



# A Comparative Study to Evaluate Therapeutic Effect of Patients with Zinc Therapy in Dermatological Diseases

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## INTRODUCTION

Zinc is the most essential trace mineral in the human body. Zinc is involved in catalytic activity of more than 300 enzymes involved in the synthesis and metabolism of carbohydrates, proteins, fats, and other micronutrients. Zinc plays a major role in stabilizing cell and organ structures, cell division, growth, immune function, wound healing, blood clotting, thyroid function, vision, taste, smell. Despite its critical role in humans, zinc must be gotten through our diet; it is not stored in the human body.

### 1.1 BENEFITS

#### **Zinc acts as an anti oxidant:**

The Journal of Clinical Nutrition revealed that zinc supplementation was able to reduce fat peroxides in the blood. And some studies demonstrated that zinc acts as an anti-inflammatory agent by inhibiting the production of many inflammatory cytokines. Further studies in zinc deficiency patients show that zinc suppresses inflammation by lowering cytokines and other inflammatory markers. Zinc is effective in management of a variety of inflammatory bowel syndrome, acne, and asthma. Some studies from Aachen University in Germany revealed that zinc reduces organ transplantations rejection by including regulatory T-cells. Similarly, zinc also helps to speed up the healing process after surgery, burns, and other wounds.

#### **Zinc helps in immune function:**

Even a mild zinc deficiency can impair immune function and increase a risk of bacterial, viral, and parasitic infections.

Zinc to reduce risk of the diseases due to its role in the repair of cells and growth: The study performed by the health research institute found that people with autism tend to have a lower level of zinc than non-autism individuals. In these studies, the severity of autistic symptoms decreased after the patients were managed with zinc therapy. Some studies found that prevention of zinc deficiency could also prevent the development of autism. Zinc improves the function of killer cells to wipe out tumours and prevents cancer.

The low level of zinc is associated with head, neck, lung, gall bladder, prostate, and ovarian cancers.

Restoring normal levels can improve the function of cells responsible for killing cancer cells and tumour cells. Zinc may also help in management of epilepsy, seizures and zinc also promotes heart health. Zinc maintains the proper human functioning including insulin, zinc improves the brain function, zinc plays a major role in male reproductive system and women hormonal health.

## 1.2 PHARMACOKINETICS OF ZINC:

Absorption : (Mc Mahon 1998).

Absorption is considered as the processes of influx into the enterocyte through the basolateral membrane and transport into the portal circulation. The sub cellular mechanisms of uptake of exogenous zinc remain to be elucidated; both saturable and unsaturable processes are thought to be involved. The recently characterised zinc transporters (Zn T) have significantly increased understanding the inter relationships of cellular zinc uptake and efflux, but do not yet account for the observations at the whole body level. ZnT-1 is a protein has been found in the villi of the proximal small bowel. These observations has led to ZnT-1 mainly acts as a zinc exporter and may play a role in the zinc homeostasis as a mechanism for elimination under the conditions of excess zinc. Intracellular metal binding protein i.e., metallothionein, in the regulation of zinc absorption. Dietary restriction also results in diminished MT synthesis. The influencing factors of absorption include the amount of zinc present in the intestinal lumen. Healthy human body contains 2 – 3 grams of zinc and requires around 15 mg per day as dietary zinc.

## DIETARY PROMOTERS AND INHIBITORS OF ZINC ABSORPTION:

The presence of modest amounts of animal protein can enhance the efficiency of absorption, in addition to increase the absolute amount of the zinc. Organic substances which are soluble and low molecular weight like sulphur containing amino acids, bind to zinc and facilitates the absorption of zinc. Dietary promoters are human milk and animal proteins. Dietary inhibitors are phytate and other minerals.

## METABOLISM:

Zinc is found in all tissues, organs and fluids and secretions in the human body. Cells in human body approximately contains 95% zinc. About 60-80% of the cellular zinc is present in the cytosol, the remaining percentage of zinc was found to be in membranes that is essential for defining effects of zinc deficiency on cellular functions. After the absorption from small intestine it binds with plasma proteins for its transportation to the tissues. Bones are deposited by large amounts of zinc.

## EXCRETION:

Zinc is excreted through the renal system, faecal excretion it indicates that excreted amounts of zinc are responsive to zinc intake, absorbed zinc, physiologic need. For zinc deficiency the major contributing factor is plant-based diets with high phytate.

## 1.3 RECOMMENDED INTAKES:

FNB refers the recommended dietary allowance of zinc and other nutrients at the Institute of Medicine of the National Academics. Recommended Dietary Allowance (RDA): daily average level of sufficient intake to meet the nutritional requirements of all healthy individuals Adequate Intake (AI): the level of intake that assumed to ensure the nutritional adequacy and established when evidence is insufficient to develop an RDA. Estimated Average Requirement (EAR): estimation of average daily level of intake to meet the requirements of 50% of healthy individuals. usually used to assess the zinc (nutrient) intake of people in the group and to plan nutritionally adequate diet to them can also be used to assess the nutritional intake of the individuals.

Tolerable Upper Intake Level (UL): daily maximum intake that may cause unhealthy adverse effects.

RDA (for infants aged 0-6 months)

| S.NO | Age         | Male | Female |
|------|-------------|------|--------|
| 1    | 0-6 months  | 2mg  | 2mg    |
| 2    | 7-12 months | 3 mg | 3mg    |
| 3    | 1-3 years   | 3 mg | 3 mg   |
| 4    | 4-8 years   | 5 mg | 5mg    |

|   |             |       |      |
|---|-------------|-------|------|
| 5 | 9-13 years  | 8 mg  | 8 mg |
| 6 | 14-18 years | 11 mg | 9 mg |
| 7 | 19 + years  | 11 mg | 8 mg |

**Adequate intake:**

➤ Source of zinc :

Food:

| S.NO | Food  | Mg per serving | Percent DV |
|------|---|----------------|------------|
| 1    | oysters, cooked, breaded and fried , 3 ounces                             | 74.0           | 493        |
| 2    | Beef chuck roast ,braised , 3 ounces                                      | 7.0            | 47         |
| 3    | Crab ,Alaska king ;cooked 3 ounces  | 6.5            | 43         |
| 4    | Beef patty ; broiled ,3 ounces  | 5.3            | 35         |
| 5    | Breakfast cereal ; fortified with 25% of the DV for zinc ,1/4 cup serving | 3.8            | 25         |
| 6    | Lobster ; cooked 3 ounces   | 3.4            | 23         |
| 7    | Baked beans , canned , plain or vegetarian ½ cup                          | 2.9            | 19         |
| 8    | Chicken, dark meat ; cooked 3 ounces                                      | 2.4            | 16         |
| 9    | Pumpkin seeds ;dried 1 ounce  | 2.2            | 15         |
| 10   | Yogurt ,fruit ,low fat ; 8 ounces   | 1.7            | 11         |
| 11   | Cashews ; dry roasted , 1 ounce   | 1.6            | 11         |
| 12   | Chickpeas ;cooked ½ cup   | 1.3            | 9          |
| 13   | Cheese ,swiss ; 1 ounce   | 1.2            | 8          |
| 14   | Oatmeal instant plain prepared with water ,1 packet                       | 1.1            | 7          |
| 15   | Milk : low fat or non fat , 1 cup   | 1.0            | 7          |
| 16   | Almonds ; dry roasted ,1 ounce  | 0.9            | 6          |
| 17   | Kidney beans ; cooked ½ cup   | 0.9            | 6          |
| 18   | Chicken breast ;roasted skin removed ½ breast                             | 0.9            | 6          |
| 19   | Cheese , cheddar or mozzarella ; 1ounce                                   | 0.9            | 6          |
| 20   | Peas , green –frozen, cooked ½ cup  | 0.5            | 3          |

**Dietary supplements:**

The percentage of elemental zinc that varies by its form like zinc acetate ,zinc gluconate ,zinc sulphate .For example 23% of zinc sulphate contains elemental zinc so 220 mg of zinc sulphate contains 50 mg of elemental zinc.

**RISK OF ZINC INADEQUACY:**

☐ People with gastrointestinal diseases: GI diseases like ulcerative colitis ,crohn's diseases ,short bowel syndrome can decrease the absorption of zinc and increase the endogenous zinc losses primarily in the GI tract .

☐ Vegetarians : bioavailability of zinc is more in non vegetarians than vegetarians ,because the non vegetarian diet contains bio available zinc and also enhance the zinc absorption .in addition to these most of vegetarians prefers to eat legumes and whole grains which contains phytates that binds to zinc and inhibits its absorption .

Vegetarians requires 50% more RDA for zinc than non vegetarians. Some techniques that improve bioavailability of zinc and reduce the inhibition process are soaking beans, grains and seeds in water before several hours of cooking and allow them to form sprouts.

□Pregnant and lactating women's: pregnant who start their months with marginal zinc levels are in the risk of zinc deficiency and risk of zinc insufficiency to fetal requirement.

□People with sickle cell disease: survey shows that 44% of children with this disease have low level of plasma zinc concentration due to increased nutritional requirements .zinc deficiency also effects adult sickle cell disease patient by 60-70%.

□Alcoholism: ethanol consumption decreases the intestinal absorption of zinc and increases urinary excretion of zinc .so zinc deficiency is seen in the patients with alcoholism

### RISK FROM OVERDOSAGE OF ZINC:

•Acute: Little over dosage of zinc can cause nausea, vomiting, loss of appetite, abdominal cramps, diarrheal and headache (4 g of zinc gluconate per day of zinc intake May leads to such over dosage).

•Chronic: High over dosage of zinc includes low copper level altered iron function, reduce immune function and reduce level of high density lipoproteins .

### Tolerable upper intake levels of zinc (UL):

| S.NO | AGE        | MALE | FEMALE |
|------|------------|------|--------|
| 1.   | 0-6months  | 4mg  | 4mg    |
| 2.   | 1-12months | 5mg  | 5mg    |
| 3.   | 1-3years   | 7mg  | 7mg    |
| 4.   | 4-8years   | 12mg | 12mg   |
| 5.   | 9-13years  | 23mg | 23mg   |
| 6.   | 14-18years | 34mg | 34mg   |
| 7.   | 19+years   | 40mg | 40mg   |

### 1.4 ZINC THERAPY IN DERMATOLOGY:

Zinc has been used in various forms as a therapeutic modality for centuries topical preparations like calamine, zinc oxide, and zinc pyrithione have been used as photo protecting smoothening agents or as active ingredients of antidandruff shampoos.

Zinc use as also expanded over the years for a number of dermatological conditions including infections (Warts, Leishmaniasis), Inflammatory Dermatoses (Acne vulgaris, Rosacea), Pigmentary disorders (Melasma) and Neoplasia (basal cell carcinoma) although the role of oral zinc is well established in human zinc deficiency syndromes including acro dermatitis.

Zinc alone as an adjuvant has been found used full in many dermatological infections owing to its modulating actions on macrophage and neutrophil functions.

### EFFECTIVENESS OF ZINC:

Most effective for:

Zinc deficiency: It may occur in the people with severe diarrhea that makes hard for the bowel to observe the food, alcoholism, liver abnormalities like cirrhosis, after major sugary, after long term use of tube feeding in hospitalized patients .Taking zinc by mouth or by giving zinc intravenously helps to restore zinc levels in the patients with zinc deficiency, however taking zinc supplements continuously is not recommended.

Likely Effective For:

Acne: Research suggested that people with acne have lower blood and skin levels of zinc .so taking zinc by mouth can help to treat acne .however zinc is beneficial when it is used with medications such as antibiotics called erythromycin. Acrodermatitis enteropathica: Taking zinc by mouth seems to help improves symptoms of acrodermatitis enteropathica.

**Age related macular degeneration:** People who take more zinc as a part of their diet have lower risk of developing AMD or age related vision loss .research shows that consuming supplements containing zinc with antioxidant vitamins can decrease the risk of vision loss from becoming advanced.

**Anorexia nervosa:** Consuming zinc supplements by mouth might increase weight gain and improve depression symptoms in teens and adults with anorexia.

**Burns:** Taking zinc supplements (intravenous) with other minerals can improve wound healing in the patients with burns .however; taking zinc alone does not improve wound healing in the patients with burns. But, it might improve recovery time in the people with severe burns.

**Diabetic foot sores:** Treatment for diabetic foot sores with topical zinc hyaluronate gel may help foot ulcers to heal faster.

**Diaper rash:** Topical zinc oxide may seems to improve the healing of diaper rash , giving zinc gluconate by oral also helps to heal diaper rash when compare to these two zinc supplements applying 2 % eosin solution is more effective these days .

**Gingivitis:** Using toothpaste containing zinc with or without antibacterial agents May helps to prevent plaque and gingivitis .some studies also shows that zinc containing tooth paste can reduce existing plaque .most of the studies showed benefits used zinc citrate in combination with triclosan.

**Bad breath:** Many of the studies showed that chewing gums , sucking on a candy or using mouth rinse containing zinc may reduce bad breath .

**Herpes labialis (cold sores):** Topical zinc oxide or zinc sulphate alone with other ingredients seems to reduce the duration and severity of oral and genital herpes .however ,zinc might not be beneficial for recurrent herpes infections.

