Title: Pain Management Modalities for Hidradenitis Suppurativa: A Patient Survey

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ABSTRACT

Background: Pain is one of the most common and debilitating symptoms of hidradenitis suppurativa (HS).

Objective: We sought to identify pain management therapies used in HS and assess patient-perceived effectiveness.

Methods: An anonymous online survey was posted to Facebook HS support groups. Participants selected all that applied from a list of 20 therapies to indicate which ones they have tried for HS pain. For each therapy used, participants were asked to rate effectiveness on a 5-point scale: not successful (1), mildly successful (2), moderately successful (3), very successful (4), and extremely successful (5). Mean effectiveness ratings were calculated by averaging the corresponding numbers.

Results: Of the 438 participants, 93.8% were female. Participants classified themselves as Hurley stage I (8.2%), II (53.4%), and III (38.4%). Warm compresses were the most commonly used therapy (82.4%), followed by ibuprophien/naproxen (74.7%), Epsom salt baths (57.8%), cold compresses (45.4%), and acetaminophen (44.7%). Marijuana smoking received the highest mean effectiveness rating (2.92±1.10), followed by marijuana edibles (2.87±1.10), and opioids (2.83±0.98). Mean effectiveness ratings were lowest for bleach baths (1.52±0.80), sitz baths (1.53±0.56), massage (1.61±0.92), gabapentin (1.64±0.73), and acetaminophen (1.71±0.75).

Conclusions and Relevance: Even the highest-rated pain management modalities are considered only moderately effective by HS patients.

KEY WORDS

Hidradenitis suppurativa, pain, pain management
INTRO

Hidradenitis suppurativa (HS) is a chronic inflammatory dermatosis characterized by recurring painful nodules in the intertriginous areas. 90% of HS patients report pain, and 61.4% rate their pain severity as moderate or worse [1]. Despite the debilitating nature of HS-related pain, data on the effectiveness of pain therapies in HS is scarce. This study aimed to identify pain management modalities used in HS and assess patient-perceived effectiveness.

METHODS

An anonymous online survey was distributed to international HS support groups’ Facebook pages and listservs from February 28 to March 17, 2020. A numeric rating scale (0-10) was used for baseline pain due to HS. Patients were asked to select all that applied from a list of therapies for the following questions: “Which of the following (topical numbing creams, prescription oral pain medications, over-the-counter medications, baths, physical interventions, products) have you tried for HS pain?” For each therapy used, patient-perceived effectiveness was evaluated with a 5-point Likert scale: not successful (1), mildly successful (2), moderately successful (3), very successful (4), and extremely successful (5). Mean effectiveness of each therapy was calculated using corresponding numbers and compared to other therapies using a linear mixed model which accounted for participants who used multiple therapies. Analysis of variance (ANOVA) was used for mean effectiveness by Hurley stage. Tukey adjustments identified specific differences for the linear mixed model and ANOVA tests. Pearson’s chi-squared test was used to compare frequency of use between similar pain therapies; p-values are unadjusted. Statistics were computed in RStudio (significance p<0.05) [2]. This study was deemed exempt by University of Arizona’s institutional review board.
RESULTS

Mean age of the 438 participants was 37.6±10.7 years. Mean age when HS symptoms first began was 18.7±8.2 years. 93.8% (411) were women. Participants classified themselves as Hurley stage I (8.2%; 36), II (53.4%; 234), and III (38.4%; 168) based on text descriptions provided. Race included Caucasian/white (82.0%), black/African descent (7.5%), mixed (4.3%), Asian (2.3%), American Indian (1.1%), Pacific Islander (0.2%), and other (2.5%).

All participants (437/437) selected “yes” when asked if they experience pain because of HS, but only 24.1% (91/378) reported ever receiving recommendations for HS pain management from a healthcare provider. Mean baseline pain score was 3.7±2.9.

