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Original Research Article

# Questionnaire based observational study of association of pruritus with intake of food items in common skin disorders

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ABSTRACT

**Introduction:** Pruritus is the commonest symptom of majority of dermatological diseases. Various chemicals in certain foods are known to trigger release of pruritogenic mediators causing pruritus. Also, there are myths about diet in the population that consumption of certain food items exacerbates their pruritus, which needs proper patient counseling.

**Aim:** Questionnaire-based observational study of association of pruritus with intake of food items in common skin disorders.

**Materials and Methods:** The duration of this cross-sectional study was 6 months in a tertiary care hospital in Patna. Cases with pruritic skin disorders were asked about their food habits and the association of any specific food item with exacerbation in itching by using a fixed set of questions.

**Observation & Results:** Among 306 patients, 147 patients complained of exacerbation in pruritus after eating certain food items (p-value- 0.02), out of which 69 had issues with single food item and 72 patients had association with multiple eatables. In specific food, it was observed that spicy vegetables like Brinjal, jackfruit, onion, and garlic were the most common culprits causing pruritus in 86 patients (p-value- 0.035), which was followed by fish which exacerbated pruritus in 45 patients (p-value- 0.055).

**Conclusion:** When the skin is inflamed by any pathology, its threshold to flare is low and various food items may trigger a pruritic sensation. So, proper counseling of such food items will help to relieve the pruritus and hence better management of the underlying diseases.



## 1. Introduction

Pruritus is an unpleasant sensation which provokes a tendency to scratch which is a common symptom of majority of dermatological & few systemic disorders.[1] Stimulus for pruritus is perceived by intraepidermal nerve fibers with free nerve endings extending into stratum granulosum, from where it is carried by unmyelinated afferent histamine sensitive C- fibers to lateral spinothalamic tract then finally to higher centres namely anterior and posterior cingulate cortex, somatosensory areas I and II, supramarginal gyrus & inferior parietal lobe.[2] This multi-dimensional process of itch sensation is mediated via release of chemical mediators; primarily by Histamine, Tryptase, Cathepsin S, Interleukin-31; secondarily via Prostaglandin E-1,2, Substance- P, u- opioid receptor agonist, Nerve growth factor, Interleukin-2 etc.[3]

Various chemicals present in certain food items are known to trigger release of pruritogenic mediators like- ovalbumin, ovomucin in eggs,[4] parvalbumin in fishes,[5] oleosins, legumin and vicilins in nuts.[6] Similarly, various phytochemicals in fruits and vegetables like-glucosinolates in brassica family vegetables, carotenoids in spinach, parsley and green onion, flavonols in tomato, onion and

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lettuce and anthocyanidins in grapes are known to trigger itching is some individuals.[7] Similarly, a variety of bioactive components have been shown to modulate inflammatory responses.[8] In certain spicy foods, there is an active chemical called microptaprotomerase that is easily absorbed into the blood stream. Butylated hydroxytoluene (BHT) and Butylated hydroxyanisole (BHA) are preservative chemicals added to cereals and other grain products to prevent them from changing color, odor, and flavor which have been associated with chronic allergic triggers.[9] The chemical eventually affects the hair follicles and accumulates on scalp and causes itching.[10]

There are various myths about diet in the common population that consumption of certain food items exacerbates their pruritus, which needs proper study for further counseling and guidance of patients while treating pruritic skin disorders.

This study aims to establish if there is any actual correlation between food items in the aggravation of pruritus in pruritic skin conditions or if isit just a common myth!.

## 2. Materials and Methods

The study was conducted in a tertiary care hospital in Patna, Bihar. The duration of study was 6 months from January 2021 to June 2021. The patients presenting to the Dermatology OPD with pruritic skin disorders, were included in the study. It was a cross sectional study of 306 patients wherein the study subjects were asked questions related to their demography, food habits and association of any specific food items with exacerbation of itching. Cases with pruritic skin disorders such as eczematous disorders, fungal infections, urticaria, generalised pruritus, psoriasis, lichen planus were included in the study. Association of specific food items like fish, egg, curd, spicy vegetables, pickles and others (if any) to cause exacerbation in itching was enquired with the patients and the response were noted.

