

# Primary Hyperhidrosis and Anxiety: a Prospective Preoperative Survey of 158 Patients

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**OBJECTIVE:** To determine the location of hyperhidrosis, the accompanying signs and symptoms, and patient anxiety assessed on 2 scales and standardized psychometric instruments.

**PATIENTS AND METHODS:** A prospective study of patients with hyperhidrosis was carried out between September 1, 2001 and June 30, 2003 with a self-administered preoperative questionnaire. The variables studied included the location of hyperhidrosis, the accompanying signs and symptoms, and the self-reported degree of anxiety and perception of its effect on daily life assessed by the State-Trait Anxiety Inventory (STAI) and a questionnaire designed in our department.

**RESULTS:** Palmar hyperhidrosis was reported by 93.6% of patients, plantar by 70.2%, axillary by 66.4%, facial by 12.1%, groin by 8.2%, chest by 5%, and abdominal by 2%. While more than 50% of the patients reported facial blushing and palpitations as accompanying signs and symptoms, approximately 30% experienced epigastric pain, trembling, and headaches. Over half of the patients reported that their anxiety was incapacitating, and a mere 1.2% experienced none at all. STAI scores were similar to those of the general population whereas scores on our department's questionnaire reflected those of the self-reported anxiety ratings.

**CONCLUSIONS:** Primary hyperhidrosis is a disorder in which excessive sweating occurs mainly, but not exclusively, on the palms. The condition is accompanied by signs and symptoms typical of autonomic nervous system hyperactivity and by a degree of anxiety that has an incapacitating effect on normal life, although that anxiety is not detected by the STAI questionnaire alone.

**Key words:** Primary hyperhidrosis. Anxiety. Sympathetic hyperreactivity. State-Trait Anxiety Inventory (STAI).

Hiperhidrosis primaria y ansiedad: estudio prospectivo preoperatorio de 158 pacientes

**OBJETIVO:** Determinar la localización de la hiperhidrosis, la clínica acompañante y la ansiedad que refieren los pacientes tanto subjetivamente como mediante instrumentos psicométricos estandarizados.

**PACIENTES Y MÉTODOS:** Estudio prospectivo realizado entre el 1 de septiembre de 2001 y el 30 de junio de 2003 mediante una encuesta autoadministrada preoperatoria a los pacientes con hiperhidrosis. Las variables de estudio fueron: localización de la hiperhidrosis, clínica acompañante, ansiedad subjetiva y percepción de ésta en la vida diaria mediante el cuestionario Escala de Ansiedad Estado-Rasgo (STAI) y un cuestionario elaborado por nuestro servicio.

**RESULTADOS:** La localización de la hiperhidrosis fue palmar en el 93,6% de los pacientes, plantar en el 70,2%, axilar en el 66,4%, facial en el 12,1%, inguinal en el 8,2%, pectoral en un 5% y abdominal en un 2%. En cuanto a la clínica acompañante, el enrojecimiento facial y las palpitaciones superaban el 50%, mientras que alrededor de un 30% presentaba epigastralgia, temblor y cefalalgia. En cuanto a la ansiedad subjetiva, más de la mitad de los pacientes presentaban ansiedad incapacitante y sólo el 1,2% no la experimentaban en ningún grado. Según el STAI, los valores obtenidos reflejaban un paralelismo con la población general, mientras que nuestro cuestionario reflejó la ansiedad autorreferida.

**CONCLUSIONES:** La hiperhidrosis primaria es un trastorno que cursa principalmente con hipersudación palmar, aunque no de forma exclusiva. Se acompaña de clínica típica de hiperactividad del sistema vegetativo y un grado de ansiedad que incapacita para llevar una vida normal y que, sin embargo, no se detecta mediante el cuestionario STAI.

