to achieve orgasm in the last year. This disorder is also accompanied by severe distress and tension in interpersonal relationships [1,3]. One study found that

men who had moderate or severe difficulty reaching orgasm cited anxiety/stress (41%), inadequate stimulation (23%), low arousal (18%), medical problems (9%), and partner problems (8%) as reasons for their difficulty [4]. Also, orgasmic disorders can increase the burden of sexual dissatisfaction in men with erectile dysfunction. [5].

Orgasmic dysfunction (anorgasmia, dyssorgasmia) in men can be lifelong (primary) or acquired (secondary), and does not depend on the presence or absence of ejaculation. In 90% of cases, the causes of OD are psychological factors. Therefore, according to ICD-10-AM, this disease has a code – F 52.3 [6–7].

The etiology of OD includes medication, psychogenic, endocrine, and pelvic dysesthesia. The causes of OD can be endocrine (testosterone deficiency, hypothyroidism, diabetes mellitus); medications (antidepressants, neuroleptics, opiates), psychosexual (depression, anxiety about sexual failure, systemic long-term masturbation, pornography, etc.), hyperstimulation or inadequate stimulation of erogenous zones, lack of sensitivity of the penis, neurogenic (multiple sclerosis, Parkinson's disease, polyneuropathy, etc.); post-traumatic (spinal cord injury, after surgery on the pelvic organs, intestines, etc.); toxic (alcohol, drugs, etc.), factors of psychological (peculiarities of socialization in childhood, lack of sexual education, religious and cultural beliefs, anxiety, fatigue, stress) and social nature (negative impact of unemployment, financial problems, poor partner relationships, conflicts in the family or family). Therefore, for the diagnosis of OD, in addition to taking anamnesis (medical and medical history), physical and psychosexual examination, the sensitivity of the glans penis is assessed. If there is no sensitivity of the penis, a more detailed examination of the patient is carried out to exclude an organic cause, with the determination of the level of testosterone, prolactin and thyroid hormone in the blood [6, 8–12].

There is no standardized treatment plan for OD, although general treatment plans are often multidisciplinary and may include correcting the negative effects of medications and sexual therapy. Psychosexual/behavioral strategies and pharmacotherapy are used to treat OD. According to these studies, there is no convincing data on the recommendations for the use of pharmacotherapy in the treatment of OD and it is difficult to assess the effectiveness of psychosexual therapy. To date, none of the medications have been approved by the U.S. Food and Drug Administration, and their use for the treatment of OD is considered off-label [12–14].

Despite the correlation between mental and sexual health established by many scientists, there is still a lack of research on the relation between mental health and orgasmic dysfunction in men.

Therefore, the purpose of the study was to investigate the quality of life and aspects of mental health in men with OD, in particular, the development of anxiety and depressive disorders.

MATERIALS AND METHODS

An observed case-control study was conducted.

During 2023–2024, 402 men who sought help for sexual dysfunction in private health care facilities in Ivano-Frankivsk and who agreed to participate in the study by signing the appropriate informed consent were surveyed.

The orgasmic function was assessed on the basis of the unified questionnaire IIEF – International index of erectile function (IIEF) [15] in the domain “Orgasmic function”. The diagnosis of “orgasmic dysfunction” was diagnosed with a score of less than 5 (questions 9, 10). Out of 402 men with sexual dysfunctions, 20 were diagnosed with orgasmic dysfunction.

The median age of the patients surveyed was 32.5 [25.0–40.5] years. Accordingly, the largest proportion of patients was under the age of 30 (45.0%), followed by 30–39 years (25.0%) and 40–49 years (30.0%). The control group consisted of 200 men who visited the same health care facilities for a check-up and were diagnosed as healthy and also agreed to participate in the study. The median age of the control group did not differ from that of the main group ($p>0.05$) and was 33.0 [27.0–42.0] years.

The quality of life (QOL) was assessed on the basis of a short-standardized questionnaire Q-LES-Q-SF (Quality of Life Enjoyment and Satisfaction Questionnaire - Short Form) [16].