**Leishmania lesions:** Studies suggested that zinc sulphate by mouth or by injecting or as a solution into lesions helps to heal lesions in the people with leishmaniasis .however, injecting zinc solutions does not seems to be more effective than conventional treatment

**Leprosy:** Taking zinc supplements by mouth in combination with antileprosy agents May helps to treat leprosy effectively.

**Pressure ulcers:** Topical zinc may helps to improve the healing of pressure ulcers (bed sores) in gediatics. Also, taking zinc through diet helps to improve healing of bed sores in hospitalized patients.

**Shigellosis:** Some studies shows that taking multivitamin syrups that contains zinc along with conventional treatment can improve recovery time. Zinc containing multi vitamin syrups helps to reduce diarrhea with food poisoning in under nourished children.

**Venous leg ulcer:** Giving zinc sulphate orally helps to heal some type of leg ulcers faster.The effect of zinc seems to be higher in the people with low level of zinc.Topical zinc also seems to improve healing of venous leg ulcer.

**Warts:** Early studies show that topical zinc sulfate improves plane warts but not common warts.Topical zinc oxide is more effective as conventional management for curing warts.

**Alopecia areata:** Early research suggested that giving zinc along with biotin might helpful for patchy hair loss .

1.5 DISEASES WITH ZINC THERAPY: (kolalapudi anjeneyulu seetharam 2013)

#### **ALOPECIA AREATA ( AA ) :**

**Definition:** Alopecia areata is a common form of hair loss of scalp or body which is non –scarring. And it common hair loss which was seen by the dermatologist about 25% of all alopecia cases.

#### **Symptoms :**

- Single or multiple patches
- A small distinct patch that merge and form large patches
- Involvement of other body parts other than scalp
- Thinning of hair

#### **ETHIOPATHOGENESIS:**

Etiopatogenesis of alopecia areata is mostly based on genetic predisposition , auto immune diseases ,environmental and other factors .

**Genetic predisposition:** Based on genetic susceptibility various factors like stress, hormones ,diet, vaccination , infectious agents and others are involved in pathogenesis of AA

Autoimmune diseases: AA is associated with other auto immune diseases like thyroid, anemia, diabetes mellitus, vitiligo, psoriasis.

### DIAGNOSIS:

Physical examination, thyroid screening and trichoscopy technique is used to diagnose AA

Some trichoscopic images that helps to diagnose AA are following :

### TREATMENT :

- Corticosteroids
- Topical immunotherapy
- Prostaglandin analogues
- Topical calcineurin inhibitors
- Sulfasalazine
- Zinc therapy

### ACNE VULGARIS :(manoj suva ,January 2015)

Definition: Acne vulgaris is a simple human skin disease characterized by scaly red skin, black heads, white heads ,pin heads ,large papules,pimples and scarring. It may be inflammatory or non inflammatory form.



### Signs and symptoms:

- ☐ Papules
- ☐ Nodules
- ☐ Pustules and scarring

### Etiology:

Acne vulgaris develops due to hyperkeratinisation and keratin plug formation and sebum, blockage of follicles with rise in androgen production, sebum production .Finally occurs in oil and dead skin cells.Environmental factors that include in acne like high humidity increase in skin hydration exposure to dirt prolonged sweating exposure to vaporized cooking oil and certain chemicals like petroleum derivatives Drugs like phenytoin, isonazide, lithium, quinine, rifampicin, steroids, phenobarbital, ethionamide, and azathioprine may cause acne Hormonal changes may include menstrual cycle and puberty may also causes acne because of increased in androgen levels causes the enlargement of follicular glands and sebum production may cause acne.Physiological condition includes stress are associated with increased acne severity. Infections that involves in the formation of acne are anaerobic bacteria species, staphylococcus aureus has been played an important roles to form acne. Diet that related to form acne associated with milk products and chocolates containing large amount of sugar might be related to acne.

### Epidemiology:

Some studies concluded that 9.4% of population affects with acne .Majorly it affects about 90% of people during teenage and commonly recorded in females of 9.8% compared to males 9.0%.

### Diagnosis:



Scales used for measuring the severity of acne vulgaris are following:

- ☐ Pillsbury scale.
- ☐ Cooks acne grading scale.
- ☐ Leads acne grading technique.

#### Differential diagnosis:

- ☐ Acne Rosacea : It is commonly observed in middle age or later in life
- ☐ Folliculitis and boils: It presents with pustular lesions similar to acne
- ☐ Milia: :It is a small keratin cyst that confused with white heads they may be whiter than acne white heads and most commonly seen around the eyes
- ☐ Perioral dermatitis

#### MANAGEMENT:

- ☐ Antibiotics`
- ☐ Antiseborrheic drugs
- ☐ Topical sulfur and sodium sulphacetamide
- ☐ Salicylic acid
- ☐ Anti androgen treatment
- ☐ Topical retinoid
- ☐ Oral retinoid
- ☐ Miscellaneous
- ☐ WARTS:

Definition: warts are very common viral infections which are regularly seen in dermatology that caused by HPV that belongs to the family papova viridae. [Peter J Lynch, 1982].



#### SYMPTOMS:

- ☐ Small , fleshy, grainy bump
- ☐ Flesh-coloured, white, pink, or tan appearance.
- ☐ Rough to touch
- ☐ Sprinkled with black pin point, which are small, clotted blood vessels.

**TYPES:** [Anderson, Keith et.al, 2005]

- ☐ Common warts(verruca vulgaris)
- ☐ Flat warts(verruca plana)
- ☐ Genital warts
- ☐ Periungual wart
- ☐ Plantar warts

**CAUSES:**[De Villiers EM,fauquet C et.al,june 2004]

Warts are commonly caused by human papilloma virus (HPV).They are about 130 known type of human papilloma virus.

Common HPV and wart type are listed below:

- ☐ Common wart: HPV type -2, 4, 3, 1,26,29,57 and others.
- ☐ Plantar warts: HPV type 1,2,3,4,27,28,58 is responsible.

☐ Anogenital warts: HPV type 6,11,42,44.

☐ Verruca plana: HPV type 3, 10, and 28.

**DIAGNOSIS:**[domg, huiing ]

Dermatoscopic examinations of warts were commonly used for diagnosis.

**MANAGEMENT:**[litke MM ,2006]

There are many procedures and management options associated with wart removal that includes:

☐ Topical treatment of salicyclic acid

☐ Imiquimod topical cream

☐ Cantharidin

☐ Bleomycin

☐ cidofovir

☐ benzyl peroxide

**Procedures:**

☐ Keratolysis

☐ Electrodesiccation

☐ Cryotherapy

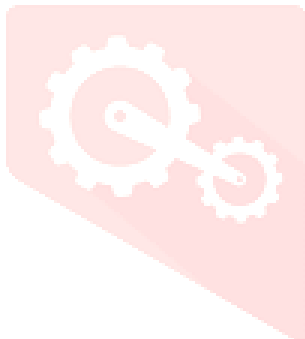
☐ Surgical curettage of warts

☐ Laser treatment

☐ Infrared coagulator

☐ ERYTHEMA NODOSUM LEPROSUM [ENL] :( Aieska de Souza et.al.,)

**Definition :** ENL is an immune mediated complication of leprosy characterized by multiple inflammatory nodules and systemic clinical presentations like fever, malaise, arthritis ,iritis, neuritis, and lymphadenitis, deposition of immune complexes associated with mycobacterium leprae antigens .(Rokea el-Azhary et,al.,)



**SYMPTOMS:**

☐ Inflammatory nodules those are usually tender multiple and bilateral in severe reactions the lesions may become ulcerative necrotic vesicular.

☐ Painful nodules with a wide spread distribution

☐ Fever ,malaise

☐ Anthralgia

☐ Inflammatory arthiritis,iritis ,orchitis

☐ Nephritis, lymphadenitis.

**DIAGNOSIS:** (Esquenazi, D, Moreira, et.al. 2008)

ENL can usually be diagnosed but skin biopsy can be needful

☐ Histopathology

☐ Hematology

☐ Increased in serum markers of inflamaiton

☐ Differential diagnosis



**RISK FACTORS:**

- ☐ Lepromatous leprosy
- ☐ Multi drug therapy
- ☐ Antibiotics
- ☐ Infections(dental cavities )
- ☐ Pregnancy and lactation
- ☐ Psychological stress
- ☐ Vaccinations

**ETIOLOGY:**

ENL is a clinical expression of immune response mediated reaction against mycobacterium leprae

**TREATMENT:** (Walker, SL et.al. 2007)

Mild reactions of ENL managed with non steroid anti inflammatory drugs (NSAIDS) like endomethacin, clofazimine (300 mg/day)

Moderate reactions are managed by prednisone (20-60 mg/day) alone or in combination with NSAIDS can be given. Sever reactions of ENL managed with aggressive immune suppression therapy is indicated with prednisone (1-2 mg/kg/day) and thalidomide (200-400 mg/day ) with or without NSAIDS

**ALTERNATIVE MEDICATIONS:**

- ☐ Methotrexate
- ☐ Mycophenolate
- ☐ Mofetil
- ☐ Cyclosporine
- ☐ Azathioprin
- ☐ TNF- $\alpha$  inhibitors

**ERYTHRODERMA** :(Freedburg et.al.,2003)

Definition: it is a skin disease associated with inflammation with redness and scaling that effects ceutaneous surface.

**SYMPTOMS:**

- ☐ Morbilliform (measles)eruption
- ☐ Dermatitis
- ☐ Plaque psoriasis
- ☐ Skin feels warm touch
- ☐ Pruritis
- ☐ Eye lid swelling leads to ectropion
- ☐ Scaling begins 2-6 days after the onset of erythema as large sheets or fine flakes
- ☐ Thick scaling on scalp with hair loss including complete baldness
- ☐ Palms and soles may become yellowish ,difuse keratoderma
- ☐ Oncholysis.

**ETIOLOGY** :( James William et.al., 2005)

- ☐ Erythroderma is generalized expholiative dermatitis involving 90% or more of the patients skin
- ☐ Atopic dermatitis
- ☐ Exacerbation of an underlying skin diseases like psoriasis ,seborrheic dermatitis,contact dermatitis
- ☐ Drug reactions such as the use of topical steroids
- ☐ Usually primary erythroderma is less frequent seen in cases of ceutaneous T-cell lymphoma

**EPIDOMOLOGY** :( Sigurdsson .V, November 2001)

Erythroderma can occur at any age group but commonly in gediatrics males and male adults

**COMPLICATIONS:**

- ☐ Temperature disregulation

- ☐ Cellulitis
- ☐ Impetigo
- ☐ Hypoalbumania
- ☐ Fluid loss leads to electrolyte abnormalities and dehydration

### DIAGNOSIS:

C- reactive protein elevated

Abnormal liver function due to hypoalbumania

Elevated immunoglobulin E (IgE)

Skin biopsy

**TREATMENT :** (Okoduwa C, Lalmbert WC, et.al, 2009)

Maintain skin moisture with wet wraps

Emollients

Mild topical steroids

Anti histamines

☐ **VITILGO VULGARIS :** (Elaine K.Luo, MD sep .26,2017)

Definition: It is defined as a skin disease in which skin loss their colour which grows like patches .it can affect any age group of peoples and any gender.

It cans also effects eyes and also effects oral cavity, hair. In maximum number of cases the affected areas remain discoloured for the rest of life of patient.



**Fig: Vitiligo vulgaris**

### SYMPTOMS:

- ☐ Appearance of white flat spot on skin
- ☐ Irregular shape of patches
- ☐ Little inflamed with slight red tone at edges
- ☐ Itching

### TYPES:

☐ Non-segmental :White patches are symmetrical ,it effects upto 90% of affected cases

Areas included are –arms, back of the hands, elbows, feet, mouth, groin and armpit area, nose, navel, genitals and rectal area.

☐ Segmental: It spreads more rapidly, considered as more constant and stable. it is less common only about 10% of effects cases of vitiligo ,it occur majourly in early age groups especially 30 % of children .

Areas affected –in these majorly affected areas of skin attached to nerves

### ETIOLOGY :

The exact cause is unclear but, number of factors may contribute such as

- ☐ Heredity
- ☐ Virus
- ☐ Skin exposure to some chemicals
- ☐ Due to critical sun burn
- ☐ Oxidative stress imbalance

□ Auto immune disorder in which the immune system becomes over active collapses and damages the melanocytes.

### COMPLICATIONS:

- Loss of hearing
- Painful sunburn
- Vision disturbances

### DIAGNOSIS:

- VIDA score
- Physical examination by using to shine ultra violet light on the skin

### TREATMENT:

According to American academy of dermatology (AAD)

- Using sunscreen the lighter patches of skin are sensitive to sunlight and it can burn easily
- Phototherapy with UVB light ,It's a common treatment option for vitiligo
- Depigmentataion: In theses applying strong topical lotions or ointments like monobenzone ,hydroquinone ,mequinol it can takes 12 -14 monts to reduce patches depending on depth of the original skin tone
- Topical steroids: Some studies concluded application of topical steroids on white patches can stop the spread in some vitiligo cases the restoration of the total original skin colour
- Corticosteroids: Should avoid on face.
- Calcipotriene: It's a topical medication and it is form of vitamin -D
- Calcineurin inhibitors: such as tacrolimus,pimecrolimus helps to reduce depigmentataion .

