# A study on types of skin diseases and its impact on quality of life of patients coming to private hospitals in Dhaka city

A Project Report to be submitted in the Department of Pharmacy for the Partial Fulfillment of the Degree of Masters of Pharmacy


**Submitted by:**

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# DECLARATION BY THE RESEARCH CANDIDATE

I am Aliya Shaheen, ID: 2016-3-79-007 and I hereby declare that the dissertation entitled **''A study on types of skin diseases and its impact on quality of life of patients coming to private hospitals in Dhaka city''** submitted to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of Masters of Pharmacy is a genuine & authentic research work carried out by me. The contents of this dissertation, in full or in parts, have not been submitted to any other institute or University for the award of any degree or Diploma of Fellowship.

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# CERTIFICATION BY THE SUPERVISOR

This is to certify that the dissertation, entitled **"A study on types of skin diseases and its impact on quality of life of patients coming to private hospitals in Dhaka city''** is a survey based research work done by Aliya Shaheen (ID: 2016-3-79-007), in partial fulfillment of the requirement for the degree of Masters of Pharmacy under my supervision.

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# ENDORSEMENT BY THE CHAIRPERSON

This is to certify that the dissertation, entitled **"A study on types of skin diseases and its impact on quality of life of patients coming to private hospitals in Dhaka city"** is a survey based research work done by Aliya Shaheen (ID: 2016-3-79-007), in partial fulfillment of the requirement for the degree of Masters of Pharmacy.

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# DEDICATION

Dedicated to my parents, who sacrificed their every desire since my birth to make me human being and inspire me in every steps of my life.

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## List of Abbreviations

| | |
|---|---|
| OTC | Over The Counter |
| ASCO | American Society of Clinical Oncology |
| UVB | Ultraviolet B-Rays |
| nBUVB | Narrow-Band Ultraviolet B |
| PUVA | Psoralen Ultraviolet |
| TNF | Tumor Necrosis Factor |
| MM | Malignant Melanoma |
| NMSC | Non-Melanoma Skin Cancer |
| QoL | Quality of Life |
| OPD | Out Patients Department |
| DLQI | Dermatology Quality of Life Index |
| PRO | Patient-Reported Outcome |
| SSc | Systemic Sclerosis |
| SSPRO | Space Shuttle Program Resident Office |
| HRQoL | Health-Related Quality of Life |
| CME | Continuing Medical Education |
| MASI | Melasma Area And Severity Index |

## Abstract

The skin is the largest organ in the body and it performs many vital functions such as protection against external physical, chemical, and biologic assailants. While skin diseases are very common among the populations in many developing countries, they have not been regarded as a significant problem that could benefit from public health measures. The aim of the study was to assess the level of awareness and knowledge about skin diseases and to observe their effect on quality of life. A total number of 148 patients of different private hospitals in Dhaka city were surveyed with a questionnaire in order to assess the awareness and knowledge regarding skin disease. Informed consent was obtained from the eligible participants before interview and participants who agreed to join the study provided the required information for the studies. Among them majority (62.2%) patients were female and highest number of patients were in the age group of 19 to 30 years. Greater part of patients had allergy (21.62%), psoriasis (16.89%) and acne (15.54%). Summer season had the maximum effect on skin and 53.38% participant had the influence of environment outside home. About 53% participants were aware about the risk factors for skin diseases. While 50% knew that bad hygiene have higher chances of contributing towards contracting skin infection, whereas 32.85% of them were aware that lack of sleep as a risk factor for infection. Among the participants 91.21% took medicines and steroids (74.07%) were the most common drugs taken by the patients. After hearing conversation, it was revealed that many patients were not satisfied with their treatment as they have to visit several times for the treatment but were still did not have any positive effect. Skin infections caused physical symptoms like itchiness, soreness and painful wounds which affect quality of life of 69.51% patients. From the result it was seen that the knowledge of the skin conditions were was not at satisfactory level among the specific settings of the patients of our country. Such awareness and knowledge could lead to better understanding and acceptance of the importance of the early detection and treatment of skin diseases.



**Key words:** *Skin diseases, Allergy, Psoriasis, Epidemiology*

# Chapter 1
# Introduction

## 1. 1 Overview

The skin is the largest organ of the body which is conceders for about 15% of the total adult body weight. It performs many vital functions such as protection against external physical, chemical, and biologic assailants. It also takes parts in prevention of excess water loss from the body and a role in thermoregulation. The mucous membranes lining the body's surface is continuous, with the skin (Paul et al, 2011).

Other functions include insulation, temperature regulation and sensation. To fulfill these functions, mechanical stability is as important as mechanical flexibility. However, the mechanical balance of skin can be threatened by diseases, trauma, medical or cosmetic treatments. In order to understand the skin behavior following the onset of these conditions, knowledge of the mechanical behavior of healthy skin in normal conditions is essential (Geerligs, 2010).

Human skin is composed of several layers, each with a unique structure and function, but most research on its mechanical properties has ignored this non-uniform layered structure. For many clinical and cosmetic applications, however, knowledge of the mechanical behavior of the various skin layers is indispensible. For example, the benefit of transdermal drug delivery is that the micro needles exclusively damage the pain-free outer skin layer, the epidermis. Its mechanical response is therefore of particular interest. For needle insertion into the underlying dermal layer or for diseases such as pressure ulcers, the combined mechanical response of all individual skin layers is important. Although often not recognized, this is also the case during the removal of skin adhesives or the use of consumer products such as shavers. For all these applications, the subcutaneous fat layer contributes by attenuating or dispersing the external pressures, even when those are very small trial (Geerligs, 2010).

## 1.2 Anatomy of skin

The skin has three layers with different thickness, strength and function:

- Epidermis: Thin outer layer
- Dermis: Thick inner layer

- Hypodermis or sub cutis: A fatty layer of subcutaneous tissue (AMN Healthcare Education Services, 2004).

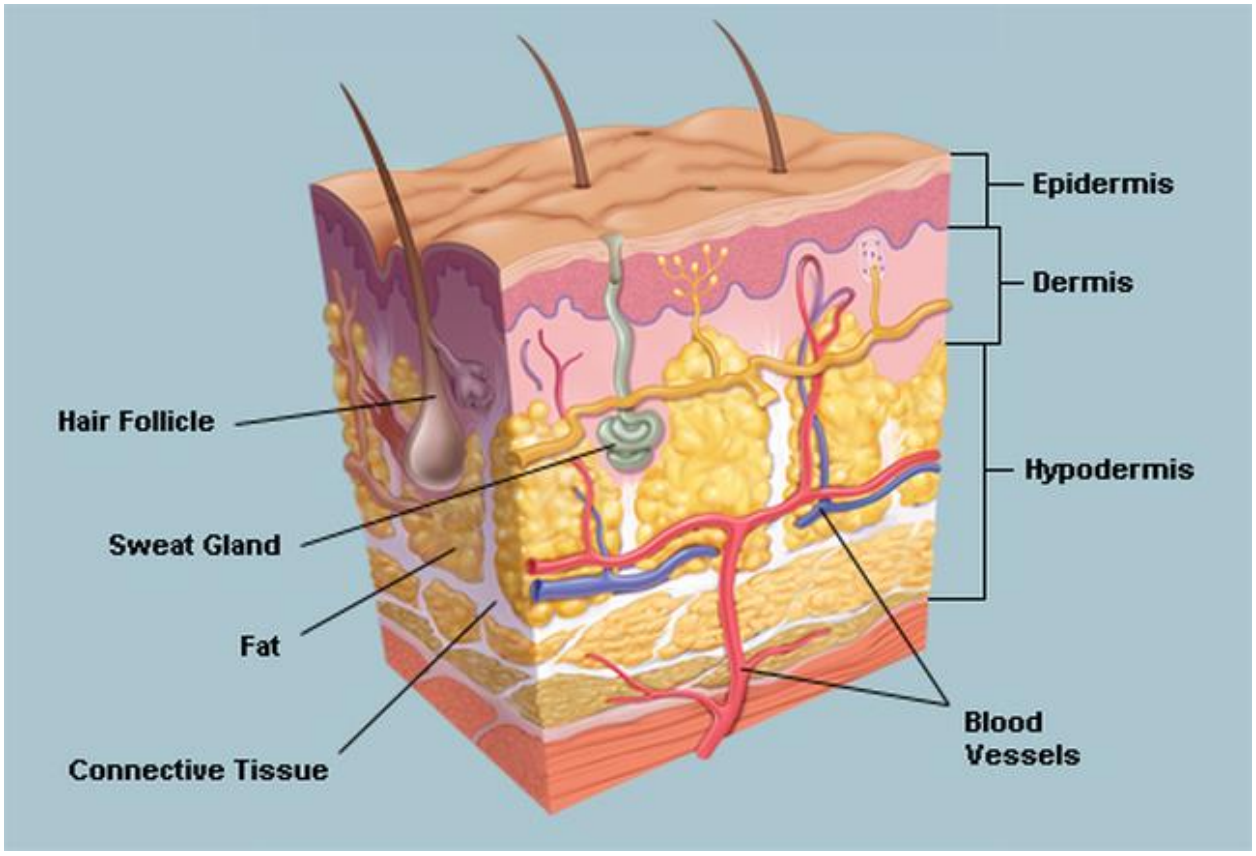


**Figure 1.1: Anatomy of different skin layer (Hoffman, 2006)**

### 1.2.1 Epidermis

The viable epidermis is a layered structure, consisting of three layers or "strata". The bulk of epidermal cells are the keratinocytes, which migrate upwards to the skin surface where they become non-viable. Other cell types within the viable epidermis include melanocytes, Langerhans cells and Merkel cells. Keratinocytes change their shape, size and physical properties when migrating to the skin surface. Indeed the morhology of an individual keratinocyte correlates with its position within the epidermis and its state of differentiation, which is reflected by the different strata: the stratum basale, the stratum spinosum and the stratum granulosum. The deepest layer is the stratum basale in which cell division occurs. It consists of 1 to 3 layers of small cubic cells. In the next layer, the stratum spinosum, the cells are

larger and polyhedral in nature and are connected by desmosomes, which are symmetrical laminated structures. The keratinocytes adopt a more flattened morphology at higher layers of the stratum spinosum. In this layer, they are associated with lamellar granules, which are lipid-synthesizing organelles that migrate toward the periphery of the cell and eventually become extruded into the intercellular compartment in the next layer, the stratum granulosum. At this stage of differentiation, the degradation of mitochondria and nuclei is apparent and the cytoplasm of the flattened cells becomes increasingly filled with keratohyalin masses and filaments. Furthermore, the cell membrane becomes gradually thicker (Geerligs, 2010).

The thickness of the viable epidermis varies roughly between 30-100 μm accomodating between 5 to 10 cell layers. The cells are communicating by very strong desmosomes in the very compact tissue; the intercellular spaces occupy less than 2% of the volume. Therefore, the mechanical integrity of the viable epidermis is considered to be stronger than other soft tissues. Because of its non-vascular structure, the epidermal cells are nourished from plasma that originates in the dermal blood vessels such that the nutrients transport across the epidermal-dermal junction (Geerligs, 2010).

### 1.2.2 Epidermal Derivatives

Epidermal derivatives (appendages) are essential parts of the skin that have adapted to serve a variety of special functions

- **Basket Cells**

Surround the base of hair follicles and sense pressure. They are evaluated when assessing overall nerve health and condition.

- **Blood Vessels**

Carry nutrients and oxygen rich blood to the cells that make up the layers of skin and carry away waste products.

- **Glands**

Three types of glands exist within the skin: the sebaceous glands, or sweat glands, and ceruminous glands. The sebaceous glands secrete an oily substance that protects the skin and prevent excess water loss. The sudiferous or sweat glands secrete a dilute, saline solution that assists in thermal regulation. When the solution evaporates on the skin's surface, it cools the skin. The ceruminous glands secrete wax from the inner ear. This wax creates a sticky barrier to invading organisms.

- **Hair**

Hair is an epidermal derivative that consists of keratinized cells tightly bound together. Hair is not permanent but is continuously being replaced. Hair assists in transmitting sensory information and is associated with gender identity. Culturally it can play an important role in self esteem and status.

- **Hair Erector Muscles (Arrector Pili Muscle)**

They are tiny muscles connected to each hair follicle and the skin. When they contract they cause the hair to stand erect (AMN Healthcare Education Services, 2004).

- **Hair Follicle**

Lies under the skin and nourishes the hair. It is a tube shaped sheath that surrounds the part of the hair and is located in the epidermis and the dermis.

- **Hair Shaft**

It is the part of the hair that is above the skin.

- **Langerhans Cells**

Attach themselves to antigens that invade damaged skin. They alert the immune system to their presence.

- **Melanocyte**

A melanocyte produces melanin, and is located in the basal layer of the epidermis.

- **Merkel Cells**

Merkel cells are located in the basal layer of the epidermis. They are tactile cells of neuroectodermal origin.

- **Nails**

Nails are hard palates of keratin, once used in defense and to assist in opening potential food items.

- **Pacinian Corpuscle**

A pacinian corpuscle is a nerve receptor that is located in the subcutaneous fatty tissue that responds to vibration and pressure.

- **Sebaceous Gland**

Sebaceous glands are small, sack shaped glands that release an oily substance onto the hair follicle that protects and coats the hair shaft from becoming brittle. They are located in the dermis (AMN Healthcare Education Services, 2004).

- **Sensory Nerves**

The epidermis is innervated with sensory nerves. These nerves sense and transmit heat, pain, and other sensations. When the nerves are not functioning properly, sensations such as pain, burning, numbness, tingling, and pins and needles may be felt (AMN Healthcare Education Services, 2004).

- **Stratum Corneum**

The stratum corneum is composed of corneocytes, which are hexagonal flat cells without a nucleus, held together by lipids and desmosomes in what is commonly referred to as a brick-and-mortar structure. The lipids are arranged in lamellar sheets, which consist of membrane-like bilayers of ceramides, cholesterol, and fatty acids together with small amounts of phospholipids and glucosylceramides. The lipids form the major permeability barrier to the loss of water from the underlying epidermis. The stratum corneum, and viable epidermis, is continuously renewed within 6 to 30 days. Cells are shed from the outside and replaced by new ones. Changes in structure, composition and function of the corneocytes occur as they move toward the outer skin surface. Cells of the deeper layers of the stratum corneum are thicker and have more densely packed arrays of keratins, a more fragile cornified cell envelope and a greater variety of modifications for cell attachment. Consequently, the deeper part of the stratum corneum has a major influence on its overall mechanical behavior. The outer stratum corneum cells have less capacity to bind water. The cells in the outermost stratum corneum have a rigid cornified envelope and in the same area, the desmosomes undergo proteolytic degradation. Although the corneocytes are non-viable, the stratum corneum is considered to be fully functional, particularly in terms of barrier properties, and retains metabolic functions (Geerligs, 2010).

- **Sweat Gland (sudoriferous gland)**

The sweat glands are located in the epidermis and produce sweat that is secreted through tiny ducts onto the surface of the skin (stratum corneum). When sweat evaporates, skin temperature is lowered (AMN Healthcare Education Services, 2004).

