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Investigating the Relationship between Acne and Depression

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Abstract The present research was carried out in order to investigate the appearance of acne in relation to depression, in women and men from the age of 18 and above, using the random sampling method. In this research, 145 people who suffered in the past or still suffered from acne participated and were asked to complete two questionnaires. The first questionnaire was focused on the appearance of acne and the evaluation of its form while the second questionnaire examined the probable changes the participants were facing in their mood and if they appear any signs of depressive behaviour after the onset of acne. According to the results, it was found that acne, as well as its treatment with any medication did not seem to cause depression, but it revealed that affected to a large extent the psychology and self-confidence of the person suffering from it. Moreover, based on the results of this research, the participants presented a reduced mood and acne affected negatively their psychology causing difficulties in their personal and social life in their everyday life.

Keywords acne, depression, psychology, self-confidence, health behavior

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1. Introduction

Acne is a chronic inflammatory skin disease that often affects teenagers and young adults. It originates from the pylori follicle and is characterized by increased sebum production, follicular hyperkeratin, inflammation and bacterial proliferation of propionobacterium, (Stamu-O'Brien, C., Jafferanyet al., 2020). There are several factors that have been considered for predisposition, from environmental to hormonal, dietary and genetic factors. Clinically, patients present with non-inflammatory acne, inflammatory which are papules, pustules, nodules, cysts, and residual lesions which are scars and macular hyperpigmentation, (Oge LK., Broussard A., et al., 2019), (Li C, Chen J, et al. , 2019). These symptoms are manifested on the face, chest and upper part of the trunk. Scars and keloids can affect quality of life and are associated with depression, anxiety and suicidal ideation (Li C, Chen J, et al., 2019). The approach and treatment depend on the site, form and severity of the acne. Many acne sufferers feel embarrassed about the appearance of skin lesions on their skin, especially their redness and scarring, and often describe feelings of embarrassment, low self-confidence, depression, anxiety and worry, especially if they have been through several treatments, (Kumar S., Sungh R., et al. 2016). According to the Global Burden of Disease, acne is the eighth most prevalent disease worldwide with a prevalence rate of 9.4%, (Tan JK., BhateK., 2015). The prevalence of acne in the adolescent age group is 56%, (Smithard A., Glazebrook C., et al., 2001). It has a negative effect on individuals' self-esteem, interpersonal relationships and daily performance. Acne patients have reported symptoms of stress 50%, anxiety 44%, depression 18%, suicidal ideation 6%, body dysmorphic disorder 8%, decreased self-esteem, anger and personality effects, (Mishra N., Rastogi MK., et al., 2017). Daily activities affect acne even more, as well as physical, mental developments and emotional changes occur, so it can have significant psychosocial disturbances, (Revol O., Milliez N., et al., 2015). The treatment of acne with isotretinoin where several dermatologists recommend, isotretinoin is a retinoid derivative of vitamin A, whose action is directly on the capillary follicle, with reduced sebum production and omolytic action, (Oge LK., Broussard A., et al., 2019). Oral isotretinoin is commonly used to treat severe or refractory nodular acne. The most common side effects are dryness, dry eyes, cheilitis and headache. Psychiatric pathology, such as depression and suicidal ideation, may be related to the use of isotretinoin or other treatments, it has some side effects and complications, such as teratogenesis, liver dysfunction and negative psychological effects, (Chen YH., Wang WM., et al., 2022). Their effect on keratinocytes is responsible for mucodermal adverse effects, on hair follicle cells for the appearance of telogen exudate, on myocytes, release of creatine phosphokinase (CPK) and on hepatocytes, an increase in homocysteine levels. It can affect neural crest cells, which can cause teratogenesis, or hippocampal cells, which can involve a decrease in hippocampus neurogenesis and depression. Therefore, all women should use contraceptive agents. Other conditions that can be caused are inflammatory bowel disease through its interaction with the intestinal epithelium and dry eye through the effect on meibomian cells (Bagatin E., Costa C.S., et al., 2020).

2. Literature Review

2.1 Acne

Acne is a dermatological condition that appears more often during adolescence, based on various studies of the American Academy of Dermatology, 85% of teenagers have acne and 12% of adults. The most common places where acne occurs are the lower part of the neck face but also more rarely on the back shoulders and chest. There are different types of acne which are phagocytic which is non-inflammatory, papulopustular acne, rosacea and cystic acne which belong to the inflammatory type of acne. The pathogenesis of acne is multifactorial and four main factors are involved in its development. These four factors are follicular epidermal overgrowth with subsequent occlusion of the follicle, excess sebum, the presence and activity of Propionibacterium acnes, inflammation, and microbes present in the atmosphere. Acne develops as a result of sebaceous follicle blockage (McInturff, JE, Kim, J, 2005) (Bergfeld, WF, 2004) (Holmes, RL, Williams, M, Cunliffe, WJ, 1972) (Borelli, C, Plewig, G, Degitz K, 2005) (Webster, GF 2005) (Bergfeld, WF, 2004). The stratum corneum enlarges the follicles and overproduces due to the stimulation of androgens in puberty. The presence of hyper granulation of the follicular pores can be observed, histologically as comedones and clinically as blackheads, whiteheads and other forms of comedones such as papules. An important role is played by the serious correlation between the severity of acne and the number and size of comedones i.e. follicular and excrescences, the presence of which is a measure of 'comendogenesis' ' (Cunliffe, WJ Holland, DB, Jeremy, 2004). The sebaceous follicles possess an enzyme that converts plasma testosterone to dihydrotestosterone. Dihydrotestosterone is a potent stimulus for follicular stem cell nuclear division and consequently excessive cell proliferation. production (Holmes,RL,Williams,M,Cunliffe,WJ 1972). In conclusion, blockage requires the presence of both circulating androgens and the converting enzyme.