### PEMPHIGUS VULGARIS: (Cholera M, Chainani et.al. June 20016)

Definition: It is defined as the chronic blistering skin disease and classified as type -2 hypersensitive reaction reactions.

### SIGNS AND SYMPTOMS:

- Oral blisters
- Cutaneous blisters
- Flaccid blisters over the skin of palms and soles
- Nikolsky sign (induction of blistering normal skin or at the edge of blister.
- Severe pain while chewing it can cause difficulty to eat ,weight loss ,malnutrition
- Common affected areas are : mucosal surfaces ,esophagus ,conjunctiva ,vagina ,penis, cervix, anus

### ETIOLOGY: (Jacquelyn Caffaso April 19, 2018)

- Pemphigus vulgaris occurs when immune system mistakenly makes antibodies against proteins in healthy skin and mucous membranes.
- The exact cause of attack by the immune system is not known
- Some medications that may cause pemphigus vulgaris very rarely they are : penicillamine ,ACE inhibitors .

### EPIDEMIOLOGY:

Majorly caused to people with

- Middle aged
- Older adults

### TYPES: (Jacquelyn Caffaso April 19, 2018)

Pemphigus vulgaris are classified into different types based on the location of blisters.

- Pemphigus vulgaris: it is a most common type of pemphigus in theses type blisters appears in oral cavity that includes no itching, painful .the blisters sometimes appears on genitals.
- Pemphigus foliaceus: in these type the blisters first appears on scalp and face then appears on the chest and back includes itching but painless.
- Pemphigus vegetans: in these blisters appears on under arms, groin, and also on feet.
- Paraneoplastic pemphigus: it is a rare type pemphigus usually blisters and sores appear in oral cavity and also on lips, skin .these type of pemphigus can cause sores on eye lids, and eyes.

**COMPLICATIONS:**

- ☐ Skin infections
- ☐ Sepsis
- ☐ Dehydration

**DIAGNOSIS:**

- ☐ Punch biopsy from the area around the lesion.
- ☐ Positive Nicolskys sign

**TREATMENT:** (Ellebrecht CT, Bhoj VG et.al. July 2016)

- ☐ Intravenous immunoglobulin's
- ☐ Mycophenolate mofetil
- ☐ Methotrexate
- ☐ Azathioprine
- ☐ Cyclophosphamide
- ☐ Corticosteroids
- ☐ Rituximab
- ☐ Miscellaneous

**INTERACTION OF ZINC WITH OTHER MEDICATIONS:**

Zinc has potential to interact with other medications .such as

**□ANTIBIOTICS:**

Antibiotics like quinolones and tetracyclines interacts with zinc in gastrointestinal tract and inhibits the absorption of both zinc and antibiotic. To minimize this interaction time gap should be maintained as zinc to be taken after or before 2 hrs of antibiotic intake Some of these antibiotics that might interact with zinc include ciprofloxacin, enoxacin, norfloxacin, sparfloxacin, trovafloxacin, and grepafloxacin. Some tetracycline's that interacts with zinc are demeclocycline, minocycline.

**□PENICILLAMINE :**

Penicillamine is a drug that used to treat rhumetoid arthritis may decrease its absorption when it takes along with zinc Time gap to be maintained to avoid this interaction .zinc to be taken after or before two hours of penicillamine.

**□CISPLATIN**

Cisplatin used to treat cancer. Taking zinc along with EDTA and cisplatin might increase the effects and side effects of cisplatin.

**□DIURETICS :**

Thiazide diuretics like chlorthalidon, hydrochlorthiazide increase urinary excretion of zinc by 60%, prolong usage of diuretics could deplete the tissue levels of zinc. So clintions should moniter zinc levels in the patients with thiazide diuretics.

**□AMILORIDE:**

Amilorid is used as "water pills" that helps to remove excess water from the body. Another effect of amiloride is that it can increase the amount of zinc in the body. Taking zinc supplements with amiloride (Midamor) might cause you to have too much zinc in your body.

**REVIEW OF LITERATURE**

1. Khalifa E sharquie, SABEEH a ALMASHHADANI, Hussam a salman, 2018 conducted a study on "TOPICAL 10% ZINC SULFATE SOLUTION FOR TREATMENT OF MELASMA" and conclude that 14 patients were treated with 10% zinc sulphate solution. the mean MASI score before treated was 9.45 which changed to 4.70 after therapy .this corresponds to a percentage improvement of 49.78 and was statistically significant ( $p \leq 0.0005$ ) no side effects were noticed apart from a mild stinging sensation reported in a few patients .most patients maintained improvement 3 months after cessation of therapy . Topical 10% zinc sulfatae solution is a new effective safe and inexpensive formulation in the treatment of Melasma.

2. T Rebello , DJ Athrotone , C Holden ,1986 conducted a study on "THE EFFECT OF ORAL ZINC ADMINISTRATION ON SEBUM FREE FATTY ACIDS IN ACNE VULGARIS" concluded that free fatty acid in sebum arise from lipolytic action of bacterial lipases have demonstrated that inhabited effect of zinc on the lipase of the three propionibacterium species found in human

pilosebaceous follicles able to show a small correspondence fall in free fatty acids content of skin surface lipid *invivo* in acne patients treated with zinc .

3. Utpal patel MD PhD, Aaton Loyd MD, Rishi patal MD, Shane Meehan MD, Roopal kundu MD ,2009 conducted a study on “NECROLYTIC ACRAL ERYTHEMA” concluded that Necrolytic acral erythema (NAE) is a recently recognised dermatosis almost exclusively associated with hepatitis C virus infection and closely related to a group of necrolytic erythemas and metabolic syndromes .NAE is characterised by pruritis , symmetric well demarcated ,hyperkeratosis ,erythematous –to – violaceous ,lichenified plaques with a rim of dusky erythema on the dorsal aspects of feet & extending to the toes. Based on morphology & histopathological features, NAE can be difficult to distinguish from certain group of necrolytic erythemas, which include necrolytic migratory erythema, Acrodermatitis enteropathica, biotin deficiency, niacin deficiency & essential fatty acid deficiencies .The condition is particularly important for clinicians to diagnose because the majority of patients present to dermatologists without a known history of HCV infection. Resolution of NAE can be achieved by treatment of the underlying HCV infection & the use of oral zinc therapy.

4. Sudhanshu Sharma ,Krishna Deb Barman ,Rashmi Sarkar ,Mukesh Manjhi,Vijay Kumar Garg ,2014, conducted a study on “EFFICACY OF ORAL ZINC THERAPY IN EPIDERMAL DYSPLASIA VERRUCIFORMIS WITH SQUAMOUS CELL CARCINOMA” & concluded that epidermodysplasia verruciformis (EV) is rare ,inherited disorder that predisposes patients to wide spread human papilloma virus (HPV) infection and cutaneous squamous cell carcinoma .There is still no definitive therapeutic modality for EV .A 24 year old male patient with EV was treated with oral zinc sulphate ,one of the cheapest and safe immune modulator available as therapeutic agent with satisfactory result & zinc therapy has a role in management of EV but in previous studies the response rate was much higher (50-70%) of compared to these study (20-40%).The higher response rate of 50-70% were obtained in case of recalcitrant common warts where the HPV type & pathophysiology involved are different from that in EDV this may be reason of lower response rate with zinc therapy in this case but still more clinical trials are required to evaluate the actual response rate with zinc therapy in EV.

5. Leo Orris ,MD, Alan R. Shalita ,MD; David Sibulkin, MD; et al ,1978, conducted a study on “ORAL ZINC THERAPY OF ACNE” & concluded that in a double controlled comparison that lasted 8 weeks ,tablet of zinc sulphate monohydrate ,411 MG total daily dose & a lactose placebo were administered orally to 22 subjects of male subjects with moderate acne at the same time ,level of zinc were determined in serum & urine .There were no statistically significant differences in the lesion counts (papules ,pustules, open comedones & closed comedones) in the zinc –treated & lactose – treated cases despite evidence in serum & urine of absorption zinc. The data from this study indicate that oral zinc therapy has no early clinical effects on male patients with moderate acne .

6. Jessica Cervantes ,Ariel E. Eber ,Marina Perper ,Vanessa M. Nascimento ,Keyvan Nouri ,Jonette E. Keri ,2017 ,conducted a study on “THE ROLE OF ZINC IN THE TREATMENT OF ACNE: A REVIEW OF THE LITERATURE” & Concluded that zinc is an inexpensive .over the counter material with a well established safety profile .limited studies have suggested that it is effective in treating acne vulgaris ,but several study design limitations need to be addressed before zinc is widely introduced as an alternative or adjunct treatment in the clinical setting .given the sample size ,short follow up periods & lack of standardization in most of the studies reviewed ,additional large scale double blind, randomized controlled studies are needed to determine the optimal treatment regimen for high efficacy of zinc in acne vulgaris .

7. Vloten W.A. Bos L.P., 1978, conducted a study on “SKIN LESIONS IN ACQUIRED ZINC DEFICIENCY DUE TO PARENTERAL NUTRITION” concluded that the skin lesions seen in 10 patients who received parenteral nutrition during treatment chronic enteropathy are described .All of these patients had a lowered serum zinc concentration .The skin lesions were similar to those seen in acrodermatitis enteropathica ,after supplementation with zinc sulphate ,the skin lesions disappeared completely .A decrease in the serum alkaline phosphatase level can be regarded as a sign of an impending zinc deficiency .Parenteral nutrition formulae should contain a sufficient amount of zinc .

8. Benjamin Bernstein ,M.D; James J. Leyden ,MD, 1978 conducted a study on “ZINC DEFICIENCY & ACRODERMATITIS AFTER INTRAVENOUS HYPERALIMENTATION” concluded that during the fourth week of intravenous hyperalimentation (IVH) a vesiculopustular & erythematous eruption developed in the perioral & perineal areas of a 60 year old woman .During the next ten days ,the eruption spread to involve the central portion of the face, periorbital areas ,entire perineum ,upper portion of the thighs ,& feet .She became depressed & agitated .Numerous study results for Candida



Albicans were negative. Within 48 hours of therapy with 220 mg, of zinc sulfate twice daily, the eruption had resolved to a mild erythema .The pretreatment serum zinc level before treatment was markedly depressed at 36 micro mg/dl.

9.F.T.Al-Gurairi, M, Al-Waiz, K.E.Sharquie, 2002, conducted a study on “ORAL ZINC SULPHATE IN THE TREATMENT OF RECALCITRANT VIRAL WARTS RANDOMIZED PLACEBO-CONTROLLED CLINICAL TRIAL” concluded that only 23 patients of the first group (zinc treated) & 20 patients of the second group (placebo treated) completed the study .In all patients the serum level of zinc was low. In the zinc treated group , the overall response was complete clearance of warts observed in 20 patients (86.9%) after 2 months of treatment .Fourteen patients (60.9%) showed complete disappearance of their warts after 1 month .3 patients (13.3%) failed to respond to the treatment after 2 months of therapy .The response to treatment was directly related to the increment in serum zinc level. No patient of the placebo-treated group showed any response. Zinc sulphate at a dose of 10 mg daily seems to be efficacious therapeutic option for recalcitrant viral warts and proved to be safe with few adverse effects.

10.Nooshin Bagherani ,Reza Yaghoobi & Mohammad Omidian ,2011,conducted a study on “ZINC CAN BE EFFECTIVE IN TREATMENT OF VITILIGO” Concluded that vitiligo is a common depigmenting skin disorder (prevalence 0.1-2%) still represents a cause of stigmatization and quality of life impairment in a large population .Several theories on vitiligo etiopathogenesis have been suggested including in trauma ,stress, & autoimmune & genetic predisposition , accumulation of toxic compounds , altered cellular environment ,imbalance in the oxidant-antioxidant system,impaired melanocyte migration & or proliferation ,infection ,& psychological factors. Zinc, as a trace element , has a many vital functions in human. It is antiapoptotic factor & needed a cofactor for antioxidant defense system .It plays an important role in the process of melanogenesis.It may be effective in prevention and treatment of vitiligo via some mechanism.

11. Khalifa E.Sharquie PhD,Rafid A.Najim PhD,Hala N.Al-Salman FIBMS(D&V),2006,conducted a study on “ORAL ZINC SULFATE IN THE TREATMENT OF ROSACEA: A DOUBLE –BLIND PLACEBO –CONTROLLED STUDY” concluded that 25 patients with Rosacea were included in this study 16 (64%) females and nine( 36%) males .19 patients completed the study ,11 (58%) females and eight (42%) males .Patient age ranged from 21 to 64 years with a mean ,duration of the disease ranged from 1 – 14 year with a mean ,group started on zinc sulfate , the score before therapy ranged from 5 – 11 with a mean .The mean started to decrease directly after the first month of therapy with zinc sulphate to a significantly lower level .After shifting to placebo treatment , the mean started to rise gradually in the fifth month but remained significantly lower than the levels before therapy .In the group started on placebo , the score before therapy ranged from 5-9 with a mean ,the mean remained high in the first 3 months of therapy while the patients were on placebo .After shifting to zinc sulfate , the mean started to decreased after the fourth month to significantly low levels. No important side effects were reported apart from mild gastric upset in three (12%) patients on zinc sulfate. Zinc sulfate was found to be a good option in the treatment of Rosacea as it is safe and effective.

