Managing Post-Burn Pruritus? – A Review of Current Knowledge among Non-Burn-Specialist Doctors in Delta State, Nigeria

Abstract

Introduction: Pruritus (itching) is a common complication of burn injuries that results in extreme discomfort. There is no consensus on the treatment worldwide but there are generally accepted methods of management. While many burn care specialists in Nigeria are conversant with these methods, most non-burn care specialists and general practitioners are unaware of a significant number of these methods.

This study aims to assess the knowledge and practice of non-burn specialists, who also manage various degrees of burn injuries in our environment, with a view to finding out the deficiencies and educating them and the general public on these modalities for the overall good of patients.

Methods: A structured questionnaire was designed and 82 doctors returned the completed questionnaires and these were analyzed using IBM SPSS version 20.

Results: A vast majority of the Doctors (85.4%) used anti-histamines as first-line treatment while 4.9% would use Ondansetron. Whereas 43.9% of the respondents could not give an answer about the second-line treatment they would give for pruritus, 36.6% of them would give anti-histamines as in first-line treatment and 9.8% would give Gabapentin as second-line treatment while another 9.8% would use other medications not specified.

Conclusion: Many doctors who are not burn-care specialists do not fully understand the enormity of the problem of post-burn pruritus and consequently do not offer adequate care to patients. There is need for more education and re-orientation.

Keywords: *Post-burn pruritus, management*

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Correspondence:

Introduction

Pruritus (itching) is a very common complication of burn injuries that results in extreme discomfort. Itching typically begins in the first 2 weeks after burn injury and may last for an extended period of time.[1] The incidence of persistent, post-burn pruritus is estimated to be about 87%.[2] More common predictors of itch include >40% TBSA and wounds requiring more than 3 weeks to heal.[2] Post-burn pruritus may interfere with sleep, activities of daily living and may even complicate healing when scratching damages

healing or thin epithelium and newly grafted skin.[1]

Twycross *et al*[3] proposed a classification of pruritus into the following four categories:

a. Pruritogenic: arising in the skin because of inflammation, dryness, or other skin damage.
b. Neuropathic: involving disease at any point along the afferent neurologic pathway.
c. Neurogenic: originating centrally but without evidence of neurologic pathology.
d. Psychogenic: associated with psychiatric conditions.

The pruritus associated with burn injuries is deemed to be predominantly pruritogenic but there is increasing speculation of neuropathic involvement in its pathophysiology.[4]

A proposal to classify burns pruritus into 'acute' and 'chronic' types has been put forward recently and is supported by a prospective study in a large number of adult burns victims.[5] 'Acute' itching affects the majority of patients irrespective of the depth of injury and probably relates to a period from wound closure to approximately 6 months into rehabilitation. 'Chronic' itching appears to persist in a subgroup of patients for up to 2 years after injury in survivors with deep dermal injury having undergone a number of surgical procedures and those with early post-traumatic stress disorder symptoms.[6]

The majority of literature reports have nearly exclusively associated pruritic symptoms with histamine release.[7] Histamine is abundant in the healing wound and along with a variety of other mediators including acetylcholine, leukotrienes and prostaglandins act on a subset of selective C-fibers to relay impulses onto the central nervous system (CNS).[4] Various components of the CNS have been implicated in sensory relay, including lamina I of the spinothalamic tract, thalamic and cortical areas. These are intricately involved in signal processing; nevertheless their exact roles remain to be fully elucidated.[8] Over the last few years, researches have turned to central nervous system targets in an attempt to identify an effective anti-pruritic drug (or drug therapy) in burns including the use of gabapentin[9], naltrexone[5] and ondansetron[10].

The successful treatment of post-burn pruritus should be a priority in the rehabilitation of all burn patients. There are many potential treatments available for itching, however, there is no consensus in the best approach for treating post-burn itching.[11] Nevertheless, while many burn care specialists in Nigeria are conversant with most of these methods, including those not readily available to them, most non-burn care specialists and general practitioners are unaware of a significant number of these methods. The most common pharmacologic treatment of post-burn pruritus treatment has been antihistamine therapy.[12-14] Several antihistamines have been tried with none giving complete relief in all patients, as have other non-pharmacologic methods which include use of pressure garments, silicone, laser, massage and so on.[11]

This study has therefore been directed at the study of the knowledge and practice of these non-burn specialists, who also manage various degrees of burn injuries in our environment, with a view to finding out the deficiencies and educating them and the general public on these

modalities for the overall good of patients, more so, as I am not aware of any previous, local or national study on this.