### 1.2.3 Dermis

The dermis can be divided into two anatomical regions: the papillary and reticular dermis. The papillary dermis is the thinner outermost portion of the dermis, constituting approximately 10% of the 1-4 mm thick dermis. It contains relatively small and loose distribution of elastic and collagen fibrils within a significant amount of ground substance. Its content in water and vascular volume show physiological variations that can alter the mechanical behavior of skin as a whole. In addition, collagen and elastin fibers are mostly vertically oriented in the papillary

region and connect to the dermalepidermal junction. In the reticular dermis, fibers are horizontally oriented. The dermis has a mainly mechanical function. The reticular dermis is able to extend up to about 25% by stretching the collagen fibers, whereas it can be squeezed due to the capacity to displace the ground substance laterally. The elastic fiber network ensures full recovery of tissue shape and architecture after deformation. The amorphous ground substance acts as a viscous gel-like material, which does not leak out of the dermis, even under high pressure. The permanent tension in the reticular dermis generates the folding of the overlying structures and hence, the skin surface. The fiber network in the papillary dermis contributes to the protection of vessels and cells against mechanical insults. In the papillary dermis, the microvasculature consists of papillary loops exchanging with extravascular elements and a horizontal plexus in which the loops emerge. Although the vascularization throughout the dermis appears relatively sparse, the supply of the papillary loops is ensured by arterioles irrigated from the deep dermis (Geerligs, 2010).

### 1.2.4 Hypodermis

The hypodermis is defined as the adipose tissue layer found between the dermis and the aponeurosis and fasciae of the muscles. Its thickness varies with anatomical site, age, sex, race, endocrine and nutritional status of the individual. The subcutaneous adipose tissue is structurally and functionally well integrated with the dermis through nerve and vascular networks and the continuity of epidermal appendages, such as hairs and nerve endings. Adipose tissue has little extracellular matrix compared to other connective tissues. Collections of white adipocytes comprise fat lobules, each of which is supplied by an arteriole and surrounded by connective tissue septae. Each adipocyte is in contact with at least one capillary, which provides the exchange of metabolites and allows the adipocytes to function effectively. It is interesting to note that the subcutaneous adipose tissue of the lower trunk and the gluteal thigh region has a thin fascial plane dividing it into superficial and deep portions. Morphological differences are observed between these two adipose tissue layers The mechanical functions of the subcutaneous adipose tissue include allowing the overlying skin to move as a whole, both horizontally and vertically, and the attenuation and dispersion of externally applied pressure (Geerligs, 2010).

### 1.3 Types of Skin

The skin is the heaviest single organ in the body. Skin varies in thickness, color, and texture. There are two major types and they are given bellow-

**Thick and hairless**

Found on the palms and soles of feet in areas those are heavily used.

**Thin and hairy**

Found over most of the body (AMN Healthcare Education Services, 2004).

### 1.4 Function of skin

Skin is a complex organ system that has many important functions, as a protective barrier against external organisms, maintains temperature control, senses our surroundings, eliminates wastes, and synthesizes Vitamin D.

Skin is much more than an outer covering. It functions to maintain the body in homeostasis despite daily external assaults. It also stores fat and water, and plays a role in immunity from disease (AMN Healthcare Education Services, 2004).

Some of the skin's major protective functions are given bellow-

#### 1.4.1 Thermoregulation

The skin is secreting sweat from our sudoriferous (sweat) glands which help to maintain temperature control and this sweat helps to lower body temperature.

#### 1.4.2 Protection

The skin is the first layer of protection when it comes to invading organisms. It also helps protect against excessive water loss, chemicals and other harmful substances, and ultraviolet radiation.

### 1.4.3 Sensation

The skin has many nerve endings that send signals to the brain to transmit sensations such as touch, pain, pressure, and temperature.

### 1.4.4 Excretion

The skin helps relieve the body of wastes through perspiration. Perspiration secretes water, salt, and a small amount of organic chemicals.

### 1.4.5 Synthesis of Vitamin D

Vitamin D is required to allow the body to absorb calcium and phosphorus. When the skin is exposed to ultraviolet light or sunlight, it converts a vitamin D precursor to vitamin D via the liver and kidneys (AMN Healthcare Education Services, 2004).

## 1.5 Skin disease

### 1.5.1 Rash

Nearly any change in the skin's appearance can be called a rash. Most rashes are from simple skin irritation; others result from medical conditions. A rash indicates an abnormal change in skin color or texture. Rashes are usually caused by skin inflammation, which can have many causes. There are many types of rashes, including eczema, granuloma annulare, lichen planus, and pityriasis rosea.

- **Causes**

Most people taking targeted therapy drugs directed at the epidermal growth factor receptor (EGFR) develop a rash on the face and upper body. These drugs include afatinib (Gilotrif), cetuximab (Erbitux), erlotinib (Tarceva), gefitinib (Iressa), lapatinib (Tykerb), panitumumab (Vectibix), and vandetanib (Caprelsa). People taking sorafenib (Nexavar) or sunitinib (Sutent) can develop a rash that causes a warm or burning feeling on the face or scalp. With vemurafenib (Zelboraf), people may develop flat red spots on the upper body and face. Ipilimumab (Yervoy) can cause red bumps on the face and torso, as well as itching on the legs or entire body. People

taking everolimus (Afinitor) or temsirolimus (Torisel) may develop a bumpy rash on the arms and legs. Rashes generally go away after treatment stops (American Society of Clinical Oncology, 2015).

- **Clinical features**

- Itchiness
- Skin redness
- Dry, scaly, or crusted skin that might become thick and leathery from long-term scratching
- Formation of small, fluid-filled blisters that might ooze when scratched
- Infection of the areas where the skin has been broken (Web MD, 2017)

- **Treatment**

Rashes can be treated with medications, including over-the-counter creams and ointments containing the steroid hydrocortisone (for example, Cortizone-10, Cort-Aid, Dermarest Eczema, Neosporin Eczema). These products may help control the itching, swelling, and redness associated with eczema. Prescription-strength cortisone creams, as well as cortisone pills and shots, are also used for more severe cases of eczema (Hoffman, 2006).

### 1.5.2 Dermatitis

A general term for inflammation of the skin. Atopic dermatitis (a type of eczema) is the most common form.

**Atopic dermatitis (eczema)**

Usually beginning in infancy, this red, itchy rash most commonly occurs where the skin flexes inside the elbows, behind the knees and the front of the neck. When scratched, the rash can leak fluid and crust over. People with atopic dermatitis may experience improvement and then flare-ups.

**Contact dermatitis**

This rash occurs on areas of the body that have come into contact with substances that either irritate the skin or cause an allergic reaction, such as poison ivy, soap and essential oils. The red rash may burn, sting or itch. Blisters may develop.

**Seborrheic dermatitis**

This condition causes scaly patches, red skin and stubborn dandruff. It usually affects oily areas of the body, such as the face, upper chest and back. It can be a long-term condition with periods of remission and flare-ups. In infants, this disorder is known as cradle cap (Taylor, 2017).

- **Causes**

The causes of dermatitis vary depending on the type of dermatitis: Contact dermatitis occurs when you come in direct contact with an irritant or allergen. Common things that cause allergic reactions include detergents, cosmetics, nickel, poison ivy, and oak. Eczema is caused by a combination of factors like dry skin, environmental setting, and bacteria on the skin. It's often genetic, as people with eczema often have a family history of eczema, allergies, or asthma. Seborrheic dermatitis is likely caused by a fungus in the oil glands. It tends to get worse in the spring and winter. This type of dermatitis also appears to be genetic for some people. Stasis dermatitis occurs due to poor circulation in the body, most commonly the lower legs and feet. Certain things can trigger dermatitis and cause symptoms to flare, such as

- stress
- hormonal changes
- the environment
- irritating substances (George, 2017).

- **Clinical features**

- dry, scaly, flaky skin
- hives
- oozing blisters

- skin redness
- skin that appears darkened or leathery
- skin that burns
- extreme itching
- sun sensitivity
- swelling, especially in the eyes, face, or groin areas (Taylor, 2017).

- **Treatment**

**Cool compresses**

Apply a cool, damp cloth to the affected area. This can help control inflammation and itching. Soaking the cloth in saline or Burow's solution (a solution of aluminum acetate) can provide additional relief.

**Clean the affected area**

If you've come into contact with an irritating substance, wash it off as soon as possible. If you're unsure what caused the rash, taking a shower can reduce the likelihood of it lingering on the skin.

**Over-the-counter (OTC) ointments**

Anti-itch creams that contain aloe or calendula, natural ingredients that are anti-inflammatory agents, can ease itchiness and control inflammation. Some popular OTC brands include Aveeno, Cortizone-10, Lanacane, Gold Bond, and Caladryl (Marcin, 2016).

**Antihistamines**

Over-the-counter oral antihistamines like Benadryl, Zyrtec, or store-brand allergy medication might help with allergic dermatitis. If you're frequently experiencing contact dermatitis due to minor allergies, you can take a prescription allergy medication to prevent future outbreaks.

**Lukewarm baths**

Baths with uncooked oatmeal or medicated solutions are also recommended, especially for children. Water should be lukewarm, not hot or cold. Baking soda can be added to lukewarm water to help with dermatitis.

**Moisturizer and lotions**

Using a gentle, hypoallergenic, fragrance-free moisturizer can both soothe and prevent contact dermatitis. It can restore and protect your skin's outermost layer and relieve some itching. Lotions add a protective barrier that decreases irritation and cracking. They also make skin less susceptible to irritants like excessive heat and cold.

**Medications**

If your contact dermatitis is severe, your doctor may prescribe corticosteroid skin creams or ointments to reduce inflammation. Steroid creams are very common for people with skin conditions and are often available in low-dose, over-the-counter strengths. It's important to follow the directions because misuse can lead to more serious skin problems. In the most severe cases of skin allergy, prescription-strength corticosteroid creams or ointments can be applied to the skin to reduce inflammation. For whoidespread or severe allergic reactions, oral or injected corticosteroids may be prescribed. They are generally used for less than two weeks and then tapered off (Marcin, 2016).

### 1.5.3 Psoriasis

Psoriasis is one of the prototypic papulosquamous skin diseases characterised by erythematous papules or plaques with silvery scales. It is a chronic inflammatory skin disease with increased epidermal proliferation related to dysregulation of the immune system.

- **Causes**

- enlargement of blood vessels in the skin

- increase in white blood cells that stimulate the skin to produce new cells more quickly than usual
- increase in skin cells, T cells, and additional immune system cells
- accumulation of new skin cells on the surface of the skin
- development of the thick, scaly patches associated with psoriasis (Rachel et al, 2016).

- **Clinical Features**

**Plaque psoriasis**

The commonest form of psoriasis is plaque psoriasis in which patients may have sharply circumscribed, round-oval, or nummular (coin-sized) plaques. The lesions may initially begin as erythematous macules (flat and ,1 cm) or papules, extend peripherally, and coalesce to form plaques of one to several centimetres in diameter. A white blanching ring, known as Woronoff's ring, may be observed in the skin surrounding a psoriatic plaque.

**Flexural (inverse) psoriasis**

Psoriasis affecting the flexures, particularly inframammary, perineal, and axillary, is distinct morphologically from traditional plaques elsewhere on the trunk and limbs. Flexural lesions are devoid of scale and appear as red, shiny, well demarcated plaques occasionally confused with candidal, intertrigo, and dermatophyte infections (Langley et al, 2005).

**Erythroderma**

Total or subtotal involvement of the skin by active psoriasis is known as erythroderma and may take one of two forms. Firstly, chronic plaque psoriasis may gradually progress as plaques become confluent and extensive. Secondly, erythroderma may be a manifestation of unstable psoriasis precipitated by infection, tar, drugs, or withdrawal of corticosteroids. Erythroderma may impair the thermoregulatory capacity of the skin, leading to hypothermia, high output cardiac failure, and metabolic changes including hypoalbuminaemia, and anaemia due to loss of iron, vitamin B12, and folate (Langley et al, 2005).

**Generalised pustular psoriasis**

Generalised pustular psoriasis (von Zumbusch) is rare and represents active, unstable disease. Precipitants include withdrawal of systemic or potent topical corticosteroids and infections. The patient is pyrexial, with red, painful, inflamed skin studded with monomorphic, sterile pustules, which may coalesce to form sheets. Patients with generalised pustular psoriasis frequently need to be admitted to the hospital for management.

**Palmoplantar pustulosis**

Palmoplantar pustulosis presents as sterile, yellow pustules on a background of erythema and scaling affecting the palms and/or soles. The pustules are tender and fade to form dark brown coloration with adherent scale/crust. Palmoplantar pustulosis is frequently associated with psoriatic nail involvement. Approximately 25% of cases are associated with classic psoriasis vulgaris, but it is now believed that palmoplantar pustulosis may not be a form of psoriasis.The demographics of palmoplantar pustulosis are markedly different from those of chronic plaque psoriasis in that it more commonly affects women (9:1), presents most commonly between the ages of 40 and 60 years, and has a very striking association with smoking, either current or past, in up to 95% of subjects (Langley et al, 2005).

**Psoriatic nail disease**

Fingernails are more commonly affected than toenails. The commonest finding is small pits in the nail plate, resulting from defective nail formation in the proximal portion of the nail matrix. The nail may also detach from the bed at its distal or lateral attachments, known as onycholysis. Orange-yellow areas may be present beneath the nail plate and are termed ‘‘oil spots’’. In addition, the nail plate may become, thickened, dystrophic, and discolored. Yellow, keratinous material may collect under the nail plate and is known as subungual hyperkeratosis (Langley et al, 2005).

- **Treatment**

**Topical drugs**

Topical steroids, vitamin D analogues, tar, dithranol (which may have been withdrawn from the local market), keratolytics, calcineurin inhibitors, tazarotene (vitamin A analogue which is not available in the local market)

**UV light therapy**

UVB including nBUVB, PUVA, targeted phototherapy such as UVB delivered with the laser system (Excimer 308 nm)

**Traditional systemic therapy**

Methotrexate, systemic retinoid, cyclosporine A, (others include hydroxyurea, 6-thioguanine, mycophenolate mofetil, fumaric acid esters, these are less extensively used and their use is regarded off-label by the manufacturers, fumaric acid esters are not available in the local market)

**Biologic therapy**

Etanercept, infliximab, adalimumab which target TNF ; ustekinumab which targets IL-12 & 23 (King, 2010).

### 1.5.4 Acne

The most common skin condition, acne affects over 85% of people at some time in life. Acne is a chronic, inflammatory skin disease that results in whiteheads, blackheads, pimples, cysts, and nodules. It is not dangerous, but it can leave skin scars. Human skin has pores that connect to oil glands under the skin. Follicles connect the glands to the pores. Follicles are small sacs that produce and secrete liquid. The glands produce an oily liquid called sebum. Sebum carries dead skin cells through the follicles to the surface of the skin. A small hair grows through the follicle out of the skin. Pimples grow when these follicles get blocked, and oil builds up under the skin. They tend to appear on the face, back, chest, shoulders, and neck. Skin cells, sebum, and hair can

clump together into a plug. This plug gets infected with bacteria, and swelling results. A pimple starts to develop when the plug begins to break down.

