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## “COMPARATIVE STUDY OF CINNAMON-HONEY AND RED SANDAL WOOD-ROSE WATER FACIAL PACK IN TREATMENT OF ACNE VULGARIS”

BY

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**ABSTRACT**

### Background

Complimentary and alternative medicine and medical practice (CAM) is a group of diverse health care which include Naturopathic medicine is a system that uses natural remedies to help the body to heal itself so the products present in the nature in its original chemical composition is used to treat the skin ailments like acne vulgaris.

### Aims and objectives

To know the efficiency of facial packs, cinnamon-honey and red sandal wood-rose water to clear the acne vulgaris is to studied.

### Methods

A total of 300 subjects with acne vulgaris aged 18-25years we screened and after filling inclusion criteria as well as diagnostic criteria (Dermatological quality of life index) 60 subjects were recruited to the study. Pre assessment were made before treatment. Cinnamon honey face pack and red sandalwood rose water face pack for study group 01 and study group 02 respectively given for 20 min everyday in the evening for 2weeks. Post assessment were made after 2weeks of treatment. All

the details of the study were explained and informed consent was obtained from subjects.

## Result

From DLQ 1, (acne vulgaris- QOL), LC, photography significant difference were detected in the study group 01. Subjects of both group reported that there is reduction in the acne vulgaris after face pack, post analysis indicate reduction in acne vulgaris and scars more in the study group 01.

## Conclusion

Both face packs are effective in treating acne but if we consider time period efficacy. cinnamon honey is more effective as compared to red sandal wood and rose water.

## KEY WORDS

CAM, Acne vulgaris, cinnamon-honey, red sandal wood, rose water, DLQ 1, LC, Photography.



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## 01) Introduction:

Naturopathic medicine is a distinct method of primary health care—an art, science, philosophy and practice of diagnosis, treatment and prevention of illness. In stark contrast to a narrowly interpreted biomedical model, where pharmaceuticals are administered to battle disease, Naturopathic physicians seek to restore and maintain optimum health in their patients by emphasizing nature's inherent self-healing process. This is accomplished through education and the rational use of natural therapeutics. The naturopathic physician thus uses holistic approaches to enhance and restore the body's own innate healing systems.<sup>1</sup>

Everybody wants to get fair and charming skin. Now a day, Acne vulgaris, black head, pimples, dark circle are common among youngsters and person who suffers from it. According to Naturopathy, Skin problems are normally due to impurities in blood. Accumulated toxins in the blood during improper food and lifestyle are causing skin related diseases.

Various herbs, medicines are described in Ayurveda for blood purification. Herbs and spices like Manjistha, Lodhra, Chandana, Haridra, tvak, etc are good example of blood purifier. The herbal paste which is applied on face to treat acne vulgaris, pimple, scars, marks and pigments are known as “mukha lepa” in ayurveda. The process of smearing this herbal mix on face is known as “mukha lepana”. This beauty therapy is popular as facial. The smooth powder which is used for facial application is “face pack”. A good face pack must supply necessary nutrients to skin. It should penetrate the subcutaneous tissues in order to deliver the required nutrients. Different types of skin need different types of herbal face packs (Rani and Hiremath, 2002).

Face packs are one of the oldest and beautiful methods of cleansing skin. There are various kinds of face packs described in Ayurveda which have nourishing, healing, cleaning, astringent and antiseptic properties (Rani and Hiremanth, 2002).<sup>2</sup>

Acne vulgaris is reported as an inflammatory disease of pilosebaceous glands of the skin which mainly occurs on the face and trunk. Acne vulgaris is among one of the most common skin conditions which commonly seen in adolescent's population.<sup>3</sup>

Moderate-to-severe acne vulgaris affects around 20% of young people and severity correlates with pubertal maturity. Acne vulgaris may be presenting at a younger age because of earlier puberty. It is unclear if ethnicity is truly associated with acne vulgaris. Acne vulgaris persists into the 20s and 30s in around 64% and 43% of individuals, respectively. The heritability of acne vulgaris is almost 80% in first-degree relatives. Acne vulgaris occurs earlier and is more severe in those with a positive family history.

Epidemiology not only describes the burden of disease in terms of incidence, prevalence and variations according to age, sex, social class, ethnic group and geography, but also has the potential to identify specific risk factors for disease occurrence or progression, which may be amenable to manipulation.<sup>4</sup>

In some research reports, cinnamon has shown potential activity against acne vulgaris bacteria. Cinnamaldehyde, a major constituent of cinnamon, shows anti-inflammatory activity. It inhibits the production of nitric oxide, which is responsible for inflammatory conditions in the human body. Moreover, cinnamon has also been shown to prevent the production of COX-2, a pro-inflammatory agent. Therefore, cinnamon has antibacterial and anti-inflammatory properties. The chemistry of cinnamon bark oil primarily contains a cinnamaldehyde that is different from that found in cinnamon leaf oil (eugenol) and root-bark oil (camphor).<sup>5</sup>

Similar to cinnamon's biological activity, honey works as a natural antibiotic, killing bacteria that cause acne vulgaris. The anti-inflammatory properties of honey reduce the redness of acne vulgaris. Its acidic property does not allow the bacteria to grow.<sup>6</sup> Honey releases hydrogen peroxide, which is an antibiotic that can also remove bacteria and clear acne vulgaris.<sup>7</sup> Moreover, honey contains natural antioxidants, which can scavenge free radicals.<sup>8</sup>

Cinnamon honey investigates the antibacterial activity of an ethanolic extract of cinnamon bark, honey, and their combination against acne vulgaris-causing bacteria. The antibacterial activity of cinnamon bark extract and honey were investigated against *P. acnes* and *S. epidermidis* using disc diffusion.<sup>9</sup>

The heartwood of red sandalwood tree or Red Sanders (*Pterocarpus santalinus* Linn.) also known as ruby wood, sanders red, saunderwood, santalwood, raktha chandana, is used as an ingredient in Ayurvedic medicines to administrate inflammatory conditions

and to improve skin health. In traditional cosmetic formulations in combination with turmeric; it imparts a healthy glow to the skin.

Traditionally it has been used as talcum powder. The powdered heartwood has a pleasant aroma and an attractive red color. Ayurvedic literature also describes the —cooling properties of raktha chandana.<sup>10</sup> The extract can be used as a natural color in various nutricosmetic and cosmetic preparations with the added benefit of antioxidant potential.

In traditional —cosmeceutical use, raktha chandana is ground to a paste with water, rose water or honey, and applied topically as a popular home remedy used in southern India, for lightening post-acne vulgaris and other facial scars. Its antioxidant, anti-inflammatory and hepatoprotective effects are reported in literature. In a preliminary clinical study, the extract was found to be facilitate wound healing. Since this extract is stable in alkaline medium, it can be conveniently used in soaps for its gorgeous deep purplish rose color.

Rose water is used as an excellent solvent it also has antibacterial and antiseptic property which eventually cure acne vulgaris.

## 02) Objectives:

The main objective of this study is to compare the efficiency of facial packs, cinnamon-honey and red sandalwood rose water to clear the acne vulgaris.

Aims:

To compare the efficiency of cinnamon -honey and red sandalwood rose water facial packs in treating acne vulgaris.

Objectives:

To compare the efficiency of cinnamon -honey and red sandalwood rose water facial packs in treating acne vulgaris.

- 01) DLQI (dermatology quality index) questionnaire
- 02) Acne- QOL (acne quality of life) questionnaire
- 03) LC (lesion count)
- 04) Photography

### 03)Literature review:

#### a) Previous research:

##### i) Cinnamon-honey facial pack in curing acne vulgaris:

The word acne vulgaris comes from the word acne vulgaris meaning "The highest point," which comes from the Greek acne vulgaris meaning "point or spot". In the entire world 650 million people with acne vulgaris have been suffering, which is about 9.4 % of the world population out of which females are 9.8 % men amounting to 9.0 % which indicates females are more prone to this acne vulgaris disease.

It has antimicrobial properties, so it can help stop bacteria from acne vulgaris. The honey has a natural anti-bacterial property to draw out buggers from the skin. Two tablespoons of honey and one teaspoon of cinnamon mixed together until they are thoroughly blended and have formed a sort of paste before application to acne vulgaris. Honey and cinnamon (literally killer combo when it comes to acne vulgaris) act as killing agent when it applies to acne vulgaris area.<sup>11</sup>

##### ii) Red Sandalwood-rose water pack for acne vulgaris:

The powdered heartwood has a pleasant aroma and an attractive red color. Ayurvedic literature also describes the —cooling properties of raktha Chandana.<sup>10</sup> The extract can be used as a natural color in various nutricosmetic and cosmetic preparations with the added benefit of antioxidant potential. In traditional —cosmeceutical use, raktha chandana is ground to a paste with water or honey, and applied topically as a popular home remedy used in southern India, for lightening post-acne vulgaris and other facial scars. Its antioxidant, anti-inflammatory and hepatoprotective effects are reported in literature. In a preliminary clinical study, the extract was found to be facilitate wound healing. Since this extract is stable in alkaline medium, it can be conveniently used in soaps for its gorgeous deep purplish rose color. Similarly red sandalwood extract can be added to lipstick, and color cosmetic compositions to impart color and a healthy glow to the skin.<sup>12</sup>

#### b) Acne vulgaris:

**Definition:** Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit (comprising the hair follicle, hair shaft and sebaceous gland; FIG. 1) and is among the most common dermatological conditions worldwide, with an estimated 650 million people affected.<sup>13,14</sup>

