Original Article

The Impact Of Primary Hyperhidrosis On Quality Of Life Among Residents In Al-Ahsa City, Saudi Arabia

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Abstract

Background: Primary hyperhidrosis is a disease characterized as perspiration more than the body's physiologic need and can significantly impact one's occupational, physical, emotional, and social life. However, the prevalence and quality of life of those patients presenting for treatment have not been well studied.

Objectives: To determine the prevalence of primary hyperhidrosis and its impact on the quality of life among residents in the Al-Ahsa City of Saudi Arabia.

Methods: This is a cross-sectional study conducted in Al-Ahsa City by using structured questionnaires which includes two parts, first part about the subjective diagnosis of hyperhidrosis using "Hyperhidrosis Disease Severity Scale (HDSS)" and the other to assess impairment on quality of life using Amir–de Campos Clinical Protocol for Quality of Life. **Results:** The study revealed that 18.3% of patients were suffering from barely tolerable or intolerable excessive sweating that is interfering with daily activities indicating a severe degree of HH. A highly statistically significant correlation was found between Amir–de Campos Clinical Protocol for QoL and HDSS among patients in functional and social domain ($r = 0.261$; $p < 0.001$), under special circumstances domain ($r = 0.336$; $p < 0.001$) and overall QoL ($r = 0.305$; $p < 0.001$).

Conclusions: This study revealed a high prevalence of hyperhidrosis and a significant impact on the quality of life among those affected.

Keywords: Al-Ahsa Region, Hyperhidrosis, Impact, Perspiration, Prevalence, Quality of Life,

INTRODUCTION

Hyperhidrosis (HH) is a disease characterized by perspiration more than the body's physiologic need and can significantly impact one's occupational, physical, emotional, and social life. Thus, this disease is not a rare event. [11] Hyperhidrosis is delineated into two classifications of either primary hyperhidrosis (PH) or secondary hyperhidrosis (SH). PH is distinguished as a chronic, idiopathic disorder of excessive perspiration in a bilateral, symmetrical manner. SH is due to an underlying condition, such as an infection, endocrine disorders, metabolic disorders, neoplastic diseases, neurologic conditions, spinal cord injuries, cardiovascular disorders, respiratory disorders, anxiety, and stress. [1]

Primary hyperhidrosis is distinguished as a chronic, idiopathic disorder of excessive perspiration in a bilateral, symmetrical manner. [1] It is thought to be caused by an overactivity of the autonomic nervous system. Physiologically, eccrine sweat glands are located in the deep dermal layer of the skin and are innervated by post-ganglionic sympathetic fibers, which are stimulated by acetylcholine neurotransmitters. [2] However, in primary hyperhidrosis, it is thought that those sweat glands receive aberrant stimulation by sympathetic fibers resulting in excessive sweating. Although overabundance of neurotransmitters as a cause is excluded with having normal quantity and function of acetylcholinesterase. In addition, histologic evaluation of eccrine sweat glands showed normal-appearing glands with a normal number, size, and density. [2-3]

The onset of primary hyperhidrosis is most common in young adults at the age of 14 to 25 years. However, PH can be seen in infants and younger children as the eccrine sweat glands are fully functional from birth onwards. Pre-pubertal onset hyperhidrosis most commonly manifests as palmar or plantar variety (88.9%). Other less common presentations of pre-pubertal HH are the axillary (15.5%), facial (6.6%), and abdominal and dorsal regions (4.4%). [4] On the other hand, post-pubertal onset hyperhidrosis is more frequently present with an axillary distribution. [1] The low prevalence of hyperhidrosis among the elderly is thought to be due to regression of HH over time. [12] According to the chart review, the majority of HH patients had an isolated axillary distribution (29%) or palms and soles distribution (25%). Other

allocations were isolated soles (15.5%), axillae with palms and soles (11%), isolated palms (6%), and craniofacial (5%). In addition, an atypical distribution included the trunk (3%), inguinal folds (1.3%), and the buttocks, legs, submammary folds, neck, wrist (<1% each). [10] Males are more commonly to experience craniofacial hyperhidrosis in addition to the involvement of "other areas" (i.e. back, chest, abdomen, forearm, genital, and lower extremities). [1] On the other hand, females are more commonly to experience axillary hyperhidrosis. [9] Positive family history is found in 35% to 65% of patients with +hyperhidrosis. It is most likely inherited as an autosomal dominant with variable penetrance, in addition to having a genetic linkage to chromosome 14. [1,3,7-8, 9]