The first recognized event in the development of acne is follicular epidermal hyper proliferation and there is no exact underlying cause of this hyper proliferation. However, to date there have been various researches and hypotheses explaining why the follicular epithelium is hyper proliferated in people with acne. The first reason is that androgen hormones have been implicated as the initial trigger. The second reason is changes in lipid composition where they have been implicated in the development of acne vulgaris. People who have acne often have oily skin that involves excessive sebum production. Excess sebum can often dilute the normal epidermal lipids and lead to a change in the relative concentrations of the various lipids. In people with acne, reduced concentrations of linoleic acid have been shown, and with successful treatment and administration of is otretinoin, these levels are significantly normalized. The associated decrease in linoleic acid may be what affects and initiates the formation of phagocytes (Arbesman, 2005). The third reason is that inflammation is responsible for the formation of phagocytes. Interleukin IL-1-α is a pro-inflammatory cytokine. It has been used in a tissue model to induce follicular epidermal hyperproliferation and follicular formation (Leyden, JJ, McGinley, KJ, Mils, OH 1975 65 382-384). While inflammation is not evident microscopically or clinically in early acne lesions, it may it plays a decisive role in the development of acne and pimples (James, WD, 2005). The fourth reason is the excess sebum that plays a leading role in the development of acne. Sebum secretion and production are regulated by various hormones and mediators. Androgen hormones in particular promote the production and release of sebum. However, most men and women with acne have normal levels of androgen hormones. Numerous other factors including growth hormone and insulin-like growth factor also regulate the sebaceous gland and may contribute to the development of acne. The pathogenesis of acne is less well understood. (McInturff,JE,Kim ,J ,2005) (Bergfeld,WF,2004) (Borelli ,C,Plewig,G,Degitz K 2005) (Bergfeld ,WF, 2004) (Leyden,JJ,McGinley,KJ,Mils ,OH 1975) (Jeremy,AH,Holland,DB-Roberts, SG 2003) (Cunliffe,WJ Holland, DB,Clark,SM 2003).

Inflammation can be the primary phenomenon or a secondary phenomenon. Most research and evidence support a secondary response to P.acnes. Interleukin IL-1-α, however, has been identified in phages and may play a role in the development of acne. Manipulation of a closed phages could very easily lead to rupture of the contents of the cavity in the dermis and an inflammatory reaction to follow. Also, in obstructed cysts there can be a spontaneous inflammation but the reason is not completely clear (Leyden, JJ, McGinley, KJ, Mils, OH 1975) (Jeremy, AH, Holland, DB-Roberts, SG, 2003). In the study of Leyden et al, Propionibacterium species appear to be more abundant on the cheeks and forehead of subjects with and without acne in three age groups 11-15 years, 16-20 years and 21-25 years.

Other factors and various external causes may be responsible for the pathophysiology of teenage acne. Such as headbands, football helmets, tight bras or other tight clothing. Oil-based cosmetics may be responsible for phagocytic acne such as and hair sprays can cause acne along the hairline. (Bojar, RA, Holland, KT, 2004) Drugs responsible for acne include androgens, glucocorticoids, lithium iodides, hydantoin, and isoniazid possibly mediated by increased plasma testosterone. Drug-induced acne has some specific characteristics; all of its lesions are at the same stage. at the same time and its appearance occurs in specific places such as the lower back and lower abdomen, arms and legs (Bojar, RA, Holland, KT, 2004) In addition to drugs and external causes responsible for the appearance of acne, much clinical evidence shows that emotional stress can affect the course of acne (Toyoda, M, Morohashi, M. 2003) (Zouboulis, CC, 2004). Additionally, various medical disorders such as congenital adrenal hyperplasia, polycystic ovary syndrome, and other endocrine disorders with excess androgens may trigger the development of acne vulgaris (Deplewski, D, Rosenfield, RL 2000).

The treatment of acne depends on the severity and type of acne lesions (Das B, Reynolds RV, 2014). A first assessment is made on whether the acne is inflammatory or non-inflammatory and how severe the acne is. Benzoyl peroxide and topical antibiotics target inflammatory lesions while adapalene, tretinoin, and tazarotene are retinoids that target phageros. But one ingredient that targets both is azelaic acid. Topical antibiotics can be quite effective but after a certain period of time a bacterial reaction can occur. To avoid this bacterial reaction, top antibiotics should not be used as monotherapy for acne. The above European experts do not use topical antibiotics for the treatment of acne, while the American Academy of Dermatology recommends the use of topical antibiotics in combination with benzoyl an oxide to avoid the bacterial reaction (Teede, HJ Misso, ML, Costello, MF 2018). For dieters, topical retinoids need to be tried gradually from the less potent irritants 'adapalene', progressing to the potent tretinoin, and finally to the more potent tazarin.

2.2 Depression

he Modern concept of Depression is defined as a mental disorder that is presented by a number of clinical features but does not require a specific aetiology. For the sufferer, Depression is an unpleasant experiential experience, that in

an advanced stage the patient is capable of harming himself or even seeing death as redemption. According to the World Health Organization, more than 350,000,000 people worldwide suffer from depression, 75% of these sufferers have not been officially diagnosed because, either they did not go to professional psychiatrists, or they do not realize their health condition. As a result, they do not undergo treatment (Hellenic Psychiatric Association, Athens 1999).

Depression is caused by a complex interaction between many social, personal, environmental, psychological and biological factors. Most experts believe the cause is multifactorial. The involvement of brain neurotransmitters such as serotonin, dopamine and norepinephrine. A relatively lesser-known cause includes drugs such as birth control pills, corticosteroids, and isotretinoin (Harvard Health, 10/01/2022).