The Q-LES-Q-SF consists of 14 main questions about satisfaction with various aspects of quality of life and two additional questions about satisfaction with treatment outcomes and life in general. For each of the questions, the respondents chose one of the answers: very bad, bad, satisfactory, good, very good, which corresponded to points from 1 to 5. For each respondent, his individual quality of life integral index was also calculated for the main 14 questions as a percentage of the maximum score (70) and its percent decrease from the maximum possible 100%.

To assess the degree of happiness, the Oxford Happiness Inventory (OHI) was used, a self-assessment tool that was developed as a measure of personal happiness at the Department of Experimental Psychology at Oxford University in the United States in the late 1980sThe test contains 29 questions, each with four answers, which corresponds to a score from 0 to 3. Accordingly, each respondent was assigned an integral happiness index OHI as a percentage of the maximum

possible 87 points (100%). With values of 0–20%, the index was rated as low, 21–40% – below moderate, 41–60% – moderate, 61–80% – above moderate, and 81–100% – high [17–18].

The Hospital Anxiety and Depression Scale (HADS) was used for screening anxiety and depression [19]. It consists of 14-questions, unpaired questions are designed to assess anxiety and paired questions are designed to assess depression. There are four answers to each question, corresponding to scores from 0 to 3. The level of anxiety and depression was determined for each respondent based on the corresponding sum of scores (for even and odd questions): 0-7 points – normal, 8–10 points – borderline, and 11–21 points – abnormal anxiety and depression. For a more accurate assessment of the severity of anxiety and depression, the author's improved criteria for the HADS scale were used [20], where the borderline form is interpreted as a mild degree, and the abnormal form is divided into two subgroups: moderate (11–15 points) and severe (≥16 points).

The design of the study was reviewed and approved by the Ethics Committee of Ivano-Frankivsk National Medical University (Protocol No. 133/23 of 29.03.2023).

All statistical calculations were performed using the data analysis packages Microsoft Excel and Statistica 10.0.

The quantitative data obtained in the study (age, scores for individual questions and the questionnaire as a whole, individual integral indices of happiness) were first checked for the type of their distribution by the Shapiro–Wilk's W test. Since most of them did not correspond to the normal distribution, the median (Me) and interquartile range (25%–75%) were chosen to represent typical values (to determine the measure of central tendency). To assess the reliability of the data between the main and control groups, the non-parametric Mann–Whitney U test was used. Accordingly, the relationships between the indicators were evaluated based on the nonparametric Spearman's rank correlation test (r_s).

Statistical processing of categorical (qualitative) data was carried out by calculating the rate of responses per 100 examinees, and the reliability of their differences in the compared groups was assessed by the chi-square ($\chi 2$) test.

RESULTS

It was found that the median of the quality-of-life integral index of respondents with OD is significantly lower than in the control group: 60.0% [57.5–63.2] of the maximum possible 100% versus 93.6% [88.6–95.0], respectively ($p<0.001$). That is present decrease of QoL in men with OD was – 40.0%, while in the control group the quality of life was reduced by 6.4%.

The study of individual components of QoL showed that the main reasons for its deterioration in the respondents of main group of respondents were quite predictably dissatisfaction with sexual life (95.0% of respondents), combined with negative self-assessments of mood (55.0%), quality of leisure time activities (50.0%), and general physical condition (25.0%), while dissatisfaction with other aspects of QoL (financial situation, work, relationships with people, etc.) ranged from 5.0–20.0%.

Such an obvious predominance of psychological aspects of QoL in respondents with OD may explain the generally low integral happiness index OHI among them (Fig. 1).

