

How to Cite:

Kamel, H. M. H., Abdel-Mohesen, A. S., Gomaa, A. A.-A., & Mahmoud, M. T. (2022). Risk factors of acne vulgaris in preparatory school students in Fayoum City. *International Journal of Health Sciences*, 6(S4), 10686–10699.
<https://doi.org/10.53730/ijhs.v6nS4.11379>

Risk factors of acne vulgaris in preparatory school students in Fayoum City

Hind Magdy Hashim Kamel

Nursing Teacher at Tamia Secondary Nursing School- El Fayoum

Afaf Salah Abdel-Mohesen

Professor of Community Health Nursing Faculty of Nursing- Helwan University.

Amany Abdel-Aziz Gomaa

Assistant Professor of Community Health Nursing Faculty of Nursing – Fayoum University

Mayada Taha Mahmoud

Assistant Professor of Community Health Nursing Faculty of Nursing- Helwan University

Abstract--Background: Acne vulgaris is a multifaceted skin defect. It is the most popular skin disease, and it usually appears among preparatory school students. Aim: was aimed to assess risk factors of acne vulgaris in preparatory school students in Fayoum City. Research Design: A descriptive research design was used in this study. Setting: The current study was conducted in 49 preparatory schools in Fayoum City. Sample: A purposive sample was used to select 400 students diagnosed with acne vulgaris. Tools: the investigator used one tool: An interviewing questionnaire which consists of four parts, patients socio-demographic data, Assess family past history and past medical history of preparatory school students diagnosed with acne vulgaris, preparatory students' knowledge regarding acne vulgaris, and risk factors that lead to acne are divided into hormonal factors, diet habits, hygiene habits, use of cosmetics products, sun exposure, and another habit. Results: This study showed, 48.5% of studied preparatory school students were in the age group 15 years, 65.0% of them were females, 40.25% of preparatory school students had average knowledge and 53.2% and 51.8% of students had a high level of risk factors about acne vulgaris related to hormonal factor and sun exposure factor. Conclusion: There was a significant relationship between sexes with total risk factor levels. Recommendations: Periodic health education for community health nurses and school nurses about acne vulgaris.

Keywords---acne vulgaris, risk factors acne vulgaris, preparatory school students.

Introduction

The term acne is derived from the Greek word "acme" from the writings of Aetius Amidinos. The word "acne" has the meaning of a skin eruption, and "Vulgaris" means "common." (*Allayali et al., 2017*). Acne vulgaris is an inflammatory defect of the sebaceous capillary unit, which operates in a chronic course and limits on its own. Acne is caused by propionibacterium acne in preparatory school students, under the influence of normal diffuse Dihydroepiandrosterone (DHT). It is a very common skin disorder that can present with inflammatory and non-inflammatory lesions (*Sutaria et al., 2020*).

Preparatory school age is usually seen as a pivotal period in psychosocial development, with an increase in self-control, independence, and self-confidence. This stage is critical in the formation of self-concept from a psychological point of view, as risk attitudes, sensitivity to peer influence, and the ability to understand others' points of view change dramatically. Health problems can exacerbate this, including in the case of skin disease to alter the appearance at a time when a student's "self-image" is already at risk (*De Vere Hunt et al., 2020*).

(AV) related many factors as genetics factors that acne vulgaris occur with people more relatives and related implication of a lot of genes, hormones (sex hormones) such as androgens, testosterone, (DHT) and Dehydroepiandrosterone (DHEA) which affect the occurrence of acne during preparatory school age, the menstrual cycle that is lead to the growth of the skin follicle glands, production of excessive oily sebum, emotional stress, diet habits and cosmetics (*Monib et al., 2020*).

(AV) is a long-term condition that can have lasting physical and psychological effects. Patient education is crucial to improving treatment adherence. Up to a third of those affected will require medical intervention to prevent irreversible scarring. Community health nurses play an important role in the promotion of the highest possible quality of life and wellness of preparatory school students with acne vulgaris throughout life span through applying the three-level of prevention in addition to different roles such as nursing care role, education, and counseling role, research role advocate role, referral role, case finder role and manager role (*Patidar et al., 2021*).

Significance of the study

The prevalence of acne vulgaris in preparatory school students (2019) in Damietta Governorate, Egypt was 23.5%. Females significantly reported acne more frequently than males (51.9% vs. 48.1%). Acne is one of the most common skin diseases and includes a great effect on the quality of life among adolescents attending preparatory schools (*Elawady et al., 2020*).

Aim of the study

The study aims to assess risk factors of acne vulgaris in preparatory school students in Fayoum City through:

1. Assessing preparatory school students' knowledge regarding acne vulgaris.
2. Assessing risk factors of acne vulgaris in preparatory school students.
3. 3-Assessing relation between socio- demographic characteristics and risk factors of acne

Research Questions

1. What is preparatory students' knowledge regarding acne vulgaris?
2. What are the risk factors of acne vulgaris in preparatory school students?
3. What is the relation between Scio-demographic characteristics and risk factors of acne vulgaris?