Among the 438 participants, the most commonly used pain management therapies were warm compresses (82.4%), ibuprofen/naproxen (74.7%), Epsom salt baths (57.8%), cold compresses/icepacks (45.4%), and acetaminophen (44.7%) (Figure 1). Warm compresses were used about twice as often as cold compresses (82.4% vs 45.4%; p<0.0001). Ibuprofen/naproxen was used more commonly than acetaminophen (74.7% vs 44.7%; p<0.0001). More patients used Epsom salt baths (57.8%) than bleach (26.0%; p<0.0001), sitz (14.6%; p<0.0001), or cannabidiol (CBD) baths (20.8%; p<0.0001). Bath usage rates increased with Hurley severity. Marijuana smoking was more common than edible consumption (29.2% vs 20.8%; p=0.0039). There was a significant association between Hurley stage and use of opioids, tramadol, and gabapentin (p<0.0001 for all). Chi-squared and pairwise comparisons by Hurley stage for frequency of use are represented in Table 1.
On a scale of 1-5, smoking marijuana had the highest mean effectiveness rating (2.92±1.10), followed by marijuana edibles (2.87±1.10), and opioids (2.83±0.98). There was no significant difference in mean effectiveness of opioids compared to marijuana smoking or marijuana edibles (p>0.9999). Mean effectiveness was lowest for bleach baths (1.52±0.80), sitz baths (1.53±0.56), massage (1.61±0.92), gabapentin (1.64±0.73), and acetaminophen (1.71±0.75).

Warm compresses (2.19) were considered significantly more effective than cold compresses (1.92, p=0.0275), topical numbing cream (1.81, p=0.0010), acetaminophen (1.71, p<0.0001), and gabapentin (1.64, p=0.0097). Mean effectiveness ratings for marijuana smoking (2.92), marijuana edibles (2.87), and opioids (2.83) were significantly higher than ibuprofen (2.02, p<0.0001) and acetaminophen (1.71, p<0.0001). Mean effectiveness of ibuprofen/naproxen (2.02) was significantly higher than acetaminophen (1.71, p=0.0077). Epsom salt baths received significantly higher mean ratings (1.85) than bleach baths (1.52, p=0.0326).

Compared to Hurley stage I, marijuana smoking was perceived to be more effective for stages II (1.86 vs 3.04, respectively, p=0.0153) and III (1.86 vs 2.90, p=0.0413) disease. Acupuncture had higher perceived effectiveness among those with Hurley stage II compared to stage III disease (2.67 vs 1.5, p=0.0384). Differences in mean perceived effectiveness by Hurley stage were nonsignificant for other interventions.

**DISCUSSION**
All patients in our study reported experiencing pain due to HS. Our findings are in line with a prior survey study which found that nearly all HS patients experience disease-related pain [1]. However, only one-fourth of our study population (24.1%) reported receiving pain recommendations from their HS provider, which contrasts to previous findings that 65% of HS patients seek medical attention for pain [3]. This reinforces the importance of inquiring about pain and counseling on pain management options.

Overall, patients perceived the queried interventions to be only mildly to moderately effective in relieving HS pain. Cannabinoids and opioids had comparable effectiveness, and patients perceived opioids to be more effective for HS pain than NSAIDs or acetaminophen, consistent with a previous report [4]. Though we found statistically significant differences in mean effectiveness ratings for various pain interventions, the absolute differences in perceived effectiveness were small and may not be clinically significant. We found a similar prevalence of marijuana usage to a prior study, but in contrast to their findings that pleasure was the most commonly reported reason for use, our cohort reported marijuana usage for pain [5]. Although cold baths and compresses are commonly used by HS patients [3], warm compresses were perceived as significantly more effective than cold compresses.

Use of prescription pain medications (opioids, tramadol, and gabapentin) in our study was significantly associated with self-reported Hurley stage but not in a prior smaller study [3]. Interestingly, perceived effectiveness of pain interventions in our cohort did not differ based on Hurley stage for most modalities, suggesting that Hurley stage may not be a critical factor in selecting an effective HS pain management strategy. Likewise, a previous study found no
association between disease severity and whether patients sought medication attention for pain [3]. Current or former depression has been reported in nearly half of HS patients and may affect the sensation of pain [3]. Other factors not addressed in this study such as pain character, severity, and frequency, or comorbid mental health disorders may be important factors in tailoring HS pain management regimens.

Study limitations include self-reported Hurley stage, recall bias particularly for analgesic effectiveness, and lack of a validated tool to assess analgesic effectiveness. Responses from those participating in social media support groups may not accurately reflect the entire HS population, and response rate is unknown.

This pilot study exploring utilization and perceived effectiveness of pain management therapies in HS highlights that pain remains an important symptom for those living with HS that often goes unaddressed by the medical community. Future investigations are needed to prospectively evaluate the effectiveness of pain management modalities, as well as to elucidate the pathophysiology of HS pain, mechanisms of pain management modalities, and how these treatments can be safely and effectively incorporated in the HS treatment armamentarium. Optimal management of physical HS symptoms require a multi-modal approach beyond just targeted pain treatments.