A major study conducted by Stratton and colleagues revealed the prevalence of hyperhidrosis in the United States. A survey scanning for subjects with excessive sweating was sent to 150,000 US households, and the results showed that 2.8% of the population is affected by hyperhidrosis with no sex predilection although several studies have shown a higher incidence of hyperhidrosis in females, it is still undetermined, giving the fact that more females often seek treatment shows a false impression that it is predominant in females. [13, 15] A retrospective chart review in 2011 revealed that 93% of patients with hyperhidrosis had the primary type of HH in contrast to secondary HH. Additionally, more than 90% of those patients affected with primary hyperhidrosis had a typical focal distribution, involving the axillae, palms, soles, and craniofacial areas. [6]

One study has found hyperhidrosis in 51.5% of patients with pachyonychia congenita, and in 22.7% of children with the disorder. [12] Other cutaneous disorders associated with hyperhidrosis include palmoplantar keratodermas, glomus tumor, blue rubber bleb nevus syndrome, nevus sudoriferous, POEMS (polyneuropathy, organomegaly, endocrinopathy, M protein, skin changes) syndrome, speckled lentiginous nevus syndrome, Riley-Day syndrome, pachydermoperiostitis, Gopalan syndrome, causalgia, pretibial myxedema, Buerger disease, eccrine pilar angiomatous hamartoma, local injury, and increased size of eccrine glands. [23] Table 1 summarizes the causes of secondary hyperhidrosis. Box 2 lists medications that can cause hyperhidrosis.

Patients with PFH experience functional restraints, which impact their quality of life leading them to adapt their behaviors to fit in with their condition, whether it is axillae, palms, soles, or another area. For instance, patients with axillary hyperhidrosis consume much time and energy on their personal hygiene, while patients with palmer hyperhidrosis experience occupational impairment. [3, 14]

QoL reduction caused by PH is often equal or more to that caused by other dermatologic diseases as atopic dermatitis, contact dermatitis, and psoriasis. [14] Furthermore, preliminary studies that are utilizing genetic linkage analysis have localized PH to chromosomes 14. [8] However, there is a lack of epidemiological studies on HH in the middle eastern region specifically, Saudi Arabia. Most current literature is related to the treatment aspect. [15]

THE AIM OF THIS STUDY

The study was conducted to estimate the prevalence of primary hyperhidrosis and to assess its impact on the quality of life among residents in the Al-Ahsa City of Saudi Arabia.

OBJECTIVES

To estimate the prevalence of primary hyperhidrosis among residents in Al-Ahsa City is increasing as it is indicated worldwide.

There is a relationship between primary hyperhidrosis severity and its impact on quality of life among residents in Al-Ahsa City

METHODOLOGY

A cross-sectional study was carried out using a self-administered online survey distributed among residents in Al-Ahsa city, Saudi Arabia via social media platforms. A total of 386 individuals participated by convenience sampling method. Sample inclusion criteria include residents in Alhasa Region, male and female, their age group 15 and above, and who were voluntarily giving consent to participate in the study. Questions were developed in the English language based on recent and related references [6,16,17,18] [, then translated to the Arabic Language to fit the sample criteria. The time reflected to fill in the questionnaire was around 10 minutes for each participant. The study was conducted from April to September 2020 after approval was taken.

THE SURVEY INCLUDES THREE MAIN PARTS:

First part:

This part is related to Socio-demographic information and includes age, sex, height, body weight, social status, educational level, occupation, and tobacco use.

