Original Article :

The Impact of bilateral endoscopic thoracic sympathectomy on hyperhidrosis patients' quality of life and its link to psychiatric disorders.

Shahd Yaser Alsalamah [1], Taif Mobarak Alotaibi [1], Sarah Nasser Alfarraj[1], Reem Jabr Aljabr [1], Leena Sami Alnassar [1], Hussah Ibrahim Almezail [2], Fahad D. Alosaimi [3]

1. Medical Intern, College of Medicine, King Saud University, Riyadh, Saudi Arabia

2. Psychiatry & Psychosomatic Medicine consultant, King Fahad Specialist Hospital, Dammam, Saudi Arabia

3. Professor, Psychiatry & Psychosomatic Medicine consultant, Department of Psychiatry, College of Medicine, King Saud University, Riyadh, Saudi Arabia

Received on Dec 06, 2023, accepted for publication on Feb 12, 2024, dx.doi.org/10.5455/mjhs.2024.02.003

Corresponding Author:
Shahd Yaser Alsalamah,College of Medicine,King Saud University,Riyadh, Kingdom of Saudi Arabia,
Tel: +966564790531 - E-mail: Shahd.alsalamah@gmail.com

OPEN ACCESS Distributed under Creative Commons CC BY-NC-ND 4.0

Abstract

Background and Aims:
To measure the Quality of Life (QOL) of patients with hyperhidrosis after undergoing Bilateral endoscopic thoracic sympathectomy (BETS), and its association with psychiatric disorders, that were diagnosed using MINI psychiatric interview, and compensatory hyperhidrosis (CH).

Methods:
A retrospective cross-sectional study was carried out on patients with primary hyperhidrosis after undergoing BETS. 50 Patients were recruited from King Saud University Medical City database and contacted via phone calls. The interview contained a hyperhidrosis-specific QOL questionnaire, and a diagnostic psychiatric questionnaire MINI. The QOL results were classified into 5 categories and used to study QOL and its associated factors.

Results:
The reported QOL before the operation has 52% of the patients showing negative QOL. Alternately, the reported QOL after the operation improved with 96% patients showing positive QOL. Among this sample, 76% reported suffering from CH post procedure, 28% were diagnosed with one or more mood disorders, and 20% were diagnosed with one or more anxiety disorders. No statistical relationship was found linking the QOL of the sample to the occurrence of CH or the presence of any common psychiatric disorder.

Conclusions:
In conclusion, there was a significant improvement in the patients' QOL after BETS. The improvement in QOL was unaffected by the surgeries most notable complication, compensatory hyperhidrosis, or the presence of any common psychiatric disorder that they were diagnosed with post-surgery. Further research is needed to explore factors that may affect the QOL of these patients.

Keywords:
Quality of life, Hyperhidrosis, compensatory hyperhidrosis, sympathectomy, Psychiatric disorders..

Introduction

Hyperhidrosis is a disorder characterized by excessive sweating from the eccrine glands, which exceeds normal physiological needs. It can affect several different areas of the body, including the palms, axillae, plantar of the foot, and facial area. Its prevalence is estimated to be from 1.53% to 2.81% of the general population but it is thought to be underestimated.[1] Furthermore, hyperhidrosis can be categorized as primary hyperhidrosis of unknown mechanism or secondary hyperhidrosis triggered by physiological or mental factors and is associated with multiple medical conditions such as hyperthyroidism and type 2 diabetes.[2]

The significant impact of hyperhidrosis on the daily lives of patients is not negligible. Patients have to change their lifestyles to cope with hyperhidrosis, along with the fear, anxiety, and low self-esteem that it can cause.[3-4] Patients with hyperhidrosis tend to avoid social situations in which they have to speak, interact, or shake hands with other people, as their sweating might be noticed by others, causing a significant impairment in personal relationships and social life.[5-6] The impact on patients may extend to an occupational impairment. In studies performed to assess the functional impairment in patients with hyperhidrosis, it is reported that hyperhidrosis affected their career choices, with negative effects on their work performance and accomplishments.[4-5]