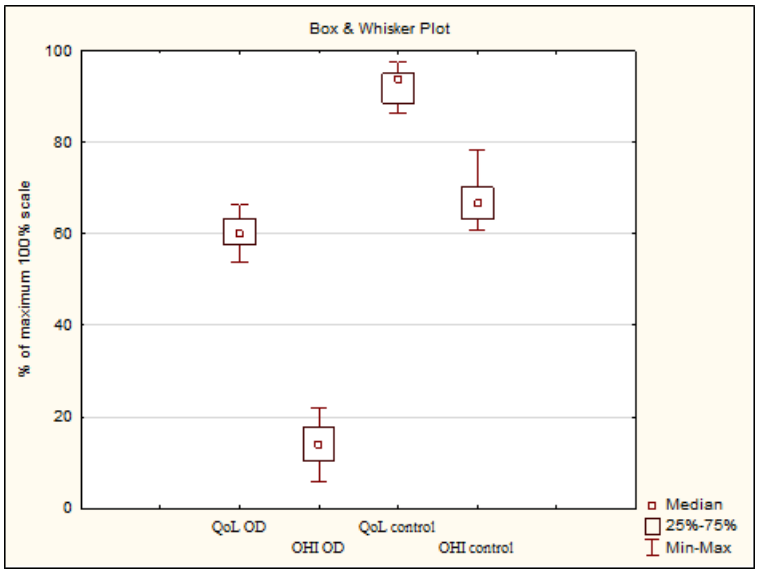

Figure 1 – Quality of life integral indices and integral happiness indices in the comparison groups

Thus, the median of the integral happiness indices in men with OD was only 13.8% [10.3–17.8] of the maximum possible 100%, which is assessed as a low level according to the criteria for interpreting the results of the OHI questionnaire. It should be noted that in the control group, this index was significantly higher (p<0.001), but far from high, and corresponded to an above-average level of 66.7% [63.2–70.1].

The prevalence rates of an anxiety and depression were much higher in the group of men with OD than in the control group (p<0.001). Thus, 35.0% of patients with mild anxiety and 65.0% with moderate anxiety were observed in the Anxiety subscale. As for depression, all 100% of respondents from the main group had severe depression. Most of the subjects in the control group were normal according to the HADS criteria and none had clinical manifestations, but 6.5% of the respondents had mild anxiety and almost one in five (21.0%) had mild depression (Table 1).

Table 1

The rates of anxiety and depression in the comparison groups

Group	Stages	Anxiety			Depression		
		n	%	±m	n	%	±m
OD (n=20)	Normal	0.0	0.0	0.0	0.0	0.0	0.0
	Borderline/mild	7	35.0	4.3	0.0	0.0	0.0
	Abnormal/moderate	13	65.0	6.0	0	0.0	0.0
	Abnormal/severe	0	0.0	0.0	20	100.0	1.8
Control (n=200)	Normal	187	93.5	1.7	158	79.0	2.9
	Borderline/mild	13	6.5	1.7	42	21.0	2.9
	Abnormal	0	0.0	0.0	0	0.0	0.0
p		<0.001			<0.001		

NB: p – the reliability of the difference in data compared to the control group

Accordingly, the median scores for the Depression subscale in the OD group were higher than for the Anxiety subscale: 18.0 [17.0–19.0] vs. 11.0 [10.0–13.0] points (Fig. 2). In the control group, similar indicators were 6.0 [3.0–7.0] and 4.0 [2.0–6.0] points (p<0.001).

The correlation analysis displayed that in men with OD there is a negative strong Correlation (rs= –0.85, p<0.05) between the integral happiness index and the level of anxiety (Fig. 3) and a moderate negative Correlation – between the integral happiness index and the level of depression (rs –0.52, p<0.05) (Fig. 4).

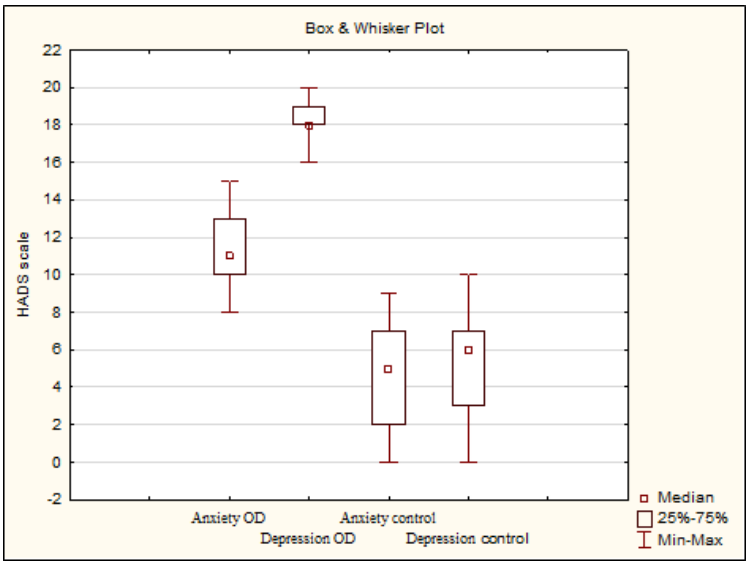

Figure 2 Levels of anxiety and depression according to the HADS scale in comparison groups