Acne vulgaris is considered a chronic disease owing to its prolonged course, pattern of recurrence and relapse, and manifestations such as acute outbreaks or slow onset. Moreover, acne vulgaris causes profound negative psychological and social effects on the quality of life of patients. Although progress has been made in understanding the pathophysiology of acne vulgaris and the mechanisms of actions of available drugs to treat the disease, many unanswered questions remain. The lack of a consensus grading system also slows efforts to compare efficacies of different medications in clinical studies, which is impeding the formulation of a globally approved consensus guideline. Given that abnormalities in several processes (sebum production and sebocyte differentiation, proliferation and inflammation) can contribute to the development of acne vulgaris, a multipronged treatment regimen is needed in most patients. This complex regimen impairs adherence, which is key for treatment success. Acne vulgaris commonly results in scarring and post-inflammatory hyperpigmentation, which has a subsequent impact on quality of life; hence, early and aggressive therapy is crucial. Novel

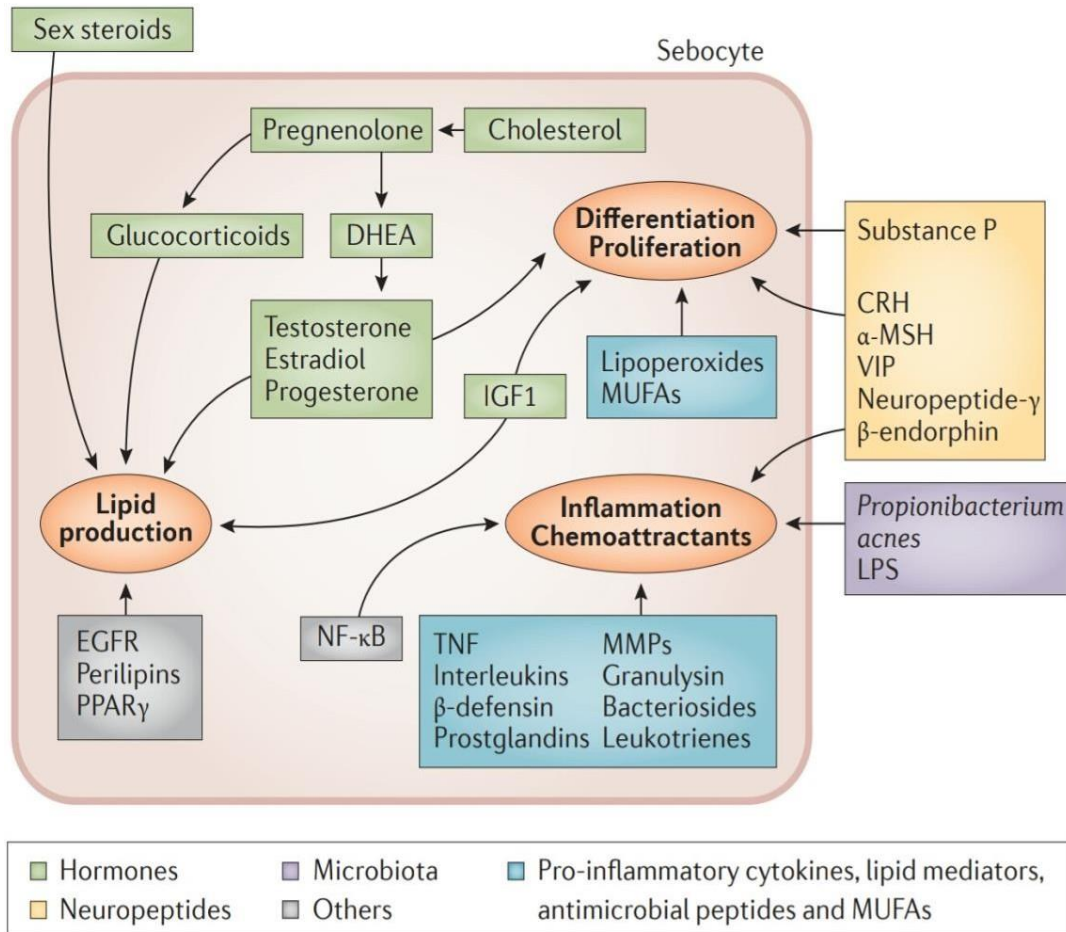


delivery strategies for and modifications of existing drugs are recent changes in acne vulgaris treatment,

in addition to the development of new medications that target regulatory pathways involved in acne vulgaris pathophysiology instead of suppressing the effects of the end products of these pathways.<sup>15</sup>

### Epidemiology of Acne vulgaris:

Most people experience acne vulgaris during adolescence, with >95% of teenage boys and 85% of teenage girls affected.<sup>16,17</sup> Almost 20% of these young people have moderate-to severe Acne vulgaris, and as many as 50% continue to suffer from acne vulgaris in adulthood.<sup>18,19</sup> A systematic analysis for the Global Burden of Disease study indicated that acne vulgaris was the eighth most prevalent disease globally in 2010, following only two other skin disease categories on the list.<sup>14</sup>

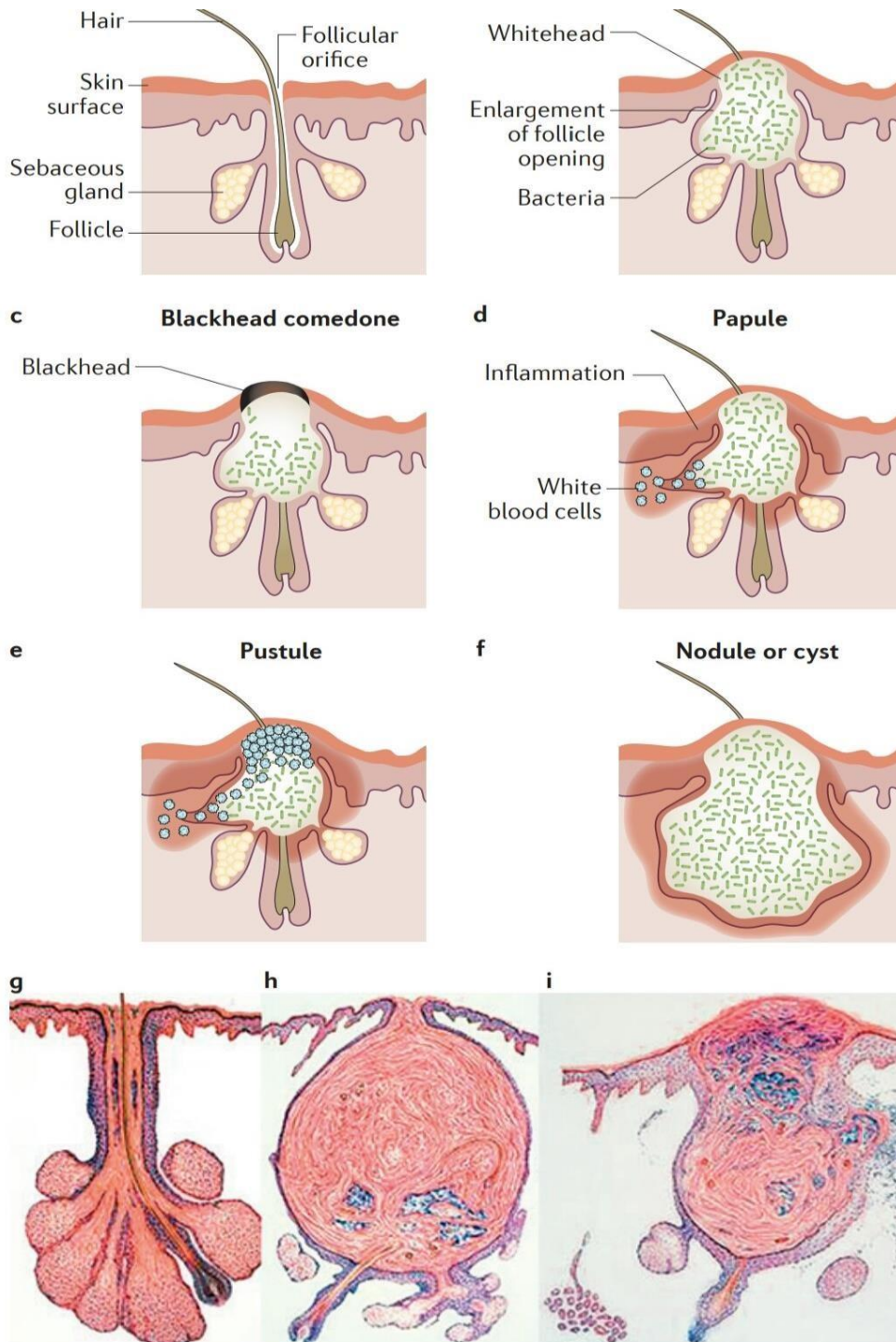


### Pathophysiology:

Acne vulgaris develops in the pilosebaceous unit (FIG. 1) and involves many processes (FIG. 3). Some of the key features underlying acne vulgaris development include disturbed sebaceous gland activity associated with hyperseborrhoea (excessive sebum) and alterations in sebum fatty acid composition, dysregulation of the hormone microenvironment, interaction with neuropeptides, follicular hyperkeratinization, induction of inflammation and dysfunction of the innate and adaptive immunity. These processes impair functioning of the pilosebaceous unit, which leads to the transition of a normal pore to microcomedones, and further to comedones and inflammatory lesions. Bacterial antigens can potentiate the inflammatory process.<sup>20-22</sup> Genetic studies of heterozygous and homozygous twins and family studies have produced a growing body of evidence for the role of hereditary factors in the risk of acne vulgaris development.<sup>23-25</sup> Acne vulgaris can also be triggered or worsened by, for example, ultraviolet radiation and other



environmental factors, dietary factors, smoking, stress and the modern lifestyle.<sup>26-31</sup>



**Acne vulgaris formation:** Schematic representation of the skin containing a sebaceous unit (part a) comprising the hair follicle and the sebaceous gland, which is

responsible for sebum production. Acne vulgaris formation starts when sebum and keratinous material shed from the skin clog up a pore and trigger bacterial colonization, leading to a closed or whitehead comedone (part b). As the whitehead comedone continues to expand, owing to more accumulation of sebum and keratinous material, the follicular orifice opens and forms an open or blackhead comedone (part c). The black color is the result of oxidized lipids and the skin pigment melanin. More distension of the comedone results in follicular rupture and inflammatory lesions such as papules (part d), pustules (part e) and nodules or cysts (part f). Nodular acne vulgaris is sometimes inaccurately referred to as 'cystic' or 'nodulocystic' acne vulgaris.