## 3. Observation & Results

The total number of cases included in the study were 306, all belonging to groups of pruritic skin disorders such as eczema, fungal infections, scabies, psoriasis, lichen planus, etc. Table 1 depicts the age & gender distribution of the study subjects in which the maximum cases were in the age group 10-40 years, & male: female ratio was 9:8. Out of the total cases, 177 belonged to urban areas and 129 belonged to rural area. Regarding the educational status of study participants, 65 were illiterate, & 241 were literate.Table 2 shows the incidence of various pruritic skin conditions found in the study subjects. It was observed that the maximum cases were of fungal infections followed by eczematous disorders followed by urticaria and psoriasis. Out of the total study subjects, 147 (48%) complained about exacerbation in itching after eating some specific food items whereas 159 (52%) cases had no such association. Out of 147 patients, 69 had an association with a single food item and 72 had an association with multiple food items causing pruritus. Among the group of eczematous disorder cases, 42 cases reported exacerbation and 48 did not have any such association (Table 3). Among the group of fungal infections, 53 cases reported exacerbation and 61 did not have any such association (Table 4). Among urticaria patients, 16 cases reported exacerbation in pruritus whereas 18 did not have such complaints (Table 5). Among cases of generalized pruritus, 06 cases reported exacerbation in pruritus whereas 02 did not have such complaints (Table 6). Out of the total patients with pruritic disorders, 53.30% of cases had an exacerbation of pruritus after food intake (Table 7). Considering the association of individual food items, spicy vegetables like brinjal, and jackfruits were the most common culprits followed by fish followed by pickles and curd (Table 8). Table 8 also depicts the association of each food item causing exacerbation in itching with respective pruritic dermatoses.

## 4. Discussion

The total number of patients studied was 306 out of which 162 were males and 144 were females, the gender ratio was 9:8. The number of patients from urban area were 177 and rural area were 129. Since the study centre is in urban area of Patna, it is easier for urban population to assess the hospital for skin disorders in comparison to the residents of rural areas, hence the number of patients from urban areas were more as compared to the rural area in our study. The youngest and eldest patients included in the study were 8 and 72 years old respectively and the maximum number of the patients belonged to the age group 10-40 years.

Out of the total number of patients in the study, a maximum of 114 patients were of fungal infections, 90 were of eczematous dermatitis, 34 were of urticaria, 33 were of psoriasis, 15 were of scabies, 12 were of lichen planus and 8 were of generalized pruritus. Among them exacerbation in pruritus on intake of certain food items was found in 147 out 306 patients (Mean- 153.00 ±8.48; p-value- 0.02), among which 69 complained of exacerbation with single food whereas 72 showed exacerbation with the intake of multiple food items (Mean-70.50 ±2.12; p-value- 0.014). Among eczema patients 42 out of 90 had increased pruritus after specific food intake (Mean-45.00±4.24; p value- 0.04). Food allergies are considered an essential comorbidity of atopic dermatitis alongside asthma & allergic rhinitis (hay fever).[11,12] Among fungal infection patients 53 out of 114 had such association (Mean-57.00±5.65; p value- 0.04). Various studies have proven allergic cross-reactivity between various food allergens and fungi with both food products and fungal cell walls having the same components.[13] Among patients of Urticaria, 16 out of 34 had such an association (Mean-17.00±4.24; p-

**Table 1:** Age and gender distribution

| Age | Male | Percentage | Female | Percentage | Total |
|---|---|---|---|---|---|
| <10 | 3 | 0.98% | 6 | 1.96% | 9 |
| 10-19 | 39 | 12.75% | 30 | 9.80% | 69 |
| 20-29 | 42 | 13.73% | 21 | 6.86% | 63 |
| 30-39 | 21 | 6.86% | 45 | 14.70% | 66 |
| 40-49 | 18 | 5.88% | 18 | 5.88% | 36 |
| 50-59 | 18 | 5.88% | 24 | 7.84% | 42 |
| >60 | 21 | 6.86% | 0 | 0% | 21 |
| Total | 162 | 52.94% | 144 | 47.05% | 306 |

**Table 2:** Area distribution

| Age | Rural | Percentage | Urban | Percentage | Total |
|---|---|---|---|---|---|
| <10 | 3 | 0.98% | 6 | 1.96% | 9 |
| 10-19 | 9 | 2.94% | 60 | 19.61% | 69 |
| 20-29 | 18 | 5.88% | 45 | 14.70% | 63 |
| 30-39 | 36 | 11.76% | 30 | 9.80% | 66 |
| 40-49 | 21 | 6.86% | 15 | 4.90% | 36 |
| 50-59 | 30 | 9.8% | 12 | 3.92% | 42 |
| >60 | 12 | 3.92% | 9 | 2.94% | 21 |
| Total | 129 | 42.15% | 177 | 57.84% | 306 |

**Table 3:** Educational status

| Educational status | No. of patients | Percentage | Mean±SD |
|---|---|---|---|
| Illiterate | 65 | 21.24% | 61.20±34.07 |
| Matriculation | 116 | 37.90% | |
| Under graduate | 59 | 19.28% | |
| Graduate | 37 | 12.09% | |
| Post graduate | 29 | 9.48% | |
| Total | 306 | 100% | |

