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Burden of Chronic Pruritus in Cancer Patients: Influence of Medical and Surgical Comorbidities on Itch Severity and Quality of Life

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Abstract: ***Chronic pruritus is a distressing yet under-recognized symptom among cancer patients. This study evaluated how medical and surgical comorbidities influence itch severity and quality of life (QoL) in individuals with chronic pruritus. In a cross-sectional analysis of 85 patients, data on comorbidities, itch intensity (NRS), and QoL (DLQI) were assessed. Hypothyroidism and asthma were associated with the highest NRS and DLQI scores, respectively, while thyroid surgeries showed the most substantial QoL impact among surgical comorbidities. A strong correlation was observed between itch severity and QoL impairment ($r = 0.65$, $p < 0.001$). The findings highlight the necessity for integrative care approaches targeting comorbid conditions to mitigate the pruritus burden in oncology patients.***

Keywords: chronic pruritus, cancer patients, comorbidities, quality of life, itch severity

1. Introduction

Chronic pruritus (CP), defined as itch lasting >6 weeks, is a complex neuroimmunological condition associated with marked psychological and functional impairment[1]. In oncology, pruritus may arise from paraneoplastic mechanisms, tumor-derived cytokines, immunotherapy or chemotherapy toxicity, and metabolic or endocrine disturbances[2].

Comorbid medical conditions- such as diabetes, hypothyroidism, liver disease, asthma, neuropathies, and cardiovascular disease- modify itch thresholds and amplify neuroimmune signalling[1],[5]. Surgical comorbidities, especially endocrine or hepatobiliary procedures, may also influence pruritic pathways through metabolic or hormonal alterations.

Despite the high prevalence of pruritus across malignancies, few studies have examined how comorbidities alter itch characteristics or QoL in cancer patients. Recent chronic pruritus guidelines highlight the importance of evaluating comorbidity-associated itch burden[3].

This study addresses a critical gap in oncology care by investigating how concurrent medical and surgical conditions modulate pruritus and affect patient-reported outcomes. Understanding these relationships may guide more targeted interventions and improve patient well-being.

2. Materials and Methods

Study Design and Setting

A cross-sectional observational study was conducted between March 2021 and June 2022 at the Department of Dermatology, Venereology and Leprosy, in collaboration with the Department of Oncology, Geetanjali Medical College and Hospital, Udaipur.

Participants

Eighty-five consecutive cancer patients presenting with chronic pruritus (>6 weeks) were enrolled.

Inclusion Criteria

- Confirmed diagnosis of any malignancy
- Chronic pruritus for ≥6 weeks
- Ability to provide informed consent

Exclusion Criteria

- Recent use of antipruritic therapy (<3 weeks)
- Cognitive inability to understand Hindi or English

Data Collection

- Sociodemographic details
- Malignancy type and duration
- Medical comorbidities: DM, HTN, asthma, hypothyroidism, hyperlipidemia, etc.
- Surgical comorbidities: hernia, varicose veins, thyroid surgery, appendectomy, cholecystectomy, etc.
- Pruritus severity measured via **NRS**, validated for chronic itch[4]
- Quality of life measured via **DLQI** according to international standards[3]

Statistical Analysis

- Continuous variables: mean ± SD
- Categorical variables: number and percentage
- ANOVA used to compare NRS and DLQI across comorbidity groups
- NRS–DLQI correlation analysed using Pearson's coefficient
- Significance set at $p < 0.05$

3. Results

Table 1: Demographic Characteristics of Study Participants (n = 85)

Variable	Value
Mean age (years)	49.9 ± 13.7
Age distribution	Majority ≥ 50 years
Sex ratio (M:F)	0.9 : 1
Influence on NRS	No significant association (p > 0.05)
Influence on DLQI	No significant association (p > 0.05)

Table 1 presents the demographic profile of the 85 cancer patients included in the study. The **mean age was 49.9 ± 13.7 years**, and most participants were aged **≥50 years**, reflecting the typical age distribution of cancer patients where chronic pruritus is more commonly reported.