12. Khalifa E.Sharquie ,MBChB,phD& Adil A,Al-Nuiamy ,MBChB ,2002 , Conducted a study on “TREATMENT OF VIRAL WARTS BY INTRALESIONAL INJECTION OF ZINC SULPHATE” Concluded that 53 patients (30 females,23 males),173 lesions were treated with 2% zinc sulphate intralesionally while 176 lesion were left untreated as control. The total clearance rate of the treated lesions were 98.2% within 6 weeks of follow up (80.92%)of lesions needed a single injection and showed total clearance within 2 weeks .While none of the control lesions showed any spontaneous clearance within the same period ,in 47 patients (27 females ,20 males) ,143 lesions were treated with 7% hypertonic sodium chloride solution intralesionally ,with the remaining 131 lesions left untreated as control.Only 8.3% of treated lesions showed total clearance within 10 weeks of follow up .2% zinc sulphate can be recommended as a new & effective local mode of therapy of viral warts , especially for the recalcitrant form.

13. Virendra N Sehgal, Pullabatl VS Prasad, Pichai K Kaviarasan, Deepak Rajan, 2014, conducted a study on “TROPIC SKIN ULCERATION IN LEPROSY EVALUATION OF TOPICAL PHENYTOIN SODIUM ZINC OXIDE PASTE” concluded that phenytoin sodium zinc oxide paste was found to be efficacious, cost effective and well tolerated alternative therapy. Patient compliance was good .bone involvement contributed to poor wound healing, but the clearance of bacterial load was significant.

14. Indira P.Kahawita ,Stephen L.Walker , Diana N.J. Lockwood ,2008, conducted a study on “LEPROSY TYPE-1 REACTIONS AND ERYTHEMA NODOSUM LEPROSUM’ concluded that the management of leprosy reactions and silent neuropathy continues to be a major challenge the prompt diagnosis and effective treatment of these complications of leprosy are essential if nerve function impairment ,deformity and disability are to be minimized .



15. Joe A Khattar , Umayya M Musharrafieh, Hala Tamim, Ghassan N Hamadeh ,2007, conducted a study on “TOPICAL ZINC OXIDE Vs SALICYCLIC ACID –LACTIC ACID COMBINATION IN THE TREATMENT OF WARTS” concluded that 16 patients in the group and 19 in the salicyclic acid – lactic acid group complete the study. In the zinc oxide – treated group 50% of the patients show complete cure and 18.7% failed to respond , compared with 42% and 26% , respectively in the salicyclic acid - lactic acid
16. MA Middelkamp –Hup , JD Bos , F Rius – Diaz , S Gonzalez , W Westerhof ,2007, conducted a study on “TREATMENT OF VITILIGO VULGARIS WITH NARROW – BAND UVB AND ORAL POLYPODIUM LEUCOTOMOS EXTRACT : A RANDOMIZED DOUBLE BLIND PLACEBO – CONTROLLED STUDY” concluded that there is a clear trend towards an increase in repigmentation of vitiligo vulgaris affecting the head and neck area when NB –UVB phototherapy is combined with oral P.leucotomus.This effect may be more pronounced in light skin types.
17. Mohammad A Basha , Rania M Azmy , Ola A Amin , Seham R Abd El- Khalik ,2015,conducted a study on “STUDY ON SERUM ZINC IN VITILIGO” concluded that in some earlier studies a variable degree of correlation was observed between serum zinc level and vitiligo .A recent study conducted in India showed low level of serum zinc to be a significant risk factor for vitiligo . This study, in contrast, has shown significantly higher level of serum zinc in vitiligo patients compared with controls .Thus; we recommended a study of longer duration with a large sample size. In addition, a multi ceneter study should be carried to reveal the accurate pattern of zinc status in vitiligo.
18. Majid Rostami Mogaddam, Nastaran Safavi Ardabili , Elham Fard conducted a study on “EVAULATION OF SERUM ZINC LEVELS IN PATIENTS WITH VITILIGO” concluded that the results of our study revealed a significant association between vitiligo and serum zinc levels.A relative decrease in the serum zinc levels in the patients with vitiligo can highlight the role of zinc in the pathogenesis of vitiligo, and large scale studies need to be conducted to confirm these findings and access the effect of oral zinc supplement in patients with low zinc levels .
19. Ala’s Shallal Farhan , Fatin Shallal Farhan conducted a study on “COMPARISON EFFECT BETWEEN IMIQUIMOD CREAM 5% AND ZINC SULPHATE SOLUTION 20% IN TREATMENT AND PREVENTION OF RECURRENCE OF EXTERNAL GENITAL WARTS” concluded that the efficacy of zinc sulphate 20% in the treatment of external genital warts was greater than imiquimod cream 5% and it is associated with lower recurrence rate but more side effects , all were mild and tolerable.
20. Marwa H Sayed ,Talal A Abd El –Raheem ,Shaheera M El Shafie,Marwa A Nassar conducted a study on “COMPARATIVE STUDY BETWEEN ORAL ZINC SULPHATE , AMINO ACIDS CHELATED ZINC AND PLACEBO IN TREATMENT OF VIRAL WARTS” concluded that oral zinc in both forms used in our study is safe but needs time to act and the response is not high , so it is not fit to be used as a monotherapy, but rather to be combined with other wart treatment modalities.
21. Samia Salman, Shahbaz Aman, Mohammad Nadeem, Atif Hasnain Kazmi conducted a study on “ORAL ZINC SULPHATE Vs TOPICAL APPLICATIONS OF SALICYCLIC (16.7%) AND LACTIC ACID (16.7%) COMBINATION IN THE TREATMENT OF PLANTAR WARTS” concluded that from this study the oral zinc sulphate is significantly more effective ( $p\text{-value} \leq 0.05$ ) than topical application of salicyclic (16.7%) and lactic acid (16.7%) combination in the treatment of plantar warts
22. Mina Minerzami, Hoda Rahimi conducted a study on “SERUM ZINC LEVEL IN VITILIGO: A CASE- CONTROL STUDY” concluded that based on the results of this study, the patients with generalized vitiligo have lower zinc level. In these patients, serum zinc level is in negative correlation with patient’s age and disease duration.
23. Reza Yaghoobi , Mohammad Omidian , Nooshin Bagherani conducted a study on “COMPARISON OF THERAPEUTIC EFFICACY OF TOPICAL CORTICOSTEROID AND ORAL ZINC SULFATE –TOPICAL CORTICOSTEROID COMBINATION IN THE TREATMENT OF VITILIGO PATIENTS : A CLINICAL TRIAL” concluded that topical corticosteroid plus oral zinc sulfate had no preference on topical corticosteroid only. Considering the more effect of corticosteroid plus zinc sulfate compared with corticosteroid alone , it appears more robust long term randomized control trials with more patients ,may be with higher dose of zinc sulfate are needed to fully establish the efficacy oral zinc in management of vitiligo.
24. Malorazata Olszewaka, et.al, 2008, conducted a study on “RESPONSE OF OCULAR PEMPHIGUS VULGARIS TO THERAPY.CASE REPORT AND REVIEW OF LITERATURE” concluded that the grounds for rare involvement of conjunctiva in pemphigus vulgaris is unclear. We hypothesize that inactivation of conjunctival desmoglein -3 may be compensated by other desmozomal proteins. Severe conjunctivitis may be the dominating clinical manifestations in pemphigus vulgaris .This implies a

need of establishing distinct severity criteria and therapeutic standards for ocular pemphigus. In our patient rapid clinical response was achieved after introducing combined treatment with prednisone and oral cyclophosphamide.

25. Mashaly, et.al, 2014, conducted a study on “ESTIMATION OF SERUM ZINC AND COPPER IN EGYPTIAN PATIENTS WITH PEMPHIGUS VULGARIS” concluded that findings indicate that low serum zinc and copper levels are associated with PV in Egyptian patients.

26. Hoon park, et.al, 2009, conducted a study on “THE THERAPEUTIC EFFECT AND THE CHANGED SERUM ZINC LEVELS AFTER ZINC SUPPLEMENTATION IN ALOPECIA AREATA PATIENTS WHO HAD A LOW SERUM ZINC LEVEL” concluded that zinc supplementation needs to be given to the alopecia areata patients who had a low serum zinc level. We suggest that zinc supplementation could become an adjuvant therapy for the alopecia areata patients with low serum zinc level and for whom the traditional therapeutic method have been and successful.

27. Solam Lee, et.al, 2019, conducted a study on “TOPOGRAPHIC PHENOTYPES OF ALOPECIA AREATA AND DEVELOPMENT OF PROGNOSTIC PREDICTION MODEL AND GRADING SYSTEM” concluded that temporal area involvement should be independently measured for better prognostic stratification. The TOAST is an effective tool for describing the topographic characteristics and prognosing of hair loss and may enable clinicians to establish better treatment plans.

28. Solam Lee, et.al, 2018, conducted a study on “HAIR REGROWTH OUTCOMES OF CONTACT IMMUNOTHERAPY FOR PATIENTS WITH ALOPECIA AREATA” concluded that the therapeutic hair regrowth outcomes of contact immunotherapy with diphenylcyclopropenone or squaric acid dibutyl ester for AA were associated with various factors in the evaluated studies, and there was significant variability in the criteria used for each therapeutic end point. Patients with AA should be individually provided with accurate information based on personal prognostic factors and level of expected therapeutic outcomes. Nevertheless, to our knowledge, no treatment has been able to modify long term prognosis of AA. Therefore, an accurate understanding of disease and treatment related prognosis is needed, and education should be provided to improve the patient's therapeutic adherence and outcomes.

29. Solam Lee, ET. al, 2019, conducted a study on “ALL- CAUSE AND CAUSE- SPECIFIC MORTALITY RISK ASSOCIATED WITH ALOPECIA AREATA” concluded that patients with alopecia areata have a higher risk of mortality associated with self-harm, psychiatric diseases, smoking – associated malignant diseases including lung cancer. For better outcomes, clinicians should appropriately treat patients to ensure emotional and psychological well-being.

30. Yasmeen J Bhat, ET .al, 2009, conducted a study on “TRACE ELEMENT LEVELS IN ALOPECIA AREATA” concluded that copper and magnesium levels are not altered in AA. But the decreased zinc levels found in our study may merit further investigating the relationship.

31. Nermeen S. et .al, conducted a study on “EVALUATION OF SERUM ZINC LEVEL IN PATIENTS WITH NEWLY DIAGNOSED AND RESISTANT ALOPECIA AREATA” concluded that low serum zinc level existed in patients with AA and correlated inversely with disease duration, severity of AA, and its resistance to therapies therefore assessment of serum zinc level in patients with AA appears useful as a marker of severity. Disease duration, and resistance to therapies accordingly, zinc supplements may provide a therapeutic benefit.

32. Min Seong Kil, et.al, 2013, conducted a study on “ANALYSIS OF SERUM ZINC AND COPPER CONCENTRATIONS IN HAIR LOSS” concluded that the data led to the hypothesis of zinc metabolism disturbances playing a key role in hair loss, especially AA and TE, whereas the effect of copper on hair growth and shedding cycles still needs more study.

33. Khalifa E Shaequie, et.al, 2012, conducted a study on “ORAL ZINC SULPHATE IN TREATMENT OF ALOPECIA AREATA (DOUBLE BLIND : CROSS OVER STUDY)” concluded that oral zinc sulphate is one of the effective treatment options for AA with low relapse rate after stopping of the treatment.

34. Prasad, et.al, 2009, conducted a study on “ZINC: ROLE IN IMMUNITY, OXIDATIVE STRESS AND CHRONIC INFLAMMATION” concluded that zinc supplementation has been successfully used as a therapeutic and preventive agent for many conditions. Zinc functions as an intracellular signal molecule for immune cells.

35. Essam – elden Mohammed Mohammed, et .al, 2016, conducted a study on “THE CLINICAL EFFECTIVENESS OF INTRALESIONAL INJECTION OF 2% ZINC SULFATE SOLUTION IN THE TREATMENT OF COMMON WARTS”

concluded that intralesional injection of 2% zinc sulfate should be considered as a therapeutic option in the treatment of common warts.

36. Stephen L. Walker, et.al, 2017, conducted a study on “A LEPROSY CLINICAL SEVERITY SCALE FOR ERYTHEMA NODOSUM LEPROSUM: AN INTERNATIONAL, MULTICENTER VALIDATION STUDY OF THE ENLIST ENL SEVERITY SCALE” concluded that the 10 item ENLIST ENL severity scale is the first valid, reliable and responsive measure of ENL. Severity and improves our ability to assess and compare patients and their treatments in this severe and difficult to manage complication of leprosy. The ENLIST ENL, severity will assist physicians in the monitoring and treatment of patients with ENL. The ENLIST ENL, severity scale is easy to apply and will be useful as an outcome measure in treatment studies and enable the standardization of other clinical and laboratory ENL research.