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Research; HS Connect.

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Conflicts of interest:

Vivian Y. Shi is a stock shareholder of Learn Health and has served as an advisory board
member, investigator, and/or received research funding from Sanofi Genzyme, Regeneron,
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Bees, GpSkin, Altus Labs and Skin Actives Scientific. There were no incentives or transactions,
financial or otherwise, relevant to this manuscript.

Lauren A.V. Orenstein has severed as an investigator for Chemocentryx. There were no
incentives or transactions, financial or otherwise, relevant to this manuscript.

Jennifer M. Fernandez, Alyssa M. Thompson, Mark Borgstrom, and Jennifer L. Hsiao have no
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Concept and design: Fernandez, Hsiao, Shi

Acquisition, analysis, or interpretation of data: All authors

Drafting of the manuscript: All authors

Critical revision of the manuscript for important intellectual content: All authors

Statistical analysis: Fernandez, Borgstrom

Supervision: Shi
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Table 1. Frequency of pain modality use by Hurley stage

<table>
<thead>
<tr>
<th>Pain Therapy</th>
<th>% (n) of therapy (n=438)</th>
<th>% (n) of Hurley I using therapy (n=36)</th>
<th>% (n) of Hurley II using therapy (n=234)</th>
<th>% (n) of Hurley III using therapy (n=168)</th>
<th>p-value from Pearson's Chi-squared test</th>
<th>p-value Stage I vs II*</th>
<th>p-value Stage I vs III*</th>
<th>p-value Stage II vs III*</th>
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<tbody>
<tr>
<td><strong>Topical agents</strong></td>
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<tr>
<td>Topical numbing creams</td>
<td>38.8% (170)</td>
<td>22.2% (8)</td>
<td>36.8% (86)</td>
<td>45.2% (76)</td>
<td>0.0234*</td>
<td>0.0884</td>
<td>0.0109*</td>
<td>0.0871</td>
</tr>
<tr>
<td>Topical CBD</td>
<td>15.5% (68)</td>
<td>19.4% (7)</td>
<td>11.5% (27)</td>
<td>20.2% (34)</td>
<td>0.0473*</td>
<td>0.1832</td>
<td>0.9140</td>
<td>0.0165*</td>
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<td><strong>Baths</strong></td>
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<tr>
<td>Epsom salt bath</td>
<td>57.8% (253)</td>
<td>44.4% (16)</td>
<td>55.1% (129)</td>
<td>64.3% (108)</td>
<td>0.0448*</td>
<td>0.2314</td>
<td>0.0269*</td>
<td>0.0656</td>
</tr>
<tr>
<td>Bleach bath</td>
<td>26.0% (114)</td>
<td>5.6% (2)</td>
<td>17.9% (42)</td>
<td>41.7% (70)</td>
<td>&lt;0.0001**</td>
<td>0.0865</td>
<td>&lt;0.0001**</td>
<td>&lt;0.0001**</td>
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<tr>
<td>Sitz bath</td>
<td>14.6% (64)</td>
<td>8.3% (3)</td>
<td>11.5% (27)</td>
<td>20.2% (34)</td>
<td>0.0277*</td>
<td>0.2314</td>
<td>0.1014</td>
<td>0.0165*</td>
</tr>
<tr>
<td>CBD bath</td>
<td>5.7% (25)</td>
<td>8.3% (3)</td>
<td>3.4% (8)</td>
<td>8.3% (14)</td>
<td>0.0867</td>
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<tr>
<td><strong>Over-the-counter pain medications</strong></td>
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<tr>
<td>Ibuprofen/naproxen</td>
<td>74.7% (327)</td>
<td>72.2% (26)</td>
<td>73.5% (172)</td>
<td>76.8% (129)</td>
<td>0.7119</td>
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<tr>
<td>Acetaminophen</td>
<td>44.7% (196)</td>
<td>38.9% (14)</td>
<td>44.4% (104)</td>
<td>46.4% (78)</td>
<td>0.7045</td>
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<td><strong>Prescription pain medications</strong></td>
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<tr>
<td>Opioids</td>
<td>24.9% (109)</td>
<td>5.6% (2)</td>
<td>19.7% (46)</td>
<td>36.3% (61)</td>
<td>&lt;0.0001**</td>
<td>0.0369*</td>
<td>0.0001*</td>
<td>&lt;0.0001**</td>
</tr>
<tr>
<td>Tramadol</td>
<td>14.8% (65)</td>
<td>2.8% (1)</td>
<td>10.3% (24)</td>
<td>23.8% (40)</td>
<td>0.0001*</td>
<td>0.2187</td>
<td>0.0024*</td>
<td>0.0002*</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>9.8% (43)</td>
<td>8.3% (3)</td>
<td>3.8% (9)</td>
<td>18.5% (31)</td>
<td>&lt;0.0001**</td>
<td>0.2051</td>
<td>0.2158</td>
<td>&lt;0.0001**</td>
</tr>
<tr>
<td>Duloxetine</td>
<td>4.3% (19)</td>
<td>5.6% (2)</td>
<td>2.6% (6)</td>
<td>6.5% (11)</td>
<td>0.1437</td>
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</tr>
<tr>
<td>Substance-based products</td>
<td>29.2% (128)</td>
<td>26.9% (7)</td>
<td>29.9% (70)</td>
<td>30.4% (51)</td>
<td>0.4019</td>
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<tr>
<td>Marijuana smoking</td>
<td>20.8% (91)</td>
<td>10.5% (4)</td>
<td>19.7% (46)</td>
<td>24.4% (41)</td>
<td>0.1682</td>
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<tr>
<td>Marijuana edibles</td>
<td>20.8% (91)</td>
<td>22.2% (8)</td>
<td>20.5% (48)</td>
<td>20.8% (35)</td>
<td>0.9724</td>
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</tr>
<tr>
<td>Oral CBD</td>
<td>15.8% (69)</td>
<td>13.9% (5)</td>
<td>15.8% (37)</td>
<td>16.1% (27)</td>
<td>0.9476</td>
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</tr>
<tr>
<td>Alcohol</td>
<td>17.8% (70)</td>
<td>20.4% (6)</td>
<td>20.1% (44)</td>
<td>20.6% (32)</td>
<td>0.3523</td>
<td>--</td>
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</tr>
</tbody>
</table>