**Table 4:** Pruritic conditions

| Pruritic conditions | No. of patients | Percentage | Mean±SD |
|---|---|---|---|
| Eczema | 90 | 29.41% | 43.71±41.62 |
| Fungal Inf. | 114 | 37.25% | |
| Urticaria | 34 | 11.11% | |
| Generalised pruritus | 8 | 2.61% | |
| Others-scabies | 15 | 4.90% | |
| Psoriasis | 33 | 10.78% | |
| Lichen Planus | 12 | 3.92% | |
| Total | 306 | 100% | |

**Table 5:** Association with food items

| Association with food items | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Yes | 147 | 48.04% | 153.00±8.48 | 0.02 |
| No | 159 | 51.96% | | |
| Total | 306 | 100% | | |

**Table 6:** Exacerbation with multiple food items

| Exacerbation with multiple food items | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Single food items | 69 | 48.9% | 70.50±2.12 | 0.014 |
| Multiple food items | 72 | 51.1% | | |

**Table 7:** Exacerbation in itching after food intake (Eczema)

| Exacerbation in itching after food intake (Eczema) | No. of patients | Percentage | Mean ± SD | P. value |
|---|---|---|---|---|
| Yes | 42 | 46.7% | 45.00±4.24 | 0.04 |
| No | 48 | 53.3% | | |

**Table 8:** Exacerbation in itching after food intake (Fungal)

| Exacerbation in itching after food intake (Fungal) | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Yes | 53 | 46.5 % | 57.00±5.65 | 0.04 |
| No | 61 | 53.5% | | |

**Table 9:** Exacerbation in itching after food intake (Urticaria)

| Exacerbation in itching after food intake (Urticaria) | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Yes | 16 | 47.4% | 17.00±4.24 | 0.03 |
| No | 18 | 52.6% | | |

**Table 10:** Exacerbation in itching after food intake (Generalised pruritus)

| Exacerbation in itching after food intake (Generalised pruritus) | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Yes | 06 | 75% | 4.00±2.82 | 0.295 |
| No | 02 | 25% | | |

**Table 11:** Exacerbation in itching after food intake (Others)

| Exacerbation in itching after food intake (others) | No. of patients | Percentage | Mean±SD | P. value |
|---|---|---|---|---|
| Yes | 28 | 46.7% | 30.00±2.82 | 0.04 |
| No | 32 | 53.3% | | |

**Table 12:** Association of individual food items with variousdermatoses

| Association of individual food items with dermatoses | Eczema | Fungal | Urticaria | Gen. Pruritus | Others | Total | P. Value |
|---|---|---|---|---|---|---|---|
| Fish | 21 | 10 | 8 | 1 | 5 | 45 | 0.055 |
| Egg | 10 | 8 | 7 | 2 | 4 | 31 | 0.012 |
| Curd | 8 | 8 | 5 | 2 | 7 | 30 | 0.006 |
| Vegetables | 31 | 28 | 12 | 1 | 14 | 86 | 0.035 |
| Non Veg. items | 2 | 4 | 2 | 1 | 2 | 11 | 0.011 |
| Pickles | 8 | 12 | 5 | 2 | 9 | 36 | 0.014 |

value- 0.03). Education on dietary modification has been a key component in managing chronic urticaria, however only a subset of patients get a benefit.[14] In the group of patients that comprised of other pruritic disorders like scabies, psoriasis, and lichen planus, it was found that 28 out of 60 patients had increased pruritus after intake of certain food items (Mean- 30.00±2.82; p-value- 0.04). In food-allergic patients with atopic dermatitis, the ingestion of the food item can provoke the whole spectrum of IgE-mediated symptoms, from oral allergy syndrome to severe anaphylaxis.[15] However in patients of generalized pruritus without a specific cause, the association was insignificant.

In specific food items, it was observed that spicy vegetables like brinjal, jackfruit, onion & garlic were the most common culprits causing pruritus in 86 patients (p-value- 0.035). It was followed by fish which exacerbated pruritus in 45 patients (p-value- 0.055) followed by egg and curd involving 31 patients (p-value- 0.012) and 30 patients (p-value- 0.006) respectively.

Hence, we can conclude that exacerbation in pruritus in various pruritic skin disorders is not merely a myth and in fact, there is an association with some food items that may increase the pruritus after their consumption. Ingested food antigens rapidly cross the gastrointestinal barrier and reach pro-inflammatory cells in the skin.[16] When the skin

is inflamed by any disease pathology, its threshold to flare is low and many things can trigger a pruritic sensation. So, proper counseling of avoidance of such specific food items will help the patients relieve their pruritus and hence better management of the underlying diseases.

## 5. Source of Funding

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## 6. Conflict of Interest

None.

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