An acne vulgaris cyst is not a true cyst as true cysts are lined by epithelium. Histological images of a pilosebaceous unit (part g), a comedone (part h) and an inflammatory lesion with rupture of the follicular walls (part i) are shown. Parts g–i reproduced with permission from REF. 242, Wiley.

### **Systemic and local hormonal imbalance:**

Whether the primary abnormality causing acne vulgaris is in the level of circulating hormones or in the processing of hormones in the peripheral tissue is debated. Typically, acne vulgaris starts during puberty when the hormone balance starts to change dramatically.

In a cross-sectional, retrospective study, the androgenic hormone profile of 835 female patients with acne vulgaris >15 years of age was analysed. In the 54.6% of participants with signs of hyperandrogenism, the levels of dehydroepiandrosterone (DHEA) were most frequently elevated<sup>44</sup>. In a recent cross-sectional study, androstenedione and testosterone levels were higher ( $P < 0.0001$ ) in patients with acne vulgaris than in healthy controls.

In addition,  $17\alpha$ -hydroxyprogesterone levels were higher in male patients with acne vulgaris than in healthy controls; high levels of this androgen were associated with greater acne vulgaris severity. By contrast,  $17\alpha$ -hydroxyprogesterone levels were not different in women with or without acne vulgaris, although studies are needed to investigate whether  $17\alpha$ -hydroxyprogesterone levels can be modulated with adrenocorticotropin treatment. Furthermore, high oestradiol levels in women had a protective effect.<sup>32,33</sup>

In addition to systemic changes in hormone levels, local overproduction of steroids, in particular androgens, is associated with acne vulgaris. Sebocytes produce steroid hormones including androgens (testosterone and 5 $\alpha$ -dihydrotestosterone (5 $\alpha$ -DHT)), oestrogens (oestradiol and oestrone) and glucocorticoids (corticosterone and cortisol)<sup>34</sup>(FIG. 4). Cutaneous steroid production can be regulated by locally produced corticotropin-releasing hormone, adrenocorticotrophic hormone or cytokines.<sup>34-36</sup> Patients with acne vulgaris produce more testosterone and 5 $\alpha$ -DHT in their skin than healthy controls,<sup>37</sup> which enhances sebaceous gland activity<sup>38,39</sup> and stimulates sebocyte function, respectively.<sup>40</sup> However, testosterone affects human sebocyte proliferation in a dose-dependent manner in vitro, but not lipid synthesis.<sup>41,42</sup> This finding suggests that other factors might influence the sebaceous gland,<sup>43</sup> with peroxisome proliferator-activated receptors (PPARs; see below) and their ligands being the primary candidates.<sup>41,42</sup> In sebaceous glands, changes in the expression of 17 $\beta$ -hydroxysteroid dehydrogenases, the group of enzymes involved in the interconversion of oestradiol, oestrone, testosterone and androstenedione, can influence the expression of genes involved in lipogenesis. Moreover, the expression of 17 $\beta$ -hydroxysteroid dehydrogenases is negatively correlated with the expression of PPAR $\gamma$  — one of the key induction factors of adipocyte differentiation.<sup>44</sup> Glucocorticoids also regulate the production of sebum. Enzymes catalysing the conversion of cortisone to active cortisol are highly expressed in keratinocytes, fibroblasts and sebaceous glands, and are upregulated in acne vulgaris lesions.<sup>34</sup> In the SZ95 sebocyte cell line, dexamethasone treatment enhances lipid synthesis, partially through the transcriptional induction of sterol regulatory element-binding transcription factor 1 (SREBF1; which encodes SREBP1) and by increasing Toll-like receptor 2 (TLR2) mRNA levels.<sup>45</sup> Adult women and men with acne have increased serum levels of insulin-like growth factor 1 (IGF1). In women, serum IGF1 levels are correlated with the number of acne vulgaris lesions, facial sebum excretion rate in post adolescent patients and serum levels of 5 $\alpha$ -DHT and DHEA sulfate.<sup>46-48</sup> IGF1 is detected in maturing sebocytes and suprabasal sebaceous duct cells.<sup>49</sup> Animal studies have shown that IGF1 stimulate sebocyte differentiation.<sup>50</sup>

By contrast, in humans, IGF1 stimulates keratinocyte proliferation,<sup>51</sup> and lipid synthesis,<sup>33,52</sup> by inducing SREBF1 (REF. 64) through the phosphoinositide 3-kinase (PI3K) and mitogen-activated protein kinase (MAPK) signal transduction

pathways.<sup>53</sup> In addition to glucocorticoids and IGF1, other factors regulate SREBF1 levels. A high glyceic Western diet and high dairy protein consumption are correlated with activation of IGF1 signalling and the promotion of mammalian target of rapamycin (mTOR) signalling.<sup>54</sup> mTOR complex 1 has a crucial role in the PPAR $\gamma$ -stimulated lipid uptake and differentiation of sebocytes<sup>55</sup> while at the same time promoting lipid production by activating SREBP1. Oestrogens might have an indirect IGF1 effect on the pathogenesis of acne vulgaris.<sup>33</sup> Androgens rapidly induce SREBP1 in animal models.<sup>56</sup> Testosterone only induces the phosphorylation of mTOR in human sebocytes in the presence of IGF1 (suggesting that local androgen production with circulating IGF1 has a pivotal role in sebum synthesis and acne vulgaris).

### **Neuropeptides:**

The sebaceous gland expresses functional receptors for several neuropeptides, including the receptor for corticotropin-releasing hormone, melanocortins,  $\beta$ -endorphin, vasoactive intestinal polypeptide, neuropeptide Y and calcitonin gene-related peptide.<sup>57-59</sup> Activation of these receptors in human sebocytes modulates the production of cytokines, cell proliferation and differentiation, lipogenesis and androgen metabolism. Substance P, which can be elicited by stress, may stimulate the proliferation of sebaceous precursor cells and increase sebaceous cell size. These observations suggests that substance P promotes the proliferation and differentiation of sebaceous glands. The facial skin of patients with acne vulgaris is highly innervated, with a higher number of substance P-containing nerves and mast cells, and strong expression of neutral endopeptidase-involve in the degradation of substance P-in sebaceous glands compared with patients without acne vulgaris. Endopeptidase inhibitors may have a therapeutic role in acne vulgaris.<sup>60,61</sup>

### **Inflammation cascades:**

Whether hyperkeratinization of the follicular duct precedes the onset of inflammation or vice versa is debated.<sup>62</sup> The finding that IL-1 activity was found to be increased around uninvolved follicles before the observation of keratinocyte hyperproliferation and activation suggests an inflammatory trigger.<sup>63,64</sup> Indeed, once inflammation is established, inflammatory acne vulgaris lesions upregulate numerous genes,



including those that encode matrix metalloproteinases,  $\beta$ -defensin 4, IL-8 and granulysin.<sup>65</sup> Nuclear factor- $\alpha$ B (NF- $\alpha$ B) is also activated in acne vulgaris lesions,<sup>66</sup> as are the NF- $\alpha$ B-regulated cytokines such as IL-1 $\beta$ , IL-8, IL-10 and tumour necrosis factor (TNF).<sup>67</sup> TNF induces lipogenesis through JNK, PI3K and AKT pathways.<sup>68</sup> Increased levels of IL-8 attract inflammatory cells, including polymorphonuclear leukocytes and lymphocytes.<sup>66</sup> IL-17A-positive T cells and T helper 17 (TH17)-related cytokines are present in acne vulgaris lesions and might have a pivotal role in the diseases.<sup>69</sup> The levels and metabolic pathways of several inflammatory lipid mediators are also abnormal in acne vulgaris lesions. Prostaglandins are synthesized by the cyclooxygenase (COX) enzymes. Sebocytes express both COX isozymes, COX1 and COX2, and COX2 expression is selectively upregulated in sebaceous glands of patients with acne vulgaris.<sup>70</sup> Activation of the platelet-activating factor signaling pathway can regulate the levels of COX2, prostaglandin E2 and IL-8 in SZ95 sebocytes.<sup>71</sup> Transgenic overexpression of Cox2 in the basal epidermis of mice leads to increased prostaglandin E2 levels, which results in sebaceous gland hyperplasia and excessive sebum production.