- **Causes**

A range of factors triggers acne, but the main cause is thought to be a rise in androgen levels. Androgen is a type of hormone, the levels of which rise when adolescence begins. In women, it gets converted into estrogen. Rising androgen levels cause the oil glands under the skin to grow. The enlarged gland produces more sebum. Excessive sebum can break down cellular walls in the pores, causing bacteria to grow. Some studies suggest that genetic factors may increase the risk.

Other causes include:

- some medications that contain androgen and lithium
- greasy cosmetics
- hormonal changes
- emotional stress
- menstruation (Christian, 2017).

- **Clinical features**

- Whiteheads: These remain under the skin and are small.
- Blackheads: Clearly visible, they are black and appear on the surface of the skin.

- Papules: Small, usually pink bumps, these are visible on the surface of the skin.
- Pustules: Clearly visible on the surface of the skin. They are red at their base and have pus at the top.
- Nobules: Clearly visible on the surface of the skin. They are large, solid, painful pimples that are embedded deep in the skin.
- Cysts: Clearly visible on the surface of the skin. They are painful and filled with pus. Cysts can cause scars (Guy and Webster, 2014).

- **Treatment**

**i. Over the counter treatment:**

**Mild acne**

Mild acne can be treated with over-the-counter (OTC) medications, such as gels, soaps, pads, creams, and lotions, which are applied to the skin. Creams and lotions are best for sensitive skin. Alcohol-based gels dry the skin and are better for oily skin.

- **Resorcinol**: helps break down blackheads and whiteheads
- **Benzoyl peroxide**: kills bacteria, accelerates the replacement of skin, and slows the production of sebum
- **Salicylic acid**: assists the breakdown of blackheads and whiteheads and helps reduce inflammation and swelling
- **Sulfur**: exactly how this works is unknown
- **Retin-A**: helps unblock pores through cell turnover
- **Azelaic acid**: strengthens cells that line the follicles, stops sebum eruptions, and reduces bacterial growth. There is cream for acne, but other forms are used for rosacea (Christian, 2017).

**ii. Treating moderate to severe acne**

**Corticosteroid injection**

If an acne cyst becomes severely inflamed, it may rupture. This can lead to scarring. A specialist may treat an inflamed cyst by injecting a diluted corticosteroid. This can help prevent scarring, reduce inflammation, and speed up healing. The cyst will break down within a few days.

**Oral antibiotics**

Oral antibiotics may be prescribed for up to 6 months for patients with moderate to severe acne. These aim to lower the population of *P. Acnes*. The dosage will start high and reduce as the acne clears. *P. acnes* can become resistant to the antibiotic in time, and another antibiotic is needed. Acne is more likely to become resistant to topical rather than oral antibiotics. Antibiotics can

combat the growth of bacteria and reduce inflammation. Erythromycin and tetracycline are commonly prescribed for acne.

**Oral contraceptives**

Oral contraceptives can help control acne in women by suppressing the overactive gland. They are commonly used as long-term acne treatments. These may not be suitable for women who:

- have a blood-clotting disorder
- smoke
- have a history of migraines
- are over 35 years old

It is important to check with a gynecologist first (Christian, 2017).

**Topical antimicrobials**

Topical antimicrobials also aim to reduce *P. acnes* in patients with moderate to severe acne. Examples are clindamycin and sodium sulfacetamide. The dermatologist may prescribe a topical retinoid. Topical retinoids are a derivative of vitamin A. They unclog the pores and prevent whiteheads and blackheads from developing. Examples of topical retinoids prescribed in the U.S. are adapalene, tazarotene, and tretinoin.

**Isotretinoin**

This is a strong, oral retinoid, used for the treatment of severe cystic acne and severe acne that has not responded to other medications and treatments. It is a strictly controlled medication with potentially serious side effects. The patient must sign a consent form to say that they understand the risks. Adverse effects include dry skin, dry lips, nosebleeds, fetal abnormalities if used during pregnancy, and mood swings. Patients who take isotretinoin must avoid vitamin A supplements, as these could lead to vitamin A toxicity (Christian, 2017).

### 1.5.5 Cellulitis

Inflammation of the dermis and subcutaneous tissues, usually due to an infection. A red, warm, often painful skin rash generally results.

### 1.5.6 Skin abscess (boil or furuncle):

A localized skin infection creates a collection of pus under the skin. Some abscesses must be opened and drained by a doctor in order to be cured (Hoffman, 2006).

### 1.5.7 Rosacea

Rosacea is a chronic skin disease that affects more than 16 million Americans. The cause of rosacea is still unknown, and there is no cure. However, research has allowed doctors to develop a course of treatment that effectively controls rosacea by minimizing its symptoms. There are four subtypes of rosacea. Each subtype has its own set of symptoms. It is possible to have more than one subtype of rosacea at a time. Rosacea's trademark are small, red, pus-filled bumps on the skin that are present during flare-ups. Typically, rosacea affects only skin on your nose, cheeks, and forehead. Flare-ups often occur in cycles. This means that you will experience symptoms for weeks or months at a time, the symptoms will go away, and then they will return.

- **Causes**

The cause of rosacea has not been determined. It may be a combination of hereditary and environmental factors. It is known that some things may make your rosacea symptoms worse. These include:

Eating spicy foods, drinking alcoholic beverages, having the intestinal bacteria *Helicobacter pylori*, a skin mite called demodex and the bacterium it carries, *Bacillus oleronius*, the presence of cathelicidin (a protein that protects the skin from infection) (Shannon, 2016).

- **Clinical Feature**

Rosacea symptoms are different between each subtype.

**Signs of rosacea ETR**

Flushing and redness in the center of your face, visible broken blood vessels, swollen skin, sensitive skin, stinging and burning skin, dry, rough, and scaly skin

**Signs of acne rosacea**

Acne-like breakouts and very red skin, oily skin, sensitive skin, broken blood vessels that are visible, raised patches of skin

**Signs of thickening skin**

Bumpy skin texture, thick skin on nose, thick skin on chin, forehead, cheeks, and ears, large pores, visible broken blood vessels

**Signs of ocular rosacea**

Bloodshot and watery eyes, eyes that feel gritty, burning or stinging sensation in the eyes, dry, itchy eyes, eyes that are sensitive to light, cysts on eyes, diminished vision, broken blood vessels on eyelids (Shannon, 2016).

- **Treatment**

Avoid product that contain: Alcohol, menthol, witch hazel, exfoliating agents

Other management steps include: Avoiding direct sunlight and wearing sunscreen, avoiding drinking alcohol, using lasers and light treatment to help with some severe cases of rosacea, microdermabrasion treatments to reduce thickening skin, taking eye medicines and antibiotics for ocular rosacea (Shannon, 2016).

### 1.5.8 Warts

A virus infects the skin and causes the skin to grow excessively, creating a wart. Warts may be treated at home with chemicals, duct tape, or freezing, or removed by a physician.

### 1.5.9 Melanoma

The most dangerous type of skin cancer, melanoma results from sun damage and other causes. A skin biopsy can identify melanoma.

### 1.5.10 Basal cell carcinoma

The most common type of skin cancer. Basal cell carcinoma is less dangerous than melanoma because it grows and spreads more slowly (Hoffman, 2006).

### 1.5.11 Seborrheic keratosis

A benign, often itchy growth that appears like a "stuck-on" wart. Seborrheic keratoses may be removed by a physician, if bothersome.

### 1.5.12 Actinic keratosis

A crusty or scaly bump that forms on sun-exposed skin. Actinic keratoses can sometimes progress to cancer.

### 1.5.13 Squamous cell carcinoma

A common form of skin cancer, squamous cell carcinoma may begin as an ulcer that won't heal, or an abnormal growth. It usually develops in sun-exposed areas.

### 1.5.14 Herpes

The herpes viruses HSV-1 and HSV-2 can cause periodic blisters or skin irritation around the lips or the genitals.

### 1.5.15 Hives

Raised, red, itchy patches on the skin that arise suddenly. Hives usually result from an allergic reaction.

### 1.5.16 Tinea versicolor

A benign fungal skin infection creates pale areas of low pigmentation on the skin.

### 1.5.17 Viral exantham

Many viral infections can cause a red rash affecting large areas of the skin. This is especially common in children (Hoffman, 2006).

### 1.5.18 Shingles (herpes zoster)

Caused by the chickenpox virus, shingles is a painful rash on one side of the body. A new adult vaccine can prevent shingles in most people

### 1.5.19 Scabies

Tiny mites that burrow into the skin cause scabies. An intensely itchy rash in the webs of fingers, wrists, elbows, and buttocks is typical of scabies.

### 1.5.20 Ringworm

A fungal skin infection (also called tinea). The characteristic rings it creates are not due to worms (Hoffman, 2006).

## 1.6 Skin Treatments

### 1.6.1 Corticosteroids (steroids)

Medicines that reduce immune system activity may improve dermatitis. Topical steroids are most often used.

### 1.6.2 Antibiotics

Medicines that can kill the bacteria causing cellulitis and other skin infections.

### 1.6.3 Antiviral drugs

Medicines can suppress the activity of the herpes virus, reducing symptoms.

### 1.6.4 Antifungal drugs

Topical creams can cure most fungal skin infections. Occasionally, oral medicines may be needed.

### 1.6.5 Antihistamines

Oral or topical medicines can block histamine, a substance that causes itching.

### 1.6.6 Skin surgery

Most skin cancers must be removed by surgery.

### 1.6.7 Immune modulators

Various drugs can modify the activity of the immune system, improving psoriasis or other forms of dermatitis.

### 1.6.8 Skin moisturizers (emollients)

Dry skin is more likely to become irritated and itchy. Moisturizers can reduce symptoms of many skin conditions (Hoffman, 2006).

## 1.7 Epidemiology

Skin cancer, including both malignant melanoma (MM) and non-melanoma skin cancer (NMSC), represents the most common malignancy in Caucasians. The incidence of both MM and NMSC is on the rise, with an annual increase in MM of 0.6% among adults over 50 years. The estimated number of new cases of skin melanoma in 2016 is 76,380, which represents 4.5% of all new cancer cases. Deviations in reported incidence rates exist and are attributed to varying risk factors amongst different populations, as well as discrepancies in national registration systems. Furthermore, the incidence of melanoma may be even higher than indicated, as the

National Cancer Registries has reported an underestimation of its incidence in certain countries (Zoe, 2016).

Overall, skin cancer is the most common type of cancer; nonmelanoma accounts for over 5.4 million cases in more than 3.3 million people in the United States. It is estimated that the incidence of malignant melanoma in Europe and the United States has almost tripled in the last 30 years. Over the last 30 years, more people have had skin cancer than all other cancers combined; he also states that 1 in 5 people will develop skin cancer over the course of his or her lifetime. It is estimated that one person will die from melanoma every hour, and while melanoma accounts for less than 1% of skin cancer cases, melanoma accounts for the majority of deaths that result from skin cancer. It has been determined that 86% of melanomas come from over exposure to the sun, and an individual's risk for melanoma doubles if he or she has experienced multiple sunburns. The American Academy of Dermatology states that melanoma has a high prevalence in Australia and New Zealand, but is less common in Asia, Africa, and Latin America. Melanoma is more common in men than it is in women and is mostly found in Caucasian individuals. Men have a higher incidence rate of melanoma than women, since the incidence rate in men aged 80 and older is three times higher than that Skin Cancer 6 of women aged 80 and older. The incidence rate is much higher in Caucasian individuals than it is in African Americans and Hispanics. In Hispanics, the incidence rate is 4 per 100,000, in African Americans the incidence rate is 1 per 100,000; however, in Caucasians, the incidence rate is 25 per 100,000. The incidence rates of melanoma have increased in Caucasian women younger than 40 by 6.1% every year, which may be due to the increasingly popular use of indoor tanning and artificial UV light (Queen, 2017).

A total of 95,983 patients presented in the outpatient Department of Dermatology, King Edward Medical University Mayo Hospital Pakistan. Out of this sample, 24,302 patients repeatedly came to the hospital for a follow up visit related to their diseases, while 71,681 were enrolled as new cases. This group comprised 58% females and 42% males; most patients were in the 20 to 40 years age group. Out of 71,681, eczema was diagnosed in 22,275 (31.07%), infections including bacterial, viral, fungal, sexually transmitted infections (STIs) in 20,178 (28.16%), acne 7910 (11.03%), drug reactions 4830 (6.74%), urticaria 2910 (4.06%), and pigmentary disorders such as lichen planus, melasma and vitiligo were reported in 2739 (3.82%) cases. In addition,

psoriasis was reported in 2724 (3.80%), bullous disorders in 1187 (1.66%) and connective tissue disorders in 645 (0.90%). The majority of patients presented with advanced eczema and infectious diseases (Shahbaz et al, 2017).

# Chapter 2
# Literature Review

## 2.1 Awareness of Risk Factors for Skin Infections and its Impact on Quality of Life among Adults in a Malaysian City: A Cross-Sectional Study

To explore the level of awareness of risk factors related to skin infection and its impact on quality of life (QoL) in Klang, Malaysia. A cross-sectional study was conducted among adults in Klang, Malaysia using a validated questionnaire and Dermatology Quality of Life Index (DLQI). A stratified and convenient sampling technique was executed. Multivariate analysis was employed to summarize significant relationships between variables. The prevalence of skin infection was 59 %. A majority (51.9 %) of the participants had experienced or claimed to have bacterial infections of the skin. More than 50 % of them were aware of the risk factors for skin infection. Several significant associations ($p < 0.05$) between variables of awareness of risk factors associated with skin infection and QoL were documented. Conclusion: Awareness of the risk factors contributing to skin infection do play a major role in improving basic understanding of skin infections and quality of life among Malaysians in Klang (Ramamuthie et al, 2015).

## 2.2 The pattern of skin and venereal disorders among patients attending in the OPD of dermatology and venereology department of a tertiary care private hospital, Dhaka, Bangladesh

It is a descriptive study conducted at dermatology and venereology OPD department in Ibn Sina Medical College Hospital, Dhaka for the period from 1st January, 2015 to 31st December 2015. Six thousand and two hundred and three patients were enrolled during the study period. The study population comprised of newly diagnosed cases as well as relapsing cases presenting in the outpatient irrespective of gender and age. Diagnosis was made on clinical basis. Lab investigations were restricted to the cases where it carried diagnostic importance. The data was collected through pre-designed questionnaire and analyzed through Microsoft SPSS.

Study was conducted on 6203 patients comprising 3373 (54.4%) males and 2830 (45.6%) females. Male female ratio was 1.2:1. Age group between 15 to 29 years carried maximum incidence (43.8%). All disorders were broadly classified into noninfective (63.5%), infective (20.2%) and miscellaneous dermatoses (16.2%). Eczema 1721 (27.7%) and fungal infections 694 (11.2%) came out to be the two top most common causes for OPD attendances.

Study found a higher prevalence of non-infective dermatoses than infective dermatoses. Eczema and fungal infections formed the largest group in their respective categories (Alam, Husain and Quarashi 2017).