**Palabras clave:** Hiperhidrosis primaria. Ansiedad. Hiperreactividad simpática. STAI.

## Introduction

Primary hyperhidrosis (PH), a disorder of unknown etiology, is characterized by excessive sweating in the

hands, armpits, or feet or a combination of these areas or other body regions in different degrees.<sup>1</sup> An incidence of up to 1% has been reported by various series in the literature. Currently the most widely applied treatment is surgery, which achieves the best outcome.<sup>1-11</sup> Excessive sweating, usually in the hands, is the principal sign. It is accompanied by a high degree of anxiety and by sympathetic hyperfunction, a clinical picture that has led hyperhidrosis to be considered a sign of psychiatric disorder.<sup>12,13</sup>

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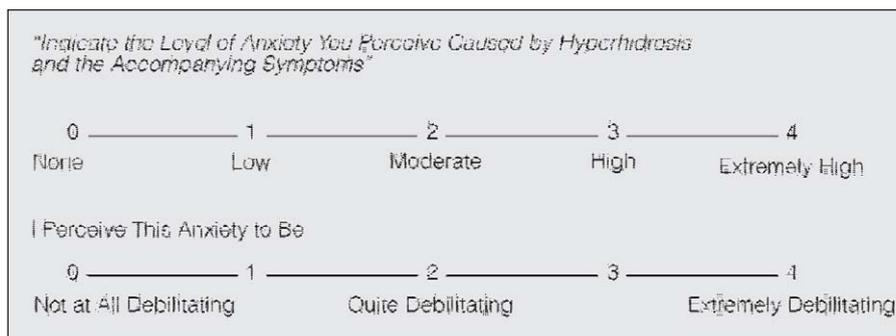


Figure 1. Scale used to assess level of anxiety and degree to which this anxiety is debilitating.

The aim of this study was to describe the location of hyperhidrosis, the accompanying signs and symptoms, the level of anxiety, and the degree to which this anxiety was incapacitating measured on 2 scales and standardized psychometric instruments.

**Patients and Methods**

A prospective study was carried out in our department between September 1, 2001 and June 30, 2003. One hundred fifty-eight patients with palmar, axillary, and/or facial hyperhidrosis participated. Eight weeks before intervention, each patient underwent appropriate preoperative testing, and then filled out a questionnaire that elicited the following information: a) location of the patients' hyperhidrosis and the associated symptoms, and b) the patients' level of anxiety, and the extent to which this anxiety was incapacitating, both assessed on a scale of 0 to 4 (Figure 1). The State-Trait Anxiety Inventory (STAI)<sup>14</sup> and a specific questionnaire designed in our department, the Anxiety-Specific Questionnaire for Primary Hyperhidrosis (ASQPH) were also administered at that time.

The STAI is an instrument that includes separate self-assessment scales measuring 2 independent concepts of anxiety: state and trait. While state anxiety is considered a transitory emotional condition, trait anxiety is defined as a relatively stable tendency towards anxiety. A version of the STAI for the Spanish population in 1982<sup>15</sup> was reported to have good internal consistency (0.9 and 0.93 in state anxiety, and between 0.84 and 0.87 in trait anxiety).

The ASQPH (Table 1) consists of 2 sections. One assesses hyperhidrosis caused by social phobia with items similar to those in Watson and Friend's Social Avoidance and Distress scale<sup>16,17</sup> and that refer to aspects of main interest for PH patients; it consists of 14 questions related to social life. The other section elicits information about associated symptoms. A total of 9 or more affirmative responses was considered to indicate a high degree of anxiety and persisting fear towards social situations.

**Results**

The study population comprised 158 PH patients. Of these 116 (73.4%) were women and 42 (26.6%) men, with a mean age of 27.9 years (range, 14-50). The location of hyperhidrosis was palmar in 148 (93.6%) cases, axillary in 6 (3.8%), and facial in 4 (2.5%).

Those patients who had consulted for sweating that involved an exclusive region reported sweating in other areas of the body as well; 148 (93.6%) reported also sweating in the hands, 111 (70.2%) in the feet, 105 (66.4%) in the armpits, 19 (12.1%) in the facial region, 14 (8.8%) in the groin, 13 (8.2%) in the back, 8 (5.1%) in the chest, and 4 (2.5%) in the abdominal area (Table 2).