Depression manifests as Normal, Subclinical and Clinical. The Normal, is expressed with the feeling of sadness and nothing more. In this form, it usually also appears as a symptom or side effect. In the Subclinical stage there is not only the feeling of sadness but at least four clinical characteristics. In Subclinical Depression it is not necessary to treat it, since you create from unpleasant events, stressful factors and stressful situations in the sufferer's life and when these stops happening, the depression usually recedes. According to the DSM-III-R diagnostic code, in the Clinical stage of Depression, at least five of the nine clinical features listed in the table below appear and their duration is more than 2 weeks. In this case the treatment of depression is necessary. A different explanation for these three stages of depression relates to the intensity of the following symptoms.

Depressive Symptoms According to DSM-III-R

1. Depressed mood for most of the day.
2. Decreased interest or pleasure in daily activities.
3. Sharp decrease or increase in body weight or fluctuations in appetites hourly during the day.
4. Insomnia or hypersomnia
5. Psychomotor activity or Delay.
6. Feeling of tolerance and worthlessness.
7. Decreased ability to think and concentrate.
8. Exhaustion or loss of energy.
9. Recurrent thoughts of suicide and death.

(Journal of American Academy of Child & Adolescent Psychiatry, December 1995)

Depression can occur at any age. In children and adolescents, it appears with long continuous periods of sadness or unhappiness, often also as irritability. Depression at young ages is often not recognized by a health professional. When children and adolescents experience depression, they are at high risk of self-harm or suicide (Ryan ND, BRENT DA, 1996).

Data from the United States National Health Interview Survey showed that while there was no significant trend by age among adults experiencing severe symptoms of depression, adults aged 18–29 and those 65 and older were more likely to experience mild symptoms depression. A higher proportion of adults aged 45–64 reported moderate symptoms of depression compared to those aged 30–44 and 65 and older. Adults aged 18–29 were just as likely to experience moderate depressive symptoms as those aged 45–64 (Kroenke K, Strine TW, 2009).

Depression is more common in women and occurs during times of hormonal changes such as premenstrual depression, postpartum depression and perimenopausal depression. All of these are related to changes in hormone levels and are the diagnosis of reproductive depression. There is a risk that severe premenstrual depression may be misdiagnosed as bipolar disorder and women may be started on inappropriate antidepressants or mood-stabilizing therapy. The most effective treatment for severe PMS is suppression of ovulation and suppression of cyclical hormonal changes by transdermal oestrogens or GnRH analogues. Postpartum depression is more common in women with a history of premenstrual depression and also responds to transdermal oestrogen (J. Studd, 21/07/2014).

Throughout their lives, women are at greater risk of depression than men. Epidemiological studies have shown that the lifetime prevalence of a major depressive disorder in women, 21.3%, is almost double that in men, 12.7%. This ratio has been documented in various countries and ethnic groups. Gender differences associated with depression vary by age, with male and female children showing similar incidence rates. National morbidity data reveal gender differences (Rudolf E. Noble, 2005).

Depression is one of the most common comorbidities of many chronic medical diseases, including cancer and cardiovascular, metabolic, inflammatory, and neurological disorders. Indeed, the rate of depression in these patient groups is significantly higher than in the general population, and depression accounts for a large part of the psychosocial burden of these disorders. Many factors can influence the occurrence of comorbid depression including, common genetic factors, social factors, health behaviours and psychological factors. Diagnosing depression in patients with a medical disorder can be particularly difficult because of symptomatic overlap. Although pharmacological and psychological treatments can be effective, it can adjustments may need to be made for patients with a comorbid medical disorder. In addition, symptoms or treatments of medical disorders may interfere with the treatment of depression. Conversely, depressive symptoms may reduce adherence to treatment for both disorders. Therefore, comprehensive treatment plans are needed to optimize care (Monika Bullinger, 2020).

When you administer medication for a medical problem, in addition to the physical burden there is a risk of psychological dysfunction. Many studies have shown the association of medical drugs with depression and suicide. Although iatrogenic depression is a common phenomenon, drugs are overlooked as an unsuspected or complicating factor, the largest percentage of attempted suicides have been found in users of medical drugs, the associations are important and often ignored (Bhate K, Williams HC, 2013).

Certain medications can affect the psychological state of the sufferer. Side effects such as prolonged sadness and despair are quite common. These drugs appear to alter brain chemicals. Although for the treatment of any condition, medication is necessary and its side effects are hardly acceptable. For example, isotretinoin prescribed to treat acne has been found to cause depression. The same goes for birth control pills (Debra Fulghum Bruce, 2021)

Isotretinoin is the only treatment that affects all the main causative factors involved in acne. Its effectiveness is due to its action on cell cycle progression, cell differentiation, cell survival and apoptosis. Isotretinoin acts, among others, in the hypothalamus, in which retinoid synthesis and the presence of their receptors have been found, regulating a number of genes such as those involved in the synthesis of corticotropic hormone, which may contribute to depression and the manifestation of biological stress (Shearer kd, Goodman th, 2010).

2.3 Acne in relation to Depression

Acne, first of all, is a chronic inflammatory condition where it affects a large percentage of people, more precisely 85%. Also, acne occurs both during adolescence and in the post-adolescent age group, where it is divided into persistent acne which is the continuation of acne from adolescence to adulthood, and bilateral onset acne which occurs after the age of 25 years, (Pelwig G., 2019).

At the age of 40, approximately 1%-5% of adults continue to show changes due to acne, thus indicating that the majority of our population will have to face possible consequences due to acne at some point in their lives, (CunliffeW., 1986). Acne is a disorder of the sebaceous glands that occurs on the upper part of the body and mainly on the face and is characterized in the initial stage mainly by pimples and papules, pustules, nodules, abscesses and scars in a later stage. It is a condition that changes occur in various forms in an overlapping manner. Acne is associated with a high psychological burden, (Kubba R., 2009).