This observation suggests that COX2-mediated prostaglandin E2 synthesis could be involved in acne vulgaris. In addition, PPAR $\gamma$  induces COX2, and increased PPAR $\gamma$  activity might further exacerbate this system.<sup>72,73</sup> Leukotrienes are pro-inflammatory lipid mediators that function as neutrophil attractants. Human sebocytes express the enzymes needed for leukotriene production, including lipoxygenases and leukotriene A4 hydrolase. Treatment of sebocytes with arachidonic acid stimulates lipoxygenase expression and induces leukotriene B4 synthesis.<sup>70</sup> Arachidonic acid also induces IL-6 and IL-8. Leukotriene A4 hydrolase and 5-lipoxygenase are expressed at a higher level in acne vulgaris lesions than in normal skin and in uninvolved skin of patients and may be potential therapeutic targets.<sup>70,74</sup>

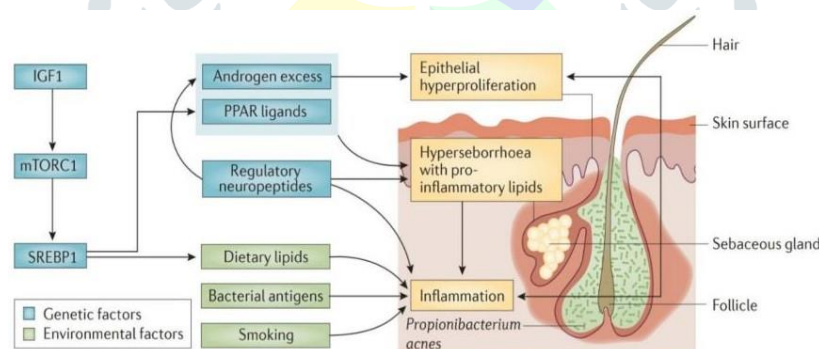


Figure 3 | **Tangled network of four core events in acne formation.** Acne development depends on hyperseborrhoea, epithelial hyperproliferation, *Propionibacterium acnes* activity within the follicle, and inflammation. Androgens, ligands of peroxisome proliferator-activated receptors (PPARs), regulatory neuropeptides with hormonal and non-hormonal activity, and environmental factors lead to hyperseborrhoea, epithelial hyperproliferation in the ductus seboglandularis and acro-infundibulum and the expression of pro-inflammatory chemokines and cytokines, which stimulate the development of comedones and inflammatory lesions. IGF1, insulin-like growth factor 1; mTORC1, mammalian target of rapamycin complex 1; SREBP1, sterol regulatory element-binding protein 1. Adapted with permission from REF. 243, Wiley.

### Modern lifestyle, diet and smoking:

The modern lifestyle, which includes diet, stress, urban noise, socioeconomic pressure, light stimuli and variations in sleep patterns, is a potential risk factor for acne vulgaris.<sup>75,76</sup> Diet might contribute substrates for synthesis of sebaceous lipids,<sup>77</sup> such as the essential fatty acid linoleic acid. Low-glycemic load diets may reduce sebum production via endocrine effects, whereas a typical Western diet exacerbates acne vulgaris.<sup>78,79</sup> Severe caloric restriction curtails sebum excretion,

which is reversible by a normal diet.<sup>80,81</sup> Changes in dietary fat or carbohydrate intake can also alter sebum production and composition.<sup>82</sup>

### Genetics:

Genetics have a role in the development of acne vulgaris, as evidenced by family and twin studies.<sup>23-25,83</sup>

### Diagnosis, screening and prevention:

Clinical presentation and grading Acne vulgaris affects body areas characterized by an increased density of pilosebaceous glands, such as the face, chest and back.<sup>84</sup> The initial acne vulgaris lesion is the microcomedone, which is an invisible (to the naked eye) microscopic structure. During the course of acne vulgaris, non-inflammatory lesions form, including closed (whiteheads) and open (blackheads) comedones, followed by inflammatory lesions that include superficial lesions such as papules and pustules ( $\leq 5$  mm in diameter) and deep pustules or nodules (FIGS 1,5). Acne vulgaris is diagnosed based on clinical examination and can be classified according to severity, lesion type and age of onset. Acne vulgaris can be classified as mild, moderate or severe and in accordance with the lesions that predominate in a given patient: comedonal, papulopustular, nodular, nodulocystic or conglobate acne vulgaris (acne vulgaris conglobata)(TABLE 1). Acne vulgaris conglobata is a rare, highly inflammatory, severe form of acne vulgaris, presenting with grouped comedones, nodules, abscesses and interconnected draining sinus tracts. This subtype primarily affects adult males and manifests a chronic, persistent course.<sup>84</sup> Furthermore, acne vulgaris may be classified on the basis of the age at presentation as neonatal acne vulgaris (<4 weeks of age), infantile acne vulgaris(3–16 months of age), mid-childhood (1–7 years of age), prepubertal (7–9 years of age), adolescent (10–18 years of age) or adult acne vulgaris(>25 years of age, either continuing from puberty or new late-onset acne vulgaris).<sup>85-87</sup>

In clinical research studies, the assessment and grading of acne vulgaris includes lesion counting, as well as overall grading systems supplemented with photographic methods.<sup>88</sup> Acne vulgaris lesion counting includes the numbers of open and closed comedones, papules, pustules and nodules on the face or trunk.<sup>89</sup> For the photographic method, the photographs of the patients are compared with the appropriate standard.<sup>90</sup> In all cases, adequate lighting is important to avoid omitting non-inflammatory lesions. Acne vulgaris lesion counting should include the whole face (forehead, cheeks and chin) and not just a single facial area; when appropriate, studies should include assessment of acne vulgaris lesions and progression in non-facial areas. Acne vulgaris lesion counting with recording of the lesions on a facial template divided into five facial segments (including the chin and the right and left forehead and cheek, excluding the nose) is reliable.<sup>91</sup> Although stretching of the skin facilitates the visualization of comedones, it is not permitted for standard lesion counting because the degree of stretching might vary.<sup>89</sup> The advantage of acne vulgaris lesion counting to grade acne vulgaris is that individual lesions are precisely counted and classified as either non-inflammatory or inflammatory lesions, which guarantees homogeneity and facilitates comparison of different results of studies on acne vulgaris treatments.<sup>88,89</sup> To locate deep lesions, palpation is also necessary because they are not detected with standard photographic methodology. Acne vulgaris grading systems have been proposed for use as a complementary, easy to use

and rapid mode of acne vulgaris grade assessment and for the selection of eligible patients for therapeutic studies.<sup>92,93</sup> Overall scales might be less quantitative but more relevant to clinicians and their patients. Grading systems currently in use are listed in BOX 1. Currently, no overall acne vulgaris grading system is considered to be a global standard, although efforts are underway to create a standard.<sup>94,95</sup>

### **Modern diagnostics through imaging:**

Various photographic methods have been proposed over the years to visualize acne vulgaris and grade its severity, and to assess response to treatments.<sup>88</sup> Standard photographs are a useful and reliable tool but need to use the same lighting, distance from the patient, camera and processing procedures. Furthermore, photographs are limited by the difficulty in distinguish deep lesions from active superficial lesions and are less accurate for non-inflammatory lesions.<sup>88,89</sup> Modern imaging methods have provided new opportunities for optimizing acne vulgaris visualization and improving the accuracy of the assessment of acne vulgaris severity and response to treatments.<sup>96-99</sup> One study has shown that autclassification of acne vulgaris lesions with a multispectral and multimodal facial imaging system have a strong correlation with results obtained by manual counting of lesions (both inflammatory and noninflammatory lesions) by expert physicians (correlation co-efficient of >0.9).<sup>98</sup> Digital photography provides various advantages, such as supervised or automatic image analysis and ease of storage of large numbers of photographs. Advanced imaging techniques include parallel polarization and orthogonal polarization imaging, stereoimage optical topometer imaging to construct three-dimensional stereoimages, and fluorescence photography. Parallel polarization imaging enhances the visualization of skin surface features, such as papules, pore size, skin oiliness and acne vulgaris scars.<sup>99</sup>

Orthogonal polarization (or cross-polarization) photography enhances the visualization of inflammatory acne vulgaris lesions, erythema and skin brightness.

Parallelpolarized and cross-polarized photography with video microscopy and sebum production measurement can be combined. Fluorescence photography using short wavelengths (long ultraviolet A or blue-range light) can be used to visualize P. acnes density based on the porphyrin production and the corresponding orange-red fluorescence intensity. Multispectral images use Fisher linear discriminant functions to classify acne vulgaris and capture image data at specific wavelengths across the electromagnetic spectrum.<sup>90,99</sup>



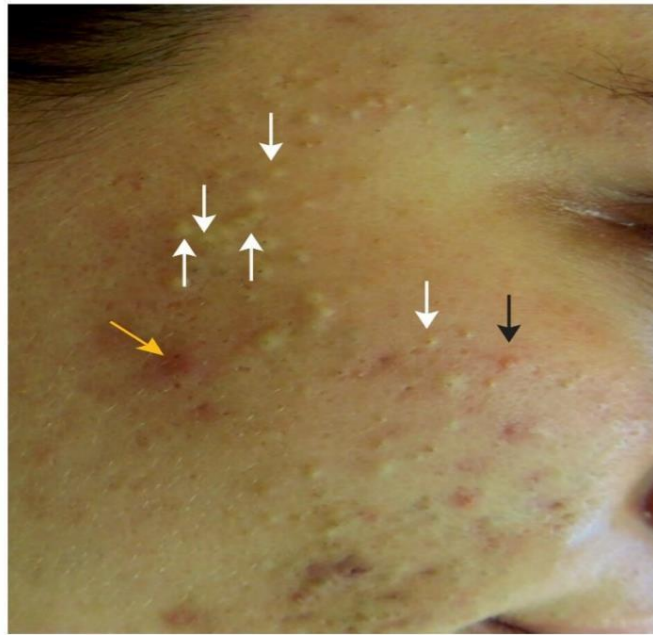


Figure 5 | **Clinical presentation of acne vulgaris.** Acne lesions, including comedones (white arrows), papule (yellow arrow) and pustule (black arrow) on the facial skin.