Of the elicited accompanying signs and symptoms, facial blushing was reported by 97 (61.4%) patients, palpitations by 82 (51.9%), muscular tension by 75 (47.4%), headaches by 53 (33.5%), nonspecific

TABLE 1  
Anxiety-Specific Questionnaire for Primary Hyperhidrosis, Designed by the Chest Surgery Department

Are you afraid of expressing yourself in front of strangers or of the possibility that they will judge you?	Yes	No
Do you avoid or feel very anxious about shaking hands or thinking that people will notice that you are sweating on your hand or under your armpits?	Yes	No
Do you avoid or feel very anxious about handling papers when others are present?	Yes	No
Do you avoid or feel very anxious about contact with attractive people or with people you might be interested in?	Yes	No
Do you avoid or feel very anxious about going to parties or being in social situations?	Yes	No
Do you avoid or feel very anxious about meeting someone in the street?	Yes	No
Do you avoid or feel very anxious about writing or working while being observed?	Yes	No
Do you avoid or feel very anxious about speaking in public?	Yes	No
Do you avoid or feel very anxious about initiating and maintaining conversations?	Yes	No
Do you avoid or feel very anxious about making eye contact with people you don't know?	Yes	No
Do you avoid or feel very anxious about performing in front of others?	Yes	No
Do you avoid or feel very anxious about being the center of attention?	Yes	No
Do you avoid or feel very anxious about drinking or eating in public?	Yes	No
Do you avoid or feel very anxious about speaking with people in authority?	Yes	No

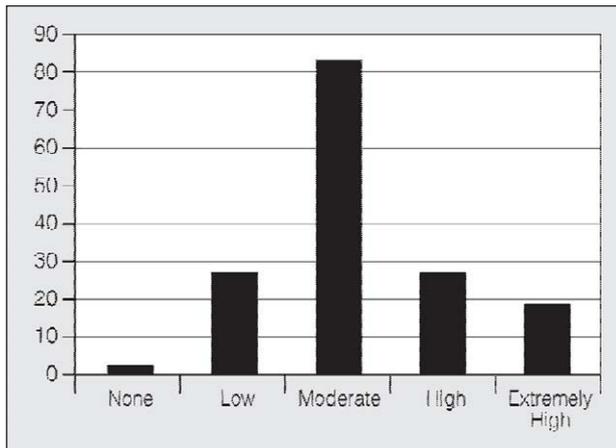


Figure 2. Evaluation of the anxiety reported by the patients (n=158).

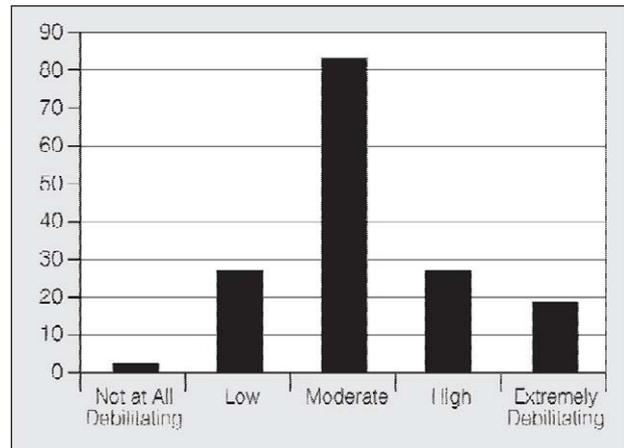


Figure 3. Perception of anxiety secondary to hyperhidrosis in the daily life of 158 patients.

epigastric pain by 51 (32.2%), trembling by 49 (31%), and dry mouth by 48 (30.3%) (Table 3).

Results from the anxiety scales showed that 2 patients (1.2%) reported experiencing no anxiety caused by hyperhidrosis or the accompanying signs and symptoms; 27 (17.1%) reported having a low level of

anxiety, 83 (52.5%) a moderate level, 27 (17.1%) a high level, and 19 (12.1%) an extremely high level (Figure 2). Five patients (3.1%) responded that this anxiety was not debilitating at all in their daily life; 25 (15.8%) reported it being a little debilitating, 83 (52.5%) said it was quite debilitating, 27 (17.1%) said highly debilitating, and 18 (11.4%) said extremely debilitating (Figure 3).