The **sex ratio (M: F) was 0.9:1**, indicating a nearly equal representation of males and females in the study population. This balanced distribution minimizes gender-related bias when assessing pruritus burden.

Importantly, **demographic variables such as age and sex did not show any statistically significant association with pruritus severity (NRS) or QoL impairment (DLQI)** (p > 0.05 for both). This suggests that:

- The severity of itch was **not dependent on age**, meaning older patients did not necessarily have more severe pruritus than younger ones.
- **Both men and women experienced similar levels of itch severity and QoL impairment**, with no meaningful sex-based differences.
- **Demographic factors alone are not major determinants** of pruritus characteristics in cancer patients.

This reinforces the notion that **clinical and systemic factors- such as comorbidities, malignancy type, and treatment-related effects- likely play a more significant role** in modulating chronic pruritus than basic demographic variables.

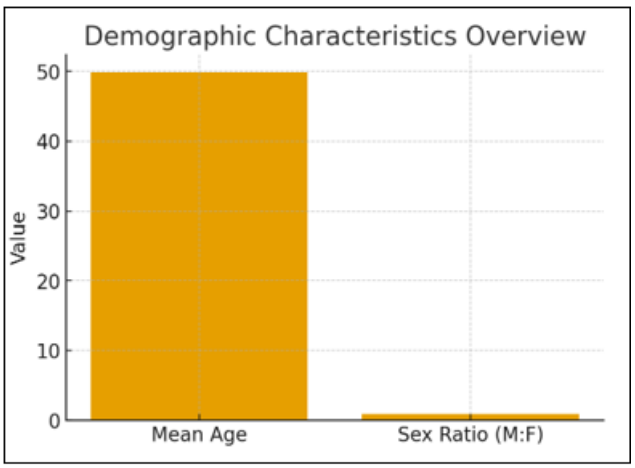


Figure 1: Demographic Characteristics of Study Participants (n = 85)

Table 2: Medical Comorbidities and Pruritus Burden

Medical Condition	n (%)	Mean NRS	Mean DLQI
Diabetes mellitus	26 (30.5%)	4.73 ± 2.54	12.85 ± 7.09
Hypertension	23 (27%)	5.26 ± 2.47	14.04 ± 7.62
Hyperlipidemia	11 (12.9%)	5.55 ± 2.38	14.45 ± 8.24
Asthma	8 (9.4%)	6.13 ± 1.64	14.50 ± 5.29
Hypothyroidism	10 (11.7%)	6.20 ± 1.69	10.90 ± 6.26
No comorbidity	7 (8.2%)	5.29 ± 1.25	15.57 ± 2.37

Table 2 summarizes the distribution of major medical comorbidities among cancer patients with chronic pruritus and their corresponding itch severity (NRS) and quality-of-life impairment (DLQI).

Diabetes mellitus was the most common comorbidity (30.5%) and showed moderate itch severity (mean NRS 4.73) with corresponding QoL impairment. Diabetic neuropathy and microvascular dysfunction may contribute to chronic itch in this group.

Hypertension (27%) and **hyperlipidemia** (12.9%) also showed moderate to high DLQI scores (14.04 and 14.45, respectively), reflecting the potential role of systemic inflammation and medication effects (e.g., ACE inhibitors, statins) in exacerbating pruritus.

Asthma demonstrated one of the highest DLQI values (14.50 ± 5.29), likely due to Th2-mediated inflammation, nocturnal symptoms, and sleep disruption, all of which may amplify pruritogenic pathways.

Hypothyroidism exhibited the **highest mean NRS score (6.20 ± 1.69)** among all medical conditions. This can be attributed to the marked xerosis, epidermal barrier impairment, and sensory nerve dysfunction associated with thyroid hormone imbalance.
Interestingly, patients with **no medical comorbidity** still reported high DLQI scores (15.57 ± 2.37), possibly reflecting the influence of advanced malignancy or treatment-related factors rather than comorbidities themselves.

