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Original Research Article

Understanding the healthcare professionals' perspective on the management of diabetic dry skin and the role of urea-based topical application

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ABSTRACT

Background: Dermatological disorders are common in diabetes mellitus (DM), with xerosis affecting 40% of patients. Xerosis, characterized by scaling and dryness, can lead to complications such as cracks and infections. Urea-based moisturizers are effective in improving skin hydration and barrier function in diabetic patients. Objective was to evaluate the prevalence, awareness, and management of dry skin in diabetic patients and to assess healthcare professionals' (HCPs) perspectives and patients' experience with urea-based topical treatments.
Methods: This questionnaire-based study involved 363 HCPs (dermatologists and cosmetologists) from India. Data were collected via an 18-question questionnaire in two phases (August and November 2023). The effect of urea-based formulations on diabetic skin dryness was assessed.
Results: Data were collected from 1,761 patients with DM, with 96.48% presenting with dry skin. While 48.83% of patients were aware of diabetes-related skin issues, 98.63% of them emphasized the importance of patient education on diabetes-related skin issues. Urea-based moisturizers were prescribed to 97.1% of patients, and 46.29% rated their efficacy as excellent. Most patients reported improvements in dryness and itchiness, with good overall tolerability (46.24%).
Conclusions: Urea-based moisturizers are effective and well-tolerated for managing dry skin in diabetic patients. HCPs view urea as essential for maintaining skin hydration and preventing complications associated with xerosis in DM.

Keywords: Diabetes mellitus, Xerosis, Dry skin, Urea-based formulation

INTRODUCTION

Dermatological disorders are highly prevalent in patients with diabetes mellitus (DM) globally, with a prevalence ranging from 51.1% to 97%.[1] Nearly, 30% of the patients with DM experience cutaneous involvement during the disease progression.[2] Elevated serum glucose levels in patients with DM may lead to underdiagnosed and often neglected skin-related non-infectious manifestations that result from the damage occurring at the cellular level, including keratinocytes and fibroblasts.[1,3] Additionally, DM-induced autonomic pathway-based neuropathy causes dry skin in diabetes via anhidrosis and vasodilation, further leading to major complications.[1]

Xerosis, a prevalent skin condition affecting 40% of individuals with diabetes, is marked by scaling, flaking, cracks, or a rough texture.[4,5] The condition poses a significant burden on patients, leading to discomfort. Among the array of dermatoses linked with DM, xerosis exhibits a strong correlation with keratosis pilaris.[4] Furthermore, ichthyosiform changes of the shins are another nonspecific skin-related manifestation in diabetic patients characterized by extensive bilateral regions of

dryness and scaling, attributing to accelerated aging of the skin and abnormalities in the adhesion of stratum corneum.[5]

As abnormal dryness correlates with elevated transepidermal water loss, indicating potential harm to the skin barrier, it is imperative to implement proper management to safeguard the skin's protective function.[4] Although the skincare options for these nonspecific dermatologic signs and symptoms are limited, topical emollients or keratolytic agents can offer beneficial effects.[5] Moreover, management of xerosis helps mitigate skin complications such as cracks, fissures, superinfections, and ulcers. Unfortunately, xerosis is prevalent and debilitating, yet it often goes unnoticed and untreated by healthcare providers, leaving patients to manage it independently.[4]

Daily moisturizer application is essential for managing dry skin in diabetic patients, serving both preventive and active skin repair to avert associated complications. Topical application of urea-based moisturizers emerges as the preferred choice for dry skin management, with clinical studies demonstrating its superior efficacy in restoring skin hydration compared to other moisturizers.[6]

Urea, a humectant, enhances the water-binding capacity of the stratum corneum when incorporated into moisturizing creams. It is widely acknowledged that moisturizers containing urea provide effective management by preserving skin flexibility and preventing fissure development. Thereby ensuring the skin's integrity as a barrier remains intact.[7] A study reports that it is not only a simple hydrating compound but can enhance cell differentiation by increasing gene expression of transglutaminase, filaggrin, aquaporin, and loricrin, thereby improving keratinocyte differentiation.[8] The objective of our survey was to find out the prevalence, awareness, and management of diabetic dry skin along with the perspectives of health care professionals (HCPs), particularly dermatologists and cosmetologists, on the urea-based topical application for dry skin and patients' experience with the urea-based formulation.