Second part:

This part includes questions about the Assessment of hyperhidrosis, and participants were asked whether they had experienced excessive sweating if they were previously diagnosed with hyperhidrosis by a health care professional,

severity of disease using Hyperhidrosis Disease Severity Scale (HDSS), [16] sites of hyperhidrosis, age of onset, symptoms related to hyperhidrosis (including itching, pain, tingling/pricking/stinging, cold hands or feet, and night sweats), family history, and past treatments. Participants with secondary causes of hyperhidrosis (including hyperthyroidism, hyperpituitarism, diabetes mellitus, pregnancy, pheochromocytoma, carcinoid syndrome, and acromegaly) or having night sweats were ruled out from the study.

The HDSS was used to determine the severity of hyperhidrosis experienced by participants. A four-point, single-item question, the HDSS asks patients to rate the severity of their symptoms based on tolerability and interference with daily activities. Specifically, participants were asked whether their sweating is (1) never noticeable and never interferes with daily activities; (2) tolerable but sometimes interferes with daily activities; (3) barely tolerable and frequently interferes with daily activities; or (4) intolerable and always interferes with daily activities. A score of (3) or (4) indicates severe hyperhidrosis. A score of (1) or (2) indicates mild or moderate hyperhidrosis.

Third part:

This part includes questions about the quality of life, using Amir–de Campos Clinical Protocol for Quality of Life [8]. The questionnaire consisted of 1 general question asking about QoL in general and 20 questions evaluating five domains which are: functional, social, personal, emotional, and under special circumstances. For each question, participants were allowed to give only one response with a score from (1) to (5), categorizing QoL elements into (1) excellent; (2) very good; (3) good; (4) poor; or (5) very poor. Therefore, the total score ranges from 20 to 100, with higher scores denoting poorer QoL. The results are ranked to one of the 5 levels of QoL impairment as follows: very poor QoL (84-100); (68-83) poor QoL; (52-67) good QoL; (36–51) very good QoL; and (20–35) excellent QoL. [7, 17, 18]

ETHICAL APPROVAL

Ethical approval was taken by the Research Ethics Committee of the College of Medicine at King Faisal University in Al-Ahsa city, Saudi. Participants were voluntarily giving consent to participate in the study, and they were instructed that they have the right to do not complete the study at any time. The questionnaire was validated by a panel of experts from the research committee. A pilot study was conducted for consistency and was excluded from the main sample.

STATISTICAL ANALYSIS

Descriptive Statistics were presented using counts, proportions (%), mean ± standard deviation, as appropriate. Between-group comparisons, Mann Whitney U test or Kruskal Wallis test (non-parametric test) as well as Chi-square test had been applied. Correlation procedures were also conducted to determine the linear agreement between HDSS among the Quality of life and its domains. All statistical tests are two-sided and a p-value < 0.05 is considered statistically significant. Normality test has been conducted using Kolmogorov-Smirnov and Shapiro-Wilk test, $p < 0.05$ were considered skewed data. All data analysis had been carried out using Statistical Packages for Software Sciences version 21 (SPSS, Armonk, NY: IBM Corp., USA).

1. RESULTS

Out of the 386 respondents we approached, 294 meet the inclusion criteria (response rate: 76.2%).

Table 1: Presented the sociodemographic characteristics of 294 respondents. Age range was from 8 to 74 years old with more than one third 38.4% were in the 21 – 30 years old group. Females dominated the males 71.4% vs 28.6% with more than a half 58.8% were married and nearly all 86.4% earned university or higher degree. With regards to occupation, more than a half 51.4% were employed. With respect to respondents BMI, 36.1% had normal BMI and 30.6% were overweight. The prevalence of smoking among the study subjects were 6.1%. When measuring the relationship between hyperhidrosis and the sociodemographic characteristics of respondents, we found that no significant relationship between hyperhidrosis among the sociodemographic characteristics of respondents including age group, gender, marital status, educational level, occupational status, BMI level and smoking (All $p > 0.05$).
The prevalence of hyperhidrosis among Al-Ahsa residents was 42.9% (126 individual), the rest 57.1% (168 individual) were negative.

Table 2: Described the characteristics of 126 individual with hyperhidrosis. The results, indicate that there were 10.3% declared that their symptoms had been diagnosed with healthcare providers. Overall, 18.3% (23) of patients were suffering from barely tolerable or intolerable excessive sweating that is interfering with daily activities indicating severe degree of HH. Nearly half of patients 46.8% had been experiencing the symptoms of HH from the age of 19 years and above while the prevalence of patients who had family history of HH was 40.5%. The most commonly reported body area where hyperhidrosis occurs is the armpits, followed by face (Figure 1).