The occurrence of depression among patients suffering from a dermatological issue can be as high as 25-40% in contrast to the prevalence of 6-8% as seen in the general population, (Ahmed S., 2007).Scars that remain on the skin after acne are a very disturbing phenomenon that is associated and reported in 95% of patients, even if they follow the appropriate treatment, (Layton AM., 1994).The actual extent and frequency of secondary scarring remains unknown. Visible scars are widely known to have a negative impact on the psychological well-being and quality of life of patients. In addition, after acne several patients where they have scars can be the cause of depression, anxiety and sometimes even lead to suicidal thoughts (Samuels, 2020).

In addition, the perception of depression and treatment to combat it are of high importance for an acne patient. Although acne is studied to be more harmful in teenagers, it has shown a higher prevalence rate of depression in patients aged 25 years and older where they declare a higher emotional impact of acne, (Uhlenhake E., 2010). Although acne is an aesthetic concern, it is not physically limiting or life-threatening but the condition can affect the patient's psychosocial domain to a point comparable to patients who have debilitating conditions such as asthma, epilepsy, diabetes, chronic back pain and arthritis, (Loney T., 2008).

The active "pimples" leave marks on the face, as a result of which they become permanent scars and create emotional discomfort, eventually leading the patient to a psychological disorder. This condition can affect personality, emotions,

image, self-esteem and the ability to create long-lasting relationships with the disappearance of active lesions, (Kulthanan K., 2007). Outpatients appear to have more experience with conditions associated with psychiatric comorbidity than is seen in the general population or other general outpatients. It has been observed that 1/3 of the patients examined in dermatological clinics present some complaint that includes an important psychological component (Filaković P., 2008). The overall frequency of psychiatric comorbidity is over 40% among patients in a dermatology clinic (Henkel V., 2002). A study of adolescents aged 13-16 years visiting a general practice in London found that 38% of those enrolled had a mental disorder, although 2% had a psychiatric issue as their primary problem, (Kramer T, 1998).

Mood disorders that are not so easily diagnosed are the group of mental illnesses, due to the inability of adolescents to freely express how they feel, the varied presentation of clinical symptoms and the inability of doctors to recognize the condition. According to Wissman M., depression experienced by adolescents often has a significant course, recurrences and mortality from suicide in adulthood, (Wissman M., 1999). The most common psychiatric problems seen in patients visiting a dermatology clinic are anxiety, depression, body dysmorphic disorder, anger, self-injurious tendencies, suicidal ideation. Kellet et al have conducted a review where they report that 18% of patients who have visited for treatment had clinically significant depression problems (Kellet Sc., Gawkrodger DJ., 1999). According to another cross-sectional study of some secondary school students in New Zealand, students who had acne vulgaris reported high rates of depressive symptoms 24%, anxiety 9%, suicidal ideation 34%, and suicide attempt 13% (Halvorsen JA., 2011).Gupta and Gupta did a study where it was shown that patients who had acne and psoriasis had higher suicidal ideation and answered positively to questions"I have thought about trying to kill myself" and "I often wish I were dead" in relation to patients who had alopecia areata and atopic dermatitis. 5.6% of acne patients have expressed a wish to die (Gupta M., 1998). Patients with mild to moderate acne were more prone to depression than patients with alopecia areata, atopic dermatitis and psoriasis. In recent years, the psychodermatology literature has dealt with different emotional effects of acne depending on the gender of the patient (Uslu G., 2008).

How severe acne is another research conducted in the UK has proven that acne is worse in men than in women. In addition, in the same study it was shown that the number of women who sought care for acne is twice as many and it was also shown that women who suffered from chronic acne were more psychologically disturbed and a statistically significant difference was observed between the two sexes in terms of embarrassment which were related to their skin condition, (Kellett Sc., Gawkrodger DJ., 1999). An analysis has proven that depression and anxiety are the most common symptoms in adults with acne, contrary to popular belief. A logical explanation could be that adults may feel out of place and time compared to their peers without acne and the socio-cultural beliefs that acne is a teenage thing, (Samuels, 2020).

Data from many researches and studies that reflect the close association between acne and depression lead us to conclude that the severity of depression in acne patients should be proportional to the severity of acne, and the same was true in one study, in which it was observed severe depression 42.4% with severe acne compared to especially low rates of 2.5% and 14.5% observed in patients with mild acne and vice versa, (Al-HuzaliS., 2014).Some other reviews showed similar results where emphasis was placed between the positive relationship and the severity of acne and depression, (Pearl A., 1998), (Wu SF., 1988).On the other hand, similar tests failed to show any correlation between acne severity and clinical depression (Smithard A., 2001), (Klassen A., 2000).

3. Methodology

3.1. Problem Analysis

This paper investigates the problem of acne in relation to depression and how it affects different ages of both sexes. It has been investigated through two questionnaires where 143 people participated, 131 women and 12 men with an age group of 18 to 35 and above. Subsequently, questionnaires were given regarding the form in which the acne appeared, the areas it has appeared, discomfort, the visit of a specialist doctor, the emotions, if they had a feeling of pessimism, suicidal ideation where the acne caused. Some questions were given in the questionnaire about the psychological state through acne and whether it caused them depression. Some questions were about whether they experienced depressed mood, whether they are satisfied with their appearance because of acne, thinking about self-harm because of acne, loss of satisfaction, guilt, or even self-hatred because of acne. Furthermore, they were asked to answer some questions related to age, gender, working environment, if there were any problems with acne, if any cosmetic preparation without medical prescription was already used, if any medication was given, what kind of medication, if it has affected psychology.

3.2. Research Type and Approach

There are various types of approach that can be chosen for the purpose of research, it can be quantitative or qualitative or a combination of both. For research the tools that should be used to gather the results of quantitative research are usually questionnaires and interview, in contrast to qualitative research that uses participation and observation of participants, the case study and the in-depth interview. The type of research used in this particular case was quantitative research, that is, basic research. Our goal was to investigate how acne affects depression. The approach was made using 2 questionnaires with closed questions. General Acne Questionnaire and the Beck questionnaire (B.D.I.) scale 1 and 2.