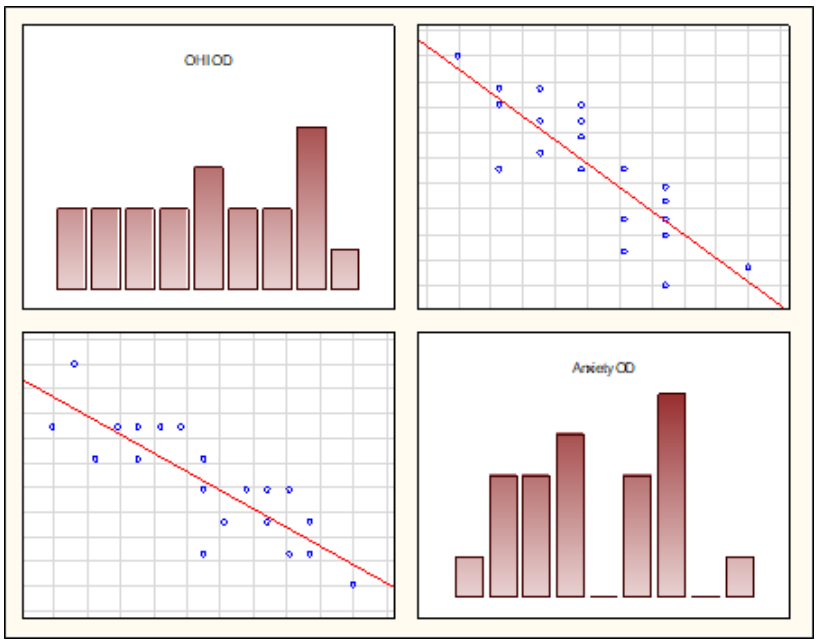

Figure 3 Correlation between the integral happiness index and the anxiety in orgasmic dysfunction

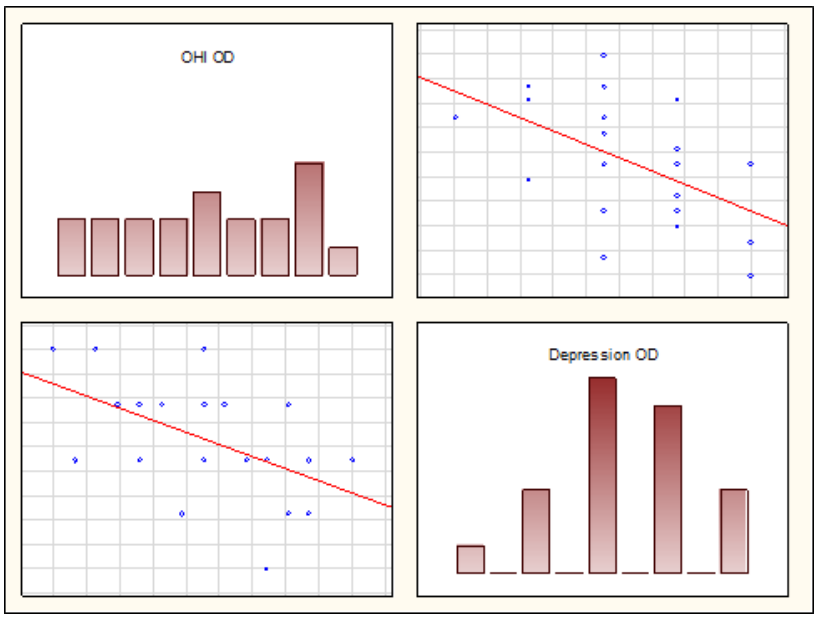

Figure 4 Correlation between the integral happiness index and the depression in orgasmic dysfunction