### 2.3 Development and validation of a patient-reported outcome instrument for skin involvement in patients with systemic sclerosis

They developed a patient-reported outcome (PRO) instrument to assess the skin-related quality of life in patients with systemic sclerosis (SSc). 140 participants completed the SSPRO: mean age was 53.4 years, median disease duration was 5 years, 82.1% were female and 32.9% had diffuse cutaneous SSc. EFA supported four factors in SSPRO corresponding to hypothesised constructs: physical effects, physical limitations, emotional effects and social effects. Removal of 4/22 items resulted in acceptable goodness-of-fit statistics. Test–retest reliability (intraclass correlation coefficient=0.61–0.83) was moderate to high and internal consistency (Cronbach's α=0.89–0.96) was high. SSPRO correlated strongly with other participant-reported measures (r=0.59–0.88) suggesting construct validity, and less well with physician-assessed measures (r=0.31–0.40). SSPRO scores were significantly different for each level of participant-reported skin severity, and for limited versus diffuse cutaneous SSc. SSPRO has been developed with extensive patient input and demonstrates evidence for reliability and validity. It is complementary to existing measures of SSc skin involvement with emphasis on the patient's experience. Further research is needed to assess its sensitivity to change (Ada et al, 2017).

### 2.4 Impaired quality of life in systemic sclerosis and patient perception of the disease: A large international survey

The purpose of this study was to assess health-related quality of life (HRQoL) and disease perception in a large, international group of patients with systemic sclerosis(SSc). A total of 1902 patients from 60 countries were included. HRQoL appeared to be impaired in SSc, particularly for physical health (PCS, mean ± SD = 43.4 ± 23.4). SSc patients also had strong perceptions about the chronic nature and negative consequence of the disease, and experienced negative emotions due to SSc. Patients with diffuse cutaneous SSc had a poorer HRQoL than those with limited cutaneous SSc, for both physical (PCS, mean ± SD = 46.6 ± 23.7 vs. 39.8 ±

22.3; $p < 0.0001$) and mental components (MCS, mean ± SD = 53.8 ± 23.0 vs. 50.3 ± 23.2; $p = 0.003$). Late-stage SSc patients were more likely to perceive their disease chronic ($p< 0.0001$), less controllable ($p = 0.03$) and with more consequences ($p = 0.008$), but they had a better understanding of their disease and experienced fewer negative emotions. Raynaud's phenomenon and gastrointestinal complications were the organ involvements with the greatest impact on QoL, they were the two variables associated with the most negative perception of illness severity. This study, performed on the largest group ever set up for this purpose, confirms the major impact on QoL and the negative perceptions of their disease expressed by SSc patients. However, the perception of this illness tended to improve with disease duration, suggesting that patients find effective coping strategies (Camelia et al, 2016).

### 2.5 Occupational skin diseases

Occupational skin diseases are the most commonly reported notifiable occupational diseases. In Germany, 23 596 out of a total of 71 263 reported occupational diseases in 2010 were classified as occupational skin diseases (BK No. 5101: "severe or recurrent skin diseases which have forced the person to discontinue all occupational activities that caused or could cause the development, worsening, or recurrence of the disease"). Contact dermatitis (allergic, irritant) of the hands is the most common skin disease and atopic skin diathesis is often an important co-factor. The number of work-related skin diseases is many times higher than the number of notified occupational dermatoses. This CME article explains the legal framework of occupational diseases, the tasks and obligations of the legal statutory work insurance. Typical allergens and irritants of high risk professions are also presented as are the important steps from diagnosis to compensation. Early prevention of occupational skin diseases is very important to avoid severe chronic hand eczema. Therefore the "dermatologist's report" is crucial. Other occupational dermatoses (outside of BK 5101) are briefly mentioned. In recent years the number of notifications of occupational skin cancer due to occupational UV-irradiation has increased. According to recent epidemiological findings, there is a significant and consistent positive association between occupational UV-irradiation and squamous cell carcinoma. Therefore, an important criterion for a new occupational disease is fulfilled (Thomas and diepgen, 2011).

## 2.6 Measurement Properties of Skindex-16: A Brief Quality-of-Life Measure for Patients with Skin Diseases

To construct a single-page version of Skindex (a dermatologic quality-of-life instrument) that would have two new features compared with the current 29-item version: (1) fewer items to which a majority of patients choose the same response, and (2) measurement of *bother* rather than frequency of patient experiences. Random samples of patients waiting for dermatology appointments in clinics of Veterans Affairs hospitals and in private dermatology practices completed questionnaires; 692 patients responded to the parent instrument and 541 additional patients responded to the brief version. Reproducibility, internal consistency reliability, validity, and responsiveness of the brief version of Skindex were determined. For 16 items of the current 29-item version (55%), more than 50% of patients responded "Never." After an explicit process of item analysis and elimination, a single-page 16-item version was composed that asks patients about bother from their experiences; responses are reported as three scales, Symptoms, Emotions, and Functioning. For 6 items of the 16-item version (38%), more than 50% of patients responded "Never." Scale scores were reproducible after 72 hours ($r$ = 0.88–0.90) and were internally reliable (Cronbach's a = 0.86–0.93). The instrument demonstrated both content and construct validity: Most patients' responses to an open-ended question about their skin disease was addressed by the items; patients with inflammatory dermatoses had higher scores than those with isolated lesions; and in an exploratory principal axes factor analysis with an oblique rotation, 74% of the common variance was explained by three factors that correlated with the *a priori* scales. Mean scale scores stayed the same or changed in the expected direction in patients who reported that their skin was the same or had improved (Mary et al, 2001).

## 2.7 Pattern of Skin Diseases in a Geriatric Patient Group in Taiwan: A 7-Year Survey from the Outpatient Clinic of a University Medical Center

Geriatric health care has become a worldwide concern, but relatively few statistical studies are available about geriatric skin diseases. Moreover, no information exists regarding skin disorders among the elderly population in Taiwan that has become a geriatric country. To determine the characteristic pattern and the prevalence of various skin disorders for the elderly who visited the National Taiwan University in the last 7 years. Using a database from the Dermatology

Outpatient Clinic of the National Taiwan University Hospital, 1993–1999 file, we conducted a retrospective cross-sectional study by evaluating the age, proportion, and gender of each specific cutaneous disease category, $\chi^2$ tests were used for analyzing statistical significance. The analysis supplied odds ratios and 95% confidence intervals. A total of 16,924 patients aged 65 years and older, which constituted 11% of the total patients seen at the Clinic of Dermatology from 1993 through 1999, were studied. The male to female ratio was 1.3 to 1. The most common cutaneous disorder in the elderly was dermatitis (58.7%), followed by fungal infections (38.0%), pruritus (14.2%), benign tumors (12.8%), and viral infections (12.3%). Cutaneous malignant tumors were found in 2.1%. Basal cell carcinoma occurred in 29.8%, actinic keratosis in 22.4%, Bowen's disease in 13.3% and squamous cell carcinoma 13.3%. Interestingly, our cases of extramammary Paget's disease showed a male predominance. Most melanomas were acral lentiginous melanoma located on the soles. The prevalence of common diseases in elderly patients compared with those outpatients of less than 65 years showed a 3-fold increased risk for pruritus. Moreover, the pattern of geriatric skin diseases in Taiwan was significantly different from Western countries. The prevalence of skin diseases in elderly patients emphasizes the importance of health education in geriatric people in Taiwan concerning appropriate use of emollients, proper foot care, sun protection and early detection of skin cancers (Liao et al, 2001).

### 2.8 A clinical study of melasma and assessment of Dermatology Life Quality Index at a tertiary health care center in South India

Melasma is a common acquired hypermelanosis, notorious for its recalcitrant nature. Though benign in nature, it could significantly affect the quality of life in some patients. Therefore,apart from pharmacologic management in cases of resistant melasma, the need for psychologic counseling would be imperative to improve the quality of life in such patients. To analyze the clinical patterns of melasmaalong with all other demographic parameters followed by Wood's lamp(WL)examination, Melasma Area and Severity Index (MASI) scoring and assessment of Dermatology Life Quality Index (DLQI) in all the participants of our study. A prospective, observational and descriptive study done over a period of 7 months in 175 freshly diagnosed females with melasma above 18 years of age. Majority of the patients with melasma were in the 31–40 year age group (44%), followed by 21–30 (26.9%) and 41–50 (16.6%) years. The duration of melasma in most of our patients was below 1 year. Sunlight (48.5%) appeared to be the major

precipitating factor followed by cosmetics (22.2%). A significant association with hypothyroidism was demonstrated amongs to or participants. A positive family history was noted in 54.85% of the study subjects. The dermal variant was the most common type of melasma that was observed. The mean MASI score observed was 5.3 and the mean DLQI seen in our study was 1.46. Melasma is common in middle-aged females. Solar radiation constitutes a major risk factor for melasma. Hypothyroidism appears to have a significant association with melasma. It is important to evaluate the DLQI in all patients with melasma to holistically manage these patients (Suthanther et al, 2016).

## Significance of the study

While skin diseases are very common among the populations in many developing countries, they have not been regarded as a significant problem that could benefit from public health measures. Indeed, more attention is frequently given to some less common health problems in the same countries. This attitude is due to the assumption that skin diseases are a benign, not life-threatening minor nuisance, and that they do not merit measures that may appear out of proportion to their low priority. However, at least in some countries, there seems to be a high demand by patients and healthcare workers for more consideration to be given to skin diseases (World Health Organization, 2005).

Skin disease here refers to disorders of exclusively (or predominantly) the superficial layers of the skin. Diseases with occasional or accessory skin features – such as leprosy, endemic treponematoses, or different varieties of filariasis – are not included as there is already an abundant literature on them. Other disorders that are excluded, despite the frequent presence of skin features, are measles, chickenpox, and dengue fever. Deep skin and soft tissue infections (e.g. erysipelas, cellulitis and abscess) are not considered although they may be cited in the context of, for example, complications of superficial infections. This applies also to burns and traumatic sores (World Health Organization, 2005).

The pattern and distribution of skin diseases differ from one country to another country and in various regions within the same country. Some factors like genetics, environment, race, religion, occupation, nutrition and habit can influence the pattern of skin diseases. Geographical factors such as season and climate also contribute to the increased prevalence of certain type skin disorders in a particular area (Alam, Husain and Quarashi 2017).

As disease pattern varies in different part of the country, we decided to undertake a retrospective analysis of skin disease pattern observed in private Medical Hospitals, a tertiary care hospital in Dhaka, Bangladesh

## Aims and Objectives of the study

The aims and objectives of this study were to:

- To determine the types of skin diseases prevailing among patients in private hospitals.
- To determine the level of awareness, attitudes and practices of patients associated with skin diseases.
- To assess the impact of skin diseases on the quality of life of the patients.

# Chapter 3
# Methodology

### 3.1 Types of the study

It was a survey based study.

### 3.2 Study Area

The survey was conducted in three private hospitals in different areas inside Dhaka city. The hospitals were

1. Birdem General Hospital

2. Labaid Hospital

3. Bangladesh Medical College Hospital

### 3.3 Study Population

In this study, a total number of 148 patients of different private hospitals were surveyed with a questionnaire in order to assess the awareness and knowledge regarding skin disease. Informed consent was obtained from the eligible participants before interviewed and participants who agreed to join the study provided the required information for the studies.

### 3.4 Study Period

The study duration was one year starting from January to December in 2017 and data collection was starting from August to November in 2017.

### 3.5 Questionnaire Development

The questionnaire was specially designed to collect the simple background data and the needed information. The questionnaire was written in simple English in order to avoid unnecessary semantic misunderstanding. The questionnaire was survey based to ensure it was understandable by the participants.

### 3.6 Sampling Technique

In this study purposive sampling technique was followed.

### 3.7 Data Analysis

After collecting, the data were checked and analyzed with the help of Microsoft Excel 2010. The result was shown in bar, pie and column chart and calculated the percentage of the awareness and disease regarding skin disease among the patients.

# Chapter 4
# Results

### 4.1 Gender distribution

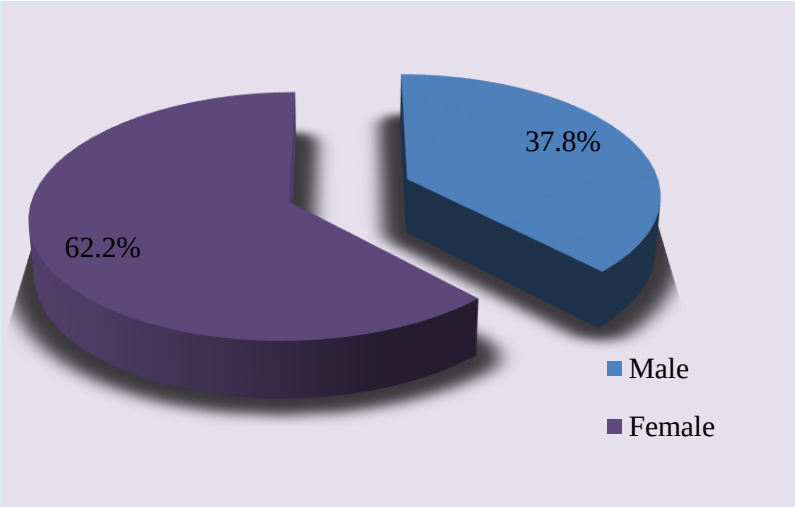


**Figure 4.1: Gender distribution**

From the above pie chart, it can be concluded that majority (62.2%) patients were female and 37.8% patients were male.

### 4.2 Age distribution

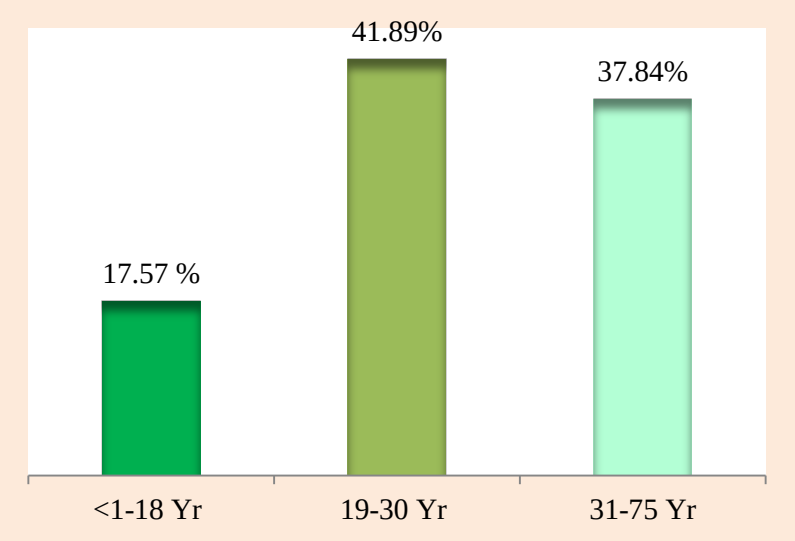


**Figure 4.2: Age distribution**

From the above graphical representation maximum (41.89%) patients were in the age group of 19-30years and 17.57% patients were in the age group of <1-18 years.