Multiple domains of the patient's quality of life (QOL) are significantly impaired by the disease, including social and occupational aspects,[4] suggesting the need for a multidisciplinary approach to managing these cases. The presentation of different psychological symptoms in patients with hyperhidrosis is common.[7,8]In the literature, Elevated level of anxiety among patients with hyperhidrosis is significantly high, debilitating their social lives.[7,9]A systematic review on the association between hyperhidrosis and anxiety and depression revealed that the site of hyperhidrosis played a role in the severity of anxiety.[10] Patients with generalized, facial, or palmar hyperhidrosis were the most anxious, but the rest of the patients with hyperhidrosis at different sites also experienced anxiety.[10] Moreover, among patients with psychosocial stress, hyperhidrosis patients are more prone to developing depressive symptoms.8 The prevalence of depression in patients with hyperhidrosis was high and most patients showed an improvement after treatment.[7,11]

The treatment depends on the severity of the condition. Mild hyperhidrosis could be treated conservatively with top-

ical medications or botulinum toxin injections.[12-13] More severe cases, and cases in which conservative treatment has failed, tend to be managed surgically by endoscopic thoracic sympathectomy (ETS).[14] Although ETS is an effective intervention for the long-term management of symptoms, compensatory hyperhidrosis (CH) is a commonly recognized side effect. CH is defined as postoperative excessive sweating from new sites apart from the primary site.[14] The incidence of CH varies in the range of 2.4-100%. This variation could be due to the population, range of sympathectomy levels, or the number of levels involved in the sympathectomy.[15] Although CH varies in severity between

patient it didn't interfere with patient satisfaction. [14,16]

Our objective in this study is to measure the QOL of patients with hyperhidrosis who underwent bilateral endoscopic thoracic sympathectomy (BETS) and evaluate the impact of psychiatric disorders and compensatory hyperhidrosis on these patients' QOL. Patients undergo BETS with hopes of improving their QOL, studying the factors that might implicate QOL will lead to better patient care after the procedure.

Methodology

After being approved by the IRB, A cross-sectional retrospective cohort study was conducted. It included 50 patients with hyperhidrosis who underwent a BETS procedure in King Saud university medical city, Riyadh between 2015–2020. This research was attempted to be carried out in a prospective cohort design, but due to SARS-COV-2 limiting surgeries to critical ones only, the team decided to convert this study into a cross-sectional retrospective study design.

All patients with hyperhidrosis who underwent BETS were included in this study, except those who met the exclusion criteria. The exclusion criteria were secondary hyperhidrosis and those aged less than 18 years.

After obtaining approval from the Institutional Review Board, college of medicine, King Saud University for the study proposal, the study was conducted via phone call interviews. Phone numbers were collected by referring to the medical records of King Saud university medical city. The interviews were conducted After obtaining verbal informed consent. The verbal informed consent included an explanation of the study including title and purpose, the research supervisor's name and affiliation, the protection of each patient's confidentiality, the right to refuse or withdraw at any time, and the length of the interview.

The interviews were divided into four sections. The first section comprised the main questionnaire, which included questions on demographics, hyperhidrosis history, psychiatric history, and CH. The patients were asked about any new onset increases in sweating in any different areas after the procedure with a "Yes" or "No" question. If they answered "Yes," a further question was asked about the region or regions that suffered from CH. This section was validated with the approval of two consultants: a psychiatrist and a thoracic surgeon.

The second section comprised the QOL questionnaire, which had been validated and translated to Arabic previously[16] and was approved for use. The questionnaire had two segments, which were both asked after the surgery: the first asked about QOL before BETS, and the second asked the same questions post-procedure. The questions were divided into different domains: functional/social, personal, emotional, and special circumstances. Each patient was asked to answer on a scale ranging 1–5. The preoperative scale used the following ratings: 1 = excellent, 2 = very good, 3 = good, 4 = bad, and 5 = very bad. In contrast, the postoperative scale used the following ratings: 1 = much better, 2 = a little better, 3 = the same, 4 = a little worse, and 5 = much worse. The score was calculated for each domain and the total score before and after the procedure. The total QOL score range was 17-100 with scores closer to 17 meaning a better QOL, whereas, a score closer to 100 meaning a poorer QOL. The total QOL scores were further classified into 5 categories for easier analysis. The third section was the Mini International Neuropsychiatric Interview DSM-IV (MINI version 6), which had been translated into Arabic, as well as previously validated [17-18] and approved for use in psychiatric illness. MINI is a validated questionnaire that is used to diagnose 17 different psychiatric illnesses in the form of "Yes" or "No" questions. For easier analysis, the diagnosed psychiatric illnesses were lumped together into 4 categories: mood disorders, anxiety disorders, psychotic disorders, and other disorders.