**Physical interventions**

| Warm compress            | 82.4% (361) | 83.3% (30) | 82.9% (194) | 81.5% (137) | 0.9291 | -- | -- | -- |
| Cold compress or ice pack| 45.4% (199) | 38.9% (14) | 46.2% (108) | 45.8% (77)  | 0.7111 | -- | -- | -- |
| Massage                  | 10% (44)    | 2.8% (1)   | 12.0% (28)  | 8.9% (15)   | 0.1929 | -- | -- | -- |
| Acupuncture              | 4.3% (19)   | 2.8% (1)   | 5.1% (12)   | 3.6% (6)    | 0.6699 | -- | -- | -- |

*For significant p-values (p<0.05) from Pearson’s chi-squared test evaluating the association between Hurley stage and each pain management modality, pairwise comparisons between Hurley stages I vs II, I vs III, and II vs III were calculated using independent proportions and Fisher’s exact tests. Pairwise comparison p-values above represent unadjusted p-values.

* p<0.05; ** p<0.0001

CBD, cannabidiol.
LEGENDS

Figure 1. Patient-reported effectiveness of HS pain management modalities

Figure Legend:

HS, hidradenitis suppurativa. CBD, cannabidiol.

Mean effectiveness rating is listed at the end of each bar.

Participants were asked to select all that applied to indicate which of these twenty therapies they have tried for HS pain. Using branching logic, participants rated effectiveness for each therapy used. Treatment effectiveness was evaluated using a 5-point rating scale; numbers corresponding to each rating were averaged to calculate a mean effectiveness rating.

*Missing data (number of participants who indicated using therapy but did not rate effectiveness): topical numbing creams (31), opioids (1), oral CBD (1), tramadol (1), sitz bath (2), gabapentin (1).

^The following items were listed for topical numbing creams: lidocaine, prilocaine, tetracaine, benzocaine (Boil-Ease), EMLA (lidocaine and prilocaine), pramoxine, other, and I do not use topical numbing creams. Effectiveness of topical numbing creams was queried collectively, rather than individually for each agent. A total of 170 participants indicated using topical numbing creams, but those who only indicated use of “other” (n=31) topical numbing creams were not prompted to provide an effectiveness rating.

† Of the 32.9% (144/438) of participants who used marijuana, 36.8% (n=53) only smoked, 11.1% (n=16) only consumed edibles, and 52.1% (n=75) used both.