Variables:

Independent Variable – Acne

Dependent Variable – Depression

Research cases:

Null hypothesis, H0 – Acne is not associated with depression.

Alternative hypothesis H1 – There is a positive correlation between acne and depression.

3.3. Sampling

For sampling, we chose the random sampling method because its results are the most valid. The questionnaire was promoted through the mass media and sent to Greece and Cyprus.

3.4 Method of Collection of Item Data

143 people participated in the questionnaire, including men and women, 12 men and 132 women. The completion and distribution of the questionnaire was anonymous and the sampling was done through the Google forms application

3.5 Data Processing

The data was processed with the statistical program SPSS. The first stage was the coding of the answers and their conversion into a specific numerical code and then their registration in the software for the additional processing of the statistical data and the analysis of the results. Finally, various graphs and tables of statistical analyzes were made through SPSS.

3.6 Limitations on Research

The limitations we faced in our research are firstly that the questionnaire is dominated by women to a very large extent and we did not have a complete view with the participation of men. For this reason, we could not have a complete correlation between men and women. Also, still one limitation we faced is that there were not enough subjects aged 30-35 so that we could judge the association of acne with depression in this particular age group.

3.7 Ethical Considerations

In the questionnaire, the anonymity of the participants was ensured in order to protect the personal data of each participant and to ensure his honest answer to the questionnaire. Ethical consideration Great emphasis was placed on the ethical aspect of the study. As Zickmund (2003) points out, ethical issues in research are of prime importance. The respondent's right to privacy, the use of deception, the respondent's right to be informed of the purpose of the research, the need for confidentiality, the need for honesty and objectivity in data collection and reporting, and other issues are factors against the design and execution of the surveys In this context, the participating students were specifically informed that they were randomly selected to participate in the survey. Both students and businesses participating in the survey were informed that participation was voluntary and that there would be no consequences if they refused. On the other hand, it was explained to them that their participation was valuable because the findings would be considered, with a possible impact both on improving education at the European University of Cyprus and on the business world in general. In addition, respondents were informed that their responses would remain strictly confidential.

4. Analysis

For the processing and analysis of the data, 2 questionnaires were given, one was for depression and the other was for depression. sector. The questionnaire is divided into 2 parts. The first part concerned demographic data of the participants such as gender, age, the working environment of the participant, but also questions regarding the severity of the acne and the areas in which it appeared. Part B included questions related to acne and depression, such as whether they experienced depression, whether they were satisfied with their appearance due to acne, thoughts of self-harm due to acne, loss of satisfaction, feelings of guilt or even self-hatred because of acne. Furthermore, they were asked to answer if there were any discomforts from acne, if they had previously used any cosmetic preparation without a medical prescription, if any medication was given, what kind of medication and if it had an effect on the participant's psychology.

4.1 Participant sheet

There were 144 participants, 12 men and 132 women. The average (Mean) of women is 7.92 compared to men which is 2.58.

Report

Αποτελέσματα Ερ. 2

Φύλο	Mean	N	Std. Deviation
Άντρας	2.58	12	3.554
Γυναίκα	7.92	132	8.047
Total	7.48	144	7.905

4.2 Age of participants

60.7% of people were in the 18-23 age group, 20% were in the 35+ age group, 15.9% were in the 24-29 age group and 2.7% were in the 30-35 age group.

4.3 To the question relating to what they do for living the majority of the people answered they were university orcollege students.

4.4 When asked if they had ever had an acne problem, 88.3% answered positively and 11.7% negatively.46.9% have moderate acne, 39.3% have mild acne and 13.8% have severe acne.

4.5 To the question "*In which part of your body did you had acne?*" 70 participants answered on the face with the percentage of 48.6%. On the other hand, 6 participants responded that acne appeared on other parts of the body such as back chest, shoulders etc. collecting the low rate of 0.07.

4.6 To the question if their acne causes them any inching, 61 of the participants answered that they did not appear to have any of these symptoms at all collecting the percentage of 42.4. Moreover 58 participants answered, "*sometimes*" collecting the percentage of 40.3, 21 participants answered "*often*" with the percentage of 14.6, and finally 4 participants answered "*quiteoften*" collecting the low percentage of 2.8.

4.7 To the question if the participants had experienced any feeling of pain during their acne, 61 participants answered that they had *"at all*" collecting the percentage of 42.4, 56 participants answered "*sometimes*" collecting the percentage of 38.9, 17 answered "*often*" with the percentage of 11.8, 8 answered "*quite often*" with a percentage of 5.6, 1 answered "*not at all and quite often*" with a percentage of 0.7 and another 1 participant answered "*often and quite often*" with a percentage of 0.7.

4.8 Tothe question if the participants experienced burning sensation, 66 people answered "*at all'* with a percentage of 45.8, 49 participants answered "*sometimes*" with the percentage of 34.0, 22 answered "*often*" with a percentage of 15.3, 6 answered "*quite often*" with a percentage of 4.2 and 1 answered "*at all and sometimes*" with a percentage of 0.7.

4.9 To the question if they felt dryness, 47 participants answered not "*at all*" with a percentage of 32.6, 44 answered "*sometimes*" with a percentage of 30.6, 33 answered "*often*" collecting the percentage of 22.9 and 20 answered "*quite often*" with a percentage of 13.9.

4.10 Out of the 144 participants, 83 answered that they initially used a cosmetic or pharmaceutical preparation without a medical prescription on their own with a fairly high percentage of 57.6in contrast to the remaining 61 participants who answered no, they had a low percentage of 42.4.