Figure 1. Anatomic location of hyperhidrosis

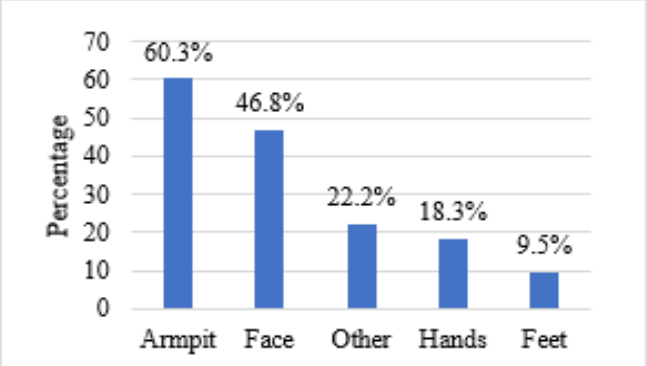

Table 3: Labelled the descriptive statistics of QoL based on Amir-de Campos clinical protocol for QoL among patients with hyperhidrosis. Overall QoL mean score was 52.1 (SD 13.4) corresponding to good QoL.

Table 4: Illustrates a highly statistically significant correlation between Amir–de Campos Clinical Protocol for QoL and HDSS among patients in functional and social domain ($r = 0.261$; $p < 0.001$), under special circumstances domain ($r = 0.336$; $p < 0.001$) and overall QoL ($r = 0.305$; $p < 0.001$).

Table 1. Sociodemographic characteristics of participants according to HH

§ P-value has been calculated using Chi square test.** Significant at $p < 0.05$ level.

Study Variables	Overall N (%) (n=294)	Hyperhidrosis		P-value §
		Positive N (%) (n=126)	Negative N (%) (n=168)	
Age group				
• ≤20 years	26 (08.8%)	15 (11.9%)	11 (06.5%)	
• 21 – 30 years	113 (38.4%)	43 (34.1%)	70 (41.7%)	
• 31 – 40 years	48 (16.6%)	23 (18.3%)	25 (14.9%)	0.102
• 41 – 50 years	67 (22.8%)	33 (26.2%)	34 (20.2%)	
• >50 years	40 (13.6%)	12 (09.5%)	28 (16.7%)	
Gender				
• Male	84 (28.6%)	31 (24.6%)	53 (31.5%)	0.192
• Female	210 (71.4%)	95 (75.4%)	115 (68.5%)	
Marital status				
• Unmarried	121 (41.2%)	50 (39.7%)	71 (42.3%)	0.657
• Married	173 (58.8%)	76 (60.3%)	97 (57.7%)	
Educational level				
• High school or below	40 (13.6%)	20 (15.9%)	20 (11.9%)	0.326
• University or higher	254 (86.4%)	106 (84.1%)	148 (88.1%)	
Occupational status				
• Employed	151 (51.4%)	59 (46.8%)	92 (54.8%)	
• Unemployed	96 (32.7%)	48 (38.1%)	48 (28.6%)	0.224
• Students	47 (16.0%)	19 (15.1%)	28 (16.7%)	
BMI level				
• Underweight	17 (05.8%)	06 (04.8%)	11 (06.5%)	
• Normal	106 (36.1%)	49 (38.9%)	57 (33.9%)	0.417
• Overweight	90 (30.6%)	33 (26.2%)	57 (33.9%)	
• Obese	81 (27.6%)	38 (30.2%)	43 (25.6%)	
Smoking				
• Yes	18 (06.1%)	07 (05.6%)	11 (06.5%)	0.725
• No	276 (93.9%)	119 (94.4%)	157 (93.5%)	

Table 2. Characteristics of patients with HH [(n=126)]

Variables	N (%)
Diagnosed with hyperhidrosis by HCP	
• Yes	13 (10.3%)
• No	113 (89.7%)
Severity of Hyperhidrosis based on HDSS	
• Mild	103 (81.7%)
• Severe	23 (18.3%)
Time symptoms started	
• Childhood (≤12 years)	23 (18.3%)
• Adolescent (13 – 18 years)	44 (34.9%)
• Adults (≥19 years)	59 (46.8%)
Family History of Hyperhidrosis	
• Yes	51 (40.5%)
• No	75 (59.5%)

HCP – Healthcare provider; HDSS - Hyperhidrosis Disease Severity Scale.
* Only respondents who were suffering from hyperhidrosis were included in the analysis.