### 4.3 Living areas

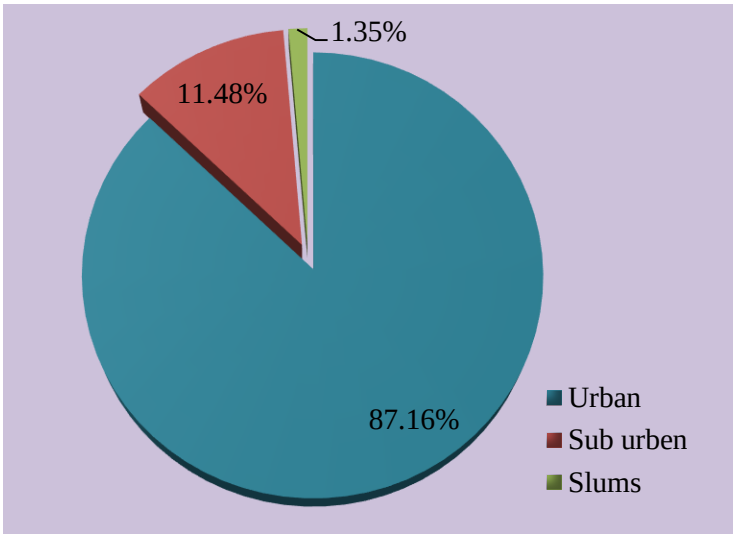


**Figure 4.3: Living areas of the patients**

It was observed that 87.16% patients were living in urban areas and 11.48% patients were living in sub urban areas.

### 4.4 Locality of the environment

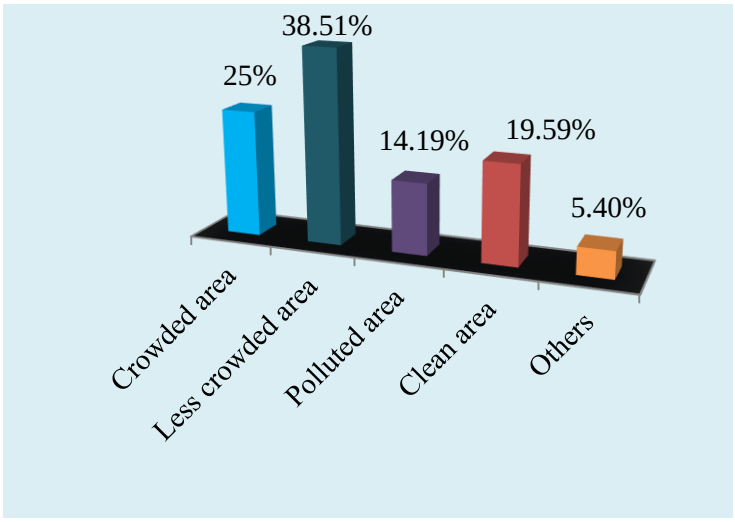


**Figure 4.4: Locality of the environment**

During the study 38.51% patients lived in less crowded areas whereas 25% lived in crowded areas and on the other hand 14.19% patients stay in polluted areas.

### 4.5 Number of family members

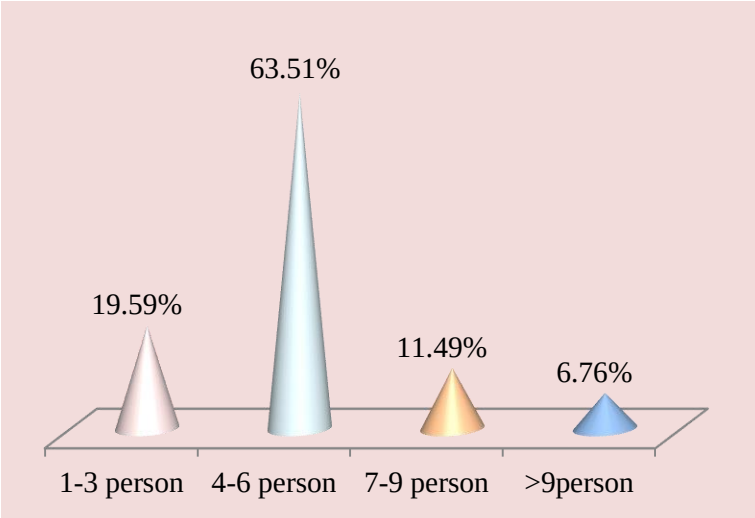


**Figure 4.5: Number of family members**

In the above graphical representation, 63.51% patients had in between the range of 4-6 persons in their family members and 6.76% patients had more than 9 people in their family.

### 4.6 Monthly income

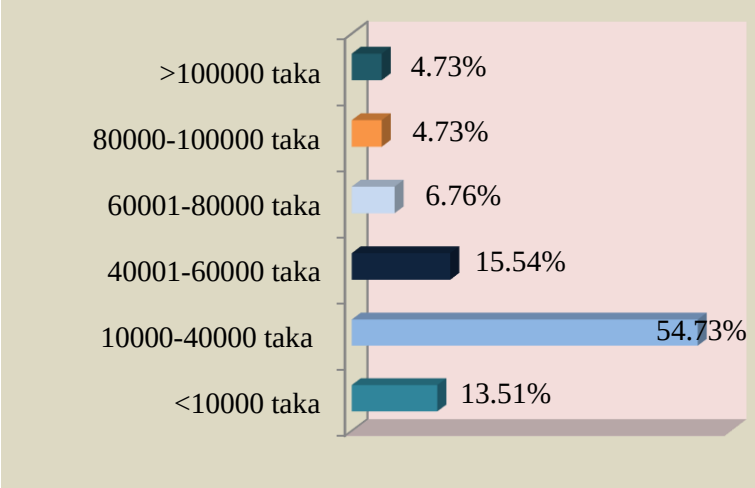


**Figure 4.6: Monthly income**

It was observed that 54.73% patients had in between (10000-40000) Taka, however 4.73% had (80000 - >100000) taka income per month.

### 4.7 Educational background

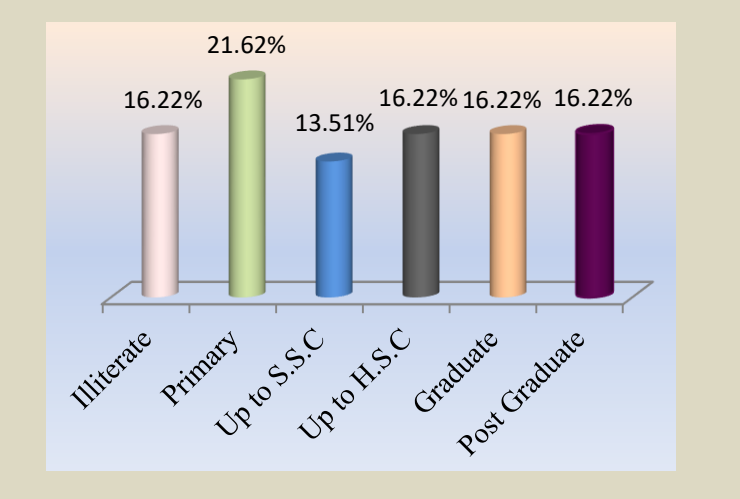


**Figure 4.7: Educational backgrounds**

During the study it was observed that maximum (21.62%) patient's studied till primary education whereas (16.22%) equal proportion of patient were distributed among till H.S.C, Graduate, post graduate educational level.

### 4.8 Occupations

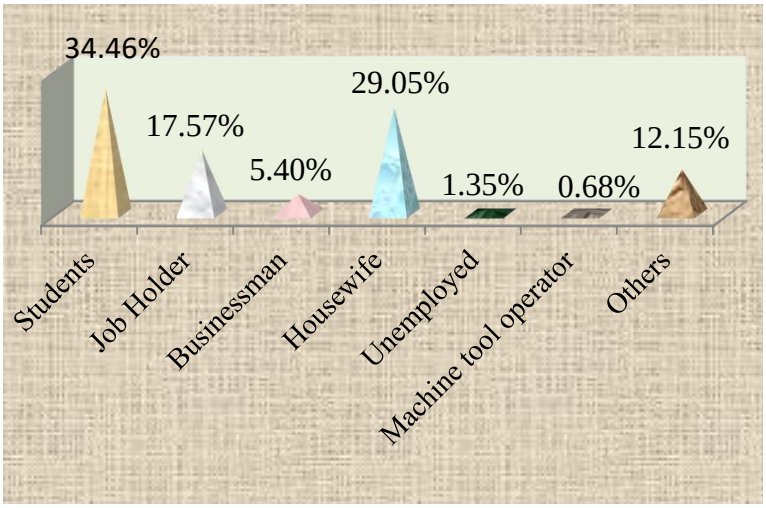


**Figure 4.8: Occupations**

From the above graphical representation, it can be concluded that majority of the patients were students (34.46%), job holder (17.57%) and housewife (29.05%).

### 4.9 Environment at work place

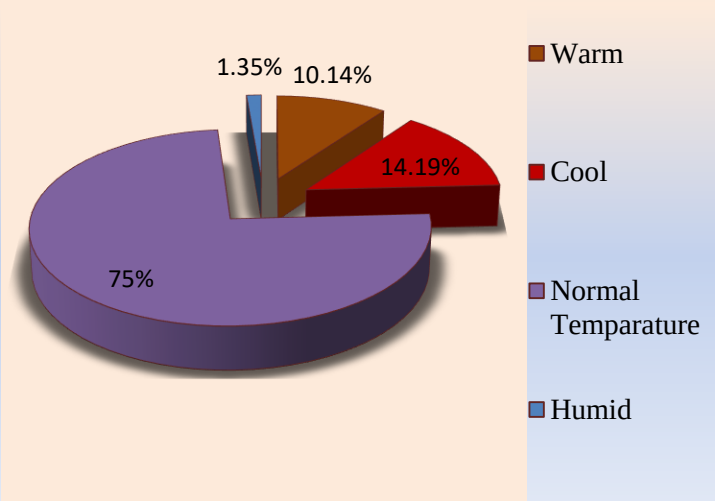


**Figure 4.9: Environment at work place**

In the pie chart we can see that 75% patients work in normal temperature while 14.19% and (10.14%) patients work at cool and warm temperature respectively.

### 4.10 Types of skin diseases

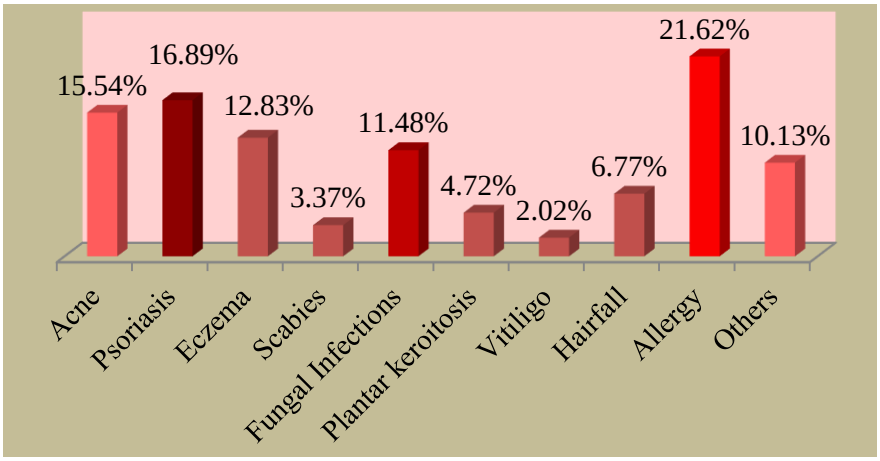


**Figure 4.10: Types of skin diseases**

The above graph depict different disease among the patients where the highest number of (21.62%) patients had allergy, 16.89% had psoriasis, 15.54% suffered from acne and 11.48% had fungal infections.

### 4.11 Types of skin

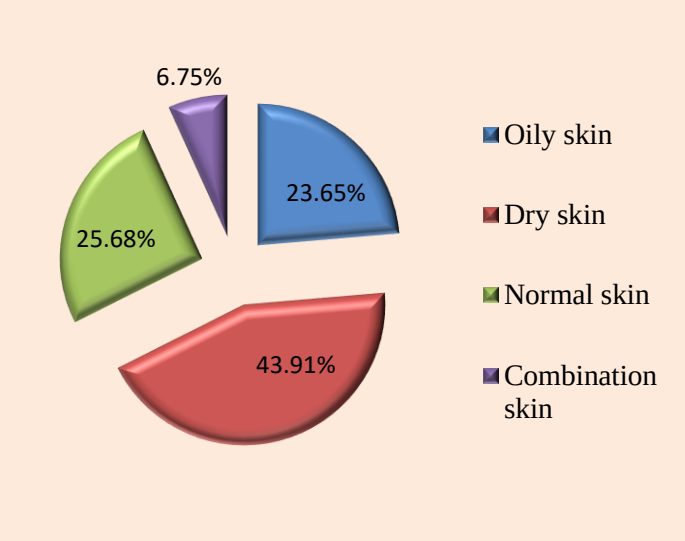


**Figure 4.11: Types of skin**

From the above pie chart it is clear that the majority (43.91%) of patients' had dry skin, 25.68% had normal skin and 23.65% had oily skin.

### 4.12 Seasonal influence

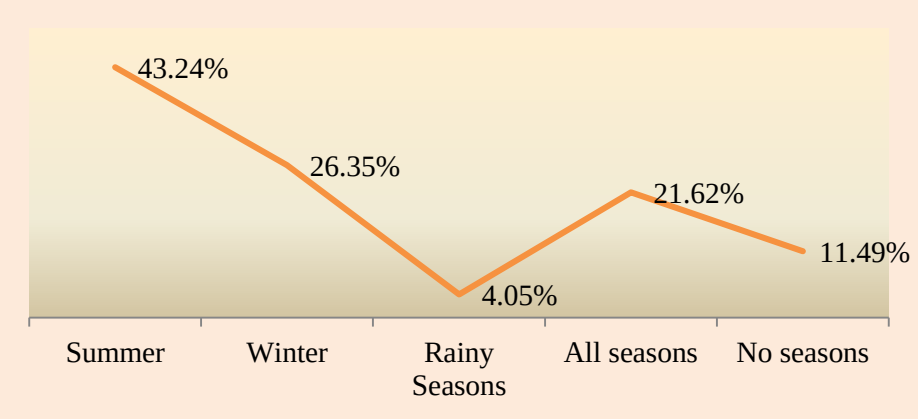


**Figure 4.12: Seasonal influence**

The given graph illustrates the seasonal influence on the occurrence of skin problems among the patients. Summer had the maximum effect on skin 43.24%, compared to winter season which had a relatively lower effect 26.35% meanwhile only 21.62% patients had skin diseases effect in all seasons.

### 4.13 Effect of external environment

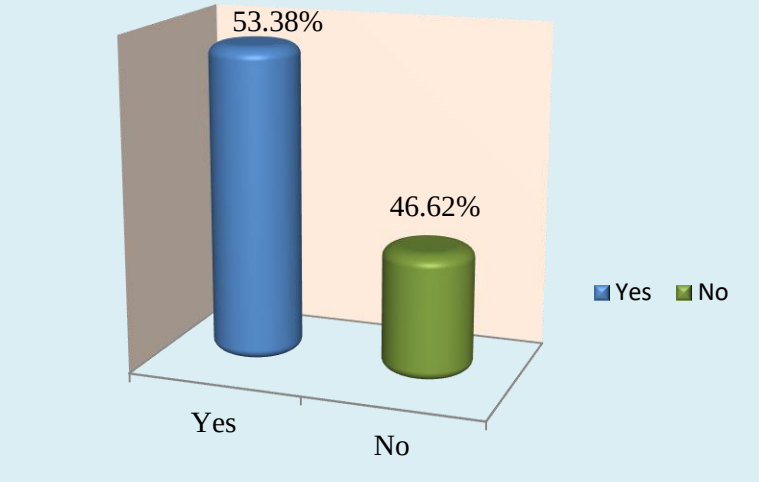


**Figure 4.13: Effect of eternal environment**

When we asked about the effect of external environment than 53.38% agreed about the influence of environment outside home.