Overall, although the differences in NRS and DLQI across medical comorbidity groups did not reach statistical significance, the trends observed are clinically meaningful and highlight that conditions such as hypothyroidism and asthma substantially intensify the burden of pruritus in cancer patients.

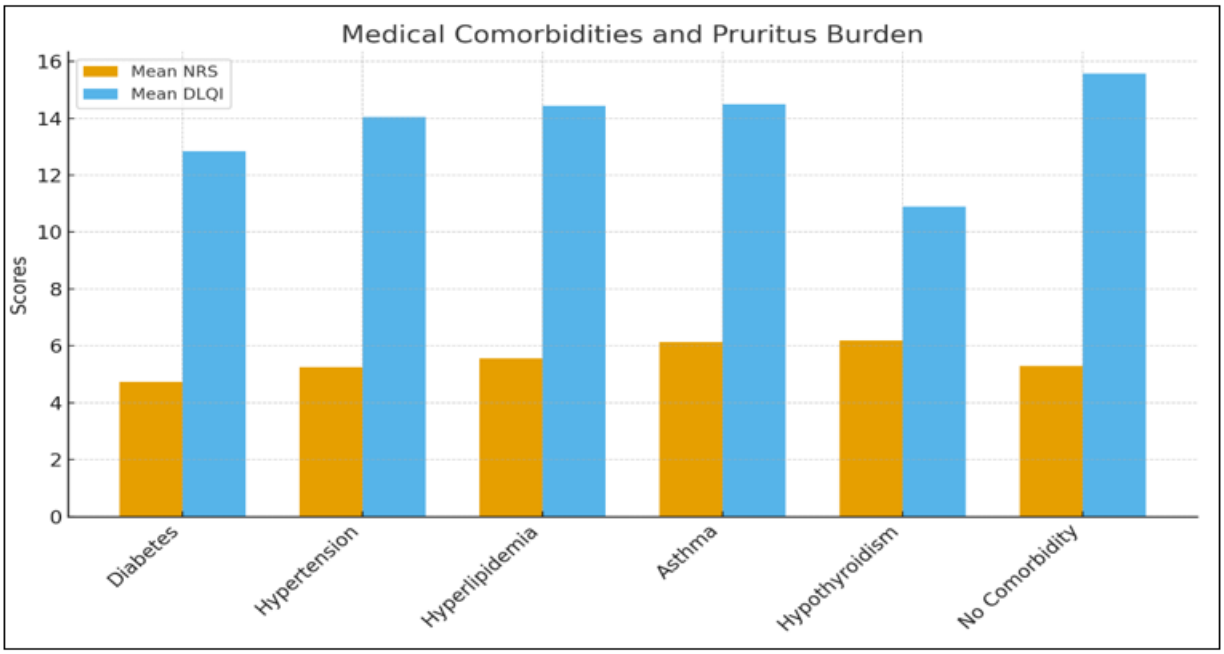


Figure 2: Medical Comorbidities and Pruritus Burden

Table 3: Surgical Comorbidities and Pruritus Burden

Surgical Condition	n (%)	Mean NRS	Mean DLQI
Hernia	20 (23.5%)	5.20 ± 2.35	13.35 ± 6.92
Varicose veins	19 (22.3%)	5.68 ± 1.89	13.84 ± 6.70
Appendicectomy	15 (17.6%)	4.87 ± 2.53	9.93 ± 4.96
Cholecystectomy	10 (11.7%)	5.40 ± 2.17	14.30 ± 6.88
Thyroid surgery	12 (14.1%)	5.67 ± 2.61	14.75 ± 8.58
No surgical comorbidity	9 (10.5%)	5.11 ± 2.37	16.78 ± 6.26

Table 3 outlines the distribution of surgical comorbidities in cancer patients with chronic pruritus and their associated itch severity (NRS) and QoL impairment (DLQI).

Hernias were the most common surgical comorbidity (23.5%), showing moderate pruritus intensity (mean NRS 5.20) and DLQI (13.35). Although hernias themselves do not directly cause itch, associated abdominal wall strain, postoperative changes, or comorbid systemic inflammation may contribute.