Research design

A descriptive research design will be used for carrying out this study.

Research setting

Subjects of the study

A purposive sample was used in this study to choose 400 students diagnosed with acne vulgaris that represent from 36114 that constitute the total number of preparatory school students in Fayoum city. Yamane (1967) provides a simplified formula to calculate sample size 95% confidence level and P=0.05 are assumed for equation

$$n = \frac{N}{1 + N(e)^2}$$

Where: N=Total population, n= sample size, e=level of precision =0.05

$$n = \frac{36114}{1 + 36114(0.5)^2}$$

$$n = \frac{36114}{90.287} = 399, 9 \approx 400 \text{ students from 49 preparatory schools}$$

Tools of data collection

An interviewer questionnaire form: The questionnaire sheet was designed by the investigator and translated into Arabic form to avoid misunderstanding divided into four parts:

Part I: Socio-demographic characteristics

Socio-demographic characteristics of study sample such as; age, sex, school name, address, and father's economic state.

Part II: Family past history and past medical history of preparatory school

Part III: preparatory student's knowledge regarding acne vulgaris

Scoring system for knowledge

Knowledge contents included (9) closed-ended questions. Each question was scored as follows: The correct and complete answers were scored (2), the correct and incomplete answers were scored (1) and the incorrect answers and not answered questions were scored (zero). The total score of questions related to the knowledge of students was 18 marks which represent 100%.

The total level of students' knowledge regarding acne vulgaris was categorized as the following:

- Poor knowledge $< 60\%$ ($0 < 11$)
- Average knowledge $60 < 75\%$ ($11 < 13.5$)
- Good knowledge $75 \leq 100\%$ ($13.5 \leq 18$)

Part III: Risk factors that lead to acne are divided into

Hormonal factors

composed (6) closed questions such as places that student's noticed hair in their body, period go down for females students, period came regularly for you, the acne was appeared from 2-6 days before the onset of your period and stress increased with menstruation approached.

Scoring system for hormonal factors

Hormonal factors composed (6) closed-ended questions. Each question was scored as follows: question answered YES, was given a score (one) and NO was given (Zero). The total score of questions related to hormonal factors was 6 marks which represent 100%. The total level of hormonal factors regarding acne vulgaris was categorized as the following:

- Low level $< 60\%$ ($0 < 3.6$)
- Moderate level $60 < 75\%$ ($3.6 < 4.5$)
- High level $75 \leq 100\%$ ($4.5 \leq 6$)

All habits are composed of 23 questions divided as the following:

- Diet habits
- Hygiene habits
- Using of cosmetics products
- Sun exposure
- Another habits

Each question was answered by always= (3), often= (2), sometimes = (1), rarely = (0)

Total scoring system regarding risk factors of habits about acne vulgaris

The total score regarding all risk factors of habits domains is 69 marks which represent 100%. It was divided into high, moderate, and low-level risk factors. Total risk factors habits level regarding acne vulgaris was considered:

- low level equals or less than 60% ($0 < 42$)
- Moderate level was 60% < 75% ($42 < 52$)
- High level equals or more 75% ($52 \leq 69$)

Scoring system regarding (total risk factors)

such as hormonal risk factors and risk factors of habits about acne vulgaris. Hormonal risk factors are composed of (6) questions and risk factors of habits about acne composed of (23) questions, total questions 29 items. The total score regarding all risk factors of habits domains is 75 marks which represent 100%. It was divided into high, moderate, and low-level risk factors. Total risk factors habits level regarding acne vulgaris was considered:

- low level equals or less than 60% ($0 < 45$)
- Moderate level was 60% < 75% ($45 < 56$)
- High level equals or more 75% ($56 \leq 75$)

Validity

Tools are submitted to a panel of three experts reviewers and experts of community health nursing from Helwan University; they examined and reviewed the tools for the face and content coverage, clarity, length, and formatting of tools, redesigning and modifications were done according to panel recommendation.

Reliability

Testing the reliability of proposed tools was done by using Cronbach alpha coefficient test, as reliability of knowledge was 0.824, reliability of risk factors was 0.746.

Pilot study

The pilot study was carried out on 10% of cases that represented about 40 preparatory school students, to ensure clarity and determine the time required to complete data collection tools. According to the result of the pilot study, no modifications were needed. So they were included in the actual study sample.

Ethical considerations

The study protocol was approved by the pertinent ethical committee at the faculty of nursing Helwan University, permission obtained from each student before participating in the study and after giving them brief information about the aim of withdrawal from the study at any time, also reassure that the confidentiality of all information will be collected and will be used only for the purpose of this study.