37. Cynthia Okoduwa, et.al, 2009, conducted a study on “ERYTHRODERMA: REVIEW OF A POTENTIALLY LIFE – THREATENING DERMATOSIS” concluded that this study outlines that underlying etiological factors of erythroderma may show geographic variations.

38. Jonathan I. Silverberg et.al, 2010, conducted a study on “A PILOT STUDY ASSESSING THE ROLE OF 25 HYDROXY VITAMIN D LEVELS IN PATIENTS WITH VITILIGO VULGARIS” concluded that very low 25-hydroxyvitamin D levels (< 15 mg/ml) appear to be a reasonable screening tool for the presence of Comorbid autoimmunity. Furthermore, we demonstrate that Fitzpatrick phototype, rather than ethnicity, is specially associated with 25-hydroxyvitamin D levels that are insufficient (<30 mg/ml).

39. Veronica Lepe et.al, 2003, conducted a study on “A DOUBLE – BLIND RANDOMIZED TRIAL OF 0.1% TACROLIMUS Vs 0.05% CLOBETASOL FOR THE TREATMENT OF CHILDHOOD VITILIGO” concluded that tacrolimus proved almost as effective as clobetasol propionate to restore skin colour in lesions of vitiligo in children. Because it does not produce atrophy or other adverse effects, tacrolimus may be very useful for younger patients and for sensitive areas of the skin such as eyelid, and it should be considered in other skin disorders currently treated with topical steroids for prolonged periods.

40. May W. Linthorst Homan, et.al, 2009, conducted a study on “THE BURDEN OF VITILIGO: PATIENT CHARACTERISTICS ASSOCIATED WITH QUALITY OF LIFE” concluded that generalized vitiligo is a serious skin disorder with an adverse impact on the emotional state, comparable with that of major skin diseases.

41. Nanette B. Silverberg, et.al, 2004, conducted a study on “TACROLIMUS OINTMENT PROMOTES REPIGMENTATION OF VITILIGO IN CHILDREN: A REVIEW OF 57 CASES” concluded that topical tacrolimus ointment is an effective alternative therapy for childhood vitiligo, particularly involving the head and neck.

42. Sanjay K Rath, 2011, conducted a study on “ACNE VULGARIS TREATMENT : THE CURRENT SCENARIO” concluded that various topical and systemic drugs are available to treat acne, which may sometimes confuse the treating dermatologist. To overcome this situation a panel of physicians and researchers worked together as a global alliance and task force to improve outcomes in acne treatment. They have tried to give consensus recommendation for the treatment of acne, mostly evidence based and inputs from various countries. Similar alliance has also been formed in India recently with their recommendations.

43. Evan Darwin, et.al, 2018, conducted a study on “ALOPECIA AREATA: REVIEW OF EPIDEMIOLOGY, CLINICAL FEATURES, PATHOGENESIS, AND NEW TREATMENT OPTIONS” concluded that AA is a complicated multifactorial disease with a variable prognosis. While many patients will heal spontaneously, other patients may have chronic disease. There are no FDA approved treatments, although corticosteroids are considered first line. Potential new avenues of therapy have been explored here and will require more extensive review before their use can be recommended. Further research into the mechanism of the disease may also elucidate further treatment options.

44. Etienne Wang, et.al, 2012, conducted a study on “CURRENT TREATMENT STRATEGIES IN PEDIATRIC ALOPECIA AREATA” concluded that alopecia areata is a common yet challenging condition to manage in the paediatric dermatology clinic. While many patients with localised AA will respond well to first- line treatment with topical or intralesional corticosteroids, some patients will require more aggressive or second –line therapy. Paediatric age of onset, more extensive disease (scalp involvement more than 50%, ophiasis, or AT/AU), and recalcitrance to initial therapies may highlight patients who will prove to be challenging to manage. Some of these patients may benefit from a cocktail of established therapies, whereby the synergy between two or more established therapies proves to be better than monotherapy. Future studies focusing on such combination therapies, as

well as novel new treatments not mentioned in this review because of lack of evidence (non – TNF- $\alpha$  biologics, drugs directed against nerves like capsaicin, and low-level light therapy devices), will expand the choices available to dermatologists, patients and their parents in the treatment of paediatric AA. We have included a treatment algorithm for pediatric cases of AA as a guide, but treatment will need to be individualised and based on discussion with the child and the 20parents.

45. Kolalapudi Anjaneyulu Seetharam, 2013, conducted a study on “ALOPECIA AREATA: AN UPDATE” concluded that AA is the common form of hair loss affecting the quality of life of many patients. Genetic susceptibility environmental factors and autoimmunity are the main etiological factors. GWAS studies had identified the key genes paving the way for better understanding of pathogenesis of AA. Corticosteroids are the main stay in the treatment of AA .The other treatment are minoxidil, immunotherapy and PUVA. Newer therapies are focused at T-cell mechanisms and NK-cell activating ligands.

46. Julie S kranseler, et.al, 2017, conducted a study on “ALOPECIA AREATA: UPDATE ON MANAGEMENT” concluded that AA is a common autoimmune disorder with inadequate treatment options particularly for pediatric patients. A growing body of research suggests that certain systemic therapies may provide benefits for patients with refractory disease. The most promising newer treatments include topical and systemic IAK inhibitors (tofacitinib, ruxolitinib, and baricitinib), topical bimatoprost, simvastatin/ezetimibe and excimer laser therapy however there remains a dearth of randomised controlled trials. Safety data are critical particularly for a disease that is medically benign. Conversely, efficacy data are essential for a disease that can be psychosocially devastating. Recent progress offers hope for more effective treatment on the horizon.

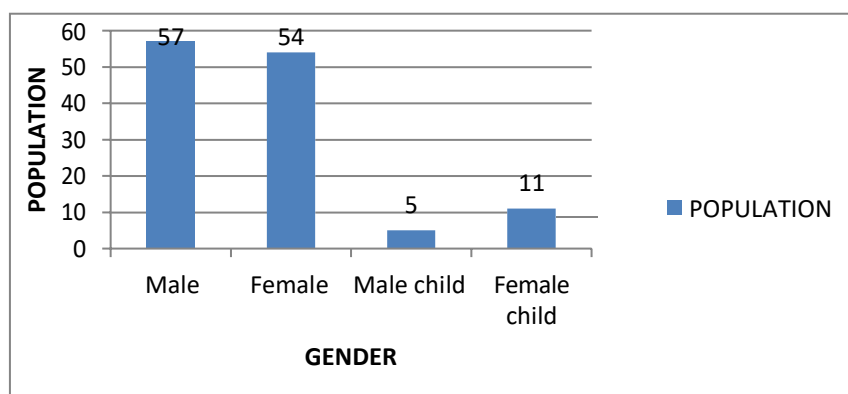
## RESULTS

TABLE NO:6.1 GENDER WISE DISTRIBUTION OF TOTAL POPULATION :

| S.No | GENDER       | POPULATION | PERCENTAGE (%) |
|------|--------------|------------|----------------|
| 1    | Male         | 57         | 44.88%         |
| 2    | Female       | 54         | 42.51%         |
| 3    | Male child   | 5          | 3.93%          |
| 4    | Female child | 11         | 8.66%          |

Table contains gender wise distribution which shows highest population in males (44.88%), followed by females (42.51%),

FIGURE NO6.1: GENDER WISE DISTRIBUTION OF TOTAL POPULATION:



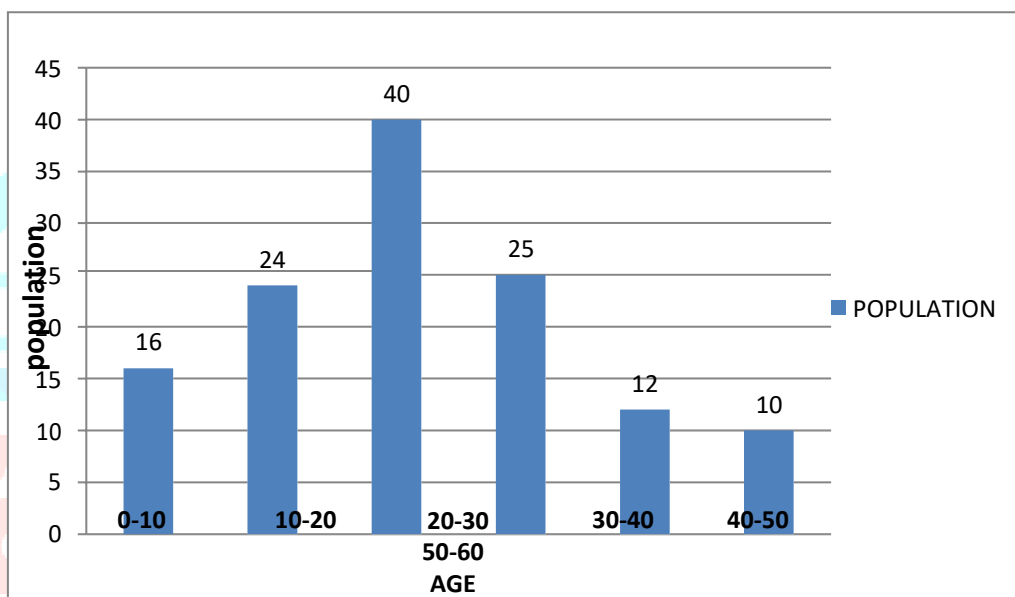
The above figure contains gender wise distribution which shows highest population in males (57), followed by females (54), female child of 11, male child of 5.

Table NO: 6.2 AGE WISE DISTRIBUTION OF TOTAL POPULATION :

| S.NO | AGE   | POPULATION | PERCENTAGE |
|------|-------|------------|------------|
| 1.   | 0-10  | 16         | 12.59%     |
| 2.   | 10-20 | 24         | 18.89%     |
| 3.   | 20-30 | 40         | 31.49%     |
| 4.   | 30-40 | 25         | 19.68%     |
| 5    | 40-50 | 12         | 9.44%      |
| 6.   | 50-60 | 10         | 7.87%      |
|      | TOTAL | 127        | 100%       |

The above table consist of age wise distribution which shows the highest population in age group of 20-30(31.49%) and the least number of population recorded in the age group (50-60%).

FIGURE NO .6.2: AGE WISE DISTRIBUTION OF TOTAL POPULATION :



The above figure consist of age wise distribution which shows the highest population in age group of 20-30(40) and the least number of population recorded in the age group 50-60(10).

TABLE NO: 6.3 DISEASE WISE DISTRIBUTION OF TOTAL POPULATION:

| S.N | DISEASE            | POPULATION | PERCENTAGE (%) |
|-----|--------------------|------------|----------------|
| 1   | Alopecia areata    | 60         | 47.24%         |
| 2   | Acne vulgaris      | 27         | 21.25%         |
| 3   | Warts              | 13         | 10.23%         |
| 4   | Erythroderma       | 8          | 6.29%          |
| 5   | BTL                | 4          | 3.14%          |
| 6   | ENL                | 4          | 3.14%          |
| 7   | Vitiligo           | 3          | 2.36%          |
| 8   | Pemphigus vulgaris | 2          | 1.57%          |
| 9   | Others             | 6          | 4.72%          |

The above table contains disease wise distribution which shows the highest population in alopecia areata (47.24%) ,and the least number of population consist in pemphigus vulgaris (1.57%)