Table 4 shows the results of each variable from the STAI. The values assigned to state and trait anxieties are parallel to those of the general population. Neither variable differed in relation to sex.

Results from the ASQPH showed 43.9% of the patients responding affirmatively to 9 or more of the questions (Figure 4). Those questions directly related to the hands and/or the situations in which the hands were used scored the highest. The questions related to public situations and relations with people of the opposite sex and/or strangers also yielded high scores (Table 5).

TABLE 2

Distribution of Primary Hyperhidrosis in 158 Patients

Body Region	No. of Patients (%)
Hands	148 (93.6)
Feet	111 (70.2)
Armpits	105 (66.4)
Facial region	19 (12.1)
Groin	14 (8.8)
Back	13 (8.2)
Chest	8 (5.1)
Abdomen	4 (2.5)

TABLE 3

Accompanying Signs and Symptoms of Hyperhidrosis

Signs and Symptoms	No. of Patients (%)
Facial blushing	97 (61.4)
Palpitations	82 (51.9)
Muscular tension	75 (47.4)
Headache	53 (33.5)
Gastric pain	51 (32.2)
Trembling	49 (31)
Dry mouth	48 (30.3)

TABLE 4

Descriptive Statistics for Mean State-Trait Anxiety Inventory Scores for the Combined Study Samples (n=158) and the Reference Groups\*

Type of Anxiety	Mean (SD)	95% CI	Reference Group*
State	22.53 (10.45)	24.16-20.91	22.36 (11.02)
Trait	24.34 (10.93)	26.04-22.63	22.47 (9.14)

CI indicates confidence interval.

\*Values are expressed as mean (SD) results for both sexes, adults, and adoles-

### Discussion

Our study indicates that PH is a disorder characterized by increased sweating primarily in the palms, soles, and armpits. However, some authors<sup>2,18</sup> claim that excessive sweating does not involve these areas exclusively but rather extends to other body regions. For example, Allen et al<sup>13</sup> concluded that the sweat gland responses of the hands and feet in reaction to emotional stimuli were not different from those of the rest of the body. They felt that emotional sweating is a generalized body response although the patients with hyperhidrosis are more aware of it on the palms. Although Adar et al<sup>2</sup> did not study the extent of location of excessive sweating in individuals, they did argue that patients tended toward hyperreactivity when facing emotional stimuli.

We have observed, as have other authors,<sup>19,20</sup> that excessive sweating is accompanied by typical autonomic signs and symptoms. No biochemical substrate that

TABLE 5  
Obtained Values of the Anxiety-Specific Questionnaire in Primary Hyperhidrosis

Questions	Yes	No	Yes (%)
Are you afraid of expressing yourself in front of strangers or of the possibility that they will judge you?	119	39	75.3
Do you avoid or feel very anxious about shaking hands or thinking that people will notice that you are sweating in your hand or armpits?	155	3	98.1
Do you avoid or feel very anxious about handling papers when others are present?	123	35	77.8
Do you avoid or feel very anxious about contact with attractive people or with people you might be interested in?	114	44	72.1
Do you avoid or feel very anxious about going to parties or being in social situations?	86	72	54.4
Do you avoid or feel very anxious about meeting someone in the street?	41	117	25.9
Do you avoid or feel very anxious about writing or working while being observed?	123	35	77.8
Do you avoid or feel very anxious about speaking in public?	96	62	60.7
Do you avoid or feel very anxious about initiating and maintaining conversations?	38	120	24
Do you avoid or feel very anxious about making eye contact with people you don't know?	42	116	26.5
Do you avoid or feel very anxious about performing in front of others?	89	69	56.3
Do you avoid or feel very anxious about being the center of attention?	98	60	62
Do you avoid or feel very anxious about drinking or eating in public?	30	128	19
Do you avoid or feel very anxious about speaking with people in authority?	85	73	53.7

Notice how the questions referring to the location of hyperhidrosis and those related to social relations have high scores.