Fieldwork

The actual field work started from April 2021 until June 2021 for data collection for period of three months, the investigator visited the included schools, two days weekly in period of time from 9: am to 12: pm. The investigator firstly explains and clarify the aim of the study and components of the tool to the school director, then for the school supervisor, school nurse class teacher, and for students included in the study to gain their support and to be aware of the study's importance, with the selected class from each school and asked them to answer individually to all questions. The investigator interviewed about 50-60 students/day from preparatory schools in the school nurse office and the investigator met students in the time of break and avoided time lectures of subjects. Time taken to fill the study tool ranged from 10:20 minutes on an individual basis to be filled depending on the degree of understanding and response of students.

Statistical analysis

Data analysis was performed using IBM SPSS Statistical software version 24. The data were explored. Descriptive statistics were used for continuous variables [mean and standard deviation [SD] and frequency for categorical variables. Correlation coefficient (r) Pearson was used to evaluate the association between studied variables. A significance level value was considered when $p\text{-value} \leq 0.05$.

Statistical design

Result

Table (1): Shows that 48.5% of studied preparatory school students were in the age group 15 years, the mean age of preparatory school students 14.52 ± 2.14 years, While, the studied preparatory school student's sex were 65.0% females. Regarding economic status of students' parents 75.7 % of them had sufficient income and save.

Table (2): shows that total knowledge of preparatory school students, 28.25 % of students had good knowledge, 40.25 % had average knowledge, 31.5% of students had poor knowledge, and the mean of total knowledge was 8.61 ± 2.86 .

Table (3): Demonstrates that total risk factors level for males students, 45.0% was high level, 15.7% was moderate level, 39.3% was low level and mean was 33.96 ± 8.52 , total risk factors level for females students, 61.2% was high level, 23.8% was moderate level, 15.0% was low level and mean of total risk factors was 39.99 ± 5.61 . Students Regarding their Total Risk Factors

Table (4): Shows that there was a significant relationship between sex with total risk factor level while age and economic status didn't have a significant relationship with total risk factor level.

Table (5): This shows that there was a significant relationship between total hormonal factors, total dietary habits, total hygiene habits, total using cosmetics products, and anthers habits with the severity of acne while total sun exposure didn't have a significant relationship with severity of acne.

Table (1): Frequency Distribution of Studied Students Regarding Their Socio-Demographic Characteristics (N=400)

Items	Studied students (N=400)	
	No.	%
Age in years		
▪ 11> 13	46	11.5
▪ 13>15	160	40.0
▪ 15	194	48.5
Mean ± SD.	14.52±2.14	
Sex		
▪ Male	140	35.0
▪ Female	260	65.0
Economic status of student's parents		
▪ sufficient and save	303	75.7
▪ sufficient	41	10.3
▪ Insufficient	56	14.0

Table (2): Frequency Distribution of Studied Students Regarding Their Total Knowledge

Items	Studied students (N=400)			
	no	%	Mean ±SD	Min -Max /Range
Total knowledge				
Good	113	28.25	8.61 ±2.86	0-16/16
Average	161	40.25		
Poor	126	31.5		

Table (3): Frequency Distribution of Studied Students Regarding their Total Risk Factors

Items	No	%	Mean ±SD	Min -Max /Range
Total risk factor for males (n=140).				
High	63	45.0	33.96 ±8.52	19-49/30
Moderate	22	15.7		
Low	55	39.3		
Total risk factor for females (n=260).				
High	159	61.2	39.99 ±5.61	29-53/24
Moderate	62	23.8		
Low	39	15.0		

Table (4): Statistically Relation between Total Risk Factor Level and Students Personal Characteristics

Items	Total risk factor level						X ²	p-value
	Low (n=159)		Moderate (n=62)		High (n=179)			
Age in years of students								
	No	%	No	%	No	%		
▪ 11>13	20	12.6	9	14.5	17	9.5	56.32	.228
▪ 13>15	59	37.1	19	30.6	82	45.8		
▪ 15	80	50.3	34	54.9	80	44.7		
Sex								
▪ Male	0	0.0	0		140	78.2	265.92	.000**
▪ Female	159	100	62		39	21.8		
Economic status								
▪ sufficient and save	123	77.4	53		127	70.9	6.214	.184
▪ sufficient	14	8.8	5		22	12.3		
▪ Insufficient	22	13.8	4		30	16.8		

Statistical significant $p < 0.05$

Table (5): Liner Regression of Risk Factors and Severity of Acne among Studied Student

Items	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.954	.638		3.061	.002
Total hormonal	5.423	.501	.512	5.981	.000**
Total dietary	2.017	.194	.147	3.884	.001**
Total personal hygiene habits	3.006	.352	.024	5.163	.000**
Total using cosmetic	2.052	.475	.136	3.112	.002*
Total sun exposure	.086	.764	.090	1.134	.257
Total other habits	2.033	.681	.036	4.475	.000**

Statistical significant $p < 0.05$

Discussion

(AV) is the most common skin condition affected preparatory school students, most likely due to elevated androgen levels during preparatory school students. Androgens stimulate and enlarge the sebaceous glands and keratinocytes, resulting in increased production of sebum and abnormal hyper proliferation of keratinocytes which lead to the formation of acne lesions (Dhurat et al., 2021).