Table 3. Descriptive statistics of QoL using Amir–de Campos Clinical Protocol for QoL among patients with HH [(n=126)]

Amir–de Campos Clinical Protocol for QoL	Mean ± SD	Mean (%)	Median	Expected range	Actual range
Functional and Social Domain	19.6 ± 6.08	49%	19.00	8 – 40	8 – 36
Personal Domain	7.65 ± 3.58	51%	07.00	3 – 15	3 – 15
Emotional Domain	5.69 ± 2.33	56%	06.00	2 – 10	2 – 10
Under Special Circumstances Domain	19.2 ± 5.67	54.9%	0.700	7 – 35	7 – 33
Overall QoL	**52.1 ± 13.4**	**52.1%**	**20.00**	**20 – 100**	**20 – 83**

When measuring the association between quality of life among the sociodemographic characteristics and hyperhidrosis clinical profile of the patients, we found that patients with university or higher degree were more associated with poor quality of life (T=-1.818; p=0.029) while patients with severe hyperhidrosis also showed significantly poor quality of life (T=2.230; p=0.011). Furthermore, patients who were overweight showed significantly low quality of life than the other groups (F=4.679; p=0.009). Other reported sociodemographic characteristics and hyperhidrosis clinical profile of the patients did not differ significantly in the score of quality of life (Table 5).

Table 4. Correlation (Pearson-R) between Amir–de Campos Clinical Protocol for QoL and HDSS among patients with hyperhidrosis [(n=126)]

Amir–de Campos Clinical Protocol for QoL	HDSS	
	R-Value	P-value
Functional and Social Domain	0.261	**<0.001 ****
Personal Domain	0.167	0.062
Emotional Domain	-0.003	0.974
Under Special Circumstances Domain	0.336	**<0.001 ****
Overall QoL	0.305	**<0.001 ****

** Correlation was significant at p = 0.01 level (2-tailed).

Table 5. Statistical Association between QoL among the Sociodemographic characteristics and HH clinical profile of the patients (n=126)

Factor	Quality of Life Total Score (100) Mean ± SD	F/T-Test	P-value
Age group [a]			
• ≤30 years	49.9 ± 14.5	T=-1.786	0.095
• >30 years	54.1 ± 12.2		
Gender [a]			
• Male	53.6 ± 51.7	T=0.714	0.353
• Female	51.7 ± 13.9		
Marital status [a]			
• Unmarried	51.7 ± 15.8	T=-0.278	0.924
• Married	52.4 ± 11.7		
Educational level [a]			
• High school or below	47.2 ± 12.8	T=-1.818	**0.029 ** **
• University or higher	53.1 ± 13.4		
Occupational status [b]			
• Employed	53.9 ± 13.7		
• Unemployed	52.7 ± 11.3	F=3.384	0.136
• Students	45.1 ± 15.7		
BMI level [b]			
• Underweight	53.5 ± 16.7		
• Normal	47.2 ± 13.6	F=4.679	**0.009 ** **
• Overweight	57.7 ± 13.6		
• Obese	53.5 ± 10.3		
Smoking [a]			
• Yes	42.7 ± 14.9	T=-1.939	0.111
• No	52.7 ± 13.2		
Diagnosed with hyperhidrosis by HCP [a]			
• Yes	57.3 ± 9.66	T=1.472	0.123
• No	51.6 ± 13.7		
Severity of Hyperhidrosis [a]			
• Mild	50.9 ± 13.7	T=2.230	**0.011 ** **
• Severe	57.7 ± 10.7		
Time symptoms started [b]			
• Childhood (≤12 years)	53.7 ± 13.1		
• Adolescent (13 – 18 years)	50.9 ± 14.2	F=0.338	0.824
• Adults (≥19 years)	52.4 ± 13.0		
Family History of Hyperhidrosis [a]			
• Yes	54.0 ± 14.3	T=1.308	0.193
• No	50.9 ± 12.7		
Symptoms of Hyperhidrosis [a]			
• Itching	56.1 ± 11.1	T=1.608	0.054
• Pain	55.5 ± 4.95	T=0.355	0.597
• Tingling/Pricking/Stinging	56.4 ± 16.9	T=0.998	0.532
• Cold hands/feet	50.2 ± 15.5	T=0.733	0.404
• Other	53.2 ± 6.69	T=0.178	0.817