Data were analyzed using the SPSS statistical package for social studies (SPSS version 25.0; IBM Corp., New York, NY, USA) for Windows. Continuous variables are expressed as mean mean±standard deviation and categorical variables as percentages. The t-test was applied for continuous variables. The chi-square test was utilized for categorical variables. Shapiro-Wilk test of normality was used on the continuous variables. A p-value <0.001 considered statistically significant.

Results

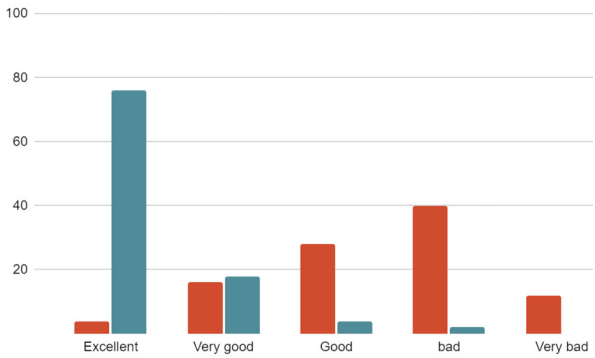
This study included 50 patients, 36 (72%) males and 14 (28%) females (Table 1). Most of our sample, 70%, suffered from primary hyperhidrosis in their hands before undergoing BETS. Notably, 48% reported a family history of hyperhidrosis.

Table 1: Distribution of sociodemographic variables of study subjects

Characteristics	N(%)
Gender:	
Male	36(72)
Female	14(28)
Nationality:	
Saudi	50(100)
Non-Saudi	0(0)
Social status:	
Married	30(60)
Single	20(40)
Education level:	
University	43(86)
High school	7(14)
Occupation:	
Employed	35(70)
Non-employed	11(22)
Student	4(8)
Pre surgery Site affected:	
Face	17(34)
Hands	35(70)
Feet	19(38)
Axilla	11(22)
Chest and back	2(4)
Whole body	2(4)

The QOL data was analyzed using the Shapiro-Wilk test of normality and was found to be normally distributed with a P value of 0.832 (^4). The general QOL reported by the patients prior to the surgery (Table 2) was notably poor: 52% had a negative QOL, and 16% had a median QOL. In contrast, only 32% reported a positive QOL. The reported QOL 3 months after the surgery (Table 2), on the contrary, was shown to generally have a positive change: 96% had a positive QOL, 4% had a median QOL and only 2% had a worst QOL. Comparison between the QOL before and after BETS is shown in (graph 1). A paired samples t-test was conducted to evaluate the null hypothesis that there is no change in participants' reported QOL scores when measured before and after surgery (N = 50). The results indicated a statistically significant effect of surgery on QOL scores, with a mean difference of 30.84 and a t value of 12.32, p<.001. Thus, there is significant evidence to reject the null hypothesis and conclude that the surgery had a clear positive impact on QOL reported by the patients.

Graph-1: The QOL distribution percentage comparing the QOL before and after treatment with BETS



QOL: Quality of life BETS: Bilateral endoscopic thoracic sympathectomy

Table 2: Reported QOL in patients with hyperhidrosis before and after treatment with bilateral endoscopic thoracic sympathectomy (BETS)

Reported QOL	No. before BETS	No. after BETS
Excellent	2	38
Very good	8	9
Good	14	2
bad	20	1
Very bad	6	0

Among the 50 patients who underwent BETS, 76% experienced CH while 24% did not. Patients who experienced CH were affected in different body areas: The majority experienced CH in the anterior trunk (abdomen and/or chest) at 54%, followed by the back at 42%, lower body (feet, legs, and/or groin) at 26%, the face at 6%, and the hands at only 2%. An independent-samples t-test was conducted to determine whether there was a difference in the reported QOL scores between patients who experienced CH and those who did not. The results indicated no significant difference between the patients who experienced CH (M = 26.55.31, SD = 10.35) and those who did not (M = 23, SD = 10.081), [t(48) = -1.043, p = .302 > .05]. The 95% confidence interval of the difference between the means ranged from [-10.403 to 3.298] and did not indicate a difference between the means of the sample. Consequently, our result showed that there is no difference between the sample means and conclude that experiencing CH does not significantly affect reported QOL scores. The only significant observation was that the only patient to report a worse QOL score after the surgery was the only one to be affected by CH in the groin area.