FIGURE NO.6.3: DISEASE WISE DISTRIBUTION OF TOTAL POPULATION

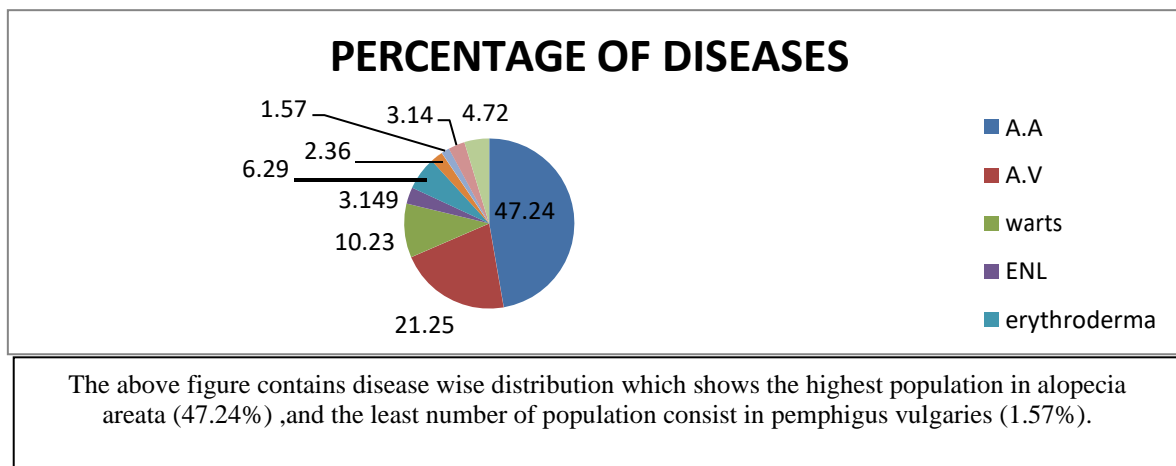
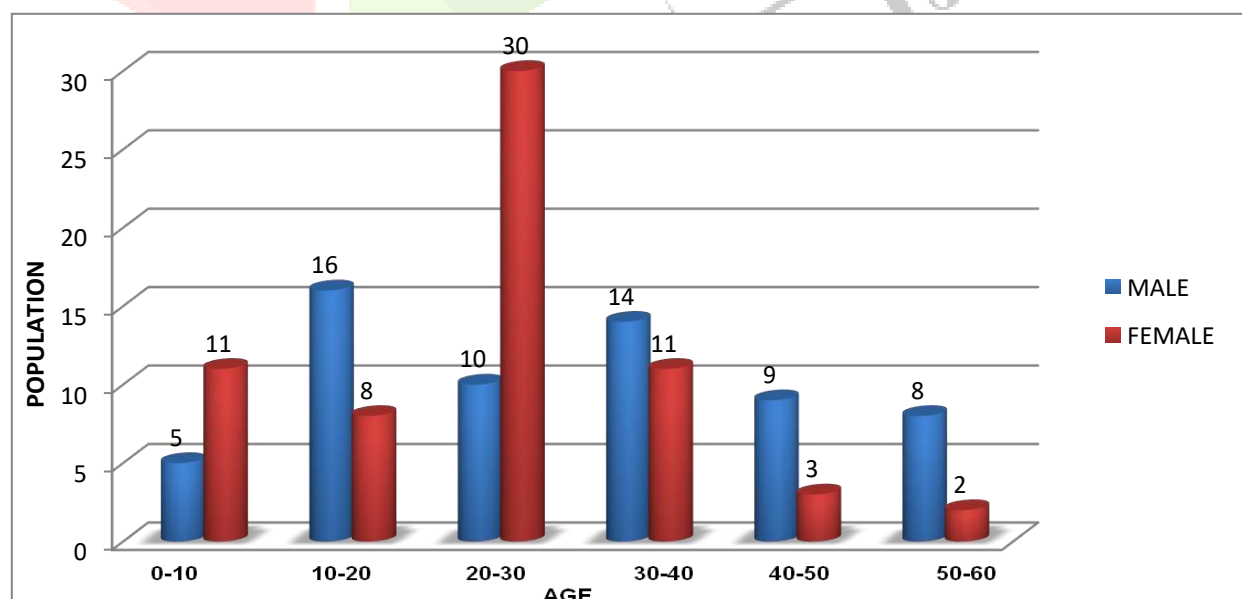


TABLE NO: 6.4 AGE WISE GENDER DISTRIBUTION IN TOTAL POPULATION :

| S.NO | AGE   | MALE | FEMALE | TOTAL | PERCENTAGE(%) |
|------|-------|------|--------|-------|---------------|
| 1    | 0-10  | 5    | 11     | 16    | 12.59         |
| 2    | 10-20 | 16   | 8      | 24    | 18.89         |
| 3    | 20-30 | 10   | 30     | 40    | 31.49         |
| 4    | 30-40 | 14   | 11     | 25    | 19.68         |
| 5    | 40-50 | 9    | 3      | 12    | 9.44          |
| 6    | 50-60 | 8    | 2      | 10    | 7.87          |
|      | TOTAL | 62   | 65     | 127   | 100           |

The above table consist of age wise gender distribution which shows the highest female population in our study are seen in the age group of 20-30 years, higher male population is seen in the age group of 10-20 years .

FIGURE NO. 6.4 :AGE WISE GENDER DISTRIBUTION IN TOTAL POPULATION:



The above figure consist of age wise gender distribution which shows the highest female population in our study are seen in the age group of 20-30 years, higher male population is seen in the age group of 10-20 years .

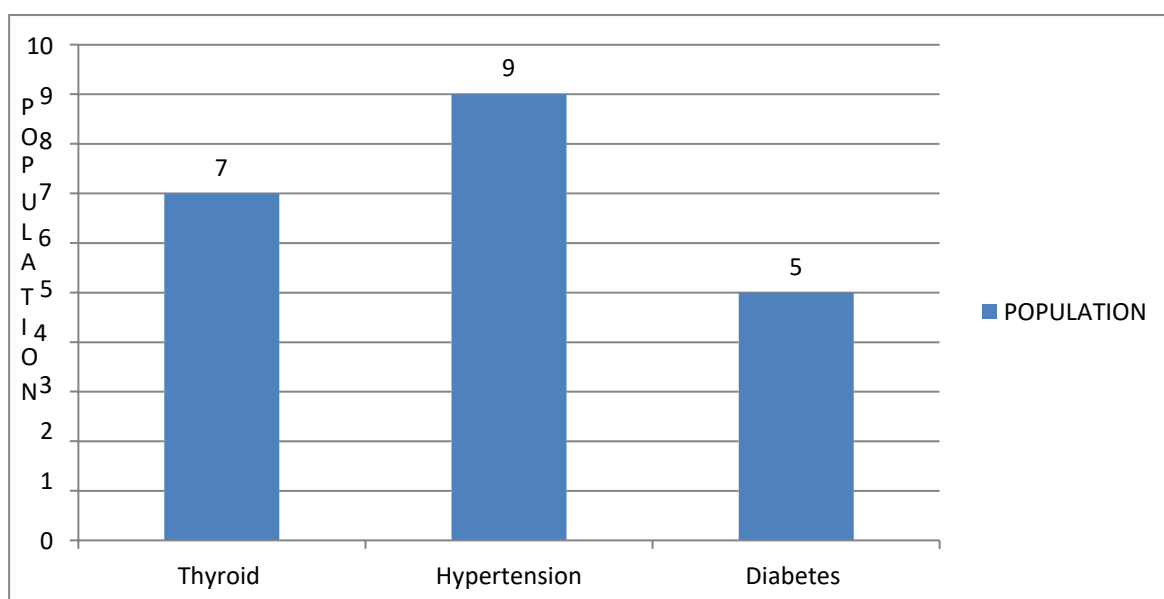


TABLE NO: 6.5 COMORBID CONDITIONS:

| S.NO | COMORBID CONDITIONS | POPULATION | PERCENTAGE |
|------|---------------------|------------|------------|
| 1.   | Thyroid             | 7          | 5.51%      |
| 2.   | Hypertension        | 9          | 7.08%      |
| 3.   | Diabetes            | 5          | 3.93%      |
|      | Total               | 21         | 16.53%     |

The above table contains about Comorbid conditions of the patients. Most common Comorbid condition observed in percentage are hypertension (7.08%), followed by thyroid (5.51%), diabetes (3.93%).

FIGURE NO: 6.6: COMORBID CONDITIONS



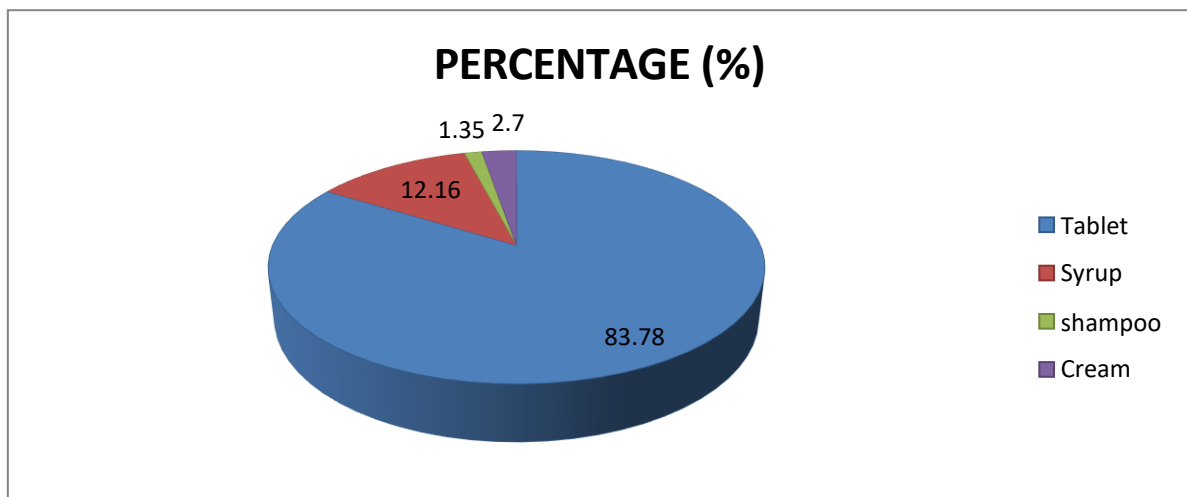
The above figure contains about Comorbid conditions of the patients. Most common Comorbid condition observed in population are hypertension (9), followed by thyroid (7), diabetes (5).

TABLE NO:6.6: FORMULATIONS OF ZINC USED :

| S.NO | FORMULATION | NO.OF CASES | PERCENTAGE (%) |
|------|-------------|-------------|----------------|
| 1    | Tablet      | 62          | 83.78          |
| 2    | Syrup       | 9           | 12.16          |
| 3    | shampoo     | 1           | 1.35           |
| 4    | Cream       | 2           | 2.70           |

The above table contains the list of formulations used, these table shows the highest number of formulations used are tablets (83.78%), the lowest number recorded as shampoos (1.35%).

FIGURE NO:6.6 : FORMULATIONS OF ZINC USED :



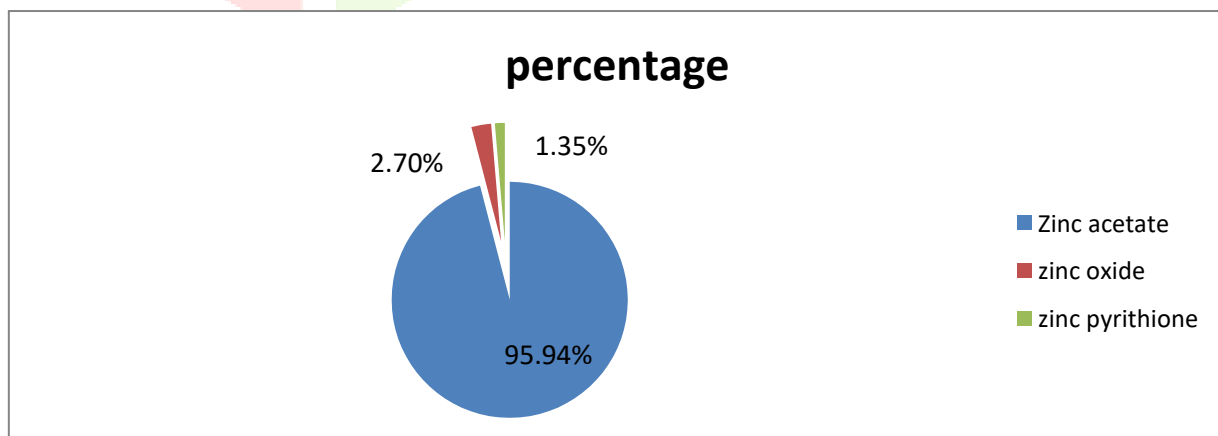
The above figure contains the list of formulations used, these table shows the highest number of formulations used are tablets (83.78%), the lowest number recorded as shampoos (1.35%).

TABLE NO: 6.7 :TYPES OF ZINC USED :

| S.NO | TYPES           | NO.OF CASES | PERCENTAGE(%) |
|------|-----------------|-------------|---------------|
| 1    | Zinc acetate    | 61          | 95.94         |
| 2    | Zinc oxide      | 2           | 2.70          |
| 3    | Zinc pyrithione | 1           | 1.35          |

The above table contains the type of zinc used and shows that the most of the population are treated with zinc acetate (95.94%),least number of population are treated with zinc pyrithione(1.35%)

FIGURE N:6.7: TYPES OF ZINC USED



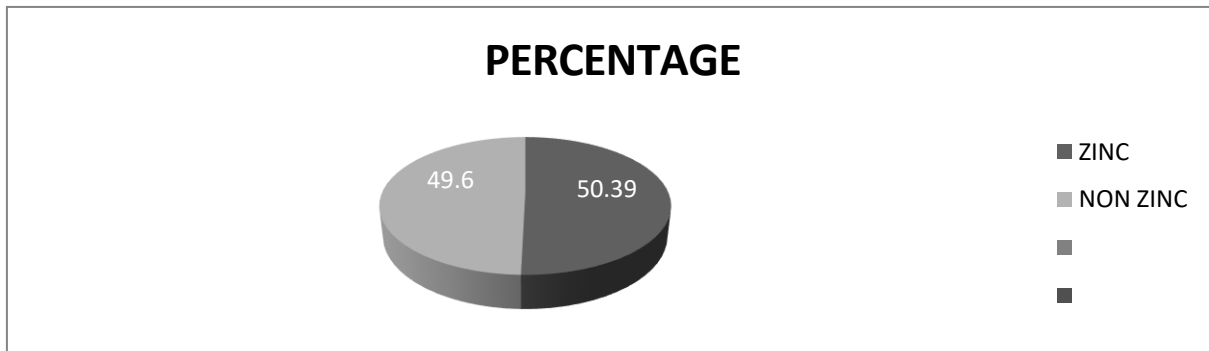
The above figure contains the type of zinc used and shows that the most of the population are treated with zinc acetate (95.94%) ,least number of population are treated with zinc pyrithione(1.35%)

