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ORIGINAL ARTICLE

Epidemiological Characterization of Skin Fungal Infections Between the Years 2006 and 2010 in Korea

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Abstract
Objectives: The purpose of this study was to build and provide a basic database of skin fungal infections for the effective management of skin fungal infections in the future.
Methods: We collected health insurance data between the years 2006 and 2010 from the Health Insurance Corporation (Seoul, Korea) and analyzed the data to determine the prevalence and treatment management of skin fungal infections.
Results: Skin fungal infections were divided into two groups: namely dermatophytosis and other superficial mycoses. Dermatophytosis showed a higher prevalence (16,035,399 cases) than the other superficial mycoses (794,847 cases) within the study period. The prevalence rate decreased consecutively by 0.01% to 0.19% every year. The prevalence according to region showed that Jeolla-do had a high prevalence distribution. The prevalences in men and women were similar (7.01% vs. 6.26%). It is interesting to note that adults from the 50–79-year age group showed a higher prevalence than children and young adults. The average convalescence time (days) of dermatophytosis was longer than that of other superficial mycoses. The total medical expenses were also much higher in dermatophytosis than in the other superficial mycoses.
Conclusion: This study provides useful data for study trends of skin fungal infections.

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1. Introduction

Fungal infections of the skin, hair, and nails are a common public health problem worldwide. However, a population-based survey reported that they are rarely managed [1]. The prevalence of skin fungal infections is expected to reach 20−25% of the world's population, and its incidence continues to increase [2,3] and accounts for 10−20% of all dermatologic outpatients in South Korea [4]. This increase may be a result of usage of antibiotics and immunosuppressive drugs [5].

Skin fungal infections are caused mainly by dermatophytes such as *Trichophyton*, *Microsporum*, and *Epidermophyton* that can invade the stratum corneum and keratinized tissues [6,7]. Skin fungal infections are less frequently caused by nondermatophyte fungi (e.g., *Malassezia in* tinea versicolor) [7].

Dermatophytoses are referred to as tinea infections and can be classified according to the body site involved [8]. These infections are typically acquired directly from contact with infected humans or animals or indirectly from exposure to contaminated soil or fomites.

The lipophilic yeast *Malassezia* is a normal microflora of the human skin that may be pathogenic under certain conditions. *Malassezia* species cause the most human skin infections, and is the most common cause of dandruff, seborrhoeic dermatitis, folliculitis, papillomatosis, and tinea (pityriasis) versicolor [9−13]. However, the exact species implicated still remains unclear [14].

The prevalence of skin fungal infection differs by social, geographic, economical status, and life environment. According to Korean research studies on skin fungal infections (trichophytosis), 5.2% of total outpatients had trichophytosis in the survey of Yonsei University Severance Hospital, Seoul, Korea from 1937 to 1946 [15]. Skin infections are known to spread not only in the patient but also to the patient's family members.

Skin fungal infections induced by fungal agents may have side effects caused by antifungal reagents and increases medical fees and social costs if not treated quickly in the early stage. However, research on the nationwide developmental distribution and epidemiological characteristics of skin fungal infections is rare. Therefore, this study aimed to build a basic database for effective fungal infection control by examining age, sex, year, distribution, and prevalence by region, medical care institution, and treatment costs over 5 years, from 2006 to 2010, by using the database of the Health Insurance Corporation (Seoul, Korea) to research the epidemiological characteristics of skin fungal infections.

2. Materials and methods

2.1. Data collection and study design

The individuals of the research were health insurance recipients over 5 years, from January 1, 2006 to December 30, 2010. The only information on skin fungal infection was extracted from all cases of fungal infections and collected data, and was divided into dermatophytosis (Korea International Classification of Diseases: B35) and other superficial mycoses (B36).

In cases of skin fungal infection, in order to avoid duplication, a new case was defined when new treatment was administered for 2 months after the last treatment date (Figure 1). The collected data were analyzed by using the SPSS version 20.0 software (SPSS Inc., Chicago, IL, USA) after entering into an Excel sheet with encoding.

2.2. Epidemiological investigations

In order to determine the significance of skin fungal infections that cause diseases, we performed an epidemiological analysis of variables such as seasonal and regional prevalences and age- and gender-specific patterns of the prevalences of dermatophytosis and other superficial mycoses.

2.3. Calculation of convalescence days and medical treatments for therapy

The convalescence days of the in- and outpatients for skin fungal infections and superficial mycosis were calculated for the previous 5 years. Medical care costs were calculated by classifying into personal and insurance charges from the insurance items in the Health Insurance Corporation database. No insurance charge items were excluded from the medical care costs.

3. Results

Among the skin fungal infections, dermatophytosis showed a higher prevalence (16,035,399 cases) than the other superficial mycoses (794,847 cases) between the years 2006 and 2010. Here, we describe the epidemiological characterization of and medical treatments for patients infected with skin fungal infections during the past 5 years in South Korea.

3.1. Epidemiological characterization of skin fungal infections

As shown in Table 1, the prevalence rate of dermatophytosis, according to resident population, consecutively decreased by 0.01% to 0.19% from the years 2006 to 2010. The regional prevalence was highest in Jeollanam-do at 7.98% and the lowest in Incheon at 5.96%.

The prevalences of the other superficial mycoses also decreased gradually every year. The yearly prevalence based on registered population information showed a 0.01% decrease in prevalence rate, the rate being 0.35% by resident population in 2006 and 0.31% in 2010. The regional prevalence showed that Jeonbuk (0.41%) had the highest prevalence and Jeju (0.26%) had the lowest prevalence (Table 1).