The prevalence of different mood and anxiety disorders is shown in (Table 3). An independent-samples t-test was conducted to determine whether there was a difference in the reported QOL scores between patients who were diagnosed with a mood disorder, using MINI psychiatric interview, and those who were not. The results indicated no significant difference between the patients with mood disorders (M = 23.29, SD = 7.173) and the patients who were not diagnosed with mood disorders (M = 26.64, SD = 11.23), [t(48) = 1.035, p = .306 > .05]. The 95% confidence interval of the difference between means ranged from [-3.164 to 9.87] and did not indicate a difference between the means of the sample. Consequently, we found that there is no difference between the sample means and conclude that being affected by a mood disorder does not significantly affect reported QOL scores. An independ-

ent-samples t-test was conducted to determine whether there was a difference in the reported QOL scores between patients who were diagnosed with an anxiety disorder and those who were not. The results indicated no significant difference between patients with anxiety disorders (M = 23.8, SD=10.335) and those who were not (M = 26.18, SD = 10.335), [t(48) = 0.648, p = .52 > .05]. The 95% confidence interval of the difference between means ranged from [-4.989 to 9.739] and did not indicate a difference between the means of the sample. Consequently, we found that there is no difference between the sample means and conclude that being affected by an anxiety disorder does not significantly affect reported QOL scores.

Table 3: Prevalence of different lifetime/ current psychiatric illnesses

Type of disorder	No. (%)	95% Confidence interval
Mood Disorders	14(28%)	(16.2-42.5)
Anxiety disorders	10(20%)	(10-33.7)
Psychotic Disorders	1(2%)	(0-10.6)
Other disorders	1(2%)	(0-10.6)

Discussion

Before undergoing BETS, patients' QOL was negatively affected by hyperhidrosis on multiple levels, with 52% showing negative QOL results. Nonetheless, our study has shown a great positive outcome, with 96% of patients indicating positive QOL and a great improvement in their QOL after undergoing the procedure. The improvement was spread throughout the researched domains: functional, social, personal, emotional, and special circumstances, with studies showing similar result to our finsings.[19-20]

CH is a side effect of BETS, in which the body starts sweating in new areas post-operation.76% of this study sample reported experiencing CH post-surgery. A systematic review showed that the incidence of CH was 77.96% [21] which was in line with our findings. Our sample showed that the incidence of anterior trunk and back CH post-BETS was the highest, which is similar to previous literature.[14] Despite the high prevalence of CH in our sample, it was not a barrier to QOL improvement after BETS. In fact, no statistical significance was identified linking CH to worse QOL results. Almost all our sample showed improvement in QOL, with the exception of one patient who reported a slightly worse QOL. This patient was reported to be the only one with groin CH. The sample size was not sufficient to confidently conclude that experiencing CH in the groin area will always result in dissatisfaction and a worse

QOL score. Further research with a larger sample size is required to answer this question.

The Mini International Neuropsychiatric Interview was used as a diagnostic tool to assess the sample's psychological status. According to Klein SZ's study,[9] patients with hyperhidrosis were at a 76% higher risk of developing depression and anxiety than their controls. These patients showed great improvement post-treatment with ETS, reducing their psychotropic medications post-surgery and improving their depression and anxiety scale scores.[11] Among our sample, which consisted of surgically treated patients with hyperhidrosis, 16% and 20% were diagnosed with depression and anxiety disorders, respectively, which is less than the known prevalence in the general population during the COVID-19 pandemic.[22] However, the prevalence of depressive disorder is high compared to the prevalence found in Saudi Arabia prior to the COVID-19 pandemic (6%).[23] The only identified psychiatric disorder found to be higher than the general population was agoraphobia (12%) compared to Saudi Arabia population prevalence of 2.3%.[23] The sample size was not sufficient to confidently conclude an association between agoraphobia and primary hyperhidrosis. Further research with a larger sample size is required to clarify whether there exists an association of primary hyperhidrosis with agoraphobia. Nonetheless, no statistical relationships were found between any of the diagnosed psychiatric disorders and worse QOL outcomes.