TABLE NO: 6.8: COMPARING PERCENTAGE OF ZINC AND NON ZINC THERPAY

| THERAPY  | NUMBER OF CASES | PERCENTAGE (%) |
|----------|-----------------|----------------|
| ZINC     | 64              | 50.39          |
| NON ZINC | 63              | 49.60          |
| TOTAL    | 127             | 100            |

The above table contains comparison of percentage of zinc with non-zinc, that shows the zinc and non zinc used in these study are almost equal

FIGURE NO:6.8: COMPARING PERCENTAGE OF ZINC AND NON ZINC THERPAY



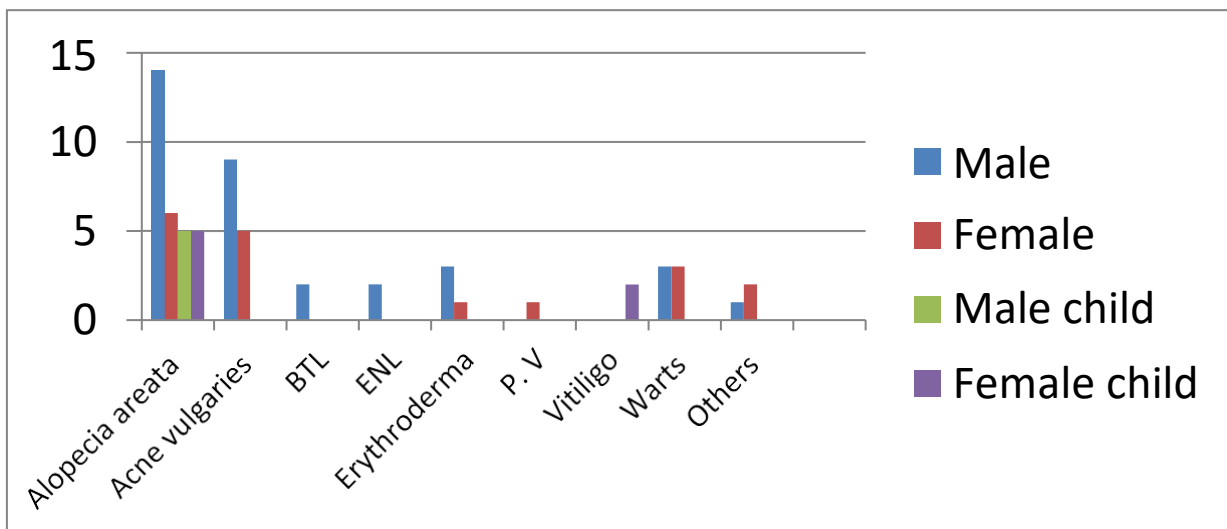
The above table contains comparison of percentage of zinc with non-zinc, that shows the zinc and non zinc used in these study are almost equal.

TABLE NO: 6.9 DISEASES –GENDER DISTRIBUTION IN ZINC THERAPY:

| DISEASE         | Male | Female | Male child | Female child |
|-----------------|------|--------|------------|--------------|
| Alopecia areata | 14   | 6      | 5          | 5            |
| Acne vulgaris   | 9    | 5      | 0          | 0            |
| BTL             | 2    | 0      | 0          | 0            |
| ENL             | 2    | 0      | 0          | 0            |
| Erythroderma    | 3    | 1      | 0          | 0            |
| P. V            | 0    | 1      | 0          | 0            |
| Vitiligo        | 0    | 0      | 0          | 2            |
| Warts           | 3    | 3      | 0          | 0            |
| Others          | 1    | 2      | 0          | 0            |
| Total           | 34   | 18     | 5          | 7            |

The above table consist of disease wise gender distribution of zinc therapy, these shows most number of male and female population are seen in alopecia areata

FIGURE NO:6.9: DISEASE –GENDER DISTRIBUTION IN ZINC THERAPY



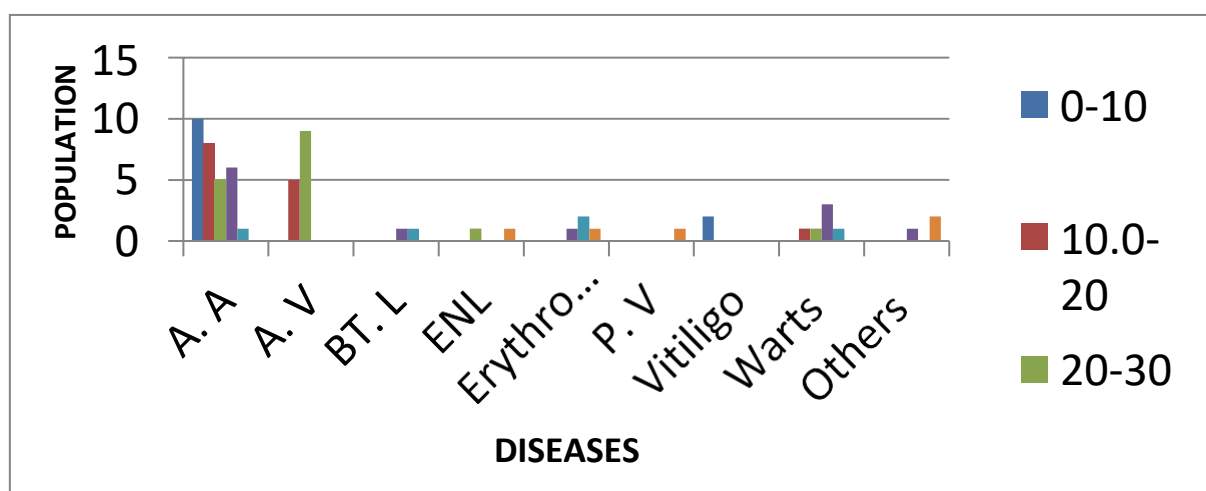
The above figure consist of disease wise gender distribution of zinc therapy, these shows most number of male and female population are seen in alopecia areata.

TABLE NO: 6.10: DISEASE –AGE DISTRIBUTION IN ZINC THERAPY

| DISEASE      | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|--------------|------|-------|-------|-------|-------|-------|
| A. A         | 10   | 8     | 5     | 6     | 1     | 0     |
| A. V         | 0    | 5     | 9     | 0     | 0     | 0     |
| BT. L        | 0    | 0     | 0     | 1     | 1     | 0     |
| ENL          | 0    | 0     | 1     | 0     | 0     | 1     |
| Erythroderma | 0    | 0     | 0     | 1     | 2     | 1     |
| P. V         | 0    | 0     | 0     | 0     | 0     | 1     |
| Vitiligo     | 2    | 0     | 0     | 0     | 0     | 0     |
| Warts        | 0    | 1     | 1     | 3     | 1     | 0     |
| Others       | 0    | 0     | 0     | 1     | 0     | 2     |
| Total        | 12   | 14    | 16    | 12    | 5     | 5     |

The above table contains disease wise age distribution in zinc therapy that shows highest number of population observed in alopecia areata in 10-20 years of age group ,the lowest number of population observed in pemphigus vulgaris .

FIGURE NO.10: DISEASE–AGE DISTRIBUTION IN ZINC THERAPY

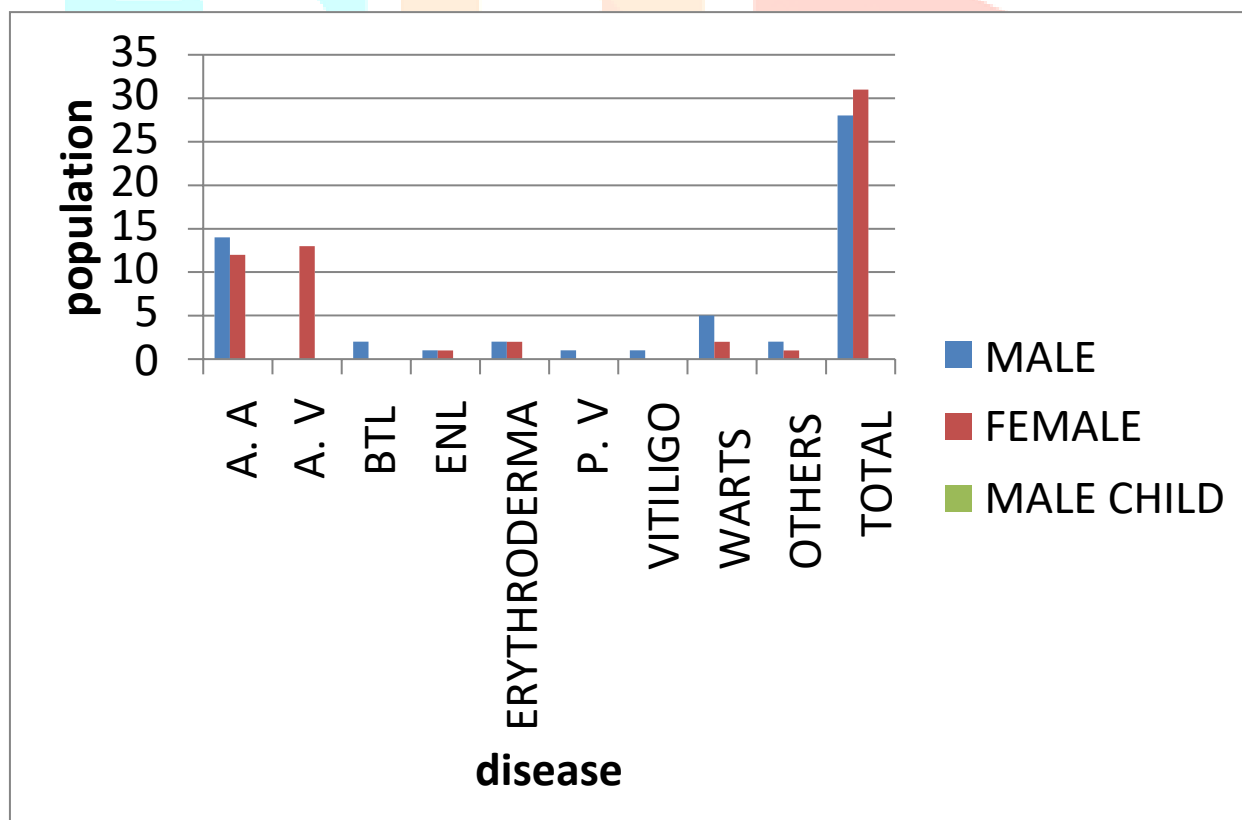


The above figure contains disease wise age distribution in zinc therapy that shows highest number of population observed in alopecia areata in 10-20 years of age group ,the lowest number of population observed in pemphigus vulgaris

TABLE NO: 6.11: DISEASES –GENDER DISTRIBUTION IN NON-ZINC THERAPY

| DISEASE      | MALE | FEMALE | MALE CHILD | FEMALE CHILD |
|--------------|------|--------|------------|--------------|
| A. A         | 14   | 12     | 0          | 4            |
| A. V         | 0    | 13     | 0          | 0            |
| BTL          | 2    | 0      | 0          | 0            |
| ENL          | 1    | 1      | 0          | 0            |
| ERYTHRODERMA | 2    | 2      | 0          | 0            |
| P. V         | 1    | 0      | 0          | 0            |
| VITILIGO     | 1    | 0      | 0          | 0            |
| WARTS        | 5    | 2      | 0          | 0            |
| OTHERS       | 2    | 1      | 0          | 0            |
| TOTAL        | 28   | 31     | 0          | 4            |

The above table consist of disease wise gender distribution in non zinc therapy patients that shows highest number of



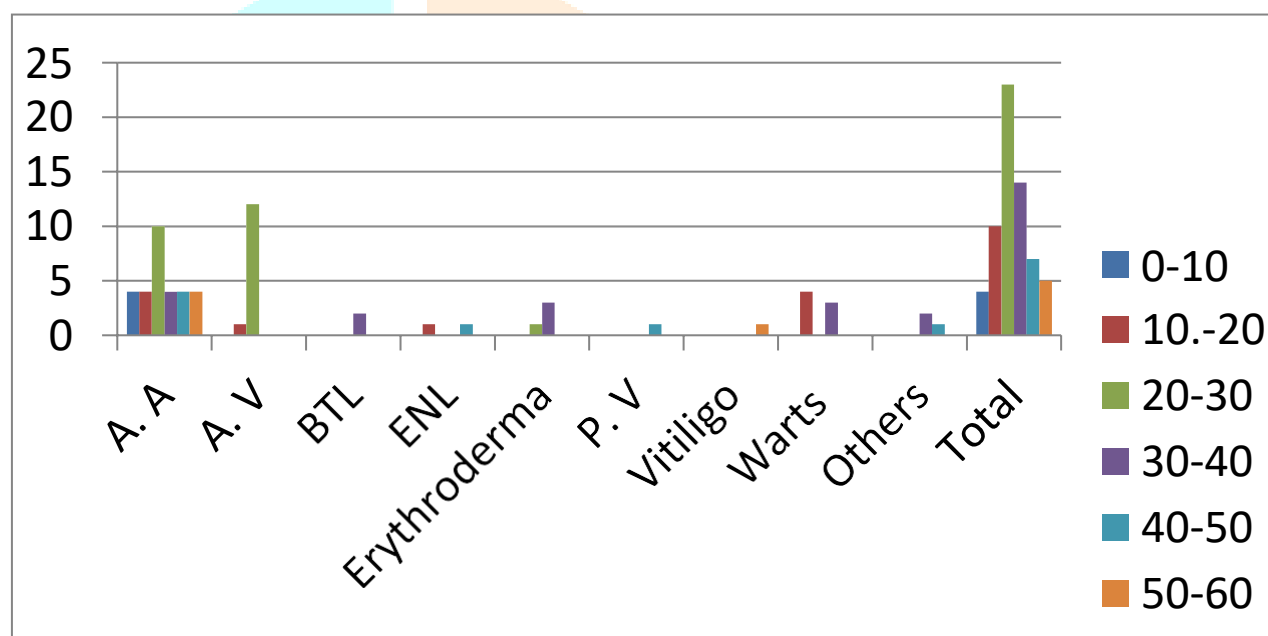
The above figure consist of disease wise gender distribution in non zinc therapy patients that shows highest number of male population is observed in alopecia areata and highest number of female population is observed in acne vulgaris.