Methods

A structured questionnaire was designed, using a similar format to the one used in a UK study, assessing the physicians' attitudes and management principles in specialist burn units[7]. The questionnaire was however modified to suit the practice of a non-burn specialist working in a developing country.

The questionnaires were distributed, completed and collected at the venue of the annual general meeting (AGM) of the Nigerian Medical Association, Delta State branch, a three day event, open to all the doctors in the state.

One hundred questionnaires were distributed to consenting doctors. Eighty-two doctors returned the completed questionnaires and these were analyzed.

The performance of the respondents was assessed by scoring each respondent for appropriate answers given for the 12 survey questions assessing their knowledge about post-burn pruritus and its management (Table 3).

Data analysis was done using IBM SPSS version 20. A one sample t-test was used to compare the mean scores of selected groups of respondents. The Chi-square test was used for non-parametric tests, (Yates correction for continuity was employed when necessary). Level of significance was set a p value of < 0.05.

Results

Socio-demographics, Experience and Level of Specialization of Respondents

A total of 82 doctors participated in the survey. Majority; 71 (86.6%), were males and only 11 (13.4%) were females. Most of the respondents were already practicing for at least five years (Table 1).

Majority [34 (41.5%)], of the respondents were General practitioners, closely followed by doctors in residency training; 32 (39.0%). Specialist in fields of medicine other than Burns and Plastic surgery were in the minority; 16 (19.5%).

Respondents' Experience with Patients having Post-Burn Pruritus

Seventy two percent of the respondents were

Table 1: *Respondents' Years of Experience in Medical Practice*

Years In Practice	Frequency (%)
< 5	13 (15.9)
5 – 9	34 (41.5)
10 – 14	6 (7.3)
15 – 19	6 (7.3)
≥ 20	23 (28.0)
Total	**82 (100.0)**

Table 2: *How Often Respondents See Patients with Post-Burn Pruritus*

How Often Respondents See Patients with Burn Pruritus	Frequency (%)
RARELY	23 (28.0)
OCCASIONALLY	41 (50.0)
OFTEN	13 (15.9)
VERY OFTEN	5 (6.1)
Total	**82 (100.0)**

already seeing patients with burn pruritus. Only 23 (28%) respondents said they rarely see such patients, (Table 2).

Knowledge about Post-Burn Pruritus and It's Management

The cumulative responses to the questionnaire on post-burn pruritus are presented in figure 1.

1)	**Are children or adults more likely to be troubled by pruritus?**		
	Children: 41.5%		Adult: 26.8%
	No difference: 9.7%		Unable to answer: 22.0%
2)	**Do you have a method/tool to assess severity/frequency of pruritus in daily patent care plans?**		
	No: 90.2%	Yes: 0.0%	Unable to answer: 9.8%
3)	**Which particular time in the day/night do you think pruritus becomes more pronounced?**		
	Day: 36.6%		**Evening/Night: 48.8%**
	No difference: 2.4%		Unable to answer: 12.2%
4)	**During which part of the healing process are patients more likely to complain of pruritus?**		
	Early: 26.8%	Late: 23.2%	**Unable to Answer: 50%**
5)	**Which depth of burn injury is more likely to elicit pruritic response?**		
	Superficial partial thickness: 37.8%		Deep Dermal: 14.6%
	Full thickness: 18.3%		Unable to answer: 29.3%
6)	**Which type of wound is more likely to itch?**		
	Conservatively treated: 30.5%		Grafted: 28.0%
	No difference: 2.4%		Unable to answer: 39.1%
7)	**Do you treat patients using injections, oral or topical agents, as first line?**		
	Oral: 52.4%		Topical: 30.5%
	Injection: 4.9%		Unable to answer: 12.2%
8)	**Which oral agents are used as first line treatment for pruritus?**		
	Antihistamines: 82.9%		Gabapentin: 0.0%
	Steroids: 4.9%	Ondasetron: 4.9%	Unable to answer: 7.3%%
9)	**Which oral agents are used as second line treatment for pruritus?**		
	Antihistamines: 34.1%		Gabapentin: 7.3%
	Steroids: 11.0%	Ondasetron: 0%	**Unable to answer: 47.6%**
10)	**Which other adjunct (if any) are used for the treatment of pruritus?**		
	Psychological support: 83.2%		Massage therapy: 14.6%
	Pressure garments/ silicon therapy: 11.0%		Unable to answer: 7.3%
11)	**Do you have an anti-puritic regimen?**		
	Yes: 0%	**No: 91.5%**	Unable to answer: 8.5%
12)	**Should your medications fail to control patient's pruritus, what will you do next?**		
	Refer to a dermatologist: 25.6%		Psychotherapy: 12.2%
	Refer to a Burn/plastic surgeon: 4.9%		**Unable to answer: 57.3%**