Varicose veins accounted for 22.3% of cases and exhibited one of the **highest mean NRS scores (5.68 ± 1.89)**. Chronic venous insufficiency and stasis dermatitis are known to cause significant lower-limb itch due to microcirculatory stasis and inflammatory mediator release.

Appendicectomy had the lowest mean DLQI (9.93), indicating minimal long-term effect on pruritus pathways, consistent with its limited systemic impact.

Cholecystectomy (11.7%) showed higher DLQI values (14.30 ± 6.88), which may relate to altered bile acid metabolism or postoperative digestive changes known to occasionally exacerbate pruritic symptoms.

Thyroid surgery demonstrated one of the **highest QoL impairments (DLQI 14.75 ± 8.58)**, likely reflecting postoperative endocrine fluctuations, altered metabolic balance, and potential changes in peripheral nerve sensitivity—all of which can intensify pruritus.

Interestingly, patients with **no surgical comorbidity** reported the **worst DLQI (16.78 ± 6.26)**. This paradoxical finding likely reflects the **impact of advanced malignancy**, treatment toxicity, or generalized systemic involvement rather than the absence of surgery itself.

Overall, although NRS differences across groups were not statistically significant ($p > 0.05$), **DLQI variation was significant**, indicating that surgical history influences **QoL more strongly than itch intensity** in cancer patients with pruritus.