TABLE NO: 6.12: DISEASE-AGES DISTRIBUTION IN NON ZINC THERAPY

| DISEASE      | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|--------------|------|-------|-------|-------|-------|-------|
| A. A         | 4    | 4     | 10    | 4     | 4     | 4     |
| A. V         | 0    | 1     | 12    | 0     | 0     | 0     |
| BTL          | 0    | 0     | 0     | 2     | 0     | 0     |
| ENL          | 0    | 1     | 0     | 0     | 1     | 0     |
| Erythroderma | 0    | 0     | 1     | 3     | 0     | 0     |
| P. V         | 0    | 0     | 0     | 0     | 1     | 0     |
| Vitiligo     | 0    | 0     | 0     | 0     | 0     | 1     |
| Warts        | 0    | 4     | 0     | 3     | 0     | 0     |
| Others       | 0    | 0     | 0     | 2     | 1     | 0     |
| Total        | 4    | 10    | 23    | 14    | 7     | 5     |

The above table consist of disease- age distribution in non- zinc therapy, that shows highest number of population observed in age group of 20-30 years.

FIGURE NO.12: DISEASE-AGE DISTRIBUTION IN NON-ZINC THERAPY



The above figure consists of disease- age distribution in non- zinc therapy, that shows highest number of population observed in age group of 20-30 years.

TABLE NO: 6.13 THERAPEUTIC EFFECT OF ZINC WITH GENDER WISE DISTRIBUTION:

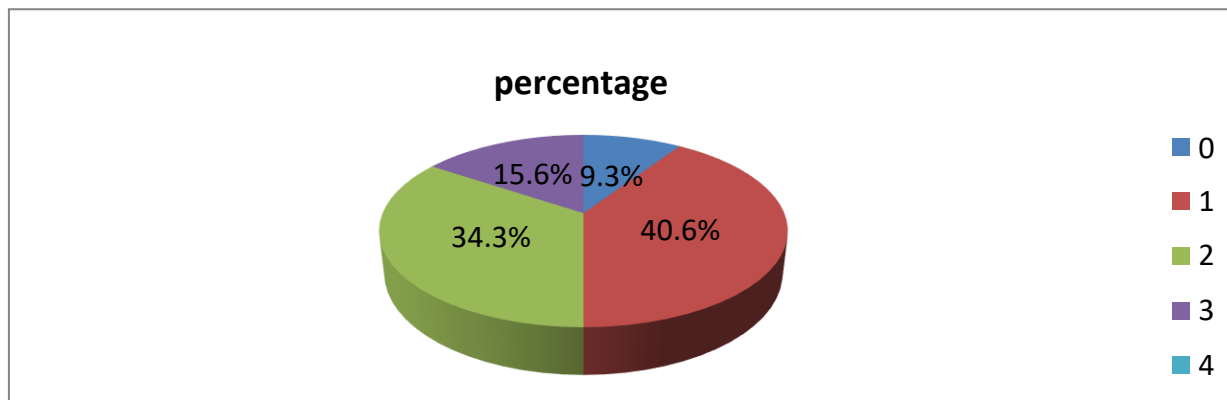
| No. reviews | MALE | FEMLAE | MCH | FCH | TOTAL | PERCENTAGE (%) |
|-------------|------|--------|-----|-----|-------|----------------|
| 0           | 4    | 2      | 0   | 0   | 6     | 9.3            |
| 1           | 10   | 9      | 4   | 3   | 26    | 40.6           |
| 2           | 13   | 4      | 1   | 4   | 22    | 34.3           |
| 3           | 7    | 3      | 0   | 0   | 10    | 15.6           |



|       |    |    |   |   |    |     |
|-------|----|----|---|---|----|-----|
| 4     | 0  | 0  | 0 | 0 | 0  | 0   |
| Total | 34 | 18 | 5 | 7 | 64 | 100 |

The above table consist of therapeutic effect of zinc with gender wise distribution, that shows the recovery of patients with zinc is fast and effective mostly with in 1,2 reviews .

**FIGURE NO.13: THERAPUTIC EFFECT OF ZINC WITH GENDER WISE DISTRIBUTION IN PATIENTS**



The above table consist of therapeutic effect of zinc with gender wise distribution, that shows the recovery of patients with zinc is fast and effective mostly with in 1, 2 reviews.

**TABLE NO: 6.14: THERAPEUTIC EFFECT OF ZINC WITH AGE WISE DISTRIBUTION:**

| No. of reviews | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | Total | %    |
|----------------|------|-------|-------|-------|-------|-------|-------|------|
| 0              | 1    | 1     | 3     | 1     | 0     | 0     | 6     | 9.3  |
| 1              | 8    | 9     | 4     | 4     | 1     | 0     | 26    | 40.6 |
| 2              | 3    | 3     | 8     | 6     | 0     | 2     | 22    | 34.3 |
| 3              | 0    | 1     | 1     | 1     | 4     | 3     | 10    | 15.6 |
| 4              | 0    | 0     | 0     | 0     | 0     | 0     | 0     | 0    |
| Total          | 12   | 14    | 16    | 12    | 5     | 5     | 64    | 100  |

The above table consist of the therapeutic effect of zinc with age wise distribution, that shows the recovery of patients with zinc therapy is fast and effective mostly in the age group of 0-20 years and, the recovery of patients is slow in the age group of 50-60years .

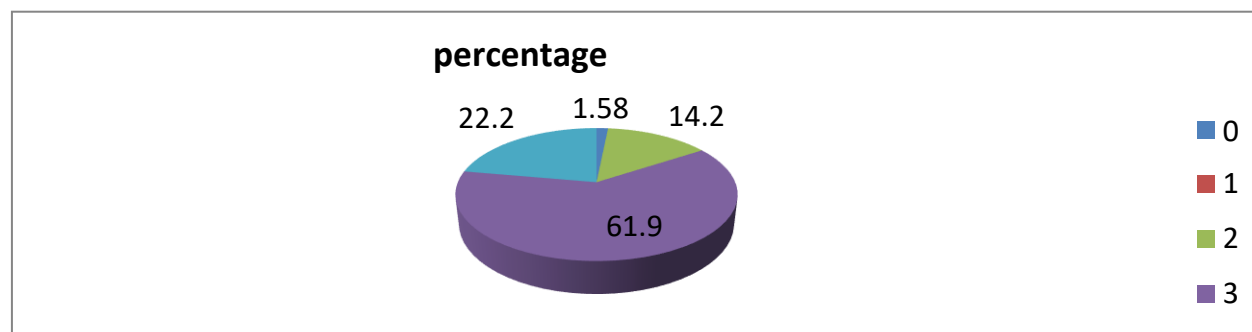
**WISE DISTRIBUTION IN PATIENTS:**

| No. reviews | MALE | FEMLAE | MCH | FCH | TOTAL | %    |
|-------------|------|--------|-----|-----|-------|------|
| 0           | 0    | 1      | 0   | 0   | 1     | 1.58 |
| 1           | 0    | 0      | 0   | 0   | 0     | 0    |
| 2           | 4    | 5      | 0   | 0   | 9     | 14.2 |
| 3           | 22   | 15     | 0   | 2   | 39    | 61.9 |
|             | 2    | 10     | 0   | 2   | 14    | 22.2 |

|       |    |    |   |   |    |     |
|-------|----|----|---|---|----|-----|
| Total | 28 | 31 | 0 | 4 | 63 | 100 |
|-------|----|----|---|---|----|-----|

The above table consist of therapeutic effect of no- zinc therapy with gender wise distribution, that shows the recovery of patients with zinc is slower; it takes 3-4 reviews to recover.

FIGURE NO: 6.14 THERAPEUTIC EFFECT OF NON- ZINC WITH GENDER WISE DISTRIBUTION IN PATIENTS:



The above figure consist of therapeutic effect of no- zinc therapy with gender wise distribution, that shows the recovery of patients with zinc is slower; it takes 3-4 reviews to recover.

TABLE NO: 6.16:THERAPEUTIC EFFECT OF NON-ZINC WITH AGE WISE DISTRIBUTION IN PATIENTS:

| No. of reviews | 0-10     | 10-20     | 20-30     | 30-40     | 40-50    | 50-60    | Total     | %         |
|----------------|----------|-----------|-----------|-----------|----------|----------|-----------|-----------|
| 0              | 0        | 0         | 1         | 0         | 0        | 0        | 1         | 1.58      |
| 1              | 0        | 0         | 0         | 0         | 0        | 0        | 0         | 0         |
| 2              | 0        | 0         | 2         | 4         | 2        | 1        | 9         | 14.2      |
| 3              | 1        | 4         | 20        | 9         | 3        | 2        | 39        | 61.9      |
| 4              | 3        | 6         | 0         | 1         | 2        | 2        | 14        | 22.2      |
| <b>Total</b>   | <b>4</b> | <b>10</b> | <b>23</b> | <b>14</b> | <b>7</b> | <b>5</b> | <b>63</b> | <b>63</b> |

The above table consist of the therapeutic effect of non-zinc therapy with age wise distribution, that shows the recovery of patients with non-zinc therapy is slower mostly in all age groups.

## DISCUSSION

This study includes 127 patients to compare and evaluate the therapeutic efficacy of zinc and non zinc therapy from the out-patients and in-patients in the department of dermatology.

Parameters like age, gender, and also considering the patients with other co- morbidities like hypertension, thyroid (hypothyroidism and hyperthyroidism), DM.

This study is conducted in the patients with age group of 0-60 years. in these study 57 members of male patients ,54 members of female patients, 5 members of male child and 11 members of female child are considered in the table no:6.1

In these study eight diseases are considered they are A.A, A.V, Borderline tuberculoid leprosy, ENL, erythroderma , Pemphigus vulgaris, vitiligo and other diseases like urticaria, leishmaniasis in which zinc is indicated as adjuvant therapy and zinc shows synergistic effect. This disease distribution was shown in the table number 6.2

Zinc formulation considered in this study is zinc acetate, zinc oxide, and zinc pyrithione. In the maximum number of patients zinc acetate is prescribed (95.94% of population).in two cases zinc oxide is prescribed (2.70% of population ) .zinc pyrithione is prescribed (1.34% of population) these was shown in table number :6.7.

zinc acetate is given in the form of tablets ,syrups, topical agents. Zinc pyrithione is given in the form of shampoos; zinc oxide is given in the form of ointments.

In zinc therapy, the total number of patients is 54(58.26%). In zinc therapy patients

The therapeutic efficacy is calculated by number of reviews

In non zinc therapy the total number of patients is 63(49.73%) in this non zinc therapy the therapeutic efficacy was calculated by number of reviews. Out of 127 patients about 60 patients are diagnosed with A.A , and 27 patients are diagnosed with A.V , 13 patients are diagnosed with warts ,8 patients are diagnosed with erythroderma, 4 patients are diagnosed with ENL and 4 are with B.T.L, and 4 are with vitiligo, 2 are diagnosed with pemphigus vulgaris ,other 6 are diagnosed with urticaria ,leishmaniasis e.c.t., Out of 127 patients in these study about 7 patients are diagnosed with thyroid accounting (5.51%), 9 patients are diagnosed with hypertension accounting (7.08%) it is the major Comorbid condition in age group of 30-60 years and other 5 are diagnosed with D.M accounting (3.93%). These are the three Comorbid conditions that are considered in the study as shown in the table no.6.6

This study is mainly for the comparison of zinc and non-zinc therapy and it was done by collecting the range of various declined symptoms. Thereby comparing the number of reviews we are concluding that females shows more effective to the zinc therapy than male patients due to social history of males like alcohol intake ,smoking tobacco e.c.t., and is more effective in the children than female patients.

## CONCLUSION

Among all the cases collected i.e., 127, we studied that the therapeutic effect of zinc in dermatology is effective and was concluded by comparison of zinc therapy with non zinc therapy patients. This study suggest that zinc will produce higher efficacy compare with non –zinc .Zinc is effective in female patients than male patients. Zinc is more effective in children when compared to adults Zinc therapy declines the symptoms of particular disease and improves the period of recovery when compare to non zinc therapy.

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