### 4.14 Knowledge about the risk factor about infection

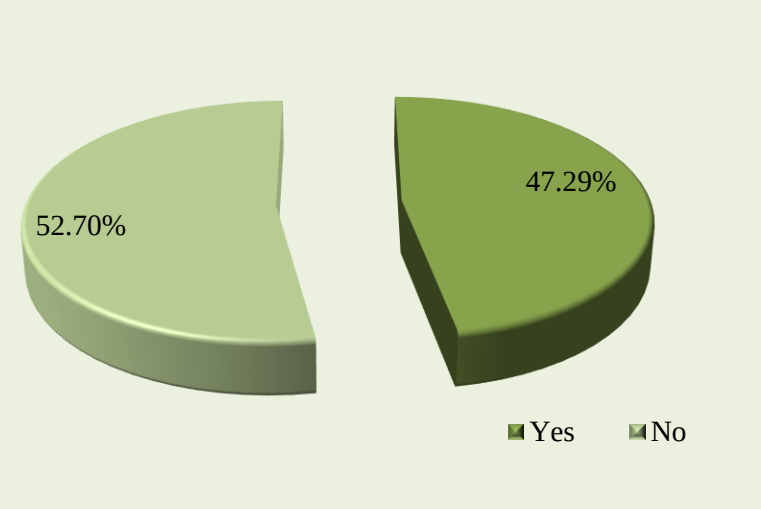


**Figure 4.14: Knowledge about the risk factor about infection**

About 52.70% patients were aware about the risk factors for skin diseases while 42.29% patients were not aware about the risk factors.

### 4.15 Risk factors for infection (N=70)

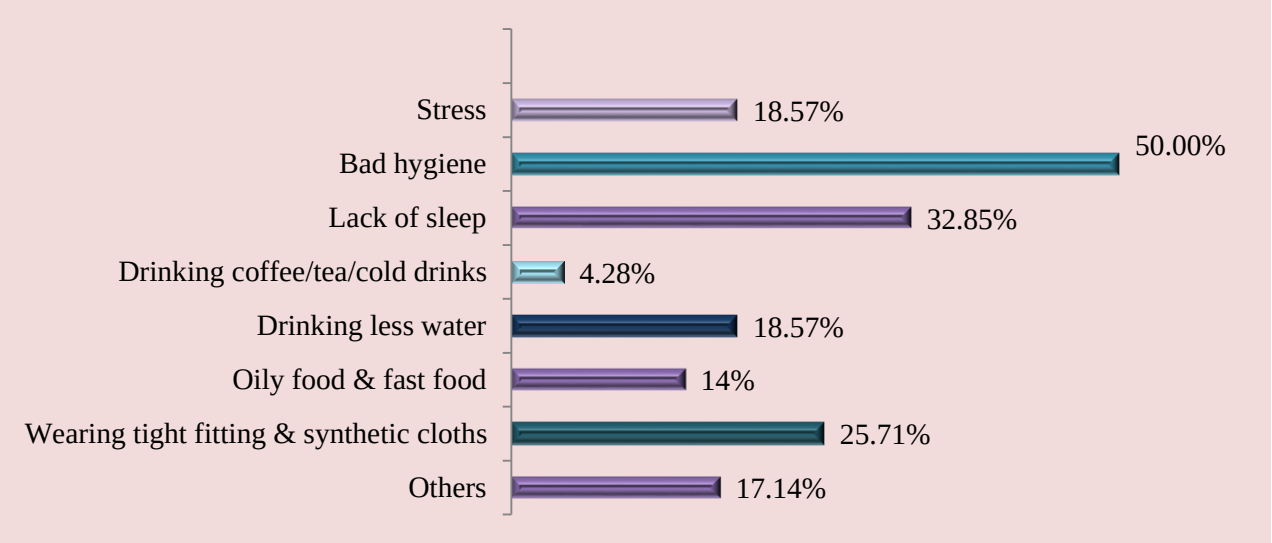


**Figure 4.15: Risk factors for infection**

The bar charts depict the risk factors for infections, where 50% patients risk factors had bad hygiene, 32.85% suffered from lack of sleep, 25.71% were wearing tight fitting cloths and 18.57% patients did not had access to sufficient water.

### 4.16 Types of preferable cloths

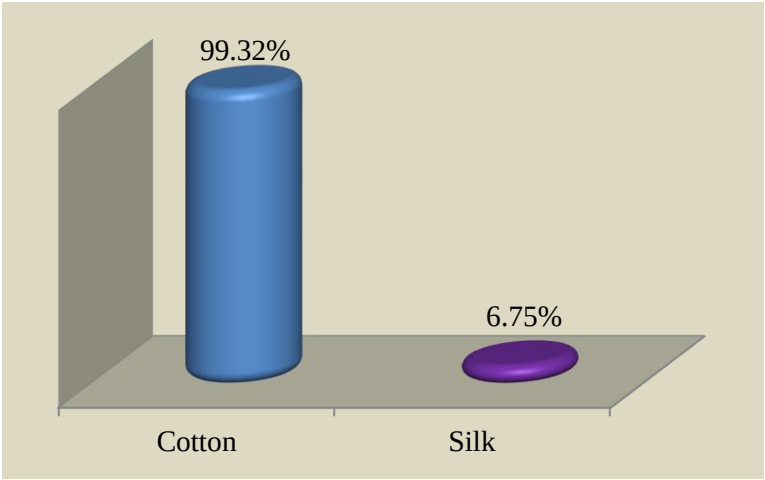


**Figure 4.16: Types of preferable cloths**

From the above graph we can see that almost all the 99.32% patients were comfortable with cotton cloths.

### 4.17 Use of Cosmetics products

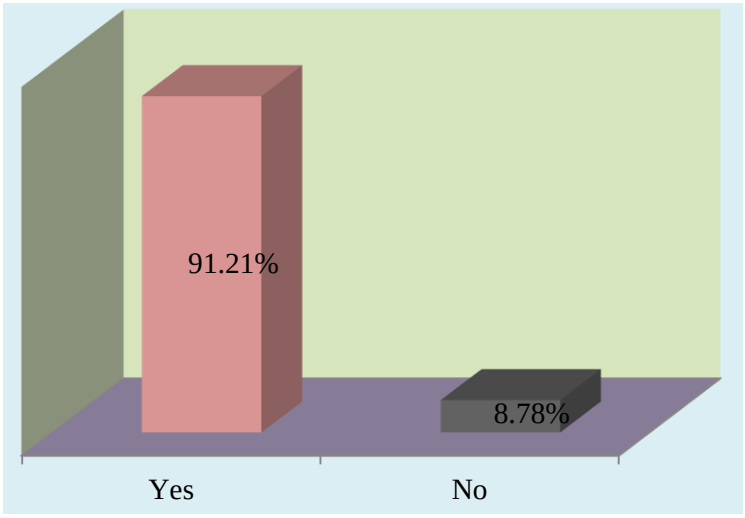


**Figure 4.17: Use of Cosmetics products**

In this study we wanted to distinguish whether patients use cosmetics products or not and 91.21% patients answered “Yes” and only 8.78% patients answered “No”.

### 4.18 Preferable Brand of cosmetics products (N=135)

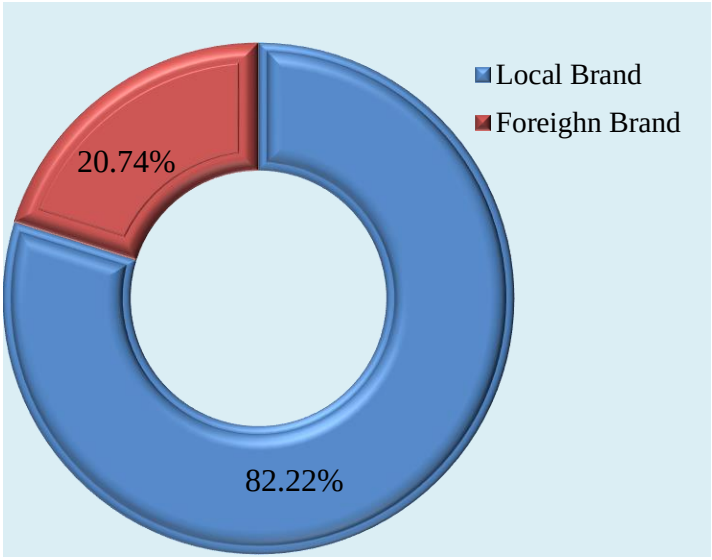


**Figure 4.18: Preferable Brand of cosmetics products**

The above graph represents that 82.22% patients preferred local brand of cosmetics and 20.74% use foreign brand of cosmetics.

### 4.19 Types of foods consumption mostly

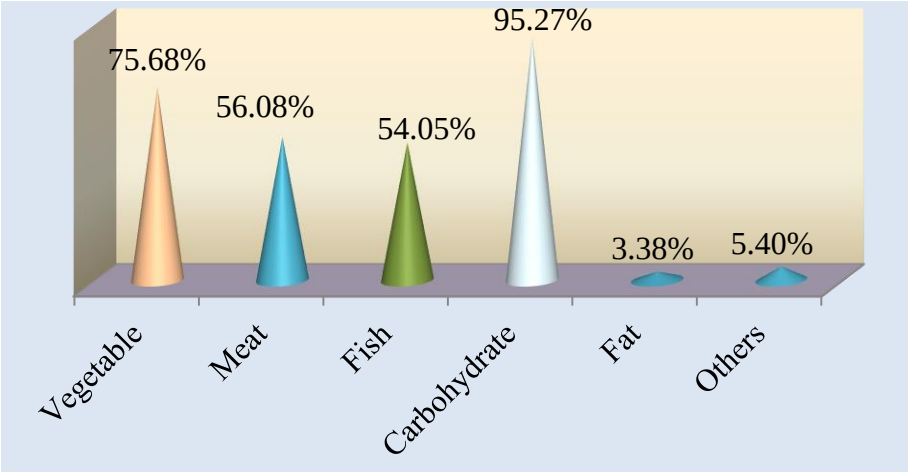


**Figure 4.19: Types of foods consumption mostly**

During the survey we wanted to gather information about the patients' daily consumptions of food and after the research we found out that 95.27% consume starch, 75.68% consume vegetables, 54.05% fish and 56.08% had meat daily.

### 4.20 Fast food consumption weekly

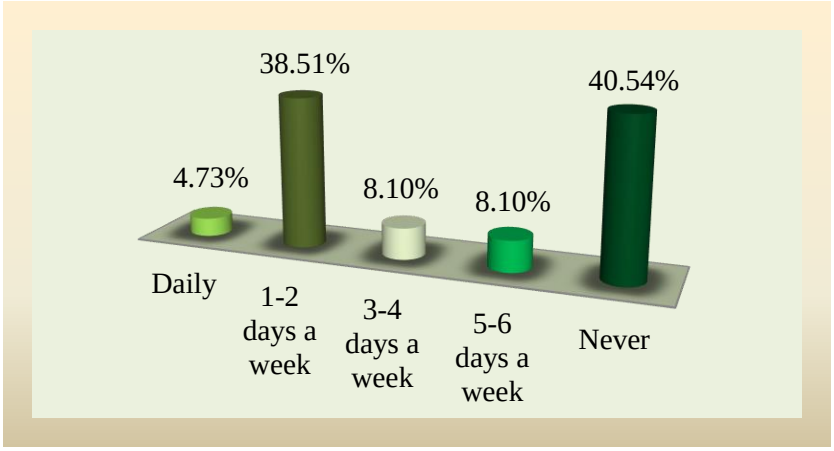


**Figure 4.20: Fast food consumption weekly**

When we asked about the weekly fast food consumptions mostly 40.54% of the patients said that they never had fast food while 38.51% had fast food (1-2) days a week and 8.10% patients had almost (3-6) days a week.

### 4.21 Oily food consumption weekly

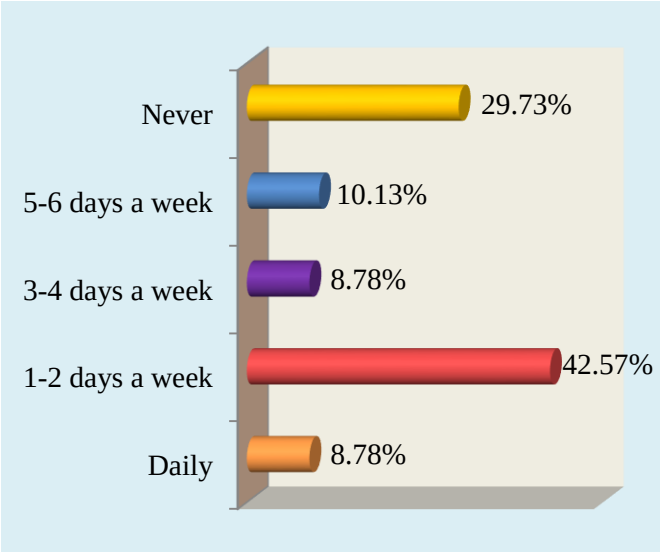


**Figure 4.21: Oily food consumption weekly**

It was figured out that 42.57% had oily food (1-2) days a week, moreover (29.73%) did not take oily food, 8.78% loved to have oily food daily.

### 4.22 Water consumption daily

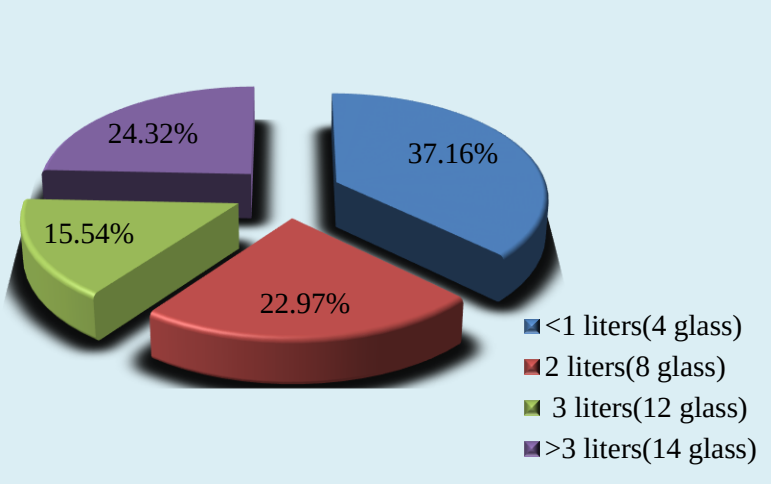


**Figure 4.22: Water consumption daily**

We asked about their daily consumptions of water but 37.16% had less than 4 glasses of water daily and 22.97% drink 2 liters of water daily and 24.32% had consumed 3 liters of water daily

### 4.23 Usage of Skin cleanser

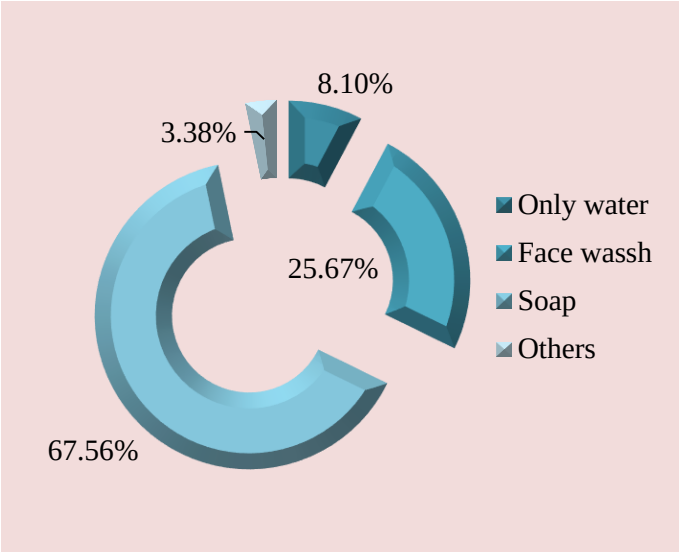


**Figure 4.23: Usage of Skin cleanser**

The graph shows that 67.57% use soap for the purpose of cleaning their skin whereas 25.67% use face wash for cleaning purpose. Very few (3.38%) use only water.

