

# Hyperhidrosis and Its Impact on Those Living With It

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Sweating plays an essential role in the daily lives of humans by maintaining body temperature, responding to emotional stress, and assisting in metabolism. The human body contains 2 types of sweat glands, eccrine and apocrine glands, which begin to form as early as the third month of fetal development.<sup>1</sup>

Eccrine glands are located throughout the body. They are involved in thermoregulation and constitute 90% of the total number of sweat glands. Eccrine glands are more effective than apocrine glands in releasing fluids and electrolytes to maintain body temperature. They can also release up to 3 liters of odorless fluid per hour. In contrast, apocrine glands are found in specific areas of the body, particularly the axillae, pubic area, and ear canal. Apocrine glands secrete sweat along with proteins and other chemicals including pheromones and steroids. The distinct odor released by apocrine glands result from bacteria-producing urea.<sup>1</sup>

In humans, sweat secretion is regulated by the central nervous system (CNS) and the autonomic nervous system (ANS). There are 2 main neurotransmitters involved in sweat regulation. Acetylcholine (ACh) regulates thermal sweating via eccrine glands, and catecholamines, such as noradrenaline, regulate both types of glands in emotional or stress-induced sweating.<sup>1</sup> When sweat regulation functions properly, the ANS can control sweating to adjust to changes in the environment, metabolism, temperature, or emotion.<sup>1</sup>

Hyperhidrosis is the term used to describe a condition of excessive sweating beyond what is physiologically necessary.<sup>2</sup> It can be either systemic or localized, based on the distribution of sweat, and is also classified as primary or secondary, based on the cause of sweating.<sup>3</sup> Systemic hyperhidrosis describes sweating over the entire body; localized sweating affects only certain parts of the body.<sup>4</sup> Primary focal hyperhidrosis presents as local sweating, such as in the axillae (underarms), palms (hands), soles (feet), and craniofacial regions. Other areas include, but are not limited to, inframammary, groin, and gluteal folds. These sites on the body are primarily affected because of the presence of large numbers of sweat glands.<sup>3,5</sup> The axillae are most commonly affected, followed by the palms and soles.<sup>6</sup>

There is no difference in morphology, number, or size between the sweat glands of a patient with hyperhidrosis and an individual without

hyperhidrosis.<sup>3,7</sup> In patients with hyperhidrosis, the sweat glands are overstimulated by ACh that is released by the sympathetic nervous system.<sup>7,8</sup> These patients appear to have a reduced threshold for emotional sweating, despite having normal responses to thermoregulatory sweating.

### **Primary and Secondary Hyperhidrosis**

Hyperhidrosis can be divided into primary and secondary hyperhidrosis. This report focuses on primary hyperhidrosis. However, it is important for healthcare practitioners to differentiate between primary and secondary classifications. In some cases, the cause of increased sweating can be alleviated.

Primary hyperhidrosis is not caused by external stimuli, body temperature, or association with a systemic disease.<sup>7,9</sup> The central mechanism of primary hyperhidrosis is largely unknown.<sup>3</sup> It is speculated that primary hyperhidrosis is a combination of a lowered threshold and exaggerated response to sweating.<sup>10</sup> The sweating pattern in primary hyperhidrosis is often focal. While generalized sweating can occur, it appears to be less common.<sup>11</sup>

In contrast, secondary hyperhidrosis (which can also be focal or generalized) is due to other modalities, such as medications, malignancies, endocrine disturbances, or other CNS issues.<sup>3,8</sup> [Table 1](#) highlights some of the most common causes of secondary hyperhidrosis.<sup>3,4</sup> It is important for a healthcare practitioner to be able to distinguish between primary and secondary hyperhidrosis, as the 2 forms may require different management and treatment.<sup>3</sup>

Practitioners should be aware of other major differences between primary and secondary hyperhidrosis. In primary hyperhidrosis, sweating is in a typical distribution.<sup>11</sup> Additionally, there is a positive family history in approximately 35% to 55% of cases. At the onset of disease, patients are most often aged between 14 and 25 years.

In secondary hyperhidrosis, the onset is usually later than 25 years of age. The sweating pattern is often unilateral, asymmetric, and more generalized rather than focal. Secondary focal hyperhidrosis is rather rare. Additionally, patients often experience symptoms during sleep. A positive family history is also less common in secondary hyperhidrosis.<sup>3,11</sup>

### **Who Is Affected by Hyperhidrosis?**

Primary hyperhidrosis reportedly affects 4.8% of Americans, or approximately 15.3 million individuals.<sup>2,12</sup> Because it is often underreported and

underdiagnosed, the true prevalence rates may be higher.<sup>13</sup> As previously mentioned, the age of onset of primary hyperhidrosis is often between 14 and 25 years. However, it is also seen in infants because eccrine sweat glands are fully functional at birth.<sup>11</sup> It primarily affects younger adults aged 18 to 39 years. Rates are lowest among those 65 years and older, young children, and adolescents.<sup>2,3</sup> It is speculated that lower prevalence among the elderly population is due to disease regression over time.<sup>11</sup> Incidence rates do not appear to differ between genders.<sup>11</sup> However, men may be more likely to be affected in craniofacial areas, although women are more likely to be affected in axillae areas.<sup>11</sup> Some literature suggests a possible racial difference in the prevalence of primary hyperhidrosis, with more Japanese American patients affected by hyperhidrosis in the palms and soles.<sup>3</sup>