DISCUSSION

In the scientific community, sexual dysfunction such as orgasmic dysfunction is more often studied in the population of women, as this pathology is more common among them [21]. At the same time, men also have orgasmic dysfunction, although much less frequently, and this is confirmed, in particular, by the sample in this study. Out of 402 men who sought help for sexual dysfunctions, only 20 had ED, with a median age of 32.5 [25.0–40.5] years, which emphasizes the actuality of the problem, as these are mostly young working-age people. The data obtained in the study demonstrated a significant decrease in QoL in men with OD – by 40.0%, mainly due to the psychological components of QoL. This may explain the critically low level of the integral happiness index OHI, the median of which in the men with OD was only 13.8% [10.3–17.8] out of the maximum possible 100%. However, in the control group, this index corresponded to an above moderate level – 66.7% [63.2–70.1]. In our opinion, this situation is largely due to the fact that the study was conducted during a war in the country, and this

generally has a negative impact on the mental health of all citizens.

The study examined the psychological state of such men using the author's improved criteria for the HADS scale [19–20]. It was found that orgasmic dysfunction is accompanied by severe depression in 100% of men and moderate anxiety in 65% and mild anxiety in 35%. This was confirmed by the analysis of interquartile ranges of HADS scores. It was found that the median scores for the Depression subscale in the OD group were higher than for the Anxiety subscale: 18.0 [17.0–19.0] vs. 11.0 [10.0–13.0] scores.

However, based on the results of this and other similar studies, it is difficult to say whether OD or anxiety and depression are the root cause. Rowland DL, et.al report that in 41.0% of cases, anxiety/stress may be the cause of OD [4]. Also, Briki M, et al. state that among patients with depression, sexual dysfunction occurs in 70% of cases [22]. The study by Błachut M et al. shows that the presence of mental illness in men, the associated absence of a partner and long-term psychiatric treatment contribute to the emergence of sexual dysfunctions [23].

The correlation and regression analysis proved the existence of a negative strong correlation between the integral happiness index and anxiety (rs= -0.85) and a moderate negative correlation between the integral happiness index and depression (rs= -0.52) in men with OD. That is, with the development of anxiety and depression, the feeling of happiness naturally decreases.

Thus, given the prevalence of anxiety and depression in men with ED, clinicians should pay more attention to psychological status, with screening for such disorders, especially in young men with orgasmic dysfunction, to ensure the organization of quality psychological and sexological care.

CONCLUSIONS

It was found that orgasmic dysfunction in men is accompanied by a significant decrease in the quality of life, especially the psychological component.

It was shown that men with orgasmic dysfunction are characterized by an extremely low level of the integral happiness index against the background of prevalence severe depression and, in the majority of cases moderate anxiety.

A strong negative correlation was displayed between the integral happiness index and the level of anxiety and a moderate negative Correlation – between the integral happiness index and the level of depression, in men with orgasmic dysfunction.

In the management of orgasmic dysfunction in men, psychological assistance aimed at correcting depression and anxiety and improving the quality of life of patients should be an obligatory component.

AUTHOR CONTRIBUTIONS

Conception and design, Collection and assembly of data, Data analysis and interpretation, Manuscript writing, Final approval of manuscript: Volodymyr Trishch.

FUNDING

Nil.

CONFLICT OF INTEREST

The author have no conflict of interest to declare.

REFERENCES

1. Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition. – United States: American Psychiatric Association, 2013. – 947 p.
2. Di Sante S, Mollaioli D, Gravina GL, Ciocca G, Limoncin E, Carosa E, Lenzi A, Jannini EA. Epidemiology of delayed ejaculation. Transl Androl Urol, 2016. 5: 541. https://doi.org/10.21037/tau.2016.05.10
3. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: prevalence and predictors. Jama, 1999; 281:537. https://doi.org/10.1001/jama.281.6.537
4. Rowland DL, Padilla S, Kövi Z, Hevesi K. Self-reported reasons for having difficulty reaching orgasm in men with diverse etiologies. Sex Med. 2023 Jul 3;11(3):qfad030. https://doi.org/10.1093/sexmed/qfad030
5. Cilio S, Pozzi E, Fallara G, Belladelli F, Raffo M, Lanzaro F, Bertini A. et.al. Unrecognised orgasmic phase disorders in men presenting with new-onset erectile dysfunction-Findings from a real-life, cross-sectional study. Andrology. 2024 Mar;12(3):606-612. https://doi.org/10.1111/andr.13506
6. Calabrò RS, De Luca R, Pollicino P, Bramantiet P. Anorgasmia during pregabalin add-on therapy for partial seizures. Epilept Dis: Int Epilepsy J Videotape, 2013. 15: 358. https://doi.org/10.1684/epd.2013.0592