Figure 1: *Presentation of cumulative responses to the questionnaire on burns pruritus (The most popular responses are shown in bold)*

assessing the doctors' knowledge and practice were further grouped as appropriate or inappropriate, based on available literature on the subject matter (Table 3). A score of 1 was assigned to an appropriate answer and a score of 0 was assigned to an inappropriate answer or when unable to answer. The performance of the respondents is as presented in Table 5. Their total scores ranged from 0 – 8 out of the 12 survey questions, with an average score of 4.33 + 1.69. None of them scored up to 70%. Fifty nine (72%) respondents

Table 3: *Appropriate Response to Survey Questions Assessing Knowledge about Post-burn Pruritus and it`s Treatment*

S/N	QUESTION	Appropriate Response[a]
1)	Are children or adults more likely to be troubled by pruritus?	Children[6, 11, 15]
2)	Do you have a method/tool to assess severity/frequency of pruritus in daily patient care plans?	Knowledge/ use of Itch Man Scale[7, 17] 5-point descriptive scale[7, 18] Visual Analogue Scale[7, 19]
3)	Which particular time in the day/night do you think pruritus becomes more pronounced?	Evening/ Night[2, 7]
4)	During which part of the healing process are patients more likely to complain of pruritus?	Late / proliferative phase[1, 2, 4]
5)	Which depth of burn injury is more likely to elicit pruritic response?	Deep dermal[6, 7]
6)	Which type of wound is more likely to itch?	Grafted[23]
7)	Do you treat patients using injections, oral or topical agents, as first line?	Oral[4, 7, 11- 14,]
8)	Which oral agents are used as first line treatment for pruritus?	Antihistamines[4, 7, 11-14]
9)	Which oral agents are used as second line treatment for pruritus?	Second line antihistamines, gabapentin, ondasetron, steroids[4, 7, 11-14]
10)	Which other adjunct (if any) are used for the treatment of pruritus?	Psychotherapy, pressure garments, silicon cream, massage therapy[7, 19, 29-32]
11)	Do you have an anti-puritic regimen?	Practice of a protocol specifying the steps of antipuritic regimen
12)	Should your medications fail to control patient's pruritus, what will you do next?	Refer to a burn/plastic surgeon

[a] *based on current available literature, but lack of concensus is acknowledged*

Table 4: *Distribution of Total Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	2 (2.4)	2 (2.4)
2 (16.7)	7 (48.5)	9 (11.0)
3 (25.0)	21 (25.6)	30 (36.6)
4 (33.3)	15 (18.3)	45 (54.9)
5 (41.7)	14 (17.1)	59 (72.0)
6 (50.0)	15 (18.3)	74 (90.2)
7 (58.3)	6 (7.3)	80 (97.6)
8 (66.7)	2 (2.4)	82 (100.0)
=9 (=75.0)	0 (0.0)	
Total	**82 (100.0)**	

Table 5: *Distribution of Knowledge Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	14 (17.1)	14 (17.1)
1 (16.7)	30 (36.6)	44 (53.7)
2 (33.3)	21 (25.6)	65 (79.3)
3 (50.0)	12 (14.6)	77 (93.9)
4 (66.7)	5 (6.1)	82 (100.0)
5 – 6 (83.3 – 100.0)	0 (0.0)	
Total	**82 (100.0)**	

representing majority, had scores of less than 50%.

The survey questions can also be grouped into two. The first six questions assessed knowledge about post-burn pruritus, while the last six questions assessed practice of its management (Table 3).