[a] P-value has been calculated using Mann Whitney U test
[b] P-value has been calculated using Kruskal Wallis test.
** Significant at $p < 0.05$ level.

DISCUSSION

The present study sought to determine the prevalence of primary hyperhidrosis among Al Ahsa City residents and measure its impact on their quality of life. The prevalence of PH in this study was relatively high 42.9%, which was higher than the previous reports. [11,19, 20, 21,22] However, the prevalence was even higher in studies done in Brazil and in China. [23-24] The high prevalence rate might be attributed to some factors. For instance, this study was carried out during hot

summer where the temperature reached as much as 50ºC while the other studies mentioned above had a presumptive cooler weather temperature. Furthermore, the criteria used to measure hyperhidrosis has been done using the HDSS questionnaire and do not support clinical or laboratory measurement of sweating. Hence, further investigations are needed, taken into consideration is the prevalence rate of the population when cooler temperatures prevail. Furthermore, among those patients with PH, 18.3% had been detected with severe hyperhidrosis. This report is lower than the severity level of hyperhidrosis patients 58% as discussed by Hajjar et al. [15] Bothersome to extremely bothersome sweating was also higher as investigated by Muthusamy et al. [21] while in the United States, [2] 70% of hyperhidrosis patients declared of severe excessive sweating in at least one part of the body which was higher than our report. In addition, in a study done by Muthusamy et al. [21], they accounted those male students were affected more, especially with palmar, and were significantly more to require treatment than female students. Consistently, pieces of the literature indicated that males had been more affected by the disease than females. [15,23] However, in our study, females were more affected contrary to the previous reports, although, a statistical test revealed that this did not show a significant relationship with PH which was consistent with the study done in Brazil. [22]

In our further investigations, we noted that 40.5% of the patients reported having a family history of PH. This prevalence is slightly lower than the paper of Mir and Mir, [25] where they accounted for 54.7% of the respondents who indicated a family history of excessive sweating. In contrast, Campos et al. [22] had reported a lower prevalence rate of 18% which was also lower than our report. Data in this study revealed that the axillae were the highest region affected by PH, followed by face and hands. These reports are in accordance with the studies reported in the United States, [2] India, [25] and Brazil. [22] Other literature indicated hyperhidrosis was widely prevalent in hands and feet. [11,15]

Although the prevalence of PH in this study was high, however, their reported QoL was deemed good (38.9%) to very good (38.1%). In the assessment of QoL domains, the mean score of the personal domain, emotional domain, and under special circumstances domain had exhibited moderate QoL rating since the scores were above the mean. Only functional and social domain showed scores lower than the mean which indicated poor QoL. In Brazil, [22] investigations showed that students with hyperhidrosis had a better outlook in their QoL, but more than one-third (36%) also already reported bad QoL. On the other hand, an investigation done by Hajjar et al. [15] revealed that before surgical intervention, the overall QoL of patients was reported to be either bad or very bad which was in line with the paper published in Brazil. [11] Moreover, it is highly important to discuss that the correlation between the mean score of HDSS among functional and social domain, under special circumstances domain and overall QoL was positively highly statistically significant, suggesting while the score in HDSS increased the overall QoL and three out of five domains (under special circumstances, functional and social domains) will also likely to increase. Due to the scarce of literature that examined the correlation between the mean score of HDSS and QoL, we viewed that the results in this study would serve as the basis for further validation.