### 4.24 Percentage of Skin Treatment

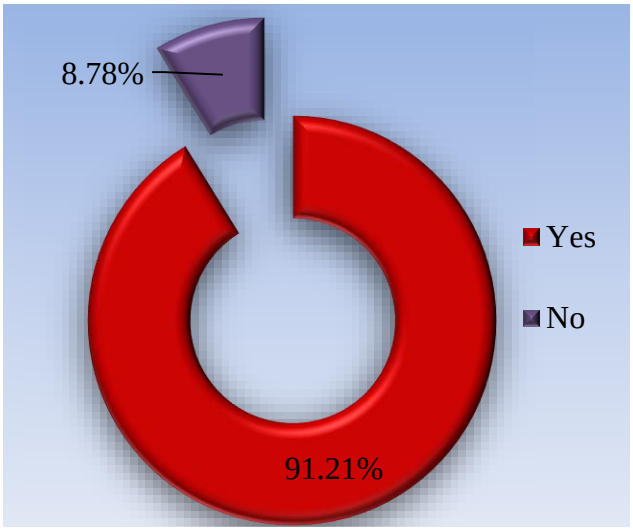


**Figure 4.24: Percentage of Skin Treatment**

During the study we wanted to know about how much patients had taken treatment and 91.21% patients said that they did skin treatment whereas only 8.78% did not take any treatment.

### 4.25 Types of skin treatment (N=135)

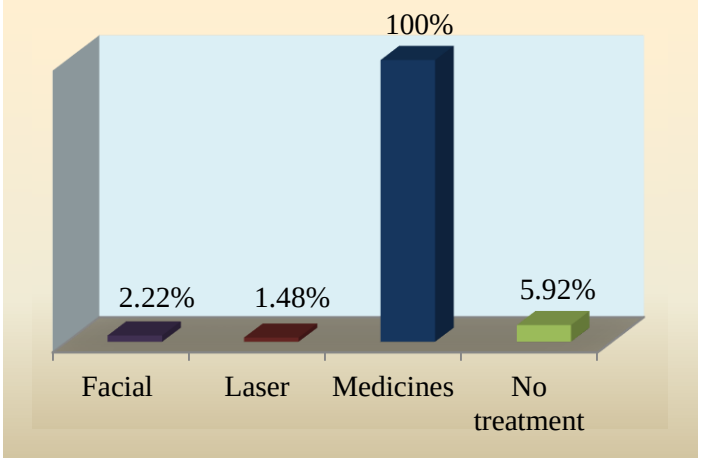


**Figure 4.25: Types of skin treatment**

Among 148 patients, 138 patients took treatment for their skin problems. In the bar chart we can see that almost all 100% patients took medicines, only 1.48% did laser treatment and 5.92% did not take any treatment.

### 4.26 Generic name of medicine

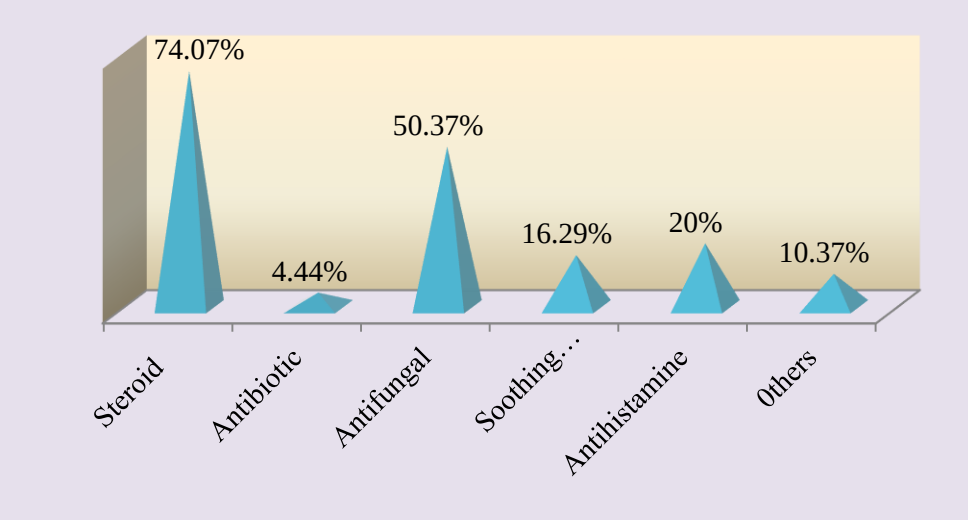


**Figure 4.26: Generic name of medicine**

During the survey we observed that the most common drug taken by patients were steroids (74.07%), antifungal (50.37%), (4.44%) antibiotics etc.

### 4.27 Effect on quality of life

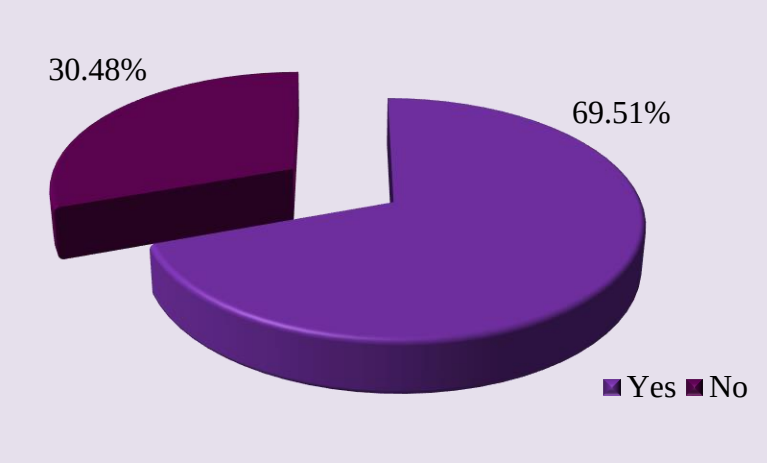


**Figure 4.27: Effect on quality of life**

In our study we asked the patients whether infection symptoms had any effect on their quality of life and we found that 69.51% were affected and 30.48% did not have any effect on their quality of life.

### 4.28 Embarrassment because of skin diseases

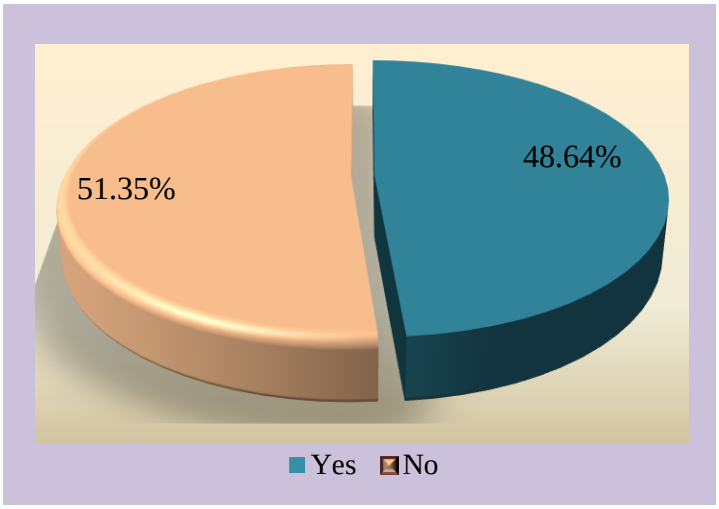


**Figure 4.28: Embarrassment because of skin diseases**

We thought that many skin patients may feel embarrassing because of their disease, so we designed a questions based on it from where we got that 43.64% felt embarrassed whereas majority 51.35% told that they do not face any embarrassment.

### 4.29 Effect on social & personal activity

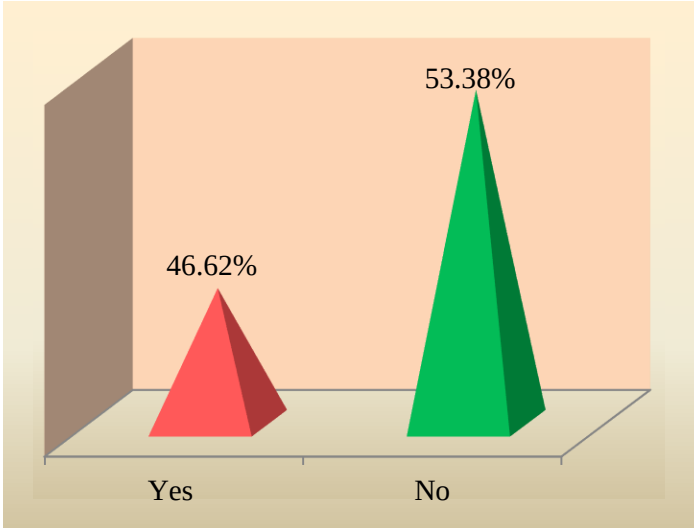


**Figure 4.29: Effect on social & personal activity**

We assumed that skin diseases can affect any ones social and personal activities but we got 53.38% negative feedback from the patients while 46.62% had problems in their social and personal activity.

### 4.30 Effect on work or study

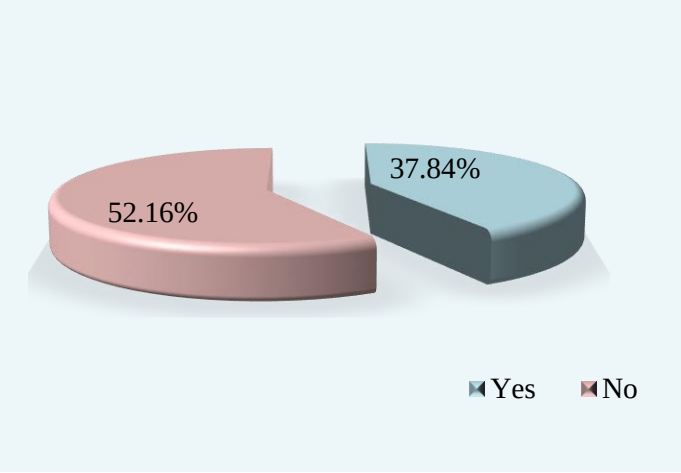


**Figure 4.30: Effect on work or study**

The pie chart above is drawn to acknowledge whether a skin disease of a patient has any effect on their work or study, and so during the survey we could conclude that 52.16% had an effect whereas 37.84% did not have any issue in their daily life and could easily work or study.

### 4.31 Effect on relationship status

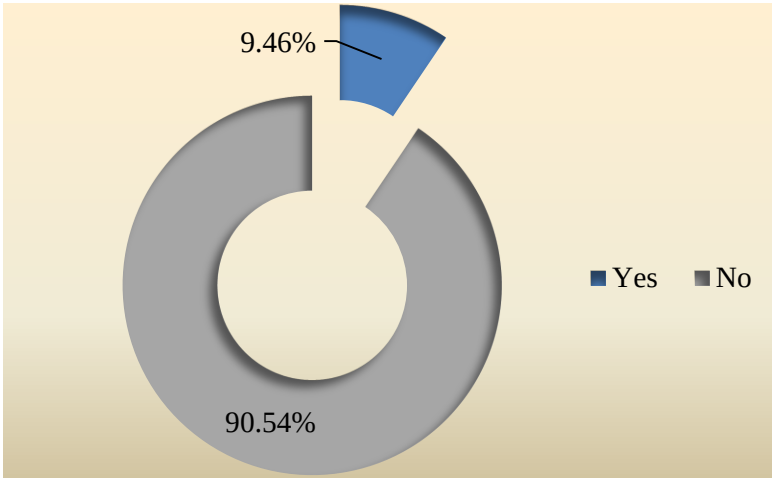


**Figure 4.31: Effect on relationship status**

More than 90.54% patients did not have any problem in their relationship status due to skin problem and 9.46% faced problem.

### 4.32 Choice of clothing because of skin diseases

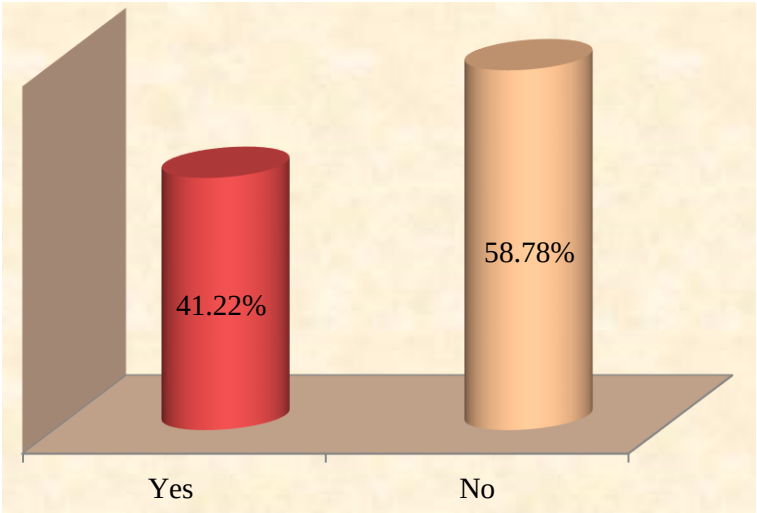


**Figure 4.32: Choice of clothing because of skin diseases**

When inquired about their choice of clothing due to their skin diseases, then 41.22% were particular with the types of clothes but the rest 58.78% had no specific preference.