The average score for knowledge about post-burn pruritus was 1.56 + 1.12, out of the 6 question asked: with almost 80% of the respondents getting less than half of the questions correctly (Table 5).

On performance on practice, 34 (41.5%) respondents got less than half of the questions correctly, while a greater proportion of the respondents 48 (54.5%) scored at least 50% (Table 6). The average performance for practice was however below average: 2.77 + 1.14 (out of 6 questions). Relationship between respondents' knowledge about post-burns pruritus and their practice of its management.

There is no correlation between the respondents' level of knowledge about post-burn pruritus and their performance on the practice. (p=0.27). There is however a positive correlation between knowledge scores and overall performance ($p < 0.01$). Their practice scores also correlated positively with their over-all performance in the survey ($p < 0-01$).

Table 6: *Distribution of Practice Scores of Respondents*

Total score (% score)	Frequency (%)	CF (%)
0 (0.0)	4 (4.9)	4 (4.9)
1 (16.7)	5 (6.1)	9 (11.0)
2 (33.3)	25(30.5)	34 (41.5)
3 (50.0)	20 (24.4)	54 (65.9)
4 (66.7)	28 (34.1)	82 (100.0)
5 – 6 (83.3 – 100.0)	0 (0.0)	
Total	**82 (100.0)**	

Relationship between Years of Experience and Performance in Survey

The respondents were divided into 2 groups using 10 years of medical practice as a cut-off (Table 7). Majority of respondents in both groups scored less than 50%, however, a greater proportion (31.9%) of those with less than 10years of medical experience had scores of at least 50%, unlike those with at least 10 years of experience, having only 22.9% scoring

Table 7*: Relationship Between Years of Experience and Performance in Survey*

		Performance in Survey		Total
		<50%	≥50%	
Years of Experience	< 10yrs	32 (68.1)	15 (31.9)	47 (100.0)
	≥ 10yrs	27 (77.1)	8 (22.9)	35 (100.0)
Total		59 (72.0)	23 (28)	82 (100.0)

X^2 = 0-82; p = 0.37

Table 8: *Relationship between How Often Respondents see Patients with Post-burn Pruritus and Their Performance in Survey*

		Performance in Survey		Total
		<50%	≥50%	
How Often Respondents See Patients	Often	40 (67.8)	19 (32.2)	59 (100.0)
	Rarely	19 (82.6)	4 (17.4)	23 (100.0)
Total		59 (72.0)	23 (28)	82 (100.0)

X^2_{yates} = 1.80; p = 0.29

50% and above. This difference however is not statistically significant (p = 0.37).

Relationship between Level of Specialization and Performance in Survey

The average score for the respondents who are specialists (in other fields of medicine other than burns and plastic surgery) is 4.00 + 2.13, which is slightly lower than the mean total score of 4.33 for all the respondents. This difference is not statistically significant (p = 0.55).

The average test scores for the general practitioners is 4.44 + 1.52, which is greater than the mean score of 4.33, for all the respondents. This observed difference is also not statististically different (p = 0.67).

Similarly the average score computed for the doctors in residency training was 4.38 + 1.66, which is close to the mean score of 4.33, calculated for all respondents, (p = 0.88).

Relationship between How Often Respondents see patients with Post-burn pruritus and Performance in Survey

Table 8 shows a cross tabulation between how often respondent see patients with post-burn pruritus (often versus rarely) and their performance in the survey. Though both groups, performed poorly in the survey, a greater proportion of those that see these patients rarely scored below 50% compared to those who see these patients more often. (82.6% vs 67.8%). Observed difference is however not statistically significant (p = 0.29)

Discussion

Post-burn pruritus is a very common and distressing condition, the reported incidence being as high as 87% in adults and 100% in paediatric burns patients.[2, 6, 15] With the incidence so high it is no surprise that in a region with a dearth of burn-care specialists, many non-specialists are managing post-burn pruritus as often as is shown in this survey. What is regrettable is the degree of demonstrated limitation of knowledge of the pathogenesis, pathophysiology and management options for itching post-burns. In keeping with higher reported incidences in children in literature,[16] our survey shows that a higher percentage of doctors believe that pruritus post-burn is commoner in children than in adults. This is unlike the Uk-based study[7] that found more care givers claiming no difference in incidence between the adult and paediatric patients.