In this study, poor QoL was widely prevalent among overweight patients and among patients with severe hyperhidrosis. Although there were limited reports in this case, however, in a study conducted in the Central region, Saudi Arabia, [15] they reported that the site of sweating had a significant effect in the patients QoL before and after endoscopic thoracic sympathectomy, explaining that the QoL after surgery was significantly better among these group of patients. It is also interesting to note that patients who were professionals showed a significantly low level of QoL than their counterparts. However, this result is subject to further investigations due to the abnormal distribution of the study data.

CONCLUSIONS

The results of this study indicate that 18.3% of patients are suffering from severe hyperhidrosis that is significantly impacting their quality of life. Further research is recommended to determine the exact prevalence of Primary hyperhidrosis by clinical and laboratory methods among the Saudi Arabia population. We consider that better recognition and awareness of Primary hyperhidrosis will enable patients and physicians to acknowledge the disease and provide early diagnosis and treatment.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants for publication.

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None.

CONFLICT OF INTEREST

The authors declare no conflicts of interest, financial or otherwise.

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REFERENCES

1. Lear W, Kessler E, Solish N, Glaser D. (2007) An epidemiological study of hyperhidrosis. dermatologic surgery. January; Vol. 33(s1): S69–75. DOI:10.1111/j.1524-4725.2006.32334.x
2. Solish N, Bertucci V, Dansereau A, et al. (2007) A comprehensive approach to the recognition, diagnosis and severity-based treatment of focal hyperhidrosis: recommendations of the Canadian hyperhidrosis advisory committee. Dermatology Surgery; Vol. 33(8): 908–23. DOI: 10.1111/j.1524-4725.2007.33192.x
3. Haider A, Solish N.(2005) Focal hyperhidrosis: diagnosis and management. CMAJ; Vol. 172(1):69–75. DOI: 10.1503/cmaj.1040708
4. Wolosker N, Schvartsman C, Krutman M, et al. (2014) Efficacy and quality of life outcomes of oxybutynin for treating palmar hyperhidrosis in children younger than 14 years old. Pediatr Dermatol. ; 31:48–53. DOI: 10.1111/pde.12142
5. Moraites E, Vaughn O, Hill Sn (2014). Incidence and Prevalence of Hyperhidrosis. Dermatologic Clinics.32(4):457-465. DOI: 10.1016/j.det.2014.06.006
6. Walling HW. (2011) Clinical differentiation of primary from secondary hyperhidrosis. Journal of Am Academic Dermatology. 64(4):690–5. DOI: 10.1016/j.jaad.2010.03.013
7. Strutton D, Kowalski J, PharmD, Glaser D, Stang P. US (2004) prevalence of hyperhidrosis and impact on individuals with axillary hyperhidrosis: Results from a national survey. Journal of the American Academy of Dermatology. Vol. 51(2):241-248. DOI: 10.1016/j.jaad.2003.12.040
8. Smith FC. Hyperhidrosis. Vascular Surgery. 2013; 31(5): 251–5.
9. Walling HW. (2009) Primary hyperhidrosis increases the risk of cutaneous infection: a case control study of 387 patients. Journal of Am. Academic Dermatology, 61(2):242–6. DOI: 10.1016/j.jaad.2009.02.038
10. Ro KM, Cantor RM, Lange KL, et al. (2002) Palmar hyperhidrosis: evidence of genetic transmission. Journal of Vascular Surgery. Vol. 35(2):382–6. DOI: 10.1067/mva.2002.119507
11. Hasimoto E, Cataneo D, Reis T, Cataneo A (2018). hyperhidrosis: prevalence and impact on quality of life. Journal of Brasilein de Pneumological;. Vol. 44(4):292-298. DOI: 10.1590/S1806-37562017000000379