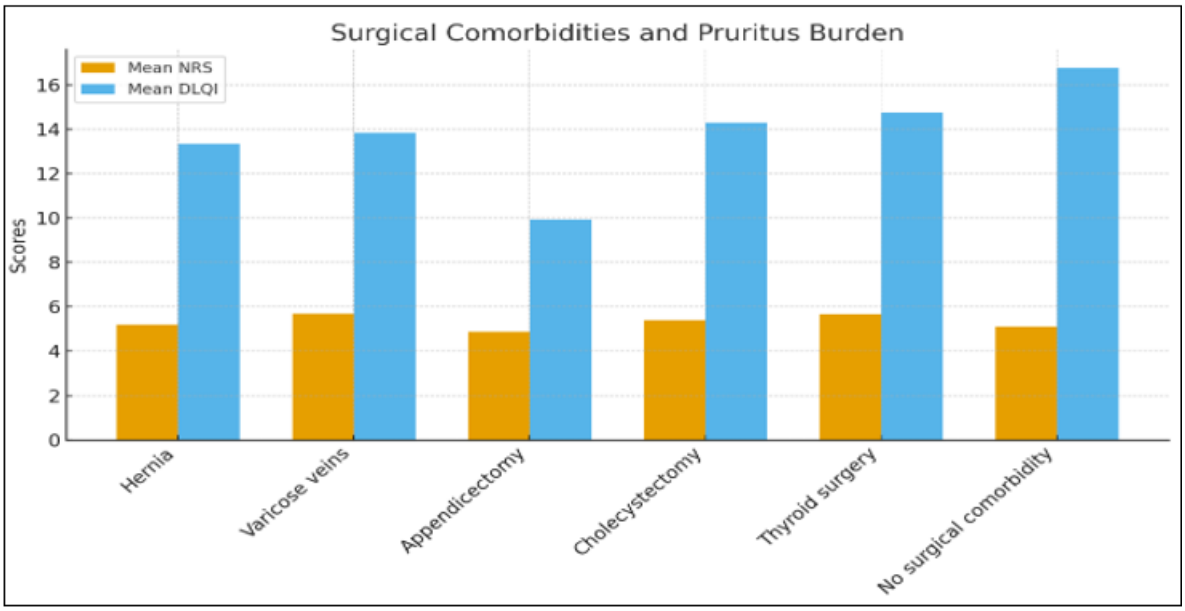


Figure 3: Surgical Comorbidities and Pruritus Burden

Table 4: Correlation Between Itch Severity and Quality of Life

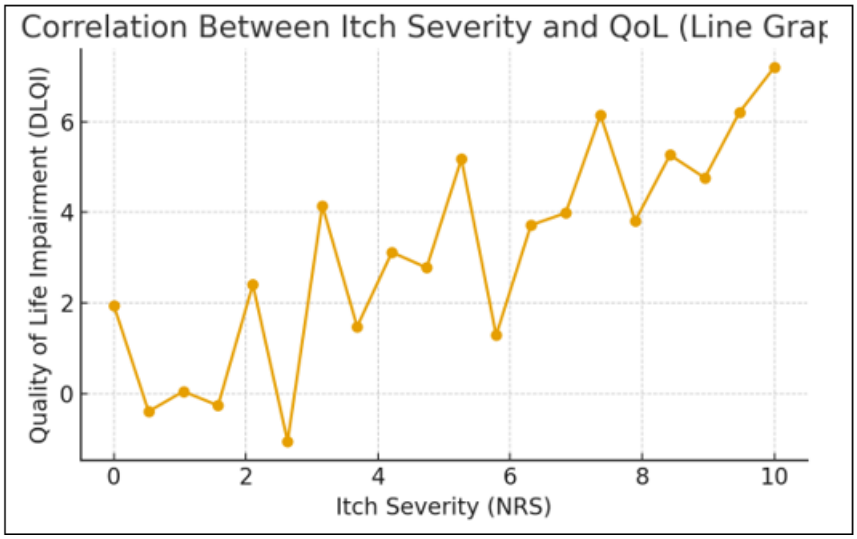
Parameter	Value
Pearson's correlation coefficient (r)	0.65
Significance (p-value)	< 0.001
Interpretation	Higher itch intensity strongly predicts poorer QoL

Table 4 presents the correlation analysis between itch severity, measured using the Numerical Rating Scale (NRS), and quality-of-life impairment, assessed through the Dermatology Life Quality Index (DLQI).

The **Pearson's correlation coefficient was r = 0.65**, indicating a **strong positive correlation** between itch intensity and QoL impairment. This means that as pruritus severity increases, patients experience a proportionately greater negative impact on their daily life- including sleep, mood, social functioning, and emotional well-being.

The association was **highly statistically significant (p < 0.001)**, confirming that the observed relationship is unlikely to be due to chance. This highlights that **itch severity is an independent and robust predictor of QoL impairment**, regardless of medical or surgical comorbidities.

Clinically, this emphasizes the importance of assessing and managing pruritus proactively in cancer patients, as controlling itch may lead to substantial improvements in overall patient well-being, psychological comfort, and functional status.



4. Discussion

This study reveals that medical and surgical comorbidities influence pruritus burden in cancer patients, although not all differences reached statistical significance.

Hypothyroidism and **asthma** showed the greatest impact on itch and QoL, consistent with mechanistic insights into neuroimmune dysregulation and barrier dysfunction[1,5].

Varicose veins produced the highest itch intensity among surgical comorbidities, likely due to stasis dermatitis and neuropathic mechanisms[1].

The significant DLQI differences across surgical groups, particularly thyroid surgeries, may reflect postoperative endocrine fluctuations affecting neuroimmune crosstalk and sensory pathways[6].

Importantly, the strong correlation between NRS and DLQI underscores that itch intensity itself is the major determinant of patient suffering[3],[6].

These findings reinforce current guideline recommendations advocating comprehensive, multimorbidity-aware pruritus management in oncology[3].

5. Conclusion

Asthma, hypothyroidism, thyroid surgery, and varicose veins exert considerable influence on chronic pruritus in cancer patients. Although comorbidity-related differences in itch severity were not universally significant, they contributed meaningfully to QoL impairment. Pruritus severity independently predicted QoL decline, highlighting the need for integrated pruritus management strategies in oncology.

Early recognition and tailored treatment of comorbidities may substantially reduce pruritus burden and improve patient well-being.

Declarations

- **Ethical approval:** Approved by the Institutional Ethics Committee.
- **Informed consent:** Obtained from all participants.
- **Conflicts of interest:** None.
- **Funding:** None.

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