### **Living With Hyperhidrosis**

In many cases, healthcare professionals may underestimate what patients with hyperhidrosis experience daily. They must overcome obstacles that many people without hyperhidrosis would never consider, such as multiple daily showers, extra changes of clothing, difficulty opening doors, and feelings of depression and anxiety.<sup>5</sup>

It is well documented that hyperhidrosis negatively affects numerous aspects of life. Worldwide, nearly one-third of patients with hyperhidrosis report they are “frequently or constantly bothered” by the sweating they experience. Some studies report that 40% of patients with hyperhidrosis experience physical discomfort.<sup>5,14</sup> Sweating can range from mild dampness to overt dripping.<sup>13</sup> Regardless, the constant sweating can lead to an impairment of daily activities and work life.<sup>5</sup> Results of a study from India demonstrated that 38% of college-aged students with hyperhidrosis (aged 17-21 years; N = 375) experienced bothersome to extremely bothersome symptoms.<sup>15</sup> In another study from the United States, approximately 75% of respondents with hyperhidrosis indicated that their sweating led to negative effects on their social life and emotional and mental health.<sup>13</sup> Other patients have reported a reduced effectiveness at work, with up to 80% of respondents being affected, and up to 86% of patients reporting a moderate to severe emotional impact from the disease.<sup>5,6</sup>

**Table 2** summarizes the impact of hyperhidrosis.<sup>5,14</sup> The table is divided into 4 large categories: general lifestyle, social life, mental impact, and professional life. For each of these categories, specific examples are provided. Some or all of these aspects may be affected, depending on which areas of the body are affected by excessive sweating.

In a review of **Table 2**, it is evident that hyperhidrosis has widespread implications, ranging from what a patient has for lunch to the career path they choose to follow.<sup>5,14</sup> Given the daily challenges that arise with the disease, patients with hyperhidrosis employ many strategies to cope. Strategies

include carrying around a change of clothes and extra sets of towels, keeping a fan nearby, making meals at home, and/or bathing several times daily. As reported in a study by Kamudoni et al, 50% to 70% of individuals with hyperhidrosis changed their clothes more than twice a day and spent an extra 15 to 60 minutes daily on managing their symptoms.<sup>5</sup>

When working with patients with hyperhidrosis, healthcare practitioners need to understand the many aspects of life this disease affects. By keeping factors from [Table 2](#) in mind, a healthcare practitioner will be better prepared to care effectively for this patient population.<sup>5,14</sup>

### **Impact of Hyperhidrosis on Quality of Life**

Quality-of-life (QOL) studies are used to measure the effect a disease has on an individual. However, in the case of hyperhidrosis, QOL studies are also used to prove efficacy of certain therapeutic interventions.

Hyperhidrosis negatively affects QOL and, as such, numerous QOL assessment tools are used to evaluate the condition. The Hyperhidrosis Disease Severity Scale (HDSS) grades the tolerability of sweating and its impact on daily life on a 4-point scale. Grade 1 indicates sweating is never noticeable and never interferes with daily activities. Grade 4 indicates sweating is intolerable and always interferes with daily activities. The QOL Index is similar to the HDSS and rates the impact of the disease on a 3-point scale. The Hyperhidrosis Impact Questionnaire asks questions related to characteristics of the disease, medical resource usage, and limitations that the patient experiences. Given that the disease directly affects the skin, the Dermatology Life Quality Index is also used. More general tools, such as the 36-item Short Form (SF-36) Health Survey, may be used in studies assessing QOL.<sup>7,14</sup>

QOL appears to be directly impacted by the specific body parts affected by hyperhidrosis.<sup>6</sup> Shayesteh and colleagues noted that HDSS and SF-36 results showed that axillary hyperhidrosis, compared with other regions, most severely impacted patients' QOL.<sup>6</sup> However, this is debated, as other studies have shown no difference in QOL based on manifestation of the disease.<sup>1</sup>