There is no consensus method for evaluation of the severity or even the presence or confirmation of post-burn itch and as in other reported studies,[7] our survey reflects a complete lack of evaluation methods. However, some workers have reported the use of methods such as, the 'itch man scale'[17], 5-point descriptive scale[18] and a 1-10 visual analogue scale[19]. The 'itch man scale' combines a numerical rating scale from 0 to 4 with a pictorial element to denote interference with daily activities and is used for adult and paediatric patients'. Visual analogue scales (VAS) are commonly used in nociceptive symptom assessment and comprise a horizontal line which patients intercept with a perpendicular mark to rate the intensity of their complaint. They are simple tools which are also sensitive but their main limitation is the need for good patient perceptual skills, which may vary according to age,

psychological and cognitive states.[7,20]

The majority of respondents (48.8%) in our survey believe that post-burn pruritus is most pronounced at night which is in keeping with previous reports,[1,7] followed by the respondents (31.7%) that believe it is commonest in the afternoon. The underlying reasons for the diurnal variation in pruritus intensity are unknown. The nocturnal exacerbation may relate to an enhanced inflammatory mediator release in the evening, as exemplified by an increase in nocturnal urinary leukotriene B4 in atopic dermatitis.[21] In addition, it is well recognized that the central nervous system constantly receives a wide range of excitatory and inhibitory impulses through interconnecting pathways. The cortical registration of nociceptive modalities is greatly influenced by modulations at various levels of these pathways as exemplified by the effect of transcutaneous electrical nerve stimulation (TENS) and distraction methods via segmental and descending inhibitory inputs.[4] A possible explanation for the perceived increase in pruritus in the evening is that painful impulses associated with daytime dressing changes and physical treatments are reduced in the evening making pruritic impulses more likely to register as the predominant unpleasant sensory modalities.[7]

Clinical experience illustrates that itching post-burn is a subacute and late event rather than an acute event, and as a result, the timing of the studies for treatment of burn is important '.[11] Various opinions exist in literature concerning presence and severity of itching and stage of healing of post-burn wounds. There are several reports of itch commencing as soon as wounds start to heal and coinciding with epidermal coverage.[1,7,14] A study involving 58 paediatric patients concluded that burn patients have a significant amount of pruritus within 1 month of the burn with a steady increase in the severity peaking at 6 months and a subsequent decline 1 year after burn.[22] As high as 44% of patients 7 years post-burn are affected by intractable itching for many years.[23,24] Itching during the early stages of healing is attributed to mast cell histamine release directly as part of the inflammatory response to injury and indirectly secondary to collagen formation during the proliferative stage of wound healing.[25] During the late proliferative and remodeling phases, the high prevalence of itching can be accounted for partly by mast cell histamine release, more applicable in patients with hypertrophic scars(known to have higher number of mast cells than normal tissue[7,26] and so, more prone to pruritus[27]. It is also thought that patients with deep dermal injuries may enter a phase of 'chronic' pruritus and the central nervous system is responsible for maintaining these symptoms via sensitization mechanisms.[28]

While majority of our respondents (68.4%) will not use adjuncts and no respondent had a specific anti-pruritic regimen, 5 units in the UK study[7] routinely used adjunctive measures for the relief of pruritus following burn injuries while only one unit had a specified protocol for the management of burn pruritus. Adjunctive methods in use around the world include psychological support,[7] massage therapy,[19,29] silicone therapy,[30] pressure garments[27] and transcutaneous electrical nerve stimulation (TENS)[31]. A few pruritus protocols have been published in the literature and most of them rely on a combination of

antihistamines and moisturizers.[12, 14] The protocol at the Shriners hospitals for children, Galveston is not too different and involves moisturization followed by oral diphenhydramine as the initial steps with hydroxyzine and cyproheptadine as additional agents for symptomatic relief.[32]

Conclusion

Many non-burn-care Specialists manage burn patients and patients with post-burn pruritus in Delta State, Nigeria. Most of the doctors are not conversant with the pathogenesis of post-burn pruritus and also appear not to believe or understand that the problem is real and very distressing to patients. There is need for re-orientation and more education of doctors on the severity and management of post-burn pruritus.

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