Despite all the physical, psychological, and social negative effects that may be caused by hyperhidrosis, only half of the patients affected by primary hyperhidrosis seek medical treatment.[24] Treatment choices are recommended depending on the severity of hyperhidrosis.[25] Aluminum chloride, inotropes, and BTX-injections are used as first-line treatment followed by oral medication. BETS is recommended to be used in refractory cases.[25] Even with treatment, the assistance of a mental health nurse and a psychiatrist is recommended, due to the severe emotional distress that hyperhidrosis patients suffer from. [26]

Limitations

This research was limited by its small sample size, SARS-COV-2 regulations, retrospective study design as well as recall bias. We recommend further studying using a prospective study design to improve the accuracy of the results. Exploring the relationship between agoraphobia and primary hyperhidrosis and investigating the effect of groin CH on QOL is also recommended.

Conclusion

In conclusion, there was a significant improvement in the patients' QOL after BETS. The improvement in QOL is unaffected by the surgeries most notable complication, compensatory hyperhidrosis, or the presence of common psychiatric disorders. Further efforts are needed to explore factors that may affect the QOL in these patients.

Conflicts of interest

The authors have no potential conflicts of interest to disclose.

Acknowledgments:

We would like to extend our sincere appreciation to Dr. Iftikhar Ahmed for his help with data collection. Furthermore, we would like to express our gratitude to Ibrahim Alsalamah for his assistance in data analysis. We would also like to thank Editage (www.editage.com) for English language editing.

Reference

1. Kristensen JK, Nielsen C. Progress and lack of progress in hyperhidrosis research 2015-2020. A concise systematic review. Int J Dermatol. 2022;61(2):148–57.
2. Nawrocki S, Cha J. The etiology, diagnosis, and management of hyperhidrosis: A comprehensive review: Etiology and clinical work-up. J Am Acad Dermatol. 2019;81(3):657–66.
3. Dharmaraj B, Kosai NR, Gendeh H, Ramzisham AR, Das S. A Prospective cohort study on quality of life after endoscopic thoracic sympathectomy for primary hyperhidrosis. Clin Ter. 2016 May 1;167(3):67-71.
4. Kamudoni P, Mueller B, Halford J, Schouveller A, Stacey B, Salek MS. The impact of hyperhidrosis on patients' daily life and quality of life: a qualitative investigation. Health and quality of life outcomes. 2017 Dec;15:1-0.
5. Glaser DA, Hebert A, Pieretti L, Pariser D. Understanding Patient Experience With Hyperhidrosis: A National Survey of 1,985 Patients. Journal of Drugs in Dermatology: JDD. 2018 Apr 1;17(4):392-6.
6. Shayesteh A, Boman J, Janlert U, Brulin C, Nylander E. Primary hyperhidrosis: implications on symptoms, daily life, health and alcohol consumption when treated with botulinum toxin. The Journal of Dermatology. 2016 Aug;43(8):928-33.
7. Bahar R, Zhou P, Liu Y, Huang Y, Phillips A, Lee TK, Su M, Yang S, Kalia S, Zhang X, Zhou Y. The prevalence of anxiety and depression in patients with

or without hyperhidrosis HH. Journal of the American Academy of Dermatology. 2016 Dec 1;75(6):1126-33

8. Gross KM, Schote AB, Schneider KK, Schulz A, Meyer J. Elevated social stress levels and depressive symptoms in primary hyperhidrosis. PLoS One. 2014 Mar 19;9(3):e92412.

9. Klein SZ, Hull M, Gillard KK, Peterson-Brandt J. Treatment patterns, depression, and anxiety among US patients diagnosed with hyperhidrosis: a retrospective cohort study. Dermatology and Therapy. 2020 Dec;10:1299-314.