#### **Differentiation from other dermatological conditions:**

Acne vulgaris is clinically heterogeneous and differential diagnosis is based on the type of lesion, age at disease onset and persistence of acne vulgaris in adulthood. The differential diagnosis is usually possible on clinical grounds and the patient's medical history; however, when in doubt, laboratory tests, imaging or histopathological examination of a skin biopsy may need to be performed to exclude other conditions to establish a correct diagnosis.<sup>100</sup> In all cases, the presence of comedones is a prerequisite for establishing diagnosis of acne vulgaris.<sup>101</sup> On the basis of the age of presentation, neonatal acne vulgaris should be differentiated from skin infections (bacterial, viral or fungal), transient benign pustular eruptions (neonatal cephalic pustulosis, erythema toxicum neonatorum and transient neonatal pustular melanosis), milia, sebaceous gland hyperplasia, miliaria, infantile acne vulgaris, acne vulgaris induced by topical oils and ointments (acne vulgaris venenata infantum), drug- induced acneiform eruptions and congenital adrenal hyperplasia.<sup>20</sup> The differential diagnosis of childhood acne vulgaris includes perioral dermatitis and childhood rosacea.<sup>100</sup> More complex conditions that may need to be differentiated from acne vulgaris include the synovitis acne vulgaris pustulosis hyperostosis osteitis (SAPHO) syndrome, and pyogenic arthritis, pyoderma gangrenosum and acne vulgaris (PAPA) syndrome.<sup>20,102</sup>

#### **Prevention:**

The prevention of acne vulgaris relies on the successful management of modifiable risk factors implicated in its development, including underlying systemic diseases and lifestyle factors. Acne vulgaris may be the cutaneous manifestation of an underlying systemic disease such as congenital adrenal hyperplasia or polycystic ovary syndrome; in these cases, the timely and successful management of the underlying disease will prevent the presentation or persistence of acne vulgaris.<sup>20,102</sup>

Various lifestyle factors, such as dietary habits, obesity and smoking, may influence the development of acne vulgaris.<sup>103</sup>

Omega-3 fatty acids may reduce inflammation by inhibiting pro-inflammatory cytokines, and  $\gamma$ -linolenic acid can have anti-inflammatory actions via inhibition of leukotriene B4. Obesity may be accompanied by peripheral hyperandrogenism, which may be associated with increased sebum production and the development of acne vulgaris.<sup>104</sup>

### **Quality of life:**

The WHO defines quality of life as the individual's perception of the position in life in the context of the culture and value systems in which someone lives and in relation to his or her goals, expectations, standards and concerns. Acne vulgaris lesions modify the individual's perception and affect every aspect of personal, social, vocational and academic life.<sup>105</sup> Patients with severe acne vulgaris have higher unemployment rates than those without acne vulgaris.<sup>106</sup> Acne vulgaris has a profound impact on a patient's emotions (self-embarrassment, self-esteem and feelings of unworthiness), annoyance owing to physical symptoms (pain and itch) and daily discomfort owing to treatment.<sup>107,108</sup> Patients with acne vulgaris usually experience social anxiety and shame; they avoid eye contact, grow their hair long to cover the face, use makeup and choose a specific clothing style to minimize the appearance of acne vulgaris lesions.<sup>107,108,109</sup> Patients with acne vulgaris reported social, psychological and emotional problems that were as great as those reported by patients with asthma, epilepsy, diabetes, back pain or arthritis.<sup>111</sup>

Acne vulgaris is associated with an increased risk of depression, anxiety and body dissatisfaction.<sup>112</sup> Depression is 2–3-times more prevalent in patients with acne vulgaris than in the general population, and the rate of depression was twice as high in women with acne vulgaris than in men.<sup>113,114</sup>

Patients with mild-to-moderate acne vulgaris even exhibit higher depression scores than patients with alopecia areata, atopic dermatitis or psoriasis. Although acne vulgaris might be more psychologically damaging to adolescents than adults, a higher prevalence of depression in older patients with acne vulgaris has been observed. Suicidal ideation rates were higher among patients with acne vulgaris than patients with general medical conditions.<sup>115</sup> Acne vulgaris is frequently associated with scarring, which continues to affect psychopathological well-being in later life.<sup>116</sup> Acne vulgaris alone may be a source of stress and anxiety, but stress can also trigger or exacerbate acne vulgaris even after controlling for changes in diet and sleep habits; a vicious cycle can occur. Neuroimmunological research may provide the first insight into the links between acne vulgaris stress and quality of life.<sup>117,118</sup> The most

frequent lesions associated with greater impairment are cysts and nodules; even those who have only comedones report symptoms (itch and pain) and emotional effects (decreased self-esteem, difficulties in building relationships and social activities).

However, the effect of acne vulgaris on quality of life does not always correlate with acne vulgaris severity. For this reason, recognition of clinical and pertinent psychological signs must be taken into account when individualizing treatment. Importantly, effective acne vulgaris therapy significantly improves quality of life.<sup>119,120</sup>

### **c)Cinnamon honey:**

Cinnamon has shown potential activity against acne vulgaris bacteria. cinnamaldehyde, a major constituent of cinnamon, shows anti-inflammatory activity. It inhibits the production of nitric oxide, which is responsible for inflammatory conditions in the human body. Moreover, cinnamon has also been shown to prevent the production of COX-2, a pro-inflammatory

agent. Therefore, cinnamon has antibacterial and anti-inflammatory properties. The chemistry of cinnamon bark oil primary contains a cinnamaldehyde that is different from that found in cinnamon leaf oil (eugenol) and root-bark oil (camphor).<sup>5</sup>

Similar to cinnamon's biological activity, honey works as a natural antibiotic, killing bacteria that cause acne vulgaris. The anti-inflammatory properties of honey reduce the redness of acne vulgaris. Its acidic property does not allow the bacteria to grow.<sup>6</sup> Honey releases hydrogen peroxide, which is an antibiotic that can also remove bacteria and clear acne vulgaris.<sup>7</sup> Moreover, honey contains natural antioxidants, which can scavenge free radicals.<sup>8</sup>

Cinnamon honey investigates the antibacterial activity of an ethanolic extract of cinnamon bark, honey, and their combination against acne vulgaris-causing bacteria. The antibacterial activity of cinnamon bark extract and honey were investigated against *P. acnes* and *S. epidermidis* using disc diffusion. A better interaction between the extract of cinnamon and honey against those bacteria was expected. When two drugs are given simultaneously, interactions in the body that cause pharmacological effect, be they synergistic, additive, or antagonist effect, can occur.<sup>9</sup>

#### Phytochemical screening of crude drug and extract of cinnamon bark and honey:

Compounds	Crude Drug	Extract
Alkaloid	+	+
Flavonoid	+	+
Steroid/Triterpenoid	+	+
Tannin	+	+
Saponin	-	-
Quinone	+	+

Phytochemical component	Remarks
Polyphenol	+++
Reducing sugars	++
Tannins	++
Glycoside	++
Alkaloids	+
Saponins	+
Flavonoids	+
Anthraquinones	+
Phlobatannins	-
Hydroxymethyl anthraquinones	-

+++ High concentration, ++ moderate concentration, + low concentration, - not detected

**Red sandalwood and rose water:**

An Indian system of traditional medicine, a wide spectrum of medicinal properties of *Pterocarpus santalinus* is described. Many important bioactive phytochemicals have been extracted and identified from the heartwood of *P. santalinus*. Bioactive compounds typically occur in small amounts and have more subtle effects than nutrients. These bioactive compounds influence cellular activities that modify the risk of disease rather than prevent deficiency diseases. A wide array of biological activities and potential health benefits of *P. santalinus* have been reported, including antioxidative, antimicrobial and anti-inflammatory properties. All these protective effects were attributed to bioactive compounds present in *P. santalinus*. The major bioactive compounds present in the heartwood of *P. santalinus* are santalin A and B, savinin, calocedrin, pterolin K and L, and pterostilbenes. The bioactive compounds have potentially important health benefits: These compounds can act as antioxidants, enzyme inhibitors and inducers, inhibitors of receptor activities, and inducers and inhibitors of gene expression, among other actions.<sup>121</sup>

In present study was designed to prepare and evaluate the antioxidant & anti-inflammatory activity of cream comprising the aqueous petals extract of *Rosa damascena* for its radical scavenging and protein denaturation activity. Antioxidant activity assessed using standard ascorbic acid (ferric reducing power assay), and anti-inflammatory activity. The rose water contains the major phytoconstituents which are polyphenolic compounds flavonoids, tannins, triterpenoids, saponins which are mainly responsible for the antioxidant and anti-inflammatory properties.<sup>122</sup>

**Phytochemicals analysis of red sandalwood and rose water:**

Parameters	Aqueous	Ethanol
Alkaloid	+	+
Tannin	+	+
Phenols	+	+
Cardiac glycosides	-	+
Triterpenoid	-	+
Sterol	+	+
Saponin	+	-
Balsam	-	+
Resin	-	+

+ ... indicates presence; - ... indicates absence

Methodology:

Phytoconstituents	Presence
Tannins	+
Triterpenoids	++
Saponins	++
Fixed oil	+
Flavanoids	++

(+) indicates the presence of components in a low amount

(++) indicates the presence of components in a moderate amount

a)Subjects:

Sixty subjects with age group ranging between 18-25 years participated in study. Those who satisfy diagnostic criteria and inclusion criteria for treatment of acne vulgaris were recruited.

b) Description of subjects including the selection of sample from the population:

Alva's college of Naturopathy and Yoga college and hospital, managed by Alva's education foundation, Moodbidri 574227, Dakshina Kannada district, Karnataka, India.