4.11 When asked if the participants visited a specialist in order to help them get rid of their acne problem , 67 answered that they have visited a dermatologist collecting the percentage of 46.5, 19 answered that they have visited both a dermatologist and a beautician with a percentage of 13.2, 13 answered that they have not visited someone specialist with a percentage of 9.0, 9 answered that they visited a gynaecologist and a dermatologist collecting the percentage of 6.3, 7 answered that they visited a beauty therapist collecting the percentage of 4.9, 5 answered endocrinologist and dermatologist with a percentage of 3.5, 3 answered endocrinologist, gynaecologist, dermatologist with a percentage of 2.1, 2 answered gynaecologist with a percentage of 1.4, 1 person gynaecologist, beauty therapist , pathologist with a rate of 0.7, 1 person answered gynaecologist, dermatologist and pathologist with a rate of 0.7, 1 person answered dermatologist and pathologist with a rate of 0.7, 1 person answered endocrinologist, gynaecologist and beauty therapist with a rate of 0.7, 1 person answered endocrinologist, gynaecologist, dermatologist, beauty therapist and pathologist with a percentage of 0.7, 1 person answered no with a percentage of 0.7 and 1 person answered nothing with a percentage of 0.7.

4.12 45.4% answered that the medication did not negatively affect their psychology, 22% answered that their psychology was negatively affected by the medication, and 7.8% answered that their psychology was negatively affected to a large extent.

4.13 When asked if acne had a negative effect on their psychology, the participants answered that they were very psychologically affected due to the occurrence of acne at a rate of 31.7 and were very affected at a rate of 23.4. There were few participants who answered that they were not affected at all by the appearance of acne with a rate of 9.7%.

4.14 When asked if they experienced a depressed mood due to acne, 29% of the participants answered that they did not experience a depressed mood at all due to acne, 23.4% that they experienced a fairly depressed mood, 21% that they sometimes experienced a depressed mood, 15.9 % that they had a very depressed mood and 9.7% that they had a very depressed mood six years after acne.

4.15 20% of participants are not at all satisfied with their appearance due to acne. 14.5% are somewhat satisfied with their appearance, 29% answered that they are fairly satisfied, 20.7% are very satisfied and 15.9 are very satisfied with the appearance of their six-year acne problem on their skin.

4.16 To the question if the participants ever thought of harming their self or ever thought about suicide because of the acne skin, the majority of participants answered that they have never thought about harming themselves or killing themselves because of their acne problem, with a percentage of 91%. However, there was a small percentage, where 3.4% answered that they have sometimes thought about harming themselves or even killing themselves six years after acne. There was also the percentage of 1.4% who answered that they think too much about the idea of self-harm and suicide because of the appearance of acne.

4.1756.6% answered that they do not feel sad, while 33.8% answered that they feel sad sometimes. No participant answered I'm so sad it hurts me.

4.18 The majority of participants answered that they are not particularly pessimistic about the future with a rate of 80.6%, while 4.9% answered that they feel that they will never overcome their difficulties.

4.1977.1% answered that they do not feel dissatisfied, while 10.4% answered that they do not enjoy things as before.

4.20 84.7% responded that they don't feel guilty about themselves, however 11.8% responded that they often feel worthless.

4.21 88.2% do not feel they are being punished, while 4.9% feel they will be punished.

4.22 81.3% don't feel self-hatered, however 5.6 stated that they don't like themselves.

4.2393.8% of the participants answered that they don't have thoughts of self-punishment towards themselves, but there was a percentage of 1.4% that they said they would try to kill themselves if they could.

4.24 75.7% answered that they have not lost their interest towards other people, while the 9.7% stated that they have lost most of their interest in other people.

4.25 While 77.1% said they are productive at work, 7.6% need to push themselves to do something productive.

4.26 In this question while a percentage of 63.7% noted that they have not notice a loss of appetite, there was a fairly significant percentage of 31.9% where they stated that their appetite is not as good as it used to be.

4.27 Finally, in the last question, 76.4% stated that they have no loss of libido, while 5.6% answered that thy have completely lost their interest in sex.

5 Results

The table below breaks down the highest correlations. The medication seems to have negatively affected psychology in relation to the appearance of scars due to the problem of acne with 0.229%. The appearance of acne has negatively affected your psychology in relation to whether medication has affected psychology negatively by 0.459%. The medication has negatively affected your psychology negatively in relation to if you think you have experienced a depressed mood cause by the appearance of acne with 0.4.3%. Medication has affected phycology negatively in relation to whether you have ever thought about harming yourself or even killing yourself because you don't feel good about the appearance of your acne-prone skin with 0.238%.

The appearance of scars due to acne in relation to whether the appearance of acne has negatively affected psychologically with 0.405%. If they developed scars due to the problem of acne compared to if they believe that they have experienced a depressed mood that caused ξ appearance of acne by 0.400%. The appearance of scars due to the problem of acne in relation to whether you are satisfied with your external appearance due to the problem of acne on your skin with -0.234%.

The appearance of acne seems to have negatively affected the psychology of the participants in relation to the fact that they believe that they have presented a depressed mood caused by the appearance of acne with 0.618%. The appearance of acne has negatively affected your psychology in relation to whether you are satisfied with your appearance due to the problem of acne on your skin with -0.213%.

Do you think you have experienced depressed mood caused by acne versus whether you are satisfied with your appearance because of the acne problem on your skin with -0.283%? Do you think you have a depressed mood caused by the appearance of acne in relation to the results of questionnaire 2 with 0.279%? Have you ever thought about harming yourself or even killing yourself because you don't feel good about the appearance of your acne-prone skin in relation to questionnaire results 2 with 0.271%?