might explain this sympathetic symptom is mentioned in the literature as there is no subsequent increase in the concentration of circulating catecholamines.<sup>21</sup> It is not surprising that PH is considered a psychiatric disorder<sup>22</sup> given that PH patients experience a high degree of anxiety, a symptom for which psychotherapy is the treatment.<sup>5,23,24</sup>

Our patients reported a high degree of anxiety perceived as debilitating in daily life. This anxiety is not reflected as increased state or trait anxiety compared to the general population, consistent with recent studies that rule out underlying psychiatric disease in such patients<sup>25</sup>; however, a clear, yet clinically insignificant, tendency towards anxiety is reported in other series.<sup>5</sup> Patient anxiety is probably reactive to hyperhidrosis, and both factors lead to a sense of disability in daily life.

The ASQPH clearly reflected the patient-reported anxiety that the STAI was unable to measure. It was noted that although these patients may not meet the diagnostic criteria for general anxiety, they do experience a debilitating effect in their lives, indicated by high scores on 1 or 2 items of the STAI questionnaire.

Our investigation leads us to believe that PH is the consequence of sympathetic hyperactivity although it remains unclear if it is generalized or localized. It is relevant that one group found morphological changes typical of hyperstimulation, in the absence of structural sweat gland impairment.<sup>26</sup> We reported abnormalities in the sympathetic ganglia consistent with neural aging,<sup>27</sup> a finding that led us to consider hyperstimulation to be the intermediate mechanism of action of this disorder. Such sympathetic hyperactivity might manifest, in

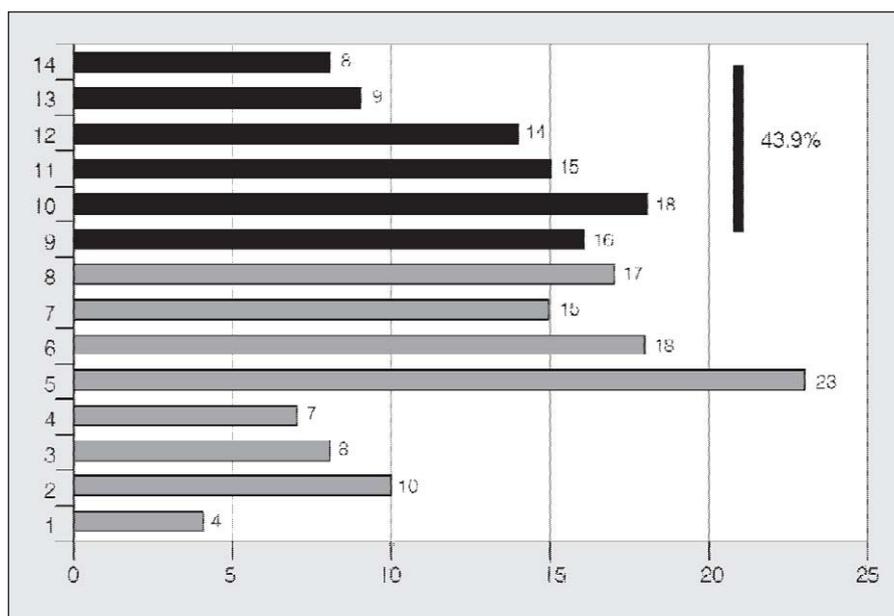


Figure 4. Number of patients who respond affirmatively to 9 or more of the items in the Anxiety-Specific Questionnaire for Primary Hyperhidrosis.

some patients, as excessive palmar sweating while in others sweating would appear in different regions along with accompanying autonomic signs and symptoms.

Further research is needed on the degree of anxiety reported by patients after surgery. We agree with Milánez et al<sup>28</sup> who recommend designing a specific questionnaire for such patients. These authors claim that post-surgical patients would probably show a marked improvement in self-evaluation scores in addition to improvement in or normalization of their social anxiety. Such questionnaires would seek to confirm that the anxiety is a reaction to hyperhidrosis and also to determine if trait anxiety would then decrease; in turn, hyperhidrosis would be considered a factor in persisting trait anxiety. The use of endoscopic surgery on the thoracic sympathetic chain as a treatment for social anxiety, as described by Teralanta,<sup>22</sup> would therefore be supported.

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