C) Ethical Considerations:

Subjects who fulfilled the inclusion criteria were shown information sheet having details regarding the nature of study and intervention to be applied.

Subjects were given enough time to go through the study details mentioned in the information sheet. They were given the opportunity to ask any question only if they agree to participate in the study, they were asked to sign the informed consent form. All expressed their willingness to participate in the study by giving signed informed consent. Approval was obtained from institutional ethical committee. **Inclusion criteria**

- Adolescent girls (18 to 25 years).
- Facial acne with white heads, black heads, papules and pustules.

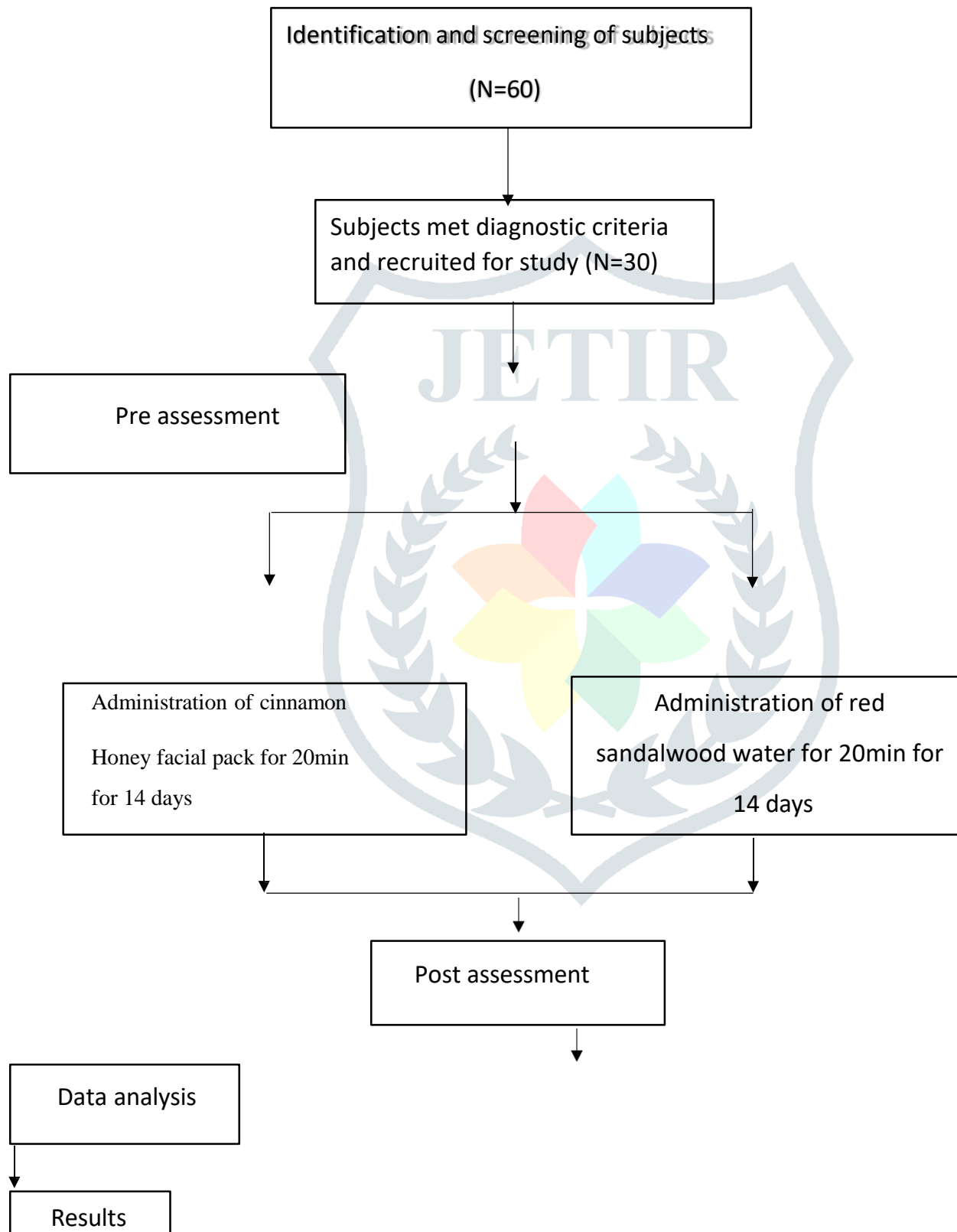
#### **Exclusion criteria**

- Boys.
- Girls who taking allopathic medication.
- Girls having endocrine problems.
- Rashes, cyst, nodules, abscess on face.
- Open wounds.
- Allergic conditions.

**Designs:**

Study Sample Size n=60 Grouping: Two group Group 1(Study group), n=30 Group 2(study group), n=30

c)Illustration of study plan:



**Study plan**



e) Intervention: Study group 1:

Administration of cinnamon Honey facial pack for 20min for 14 days.

Study group 2:

Administration of red sandalwood water for 20min for 14 days.

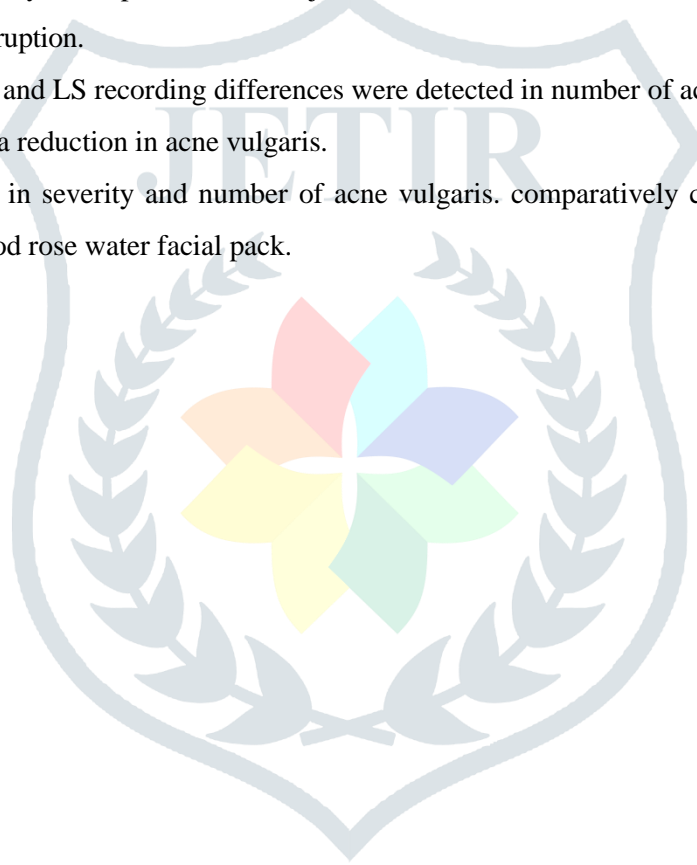
#### **04) Results**

Total of 300 individuals were assessed for study eligibility 60 met eligibility and were enrolled for the study.

30 subjects received cinnamon honey facial pack and 30 subjects received red sandalwood rose water facial pack for consecutive 14 days without interruption.

some DLQI, acne vulgaris- QOL, and LS recording differences were detected in number of acne vulgaris. Subjects of both study group reported that there is a reduction in acne vulgaris.

Post analysis indicated reduction in severity and number of acne vulgaris. comparatively cinnamon honey facial pack was more effective than red sandalwood rose water facial pack.