Correlations

		Η φαρμακευτική αγωγή έχει επηρεάσει την ψυχολογία σας αρνητικά ;	Στη συνέχεια εμφανίσατε ουλές εξαιτίας του προβλήματος της ακμής;	Η εμφάνιση της ακμής επηρέασε αρνητικά την ψυχολογία σας;	Πιστεύετε ότι έχετε παρουσιάσει καταθλιπτική διάθεση που να σας προκάλεσε η εμφάνιση της ακμής;	Είστε ικανοποιημένοι με την εξωτερική σας εμφάνιση εξαιτίας του προβλήματος της ακμής στο δέρμα σας;	Έχετε ποτέ σκεφτεί να κάνετε κακό στον εαυτό σας ή ακόμα και να αυτοκτονήσετε γιατί δεν νιώθετε όμορφα με την εμφάνιση του ακνεικού σας δέρματος;	Αποτελέσματα Ερ. 2
Η φαρμακευτική αγωγή έχει επηρεάσει την ψυχολογία σας αρνητικά ;	Pearson Correlation	1	.229**	.459**	.403**	-.207*	.238**	.182*
	Sig. (2-tailed)		.006	<.001	<.001	.014	.005	.031
	N	140	140	140	140	140	140	140
Στη συνέχεια εμφανίσατε ουλές εξαιτίας του προβλήματος της ακμής;	Pearson Correlation	.229**	1	.405**	.400**	-.234**	.071	.097
	Sig. (2-tailed)	.006		<.001	<.001	.005	.398	.248
	N	140	144	144	144	144	144	144
Η εμφάνιση της ακμής επηρέασε αρνητικά την ψυχολογία σας;	Pearson Correlation	.459**	.405**	1	.618**	-.213*	.108	.200*
	Sig. (2-tailed)	<.001	<.001		<.001	.010	.196	.016
	N	140	144	144	144	144	144	144
Πιστεύετε ότι έχετε παρουσιάσει καταθλιπτική διάθεση που να σας προκάλεσε η εμφάνιση της ακμής;	Pearson Correlation	.403**	.400**	.618**	1	-.283**	.207*	.279**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	.013	<.001
	N	140	144	144	144	144	144	144
Είστε ικανοποιημένοι με την εξωτερική σας εμφάνιση εξαιτίας του προβλήματος της ακμής στο δέρμα σας;	Pearson Correlation	-.207*	-.234**	-.213*	-.283**	1	-.047	-.206*
	Sig. (2-tailed)	.014	.005	.010	<.001		.580	.013
	N	140	144	144	144	144	144	144
Έχετε ποτέ σκεφτεί να κάνετε κακό στον εαυτό σας ή ακόμα και να αυτοκτονήσετε γιατί δεν νιώθετε όμορφα με την	Pearson Correlation	.238**	.071	.108	.207*	-.047	1	.271**
	Sig. (2-tailed)	.005	.398	.196	.013	.580		.001
	N	140	144	144	144	144	144	144

		Η φαρμακευτική αγωγή έχει επηρεάσει την ψυχολογία σας αρνητικά ;	Στη συνέχεια εμφανίσατε ουλές εξαιτίας του προβλήματος της ακμής;	Η εμφάνιση της ακμής επηρέασε αρνητικά την ψυχολογία σας;	Πιστεύετε ότι έχετε παρουσιάσει καταθλιπτική διάθεση που να σας προκάλεσε η εμφάνιση της ακμής;	Είστε ικανοποιημένοι με την εξωτερική σας εμφάνιση εξαιτίας του προβλήματος της ακμής στο δέρμα σας;	Έχετε ποτέ σκεφτεί να κάνετε κακό στον εαυτό σας ή ακόμα και να αυτοκτονήσετε γιατί δεν νιώθετε όμορφα με την εμφάνιση του ακνεικού σας δέρματος;	Αποτελέσματα Ερ. 2
Η φαρμακευτική αγωγή έχει επηρεάσει την ψυχολογία σας αρνητικά ;	Pearson Correlation	1	.229**	.459**	.403**	-.207*	.238**	.182*
	Sig. (2-tailed)		.006	<.001	<.001	.014	.005	.031
	N	140	140	140	140	140	140	140
Στη συνέχεια εμφανίσατε ουλές εξαιτίας του προβλήματος της ακμής;	Pearson Correlation	.229**	1	.405**	.400**	-.234**	.071	.097
	Sig. (2-tailed)	.006		<.001	<.001	.005	.398	.248
	N	140	144	144	144	144	144	144
Η εμφάνιση της ακμής επηρέασε αρνητικά την ψυχολογία σας;	Pearson Correlation	.459**	.405**	1	.618**	-.213*	.108	.200*
	Sig. (2-tailed)	<.001	<.001		<.001	.010	.196	.016
	N	140	144	144	144	144	144	144
Πιστεύετε ότι έχετε παρουσιάσει καταθλιπτική διάθεση που να σας προκάλεσε η εμφάνιση της ακμής;	Pearson Correlation	.403**	.400**	.618**	1	-.283**	.207*	.279**
	Sig. (2-tailed)	<.001	<.001	<.001		<.001	.013	<.001
	N	140	144	144	144	144	144	144
Είστε ικανοποιημένοι με την εξωτερική σας εμφάνιση εξαιτίας του προβλήματος της ακμής στο δέρμα σας;	Pearson Correlation	-.207*	-.234**	-.213*	-.283**	1	-.047	-.206*
	Sig. (2-tailed)	.014	.005	.010	<.001		.580	.013
	N	140	144	144	144	144	144	144
Έχετε ποτέ σκεφτεί να κάνετε κακό στον εαυτό σας ή ακόμα και να αυτοκτονήσετε γιατί δεν νιώθετε όμορφα με την εμφάνιση του ακνεικού σας δέρματος;	Pearson Correlation	.238**	.071	.108	.207*	-.047	1	.271**
	Sig. (2-tailed)	.005	.398	.196	.013	.580		.001
	N	140	144	144	144	144	144	144
Αποτελέσματα Ερ. 2	Pearson Correlation	.182*	.097	.200*	.279**	-.206*	.271**	1
	Sig. (2-tailed)	.031	.248	.016	<.001	.013	.001	
	N	140	144	144	144	144	144	144