10. Kristensen JK, Vestergaard DG, Swartling C, Bygum A. Association of primary hyperhidrosis with depression and anxiety: a systematic review. Acta Dermato-Venereologica. 2020 Jan 30;100(1):1-2.

11. Li DC, Hulbert A, Waldbaum B, Ober C, Hooker CM, Huang P, Molena D, Yang SC, Ito T, Perry-Parrish C, Brock MV. Endoscopic thoracic sympathectomy for primary focal hyperhidrosis: impact on psycho-social symptomatology and psychotropic medication use. European Journal of Cardio-Thoracic Surgery. 2018 Nov 1;54(5):904-11.

12. Artzi O, Loizides C, Zur E, Sprecher E. Topical Oxybutynin 10% Gel for the Treatment of Primary Focal Hyperhidrosis: A Randomized Double-blind Placebo-controlled Split Area Study. Acta Derm Venereol. 2017 Oct 2;97(9):1120-1124. doi: 10.2340/00015555-2731. PMID: 28654131.

13. Rummaneethorn P, Chalermchai T. A comparative study between intradermal botulinum toxin A and fractional microneedle radiofrequency FMR for the treatment of primary axillary hyperhidrosis. Lasers Med Sci. 2020 Jul;35(5):1179-1184. doi: 10.1007/s10103-020-02958-8. Epub 2020 Jan 14. PMID: 31939036.

14. Horslen LC, Wilshire CL, Louie BE, Vallières E. Long-Term Impact of Endoscopic Thoracic Sympathectomy for Primary Palmar Hyperhidrosis. Ann Thorac Surg. 2018 Oct;106(4):1008-1012. doi: 10.1016/j.athoracsur.2018.04.063. Epub 2018 Jun 7. PMID: 29885977.

15. Sang HW, Li GL, Xiong P, Zhu MC, Zhu M. Optimal targeting of sympathetic chain levels for treatment of palmar hyperhidrosis: an updated systematic review. Surg Endosc. 2017 Nov;31(11):4357-4369. doi: 10.1007/s00464-017-5508-y. Epub 2017 Apr 7.

PMID: 28389800.

16. Hajjar WM, Al-Nassar SA, Al-Sharif HM, Al-Olayet DM, Al-Otiebi WS, Al-Huqayl AA, et al. The quality of life and satisfaction rate of patients with upper limb hyperhidrosis before and after bilateral endoscopic thoracic sympathectomy. Saudi J Anaesth. 2019;13(1):16–22.
17. Sadek A. Mini international neuropsychiatric interview MINI: the Arabic translation. Psychiatry Updat Inst Psychiatry. 2000;2:23–31
18. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview M.I.N.I.: the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry. 1998;59 Suppl 20:22-33;quiz 34-57.
19. Henning MAS, Ibler KS, Loft I, Ostrowski SR, Erikstrup C, Nielsen KR, et al. The health-related quality of life in hyperhidrosis and co-morbidities. Qual Life Res. 2022;31(8):2331–40.
20. Soares TJ, Dias PG, Sampaio SM. Impact of video-assisted thoracoscopic sympathectomy and related complications on quality of life according to the level of sympathectomy. Ann Vasc Surg. 2020;63:63-67.
21. Cai S-W, Shen N, Li D-X, Wei B, An J, Zhang J-H. Compensatory sweating after restricting or lowering the level of sympathectomy: a systematic review and meta-analysis. Clinics Sao Paulo. 2015;70(3):214–9.
22. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Global Health. 2020;16(1):57.
23. Altwaijri YA, Al-Subaie AS, Al-Habeeb A, Bilal L, Al-Desouki M, Aradati M, et al. Lifetime prevalence and age-of-onset distributions of mental disorders in the Saudi National Mental Health Survey. Int J Methods Psychiatr Res. 2020;29(3):e1836.
24. Doolittle J, Walker P, Mills T, Thurston J. Hyperhidrosis: an update on prevalence and severity in the United States. Arch Derm Res. 2016;308(10):743–9.
25. Henning MAS, Bouazzi D, Jemec GBE. Treatment of hyperhidrosis: An update. Am J Clin Dermatol. 2022;23(5):635–46.
26. Brackenrich J, Fagg C. Hyperhidrosis. StatPearls Publishing; 2022