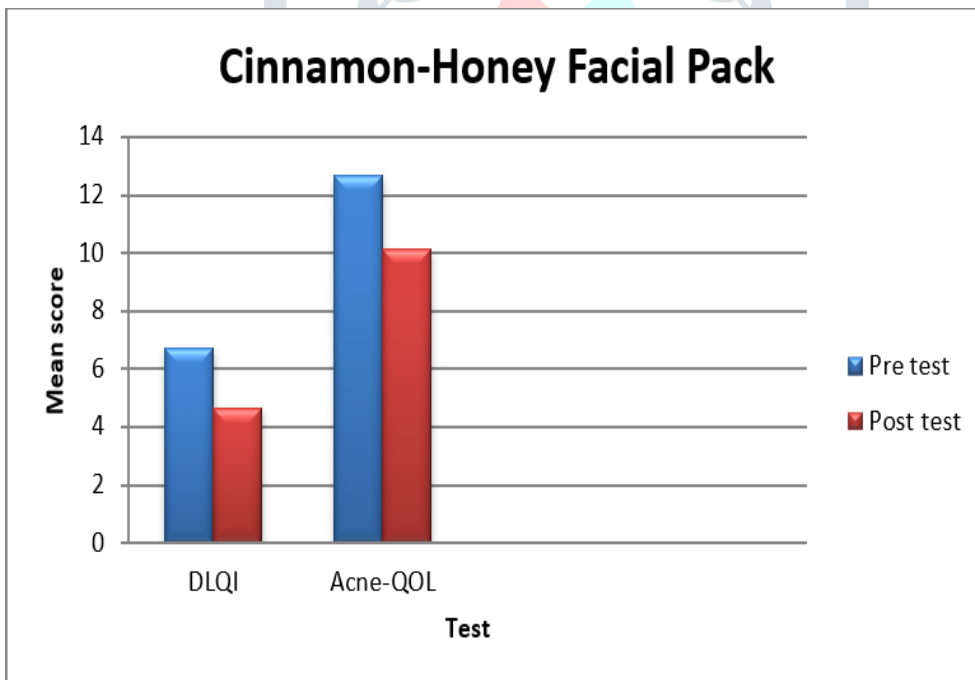
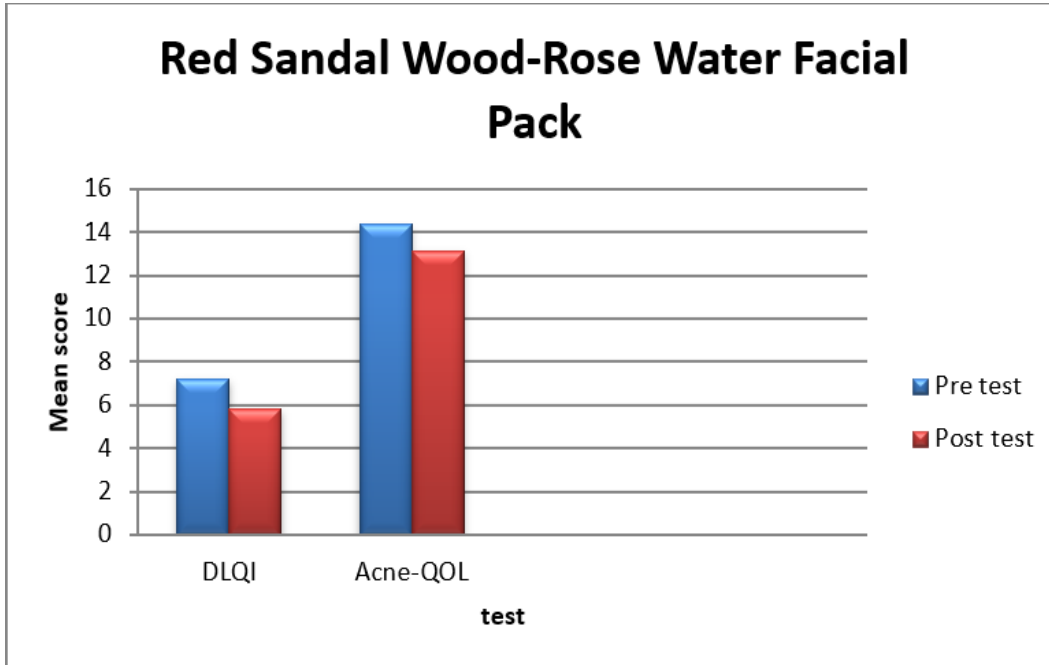


**CINNAMON-HONEY:**

SERIAL NO	PRE-TEST			POST-TEST		
	DLQI	ACNE-QOL	LC(GRADE)	DLQI	ACNE-QOL	LC(GRADE)
1	7	16	III	3	10	II
2	9	18	III	5	11	II
3	5	10	II	4	8	I
4	8	15	III	6	11	II
5	6	12	II	4	8	I
6	10	18	III	7	15	II
7	4	5	II	2	4	I
8	8	17	III	7	16	II
9	6	10	II	5	9	I
10	9	19	III	7	17	II
11	7	10	II	5	8	I
12	5	7	II	4	6	I
13	9	18	III	7	17	II
14	8	17	III	7	15	II
15	4	10	II	3	9	I
16	10	19	III	7	17	II
17	4	10	II	3	9	I
18	3	7	II	2	5	I
19	7	5	II	5	4	I
20	8	17	III	5	10	II
21	4	10	II	3	9	I
22	3	7	II	2	6	I
23	9	19	III	5	14	II
24	6	10	II	4	8	I
25	5	9	III	1	7	II
26	7	12	II	5	10	I
27	8	14	III	6	12	II
28	6	13	III	4	9	II
29	8	15	III	5	9	II
30	9	18	III	7	11	II

**RED SANDAL WOOD-ROSE WATER FACIAL PACK:**

SERIAL NO	PRE-TEST			POST-TEST		
	DLQI	ACNE-QOL	LC(GRADE)	DLQI	ACNE-QOL	LC(GRADE)
1	8	15	III	7	14	III
2	5	10	II	4	8	II
3	9	18	III	7	16	III
4	10	18	III	8	15	III
5	7	9	II	6	8	II
6	7	16	III	7	14	III
7	4	5	II	4	4	II
8	7	16	III	6	15	III
9	8	15	III	7	15	III
10	8	17	II	6	15	II
11	9	17	III	8	17	II
12	7	18	III	7	16	III
13	5	10	II	4	11	II
14	3	6	II	3	5	II
15	7	10	II	6	10	II
16	9	18	III	7	16	III
17	5	18	II	5	15	II
18	9	17	III	7	17	III
19	8	16	III	7	16	III
20	6	12	II	5	12	II
21	9	19	III	7	15	III
22	10	19	III	7	18	II
23	7	13	II	6	15	II
24	9	15	II	4	14	II
25	7	16	II	3	13	II
26	5	18	II	5	16	II
27	9	19	II	8	12	II
28	10	12	III	7	13	II
29	4	10	II	3	11	II
30	6	9	II	4	8	II



## 05) Discussion

The present study forms that 14 days program of cinnamon honey and red sandalwood rose water facial pack for duration of 20min were both efficacious for reducing acne in a selected population. There was reduction in acne vulgaris in both the groups. Comparatively cinnamon honey facial pack was more effective than red sandalwood rose water facial pack on acne vulgaris.

Acne vulgaris is reported as an inflammatory disease of pilosebaceous glands of the skin which mainly occurs on the face and trunk.

Cinnamon has shown potential activity against acne vulgaris bacteria. cinnamaldehyde, a major constituent of cinnamon, shows anti-inflammatory activity. It inhibits the production of nitric oxide, which is responsible for inflammatory conditions in the human body. Moreover, cinnamon has also been shown to prevent the production of COX-2, a pro-inflammatory agent. Therefore, cinnamon has antibacterial and anti-inflammatory properties. The chemistry of cinnamon bark oil primary contains a cinnamaldehyde that is different from that found in cinnamon leaf oil (eugenol) and root-bark oil (camphor).<sup>5</sup>

Similar to cinnamon's biological activity, honey works as a natural antibiotic, killing bacteria that cause acne vulgaris. The anti-inflammatory properties of honey reduce the redness of acne vulgaris. Its acidic property does not allow the bacteria to grow.<sup>6</sup> Honey releases hydrogen peroxide, which is an antibiotic that can also remove bacteria and clear acne vulgaris.<sup>7</sup> Moreover, honey contains natural antioxidants, which can scavenge free radicals.<sup>8</sup>

Cinnamon honey investigates the antibacterial activity of an ethanolic extract of cinnamon bark, honey, and their combination against acne vulgaris-causing bacteria. The antibacterial activity of cinnamon bark extract and honey were investigated against *P. acnes* and *S. epidermidis* using disc diffusion.

A better interaction between the extract of cinnamon and honey against those bacteria was expected. When two drugs are given simultaneously, interactions in the body that cause pharmacological effect, be they synergistic, addictive, or antagonist effect, can occur.<sup>9</sup>

## 06) Conclusion

The study results showed that there was reduction in the acne vulgaris by inhibiting the growth of bacteria causing acne vulgaris the cinnamon honey facial pack and red sandalwood rose water facial pack will be a reasonable alternative method in treating patient with acne vulgaris.

Comparatively cinnamon honey facial pack was more effective than red sandalwood rose water facial pack in subjects with acne vulgaris.

## 07) Summary

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit (comprising the hair follicle, hair shaft and sebaceous gland; FIG. 1) and is among the most common dermatological conditions worldwide, with an estimated 650 million people affected.<sup>13,14</sup>

Acne vulgaris is considered a chronic disease owing to its prolonged course, pattern of recurrence and relapse, and manifestations such as acute outbreaks or slow onset. Moreover, acne causes profound negative psychological and social effects on the quality of life of patients.