METHODS

Study design and population

The online questionnaire-based study evaluated the perspectives of 363 HCPs (dermatologists and cosmetologists) from all over India, on the effect of a urea-based formulation (Galderma Laboratories) on dry skin in individuals with diabetes. The study utilized a well-structured questionnaire comprising 18 questions to gather data on the urea-based formulation, consisting of 10% urea, lactic acid, caprylic triglyceride and tocopherol. The data was compiled using a survey link that was sent to the HCPs in two phases: phase 1 (August 2023) and phase 2 (November 2023). The HCPs documented patients' experiences with the urea-based formulation during these phases.

Inclusion criteria

The inclusion criteria involved HCPs, specifically dermatologists, cosmetologists, and patients with diabetes, registered across India.

Exclusion criteria

General practitioners, and individuals without a history of diabetes or with other skin conditions not associated with dry skin or with exposed wounds were excluded from the study.

Statistical analysis

The survey responses underwent analysis utilizing Microsoft excel spreadsheets, version 2021. The descriptive statistics were computed using predefined excel formulas.

RESULTS

Patient demographics and dermatological manifestations

The HCPs provided data for a total of 1,761 patients with DM. No major gender differences were noted among the patients (55.08% were males and 44.92% were females). HCPs reported that nearly 15-30% of patients with diabetes who visited them monthly, complained of dry and itchy skin. Dry skin was the most common presentation of skin-related manifestation, observed in 96.48% of the patients with DM (Figure 1).

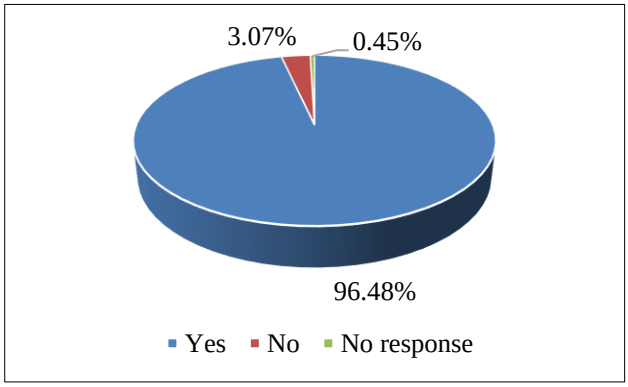

Figure 1: Patients with DM presenting with dry skin.

Patient education and awareness

As per the survey, HCPs reported that 48.83% of the patients were aware of diabetes-associated cutaneous manifestations. Most patients felt that it was important to educate them about the impact of diabetes on the skin (98.63%) (Figure 2).

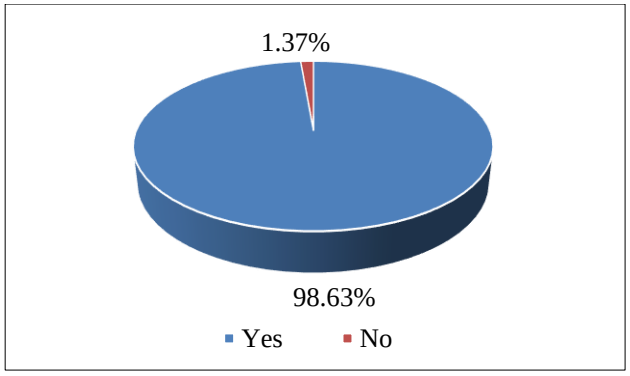

Figure 2: Percentage of patients who felt the need to be educated on the impact of diabetes on the skin.