12. Shah S, Boen M, Kenner-Bell B, et al. (2004) Pachyonychia congenital in pediatric patients: natural history, features and impact. JAMA Dermatol; Vol. 150(2): 146–53. epublished: E1–7. DOI: 10.1001/jamadermatol.2013.6448
13. Baskan EM, Karli N, Baykara M, et al. (2005) Localized unilateral hyperhidrosis and neurofibromatosis type I: case report of a New Association. Dermatology; 211:286–9. DOI: 10.1159/000087026
14. Hamm H, Naumann MK, Kowalski JW, et al. (2006) Primary focal hyperhidrosis: disease characteristics and functional impairment. Dermatology. p212:343–53. DOI: 10.1159/000092285
15. Felini R, Demarchi AR, Fistarol ED, Matiello M, Delorenze LM. (2008) Prevalence of hyperhidrosis in the adult population of Blumenau-SC, Brazil. Anais Brasileiros De Dermatologia. Vol. 84(4):361-66.
16. Kowalski JW, Eadie N, Dagget S, Lai PY (2004) Validity and reliability of the hyperhidrosis disease severity scale (HSDD). Journal of Am Academic Dermatology; Vol. 50(suppl):51. DOI:https://doi.org/10.1016/j.jaad.2003.10.202
17. Amir M, Arish A, Weinstein Y, et al. (2000) Impairment in quality of life among patients seeking surgery for hyperhidrosis (excessive sweating): preliminary results. ISR Journal of Psychiatry Related Scinces. Vol. 37:25–31. PMID: 10857268. URL: https://pubmed.ncbi.nlm.nih.gov/10857268/
18. De Campos JR, Kauffman P, Werebe Ede C, et al. (2003) Quality of life, before and after thoracic sympathectomy: report on 378 operated patients. Ann Thoracic Surgery; Vol. 76:886–91. DOI: 10.1016/s0003-4975(03)00895-6
19. Keller SM, Bello R, Vibert B, Swergold G, Burk R.(2009) Diagnosis of palmar hyperhidrosis via questionnaire without physical examination. Clinical Autonomic Research. 16;19(3):175–81. DOI: 10.1007/s10286-009-0006-5
20. Doolittle J, Walker P, Mills T, Thurston J. (2016) Hyperhidrosis: An update on prevalence and severity in the United States. Archives of Dermatological Research. Oct 15. DOI: 10.1007/s00403-016-1697-9
21. Muthusamy A. (2016) A study on the impact of Hyperhidrosis on the quality of life among college students. Journal of Clinical and Diagnostic Research. Jan 1; Vol-10(6): CC08-CC10:8–10. doi: 10.7860/JCDR/2016/19495.8061
22. De Campos JR, Kauffman P, Werebe Ede C, et al. (2003) Quality of life, before and after thoracic sympathectomy: report on 378 operated patients. Ann Thoracic Surgery; Vol. 76:886–91. DOI: 10.1016/s0003-4975(03)00895-6
23. Kreyden OP, Schmid-Grendelmeier P, Burg G. (2001) Idiopathic localized unilateral hyperhidrosis. Case report of successful treatment with Botulinum Toxin Type A and review of the literature. Arch Dermatology; 137:1622–5. DOI: 10.1001/archderm.137.12.1622
24. Tu YR, Li X, Lin M, Lai FC, Li YP, Chen JF, et al(2017). Epidemiological survey of primary palmar hyperhidrosis in adolescent in Fuzhou of People's Republic of China. Eur J Cardiothoracic Surgery. Vol. 31:737-39. doi:10.1016/j.ejcts.2007.01.020
25. Mir MM, Mir MS .(2018) Hyperhidrosis and its Prevalence in a Population: A Cross Sectional Survey. Chronicles of Pharmaceutical Science; Vol. 2:614-6. DOI: 10.19080/ CTBEB.2018.15.555902.
26. Ballestero-Diez M, Garcia-Rio I, Dauden E, et al.(2005) Ross Syndrome, and entity included within the spectrum of partial disautonomic syndromes. J Eur Acad Dermatol Venereol; 19:729–31. DOI: 10.1111/j.1468-3083.2005.01254.x
27. Cerfolio RJ, Milanez de Campos JR, Bryant AS, et al. (2011) The society of thoracic surgeons expert consensus for the surgical treatment of hyperhidrosis. Ann Thoracic Surgery; 91:1642–8. DOI: 10.1016/j.athoracsur.2011.01.105
28. Yogesh Hole et al 2019 J. Phys.: Conf. Ser. 1362 012121