Most people experience acne during adolescence, with >95% of teenage boys and 85% of teenage girls affected.<sup>16,17</sup> Almost 20% of these young people have moderate-to-severe Acne vulgaris,<sup>18</sup> and as many as 50% continue to suffer from acne vulgaris in adulthood,<sup>18,19</sup>. A systematic analysis for the Global Burden of Disease study indicated that acne vulgaris was the eighth most prevalent disease globally in 2010, following only two other skin disease categories on the list.<sup>14</sup>

The study is the first attempt to clinically evaluate the effect of cinnamon honey and red sandalwood rose water facial pack as adjuvant to comprehensive naturopathy treatment in the management of acne vulgaris. The study was set in with two intervention group and was followed up for 14days. Both cinnamon honey and red sandalwood rose water facial pack has been given for 14days. pre and post assessments were done. The study used standardized questionnaire tools like DLQI, acne vulgaris QOL along with LC and photography to measure the degree to which aspects of life are disrupted. DLQI for assessing quality of life acne vulgaris QOL, LC, photography for assessing, nature, intensity and grade for gathering all information regarding acne vulgaris triggering factors and type. subjects reported that there is gradual decrease in number of acne vulgaris after taking the treatment.

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## ANNEXURES

### ANNEXURE 1

#### Information sheet & Written Informed Consent Form

SIGNED INFORMED CONSENT FORM ALVAS COLLEGE OF NATUROPATHY & YOGIC SCIENCES

MOODABIDRI-574227, DK DISTRICT, KARNATAKA, INDIA

Phone: 08258 262142, Email: [acnys@gmail.com](mailto:acnys@gmail.com), Website: [www.alvas.org](http://www.alvas.org)

**Title of the project:** Comparative study of cinnamon-honey and red sandal wood-rose water facial pack in treatment of acne vulgaris.

**Investigator:** Ms. Jahnvi. B.R

**Name of the participant:**

**Date & time:**

**About the project:**

In order to understand the effect of cinnamon-honey and red sandal wood-rose water facial pack on acne vulgaris both treatments will be given for 20 min daily for consecutive 14 days.

**Please note:**

- All information obtained during the study will be kept confidential.
- You can withdraw from the study at any point of time unconditionally.
- In case the study does cause any adverse effects, the institution is not liable.

I hereby have understood the above and consent voluntarily to participate in the study.

**Signature of the participant**

**Signature of parents/guardian**

## ANNEXURE 2: CASE HISTORY DATA SHEET

### Preliminary data:

Name:

Age:

Gender:

Marital status: Occupation: Religion:

Address and contact number:

### Chief complaint:

History of chief complaint: Past history:

Family history:

Menstrual history:

Medical history:

Personal history:

Diet:

Appetite: Sleep: Micturition:

Bowel movement: Habit:

Addiction



**General physical examination:**

Height:

Weight:

BMI:

Pallor:

Clubbing:

Cyanosis:

Icterus:

Edema: Lymphadenopathy:

**Vital data:**

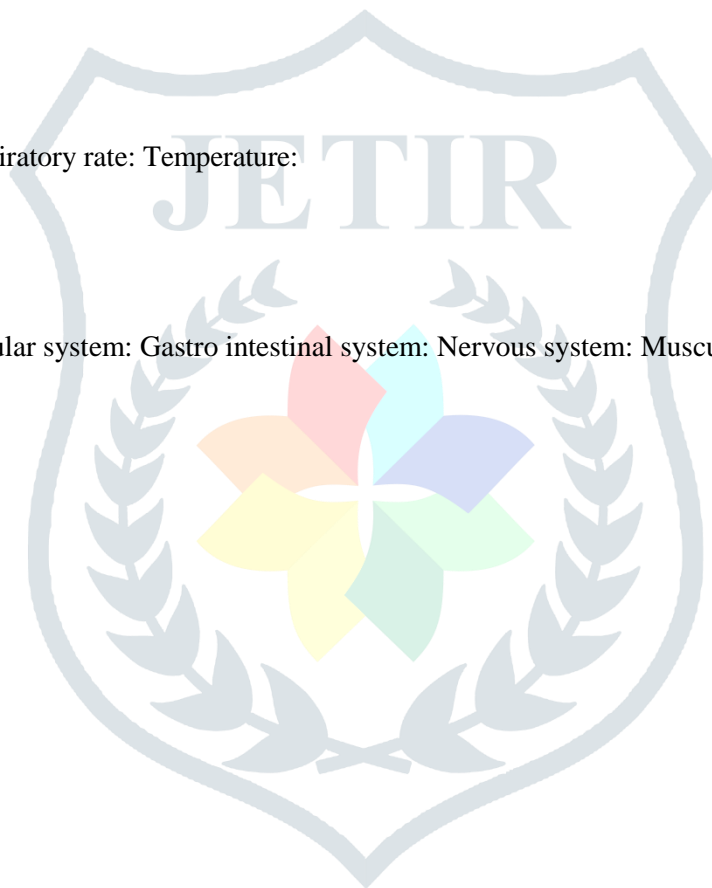
Blood pressure: Pulse rate: Respiratory rate: Temperature:

Differential Diagnosis:

**Systemic examination:**

Respiratory system: Cardiovascular system: Gastro intestinal system: Nervous system: Musculoskeletal system:

**Investigation: Diagnosis:**





## ANNEXURE 3

## DERMATOLOGY LIFE QUALITY INDEX (DLQI)

Hospital No: 0 0 0 0 0 0 0 0 0 0 0 0 .

Date: 0 0 0 0 0 0 0 0 .

Name: 0 0 0 0 0 0 0 0 0 0 0 0 .

Score: 0 0 0 0 0 0 0 0 .

Address: 0 0 0 0 0 0 0 0 0 0 0 0 .

Diagnosis: 0 0 0 0 0 0 0 0 .

0 0 0 0 0 0 0 0 0 0 0 0 .

The aim of this questionnaire is to measure how much your skin problem has affected your life OVER THE LAST WEEK. Please tick (✓) one box for each question.

- |   |            |                          |                                       |
|---|------------|--------------------------|---------------------------------------|
| 1. Over the last week, how <b>itchy, sore, painful</b> or <b>stinging</b> has your skin been?   | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> |                                       |
| 2. Over the last week, how <b>embarrassed</b> or <b>self conscious</b> have you been because of your skin?  | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> |                                       |
| 3. Over the last week, how much has your skin interfered with you going <b>shopping</b> or looking after your <b>home</b> or <b>garden</b> ?            | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 4. Over the last week, how much has your skin influenced the <b>clothes</b> you wear?   | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 5. Over the last week, how much has your skin affected any <b>social</b> or <b>leisure</b> activities?  | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 6. Over the last week, how much has your skin made it difficult for you to do any <b>sport</b> ?  | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 7. Over the last week, has your skin prevented you from <b>working</b> or <b>studying</b> ?   | Yes        | <input type="checkbox"/> |                                       |
|   | No         | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| If "No", over the last week how much has your skin been a problem at <b>work</b> or <b>studying</b> ?   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> |                                       |
| 8. Over the last week, how much has your skin created problems with your <b>partner</b> or any of your <b>close friends</b> or <b>relatives</b> ?       | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 9. Over the last week, how much has your skin caused any <b>sexual difficulties</b> ?   | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |
| 10. Over the last week, how much of a problem has the <b>treatment</b> for your skin been, for example by making your home messy, or by taking up time? | Very much  | <input type="checkbox"/> |                                       |
|   | A lot      | <input type="checkbox"/> |                                       |
|   | A little   | <input type="checkbox"/> |                                       |
|   | Not at all | <input type="checkbox"/> | Not relevant <input type="checkbox"/> |

Please check you have answered EVERY question. Thank you.



## ANNEXURE 4

Date: \_\_\_\_\_

**Acne-Specific Quality of Life Questionnaire (Acne-QoL)**ID Number: *(Please check one box for each question)*

1. In the past WEEK, how unattractive did you feel because of your facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. In the past WEEK, how embarrassed did you feel because of your facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In the past WEEK, how self-conscious (uneasy about oneself) did you feel about your facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. In the past WEEK, how upset were you about having facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. In the past WEEK, how annoyed did you feel at having to spend time every day cleaning and treating your face because of your facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In the past WEEK, how dissatisfied with your self-appearance did you feel because of your facial acne?

extremely	very much	quite a bit	a good bit	somewhat	a little bit	not at all
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. In the past WEEK, how concerned or worried were you about not looking your best because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

8. In the past WEEK, how concerned or worried were you that your acne medication/products were working fast enough in clearing up the acne on your face?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

9. In the past WEEK, how bothered did you feel about the need to always have medication or cover-up available for the acne on your face?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

10. In the past WEEK, how much was your self-confidence (sure of yourself) negatively affected because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

11. In the past WEEK, how concerned or worried were you about meeting new people because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

12. In the past WEEK, how concerned or worried were you about going out in public because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all  
                                                                                                                       

13. In the past WEEK, how much was socializing with people a problem for you because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all

14. In the past WEEK, how much was interacting with the opposite sex (or same sex if gay or lesbian) a problem for you because of your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all

15. In the past WEEK, how many bumps did you have on your face?

Extensive      A whole lot      A lot      A moderate amount      Some      Very Few      None

16. In the past WEEK, how many bumps full of pus did you have on your face?

Extensive      A whole lot      A lot      A moderate amount      Some      Very Few      None

17. In the past WEEK, how much scabbing from your facial acne did you have?

Extensive      A whole lot      A lot      A moderate amount      Some      Very Few      None

18. In the past WEEK, how concerned or worried were you about scarring from your facial acne?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all

19. In the past WEEK, how oily was your facial skin?

extremely      very much      quite a bit      a good bit      somewhat      a little bit      not at all



## LESION COUNTING

Regions	Blackheads	Whiteheads	Papules	Pustules	Nodules
Forehead					
Cheek (Rt)					
Cheek (Lt)					
Nose					
Chin					
<b>Total</b>					

**Grading:**