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

6 Discussion

This thesis aimed to investigate and correlation between acne and depression and more specifically to investigate if acne is affected by depression due to its appearance but also due to the medication given to them if this is the main cause of the appearance of acne or if it is because of the outward appearance of individuals. However, before we continue, we would like to mention that the difficulties we encountered in the process of finding participants are that women outnumber men to a very large extent and we were not able to have a complete correlation between men and women. Also, another limitation we faced is that there were not enough people aged 30-35 so that we could judge the association of acne with depression in this particular age group. The first step for the preparation of the thesis was to find the literature review and the theoretical background based on the primary research. The second step we followed was to expand and further analyse our topic by basing all our findings on the literature. Then we designed the questionnaire, it was sent to the mass media and after collecting as much data as we could, we proceeded to process our data using the SPSS statistical program. Starting from the gender, it is worth mentioning that the answers of women were superior in the majority in relation to the participation of men. In addition, the age groups concerned people aged 18-23, 24-29, 25-30, 30-35, 35+. In the largest percentage of the participants, it seems that the form of acne was moderate, the next percentage was for people who had acne mild form of acne and the smallest percentage of subjects were those who experienced severe form of acne. Regarding the area in which the acne appeared, the largest percentage of people answered the face, the next one was the back and a smaller percentage answered the neck, shoulders, chest and finally the chest. Regarding the appearance of scars during or after acne, the majority answered that they did not show signs and scars. But the most basic conclusion related to the question of whether acne affected the psychology of the people, the largest percentage answered positively, which clearly proves that the external appearance affects the psychology of the participants. Another key conclusion related to the question of whether any medication has been given, the largest percentage answered creams for external use and the next one is isotretinoin. Therefore, putting more emphasis on the main question of the research which was acne, whether it can cause depression, we concluded that a greater percentage of responses were in the middle, and a strong correlation based on this result is that a larger percentage of people answered that they did not experience a depressed mood due to acne, but an equally large percentage answered that acne negatively affected the participants' psychology.

Although acne was directly associated with depression in our literature, our questionnaire survey did not show any to indicate it. The majority of the participants suffer from moderate acne and the medication they were given was mostly creams for external use and not pills for oral use with some strong active substance. The medication through the results of the research has not affected the psychology of the individuals, however the appearance of acne, based on the image it brings to their face and body, seems to have greatly affected their psychology. The participants answered that they are not satisfied with their appearance due to the problem of acne. Based on the second questionnaire to assess depression, it was shown that people suffering from acne experience feelings of infer the results we collected from our personal research were above, from people with moderate acne who were not given strong acne pills, but only creams for external use. So, the medication that was administered to the majority of the participants did not have such a strong effect on the person's psychosis. This could be a possible explanation for the non-correlation of our research results from the literature above. Isotretinoin, which is the substance contained in pills to combat the severe form of acne, appears through reports and research in the literature review above, that it can cause depression and psychological disorders.

7 Conclusion

The purpose of this research paper is the processing of data and the discussion of bibliographic data. We achieve this through the survey questionnaire carried out through sampling. Acne is a skin disease where it occurs in mild, moderate or severe form where most answered that they went through moderate form and depression is a health problem that may exist from the past, apart from this above topic where we investigated the answers through of questionnaire sampling of 144 people where the result is, acne has been found to affect depression. Acne is more common in women than in men, several participants answered that people who have acne also have increased levels of stress due to their external appearance and thus affects the psychological field of the person. Several of the participants used an over-the-counter medication but then visited a specialist to help them get rid of their acne problem. Most answered that they used creams for external use and that it has appeared on the face area. Most answered that they did not itch at all and very few quite often. Pain was answered by most of them not at all and very

few quite often. Very few reported feelings hot quite often and most did not respond at all. Dryness most answered not at all and very few quite often.

In addition to the question of whether the participants have visited a specialist to get rid of the acne problem, the largest percentage answered positively, which means that the participants acted immediately to deal with the acne regardless of its severity. We have analyzed various questions as the effect of medication on the functioning of the individual's psychology has been highlighted. The above-mentioned high correlations support that the occurrence of acne has negatively affected the psychology of the individual and the presentation of depressed mood due to acne is strong with high correlation rates, 0.618%. Also, acne is a skin disorder in a condition that can affect a person's long-term psychological functioning. It can also be the root cause of many other problems that were previously completely unrelated. Depression can be caused by an earlier situation such as bullying. People's expectations should be recognized and they should be able to address their psychological needs through a few visits from psychologists. A multidisciplinary approach consisting of a dermatologist, psychiatrist, psychologist and aesthetician in an interface clinic could be beneficial for optimal acne care and quality of life for patients. It would be good before the start of medication for the patient to be monitored by a specialist, a psychologist, to guide him in the management of the person's psychology. but also, to supervise him during the treatment so that the patient can be able to be aware of himself and the management of his thoughts.

In conclusion, the above results have been analysed for this research and we concluded that acne can affect the psychological field of the person but we did not conclude if it can cause depression because the answers to the question of whether people present a depressed mood the answer was negative to the question however, if acne affects the psychology of individuals, the answer was positive, which means that acne can sensitize the individual in the emotional field of the patient and can act as an obstacle in social contacts and end up in mood disorders of various seriousness. The acne lesions left on the face posed a problem for patients and compromised self-perception of attractiveness. It is worth noting that for more accurate results we could add another research method within the questionnaire so that we can focus on our main question, that is, what is the medication that the person is receiving and based on the medication what are the side effects of each person in his health or his appearance and how this affects him every day.

In conclusion, the purpose of this thesis was to investigate the correlation of acne with depression and the effect of acne on the psychology of each person and to aim for people who are experiencing acne to have a treatment plan, the combination of a dermatologist, beautician and psychologist would be the most correct interdisciplinary approach to improve the problem of acne but also for the better quality of life of the patients.

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