7. International Statistical Classification of Diseases and Related Health Problems 10th Revision. Available: https://icd.who.int/browse10/2019/en
8. European Association of Urology Guidelines on Sexual and Reproductive Health. 2024 Available: https://uroweb.org/guidelines/sexual-and-reproductive-health
9. McCabe MP, Sharlip ID, Atalla E, Balon R, Fisher AD, Laumann E, Lee SW. Definitions of Sexual Dysfunctions in Women and Men: A Consensus Statement From the Fourth International Consultation on Sexual Medicine 2015. J Sex Med, 2016. 13: 135. https://doi.org/10.1016/j.jsxm.2015.12.019
10. Jenkins LC, Mulhall JP. Delayed orgasm and anorgasmia. Fertil Steril, 2015.104:1082. https://doi.org/10.1016/j.fertnstert.2015.09.029
11. Haney NM, Alzweri LM, Hellstrom WJG. Male orgasmic dysfunction post-radical pelvic surgery. Sex Med Rev. 2018;6:429–37. https://doi.org/10.1016/j.sxmr.2017.12.003
12. Nguyen V, Dolendo I, Uloko M, Hsieh T, Patel D. Male delayed orgasm and anorgasmia: a practical guide for sexual medicine providers. International Journal of Impotence Research, 2024, volume 36, pages186–193. https://doi.org/10.1038/s41443-023-00692-7
13. Abdel-Hamid IA, Ali OI. Delayed ejaculation: pathophysiology, diagnosis, and treatment. World J Mens Health. 2018; 36:22–40. https://doi.org/10.5534/wjmh.17051
14. Shindel AW, Althof SE, Carrier S, Chou R, McMahon CG, Mulhall JP et.al. Disorders of Ejaculation: An AUA/SMSNA Guideline J Urol. 2022; 207: 504-12. https://doi.org/10.1097/JU.0000000000002392
15. Rosen R, Riley A, Wagner G, Osterloh I, Kirkpatrick J, Mishra A. The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. Urology, 1997, 49: 822-830. https://doi.org/10.1016/S0090-4295(97)00238-0
16. Endicott J, Nee J, Harrison W, Blumenthal R. Quality of Life Enjoyment and Satisfaction Questionnaire: A New Measure. Psychopharmacology Bulletin 1993;29:321-326.
17. Argyle M, Martin M, Crossland J. Happiness as a function of personality and social encounters. In: Forgas J. P., Innes J. M., editors. Recent advances in social psychology: An international perspective. North-Holland: Elsevier; 1989
18. Hills P, Argyle M. The Oxford happiness questionnaire: a compact scale for the measurement of psychological well-being. Personality and Individual Differences. 2002;33(7):1073–1082. https://doi.org/10.1016/S0191-8869(01)00213-6
19. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983; 67:361–370. https://doi.org/10.1111/j.1600-0447.1983.tb09716.x
20. Snaith RP, Zigmond AS. The Hospital Anxiety and Depression Scale manual. Windsor, Berkshire (UK): Nfer-Nelson; 1994.
21. Marchand E. Psychological and Behavioral Treatment of Female Orgasmic Disorder. Sex Med Rev. 2021 Apr;9(2):194-211. https://doi.org/10.1016/j.sxmr.2020.07.007
22. Briki M, Haffen E, Monnin J, Tio G, Nicolier M, Sechter D, Vandel P. Sexual dysfunction and depression: Validity of a French version of the ASEX scale. Comparative Study Encephale. 2014 Apr;40(2):114-22. https://doi.org/10.1016/j.encep.2012.10.008
23. Błachut M, Badura-Brzoza K, Ścisło P, Bugdol M, Świerzy K, Piegza M, Gorczyca P. Sexual disorders in the men treated in a psychiatric ward. Psychiatrm Pol. 2022 Dec 31;56(6):1221-1236. https://doi.org/10.3389/fpsyt.2022.980361

Received 13.02.2025

Accepted for publication 14.03.2025

Published 30.03.2026