Skincare in patients with diabetes

Most patients (91.02%) believed that regular skin examinations, keeping the skin clean and dry, avoiding harsh soaps and detergents, and a consistent skincare routine with gentle emollients and moisturizers are important skincare components in diabetes. In the management of dry skin, around 90.80% of the patients considered repair of the skin barrier, reduction in trans-epidermal water loss, and control of nocturnal itchiness as ideal properties of the moisturizer. The HCPs considered that urea was an important ingredient for skincare in most of their patients with diabetes (77.96%) (Figure 3).

Management of skin-related manifestations in patients with diabetes

The majority of patients (97.1%) were prescribed the urea-based formulation for the management of skin-related manifestations for a period of up to 3 months (n=1,241), whereas some patients even applied it for more than 3 months (n=504).

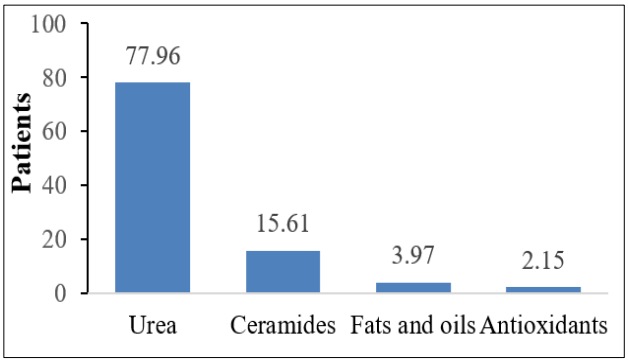

Figure 3: Patient perception on the important ingredients for skincare management in diabetes.

The urea-based formulation related outcomes in patients with diabetes: the HCPs assessment

HCPs reported that most patients experienced a reduction in dryness/itchiness/scales and felt rejuvenated along with a moisturized effect following the application of the urea-based formulation (Figure 4). Furthermore, the clinical effectiveness of the urea-based formulation was found to be excellent by nearly half of the patients (44.97%), whereas the HCPs reported that 40% of the patients rated this application as good, with 68.82% of the patients being compliant with the skincare regimen. The survey analysis revealed that the urea-based formulation was well-tolerated by most patients (Figure 5).

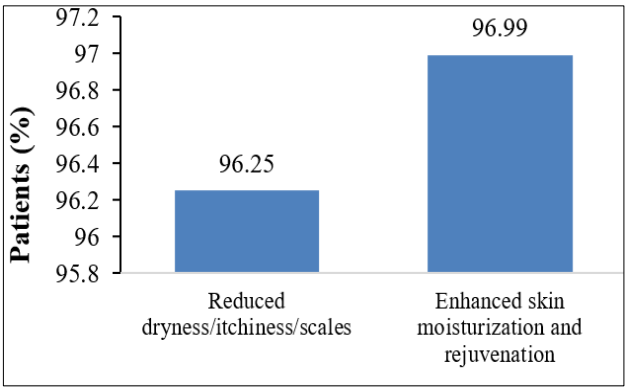

Figure 4: Impact of the urea-based formulation on patients' skin.

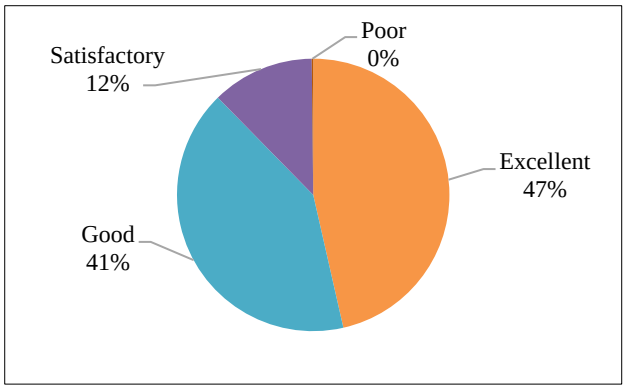

Figure 5: HCPs-rated tolerability profile of the urea-based formulation in diabetics.