To date, many QOL impact studies have been completed outside of the United States, but it is likely the results represent QOL in US patients. In a study from Brazil that included 85 respondents who reported excessive sweating, nearly half indicated an impaired QOL secondary to hyperhidrosis. Of 23 patients diagnosed with primary hyperhidrosis, 11 reported a poor or very poor QOL.<sup>16</sup> Muthusamy et al reported on a study of college-aged students in India, where QOL was impacted in nearly 35% of respondents.<sup>15</sup> While numerous QOL tools are available, other studies show an overall impact on a patient's life, without quantifying it based on a specific tool. A study from the United Kingdom included 71 patients; 41% of the patients indicated that hyperhidrosis negatively affected their choice of hobby (eg, yoga, knitting), 69% experienced emotional sequelae, 50% felt restricted by

their disease, and 57% had difficulty interacting with others.<sup>5</sup>

### **Comorbid Conditions and Unintended Consequences**

The study by Kamudoni et al highlights other components of hyperhidrosis: emotional sequelae and secondary comorbidities.<sup>5</sup> Hyperhidrosis negatively affects the mental health of patients.<sup>6</sup> The State-Trait Anxiety Inventory G Form, the Social Phobia Scale, and the Hospital Anxiety and Depression Scale are commonly used tools to assess how the disease impacts emotional well-being.<sup>14</sup> One international study used the Patient Health Questionnaire–9 and Generalized Anxiety Disorder–7 scales, and it was determined that the prevalence of anxiety and depression was 21.3% and 27.2%, respectively, in patients with hyperhidrosis compared with 7.5% and 9.7% in those without the disease.<sup>1</sup> Lessa Lda et al documented that in patients with severe hyperhidrosis, the rate of social anxiety disorder was 47.1% compared with 13.8% in patients without hyperhidrosis.<sup>17</sup> In a study reported by Bahar et al, rates of depression in patients with hyperhidrosis appeared to be higher, 27.2% compared with 9.7% in patients without the disease.<sup>1</sup> Another study of patients with hyperhidrosis indicated that rates of anxiety were more than 4 times higher than rates for depression (49.6% vs 11.2%, respectively).<sup>18</sup> The reason for the higher rate of anxiety compared with depression in this study is not clear. Results of this study also indicated that anxiety and depression were not associated with age group or gender.

Constant sweating leads to embarrassment for many patients. Other feelings caused by excessive sweating include anxiousness, sadness, anger, and hopelessness.<sup>5</sup> Beyond emotional issues, excessive sweating can also lead to further consequences. Excessive sweat causes constant wetness and skin macerations that lead to sore or cracked skin and thus to conditions such as athlete's foot.<sup>5,6,19</sup> A study found a 3.5-fold increase in risk for patients with athlete's foot to also have hyperhidrosis.<sup>20</sup> The risk of skin infections, dermatophytes, psoriasis, and/or warts is increased secondary to sweating.<sup>5,6</sup> Hyperhidrosis is considered a predisposing factor for both bacterial growth and the dermatologic condition known as pitted keratolysis.<sup>21</sup> Pitted keratolysis is an infection on the bottom of the foot that is characterized by craters or pits.<sup>19</sup>

In a retrospective case-control study, the overall risk of any cutaneous infection was significantly increased in patients with hyperhidrosis compared with control patients (odds ratio [OR], 3.2; 95% CI, 2.2-4.6). Risks of fungal (OR, 5.0), bacterial (OR, 2.6), or viral infection (OR, 1.9) were also all significantly increased.<sup>22</sup> The International Hyperhidrosis Society (IHHS) reports that those with hyperhidrosis have a 300% greater risk of skin infections than those not experiencing the disease.<sup>19,22</sup> Although these rates are alarming, studies have not yet quantified what these increased rates of infection mean for the long term. For example, are more patients with hyperhidrosis being admitted to the hospital for management of these infections? Are repeat skin infections in this patient population leading to any antimicrobial resistance patterns? These questions remain to be

answered, and more research is needed in this field.

## **Resources**

It is important that we, as healthcare professionals, understand what it is like living with this disease, what these patients experience daily, and how it affects them. Of the estimated 15 million people with hyperhidrosis, just half report discussing their excessive sweating with a healthcare professional, despite nearly a third of patients presenting with a severe form of the disease.<sup>13</sup> Additionally, for many individuals with hyperhidrosis, information about their disease is inadequate.<sup>5</sup> Fortunately, the IHHS is attempting to change that. The IHHS website, SweatHelp.org, provides users with extensive up-to-date information and educational resources. The website is divided into sections that are tailored to, for instance, teenaged or adolescent patients, medical professionals, and the media. On the website, a translator tool can convert content into any language. Diagrams, support programs, a physician finder, continuing medical education programs, and original referenced material are among this website's resources for users.<sup>9</sup>

## **Conclusions**

Approximately 15.3 million Americans are impacted by hyperhidrosis. This disease negatively affects numerous aspects of life, with approximately 40% of individuals reporting some level of physical discomfort.<sup>5,14</sup> Hyperhidrosis impairs emotional, mental, and professional facets of living, leading to a significantly decreased QOL. Patients experiencing hyperhidrosis must overcome obstacles that individuals without hyperhidrosis would never consider. Multiple changes of clothing, showering numerous times a day, and feelings of embarrassment, shame, and depression are just some considerations this patient population must endure daily. Excessive sweating may also lead to comorbid conditions, such as skin infections, psoriasis, or warts. It is imperative that healthcare practitioners understand the epidemiology and impact this disease has on individuals.