### 4.33 Any food restriction

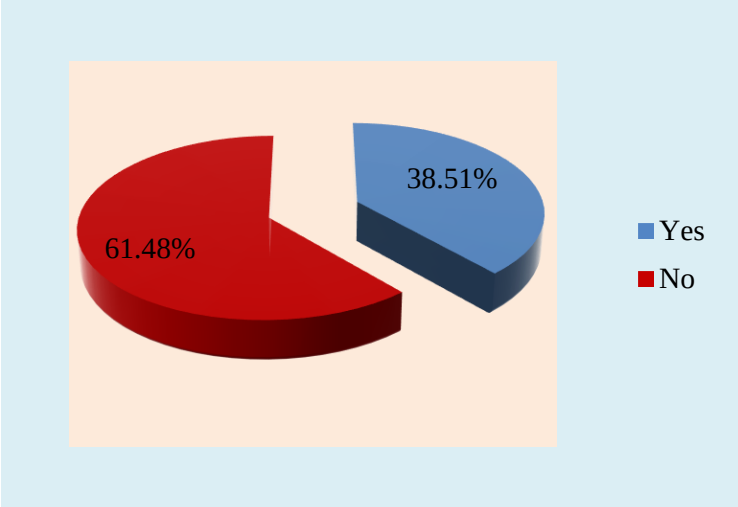


**Figure 4.33: Any food restriction**

Majority 61.48% patients did not have any problem with the variety of food but 38.51% had restriction on food.

# Chapter 5
# Discussions & Conclusion

## Discussions

In developing countries skin diseases have a serious impact on people's quality of life, causing low productivity at work and school, and discrimination due to disfigurement. Skin changes may also indicate the presence of more serious diseases that need treatment. In the past, such conditions were ignored or given low priority by health authorities because they did not on the whole cause death, and they often were not presented in tertiary care centers. But now considering the issues and effects of skin disease on social and economic development there is a huge pressure equally on national and international levels to train health workers in developing countries to improve diagnosis and treatment of dermatological conditions (World Health Organization, 2005).

The present study was conducted over a population of 148 patients in the specific settings of private hospitals in Dhaka city. Among them majorities were female (62.2%) and 37.8% were male patients. The study of Alam, Husain and Quarashi, (2017) found out that 54.4% male and 45.6% female patients were having skin diseases.

About 41.89% patients were within the age group of 19 to 30 years. Almost similar result was obtained in the study of Alam, Husain and Quarashi, (2017) where 43.8% of patients were in the age group of 15 to 29 years.

During the study it was observed that 87.16% patients lived in urban areas and 38.51% lived in less crowded areas.

Highest number of (63.51%) patients had 4-6 persons in their family and maximum (54.73%) had 10000-40000 taka income per month and maximum patients were from middle class family. According to Criestie et al, (2005) a study was estimated that the direct cost of atopic dermatitis in the United States alone is almost $1 billion per year. Reducing the burden of this disease must take into account the full breadth of its burden. Targeting parents and caregivers with education and psychosocial support can decrease family and personal burden, which in turn may decrease the cost of treating the condition because of better medical, psychosocial, and family outcomes.

As depicted, 21.62% patients had only primary education whereas 16.22% proportion of patients was equally distributed among different educational levels. Greater parts of the

patients were students (34.46%) and housewife (29.05%) on the other hand 75% worked at normal temperature.

From the study we figured out the most prevalent skin diseases and there were 21.62% allergy, 16.89% psoriasis, 15.54% acne, 12.83% eczema patients. From the study of Alam, Husain and Quarashi, (2017) it was revealed that 16.2% of patients had total burden of miscellaneous dermatoses, eczema (27.7%) and fungal infections (11.2%).

While observing types of skin, it was figured that 43.91% patients had dry skin, 25.68% had normal skin and 23.65% had oily skin while summer season had the maximum effect on skin (43.24%) compared to winter season. In contrast 21.62% patients had skin diseases in all seasons. About 53.38% patients agreed to the fact that the outside environment has more influence on their skin. According to Jha and Gurung, (2006) majority of the patients were diagnosed to have fungal infections (n=424), with a peak in summer (33.7%) and trough in winter (15.3%). The peaks and troughs of other diseases varied in different seasons.

More than 53% patients were aware about the risk factor of infections. A huge number of participants (50%) knew that bad hygiene had higher chances of contributing towards contracting skin infection, whereas 32.85% of them were aware that lack of sleep was a risk factor for infection. Only 25.71% showed awareness of the risk of wearing tight fitting cloths, 18.57% thought drinking less water and stress could be the risk factors. On the other hand Ramamuthie, et al, (2015) described that more than 50% of participants were aware of the risk factors associated with skin infection. A huge number of participants (71.9 %) knew that sharing their belongings could contribute to chances of contracting skin infection, whereas 69.5 % of them were aware of heavy perspiration as a risk factor of skin infection. Only 45.6 % showed awareness of the risk of wearing tight fitting and non-cotton clothes as a trigger to skin infection.

Almost all the (99.32%) patients were comfortable with cotton cloths because people preferred cotton cloth for comfortable.

Verma, (2014) found many harmful effects for using cosmetics products such as headache, hair problems, danger to reproductive organ, aging, cancer and other dangerous diseases, damge to nails, harmful for eyes, allergy, skin diseases and reactions. Our study detected that 91.21% patients used cosmetics products and 82.22% preferred local brand of cosmetics products. More

over 67.56% patients used soap for the purpose of cleaning their skin and 25.67% used face wash for cleansing purpose.

Girdwain, (2017) found dark chocolates, olive oil, green tea, tomatoes, oat meals, walnuts, almond milk, soy, oysters, yellow bell papers, water, orange peel, kale all are beneficial for skin diseases. The study analyzed that 95.27% consumed carbohydrate and 75.68% consumed vegetables in their daily food consumptions, more over 40.54% patients never had fast food while 38.51% had fast food in (1-2) days a week. Majority 42.21% patients had oily food in (1-2) days a week, moreover 29.73% did not take oily food.

Majority (37.16%) had less than 1 liters of water daily and 22.97% drink 2 liters of water daily. According to guideline daily consumption of water for men is 3.7 liters and women 2.7 liters (Grandjean, 2004). Drinking an adequate amount of water daily was important for a good health because water aids in digestion, circulation, absorption and even excretion and skin cells, like any other cell in the body, were made up of water. Without water, the organs would certainly not function properly or at their best (U W Health, 2017).

Among the participants, majority (91.21%) patients were doing treatment, among which almost all the patients took medicine and the most common drugs taken by patients were steroids (74.07%), antifungal (50.7%) and antihistamine (20%).

While observing the effects of skin diseases on quality of life we found that 69.51% skin infections caused physical symptoms like itchiness, soreness and painful wounds among the participants which affected their quality of life. While Ramamuthie et al, (2017) concluded that 85.8% skin infections caused physical symptoms which affected their quality of life.

During the study it was estimated that 51.35% participants felt embarrassed because of their skin diseases, more over 53.38% had no problems in their social and personal activity, but 52.16% had dire consequence on their study and work. On the other hand similar to our study Ramamuthie, et al., (2017) found that 77.1% felt embarrassed, 51.5% had no problems in their social and personal activity and 44.9% had consequence in their study and work

More than 90.54% patients did not have any problems in their relationship status due to skin problems and 58.78% had no specific preferences of cloths and majority patients did not have

any food restrictions. According to Ramamuthie et al, (2017) in 65.2% cases skin problems had not affected their relationship and similar to our study 56.2% had no particular choice of cloths.

## Conclusion

Based on all the facts, it could be concluded that knowledge and awareness about skin diseases were not at all satisfactory. People should have basic knowledge and information to avoid skin diseases. Many people do not understand the significance of skin diseases which may have an impact on their daily life. At that point, the only way to remedy was to promote health awareness programs and much other awareness related things and government should take certain measures such as organize health awareness programmers, better health care facilities, seminars etc. It was however needed to mention that this research was conducted on randomly chosen private hospitals and in a very small scale so it doesn't reflect the whole idea. Therefore it was suggested that if a conclusive result about the awareness of skin diseases was desired, further large scale researches should be conducted.

# Chapter 6
# References

## References


Ada, M., Jeannette, K., Correa, Jessica, Z., Robert, W., Simms, David T Felson , Robert Lafyatis, (2017). Development and validation of a patient-reported outcome instrument for skin involvement in patients with systemic sclerosis. *BMJ Journal*, 76 (8), 1374-1380.

AMN Healthcare Educational Services, (2004). *Skin Anatomy, Physiology, and Assessment.* [Online] Available from: https://lms.rn.com/getpdf.php/2072.pdf. [Accessed 27 September 2017].

American Society Of Clinical Oncology, (2015). *Rash.* [Online]. Retrieved from: http://www.cancer.net/sites/cancer.net/files/asco_answers_rash.pdf. [Accessed 27 September 2017].

Alam, M. N., Husain, A., Quarashi, S. A., (2017). The pattern of skin and venereal disorders among patients attending in the OPD of dermatology and venereology department of a tertiary care private hospital, Dhaka, Bangladesh. *Journal of Pakistan Association of Dermatologists*. 27 (1), 10-14.

Camelia, F**.**, Jerome, A., Oliver, D., Fazia, A., Dominique, G., Ann, T. K**.**, Kerry, C., John, V., Marco, M. C., Yannick, A, (2016). Impaired quality of life in systemic sclerosis and patient perception of the disease: A large international survey. *Seminars in Arthritis and Rheumatism*, 46 (1**),** 115-123.

Christie, L., Carroll, M. D., Balkrishnan, R., Ph.D., Steven, R. Feldman, M.D., Ph.D.,Alan B. Fleischer Jr. M.D.,Janeen C. Manuel Ph.D. (2005). The Burden of Atopic Dermatitis: Impact on the Patient, Family, and Society. *Pediatric Dermatology*, 22 (3), 192–199.

Christian, N., (2017). *Acne: causes, treatment and tips.* [Online] Retrieved from: (https://www.medicalnewstoday.com/articles/107146.php). [Accessed 27 September 2017].

Geerligs, M., (2010). *Skin layer mechanics Eindhoven: Technische Universiteit Eindhoven*, Netherlands, Eindhoven publishing.

George, K., (2017). *What causes Dermatitis's?* [Online] Retrieved from: https://www.healthline.com/symptom/dermatitis. [Accessed 27 September 2017].

Guy, F., Webster, (2014). *Clinical Presentation of Acne*. USA, Joshua A. Zeichner publication. DOI: 10.1007/978-1-4614-8344-1_2.

Girdwain, (2017). *25 best food for your skin*. Retrieved from https:// www.prevention.com/beauty/25-best-foods-for-your-skin. [ Accessed 4 December 2017].

Grandjean, A., (2004). *Water Requirements, Impinging Factors, and Recommended Intakes: WHO Guidelines for Drinking-Water Quality*, North America, ILSI publication.

Hoffman, M., (2006). *Picture of the skin*. [Online]. Retrieved from: http://www.webmd.com/skin-problems-and-treatments/picture-of-the-skin#1. [Accessed 27 September 2017].

Jha, A.K. and Gurung, D. (2006). Seasonal variation of skin diseases in Nepal: A hospital based annual study of out-patient visits. *Journal of Nepal Medical College*, 8 (4), 266-8.

Karimkhani, C., Robert, P., Dellavalle, Luc E. Coffeng, Flohr. C, Roderick. J. Hay, Sinéad M. Langan, Elaine O. Nsoesie, Alize J. Ferrari, Holly E. Erskine, JonathanI. Silverberg, TheoVos, Mohsen Naghavi, (2017). *Journal of JAMA Dermatology,* 153 (5), 406-412.

King, M. H. O., (2010). Psoriasis. *Medical Bulletin.* London.15 (5), 10-14.

Langley, R.G.B, Krueger, G.G, Griffiths, C.E.M, (2005). *Psoriasis: epidemiology, clinical features, and quality of life.* [Online] 64(Supply II):ii18–ii23, 10.1136/ard.2004.033217. Available from: http://ard.bmj.com/content/64/suppl_2/ii18. [Accessed 27 September 2017].

Liao, Y. H, Chen, K. H, Tseng, M. P, Sun, C. C. (2001). *Pattern of skin diseases in a geriatric patient group in Taiwan: a 7-year survey from the outpatient clinic of a university medical center*. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/11752818. [ Accessed 4 December 2017].

Marcin, J. D., (2016). *Contact Dermatitis Treatment*. [Online] Retrieved from: https://www.healthline.com/health/contact-dermatitis-treatments#modal-close. [Accessed 27 September 2017].

Mary, M. C., Rebecca, J., Lasek, Anju, P., Sahay, Laura, P., Sands, (2001). Measurement Properties of Skindex-16: A Brief Quality-of-Life Measure for Patients with Skin Diseases. *Journal of cutaneous Medicine & Surgery*, 5 (2), 101-104.

Paul, A. J., Kolarsick, B. S., Maria A. K, M. S. N, Carolyn, G., APRN-BC, FNP. (2011). Anatomy and Physiology of the Skin. *Journal of the Dermatology Nurses' Association*, 3 (4), 1-11.

Queen, L. (2017). *Skin Cancer Causes, Prevention, and Treatment*. [Thesis articles] Liberty University.

Rachel, N., RN, BSN, CCRN, (2016). Psoriasis causes. *Health line Media*. [Online] Retrieved from: https://www.healthline.com/health/psoriasis/causes. [Accessed 27 September 2017].

Ramamuthie, G., Kumar, R. V., Appalasamy, J., Ankur, B., (2015). Awareness of Risk Factors for Skin Infections and its Impact on Quality of Life among Adults in a Malaysian City: A Cross-Sectional Study. *Tropical Journal of Pharmaceutical Research*, 14 (10), 1913-1917.

Shannon, J., (2016). Rosacea. [Online] Retrieved from: https://www.healthline.com/health/skin/rosacea#overview1. [Accessed 27 September 2017].

Shahbaz, A., FCPS , Nadeem, M, FCPS , Mahmood, K., M. D and Muhammad B. Ghafoor, MD, (2017). *Journal of Taibah University Medical Sciences*, 12 (5), 392-396.

Suthanther, C. B., Bubna, A. K., Sankarasubramanian, A., Veeraraghavan, M., Rangarajan, S., Muralidhar, K., (2016). A clinical study of melasma and assessment of Dermatology Life Quality Index at a tertiary health care center in South India. *journal of Dermatology*, 3 (2), 77-82.

Taylor, S., MD, (2017). *What is contact dermatitis?* [Online] Available from: https://www.healthline.com/health/contact-dermatitis. [Accessed 27 September 2017].

Thomas, L., Diepgen, (2011). Occupational skin diseases. *Journal der Deutschen Dermaogischen Gesellschaff*, 10 (5), 297-315).

U W Health, (2017). *The Benefits of Drinking Water for Your Skin*. Retrieved from: https://www.uwhealth.org/madison-plastic-surgery/the-benefits-of-drinking-water-for-your-skin/26334. [ Accessed 4 December 2017].

Verma, N., (2014). *Top 10 Harmful Effects of Using Cosmetics*. Retrieved from: https://listcrux.co/top-10-harmful-effects-of-using-cosmetics/. [Accessed 4 December 2017].

Web MD, (2017). *Common Skin Rashes.* [Online] Retrieved from: https://www.webmd.com/skin-problems-and-treatments/guide/common-rashes#1. [Accessed 27 September 2017].

World Health Organization. Department of Child and Adolescent Health and Development, (2005). *Epidemiology and Management of Common Skin Diseases in Children in Developing Countries.* Geneva publication.

Zoe, A., Dorothe, N., Richard, B. W., Xavier, C., (2016). Skin Cancer: Epidemiology, Disease Burden, Pathophysiology, Diagnosis, and Therapeutic Approaches. *Journal of Dermatology & Therapy,* 7 (1), 15-19.