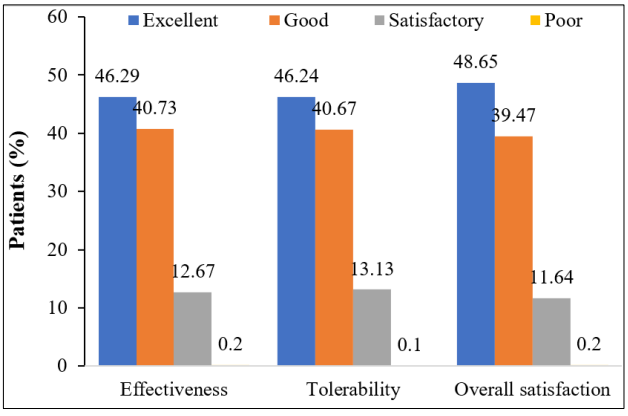

Figure 6: Patients assessment on application of the urea-based formulation.

Patients assessment of the urea-based formulation

The efficacy, tolerability, and patient satisfaction of the urea-based formulation for improving skin dryness was graded on a scale of excellent, good, satisfactory, and poor. The survey analysis shows that the effectiveness of the urea-based formulation was found to be excellent in nearly half of the patient population (46.29%) and the HCPs reported that 46.24% of the patients rated it as excellent for tolerability. Moreover, the HCPs reported that 48.65% of the patients were extremely satisfied with the use of the urea-based formulation (Figure 6).

DISCUSSION

Skin manifestations including lesions are highly prevalent in patients with diabetes, with about 30% of the individuals experiencing cutaneous disorders, yet they are often overlooked in clinical practice.[9] According to the American Academy of Dermatology Association (AADA), diabetes often leads to abnormally dry skin that can cause subsequent itching. To avoid serious skin conditions, such as an infection, open sores, or non-healing wound, the dermatologist recommends routine application of moisturizer that would aid in retaining moisture and prevent cracks.[10]

Urea is naturally present in the epidermis as a vital component of the natural moisturizing factor (NMF). It is indispensable for ensuring adequate hydration and preserving the integrity of the stratum corneum.[11] Currently, urea holds an important place in the cosmetic formulation including moisturizers and keratolytic agents, wherein it enhances skin barrier function, including antimicrobial defence, by regulating gene expression in keratinocytes, which is pertinent for their differentiation and production of antimicrobial peptides.[11] Furthermore, the AADA recommends topical application of 10-25% urea-based creams to heal dry and cracked heels.[10] Clinical studies on urea-based formulations have demonstrated significant improvements in dermatoses with dry and scaly skin including xerosis.[11] Various dermatological preparations ranging from low to high concentrations of urea are available to provide moisturizing to keratolytic effects, respectively.[11,12] Thus, making urea a key ingredient for the preservation of skin hydration and integrity.[12]

The present survey indicates that urea-based formulations are effective for managing diabetic patients with dry skin. Similarly, clinical evidence reported that low-concentration urea-containing products (2-12%) effectively improve and/or prevent xerosis in some skin diseases, such as psoriasis, atopic dermatitis, and ichthyosis, or unrelated to any skin condition.[13] The HCPs in the survey revealed that a urea-containing cream was well tolerated by most of the patients, similar to the clinical evidence reported by Lacarubba et al.[13]

The current study revealed that the majority of the HCPs recommend urea-based formulation as a skin care product for the management of dryness in patients with diabetes. Most HCPs rated urea to be extremely important in cosmetic formulations to act on dry skin. Likewise, studies suggest the importance of urea in dermatological preparations to control dry skin.[11]

Limitations

Study limitations include reliance on self-reported data, which may introduce bias. Additionally, it only assesses short-term outcomes, limiting insights into long-term effects.

CONCLUSION

Diabetes is a known cause of various dermatological manifestations including dryness, scale formation, and rough texture. This condition can be counteracted using moisturizing agents containing humectants such as urea. Urea aids in providing a moisturizing effect on the skin, including patients with diabetes.

Through this survey-based study, it was observed that considering urea-based moisturizing personalized products in patients with diabetes can be easily managed. The HCPs considered this component quite essential in cosmetic formulations for the management of abnormal dryness occurring in patients.

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