Regarding socio demographic characteristic of preparatory school students with acne vulgaris, the present study finding showed that the mean \pm SD of age is 14.52 ± 2.14 , this study was in the same direction with Monib et al., (2020) who conducted a published study in Egypt under the title of "Risk Factors for Acne Vulgaris Development" and cleared that mean age of preparatory school students participant study was 14.9 ± 2.3 .

Concerning gender, the current study showed that two thirds of studied subjects were females, this findings agreement with Faheim et al., (2021) who conducted a published study in Egypt under title of "Effect of Educational Guideline on Performance and Attitude of Blind Adolescent Students Regarding Acne Vulgaris" and reported that less than two thirds (65%) of studied subjects were females. From the investigator point of view might be due to increased acne before menstruation

While these findings disagreement with Yang et al., (2020), who conducted a published study in China entitled " A Review of Advancement on Influencing Factors of Acne: An Emphasis on Environment Characteristics" and reported that more than half (51.30%) of studied subjects were males and less than half (49.65%) were females.

Related to economic status of students' parents, more than three quarters of studied subjects were economic status of their parents was sufficient and saved, this finding disagreement with study was done by Gabr et al., (2021), entitled as " Acne vulgaris among Egyptian secondary school Adolescents: Prevalence, Complementary Alternative Treatment and Impact on quality of Life " who reported that less than two thirds (65.6%) of students' parents had in sufficient income. From the investigator's point of view, it may be that sufficient income and saved for students' parents helped students went to a dermatologist for acne treatment.

Concerning total Preparatory Student's Knowledge Regarding Acne Vulgaris, the present study viewed that, more than two fifth of predatory school students had average knowledge regarding Acne Vulgaris. This result was similar to Albahloul et al., (2017) who reported that more than half (59. 1%) of studied subjects had average knowledge regarding acne vulgaris. These findings were not consistent with Mohamed et al., (2018) who reported that vast majority (91.1%) of studied subjects had poor knowledge about acne vulgaris.

Regarding relation between total risk factor level lead to acne and students personal characteristics, these results showed that, there were statistically significant relationship between total risk factors and sex; while there was no statistically significant relation between total risk factors and age and economic status. This results agreement with Hassan et al., (2019) entitled "" who reported that there was statistically significant relationship between total risk factors lead to and sex but there was no statistically significant relation between total risk factors lead to and age and economic status.

Regarding relation between total hormones and severity of acne, these results showed that there were significant relation between total hormones and severity

of acne, these results agreement with Shrestha S., (2018) who reported that there were significant relation between total hormones and severity of acne ($p= 0.066$). From investigator point of view without high estrogen, androgens increase sebum production, which leads to increased pore clogging and a habitable environment for *P. acnes*.

This study showed that there were significant relation between total dietary habits and severity of acne, this results disagreement Kaminsky et al., (2019) entitled "Large prospective study on adult acne in Latin America and the Iberian Peninsula: risk factors, demographics, and clinical characteristics with " who reported that no statistically significant relationship between total dietary habits and severity of acne ($P = 0.114$).

Regarding relation between total using cosmetics products and severity of acne, this study showed that there were significant relation between total using cosmetics products and severity of acne ,these results agreement with Mahmoud et al., (2019)who reported that there were significant relation between total using cosmetics products and severity of acne ($p < 0.05$).

Also, this results agreement with Perera et al., (2018) entitled "Relationship between acne vulgaris and cosmetic usage in Sri Lankan urban adolescent females" who reported that there were significant relation between total using cosmetics products and severity of acne ($P < 0.001$). In the same line these results agreement with Kaminsky et al., (2019) who reported that that there was significant relation between total using cosmetics products and severity of acne. From investigator point of view when sharing makeup and tools, those acne-causing culprits can spread to your skin, leading to new breakouts

Concerning relation between total sun exposure and severity of acne, this study showed that there were no significant relation between total sun exposure and severity of acne ,this study agreement with Heng et al., (2020) entitled "Systematic review of the epidemiology of acne vulgaris" who reported that were no significant relation between total sun exposure and severity of acne.

Concerning relation between total personal hygiene habits and severity of acne, this study showed that there were significant relation between severity of acne and total personal hygiene habits as frequent face washing through the day, this results agreement with Hastuti et al., (2019) who reported that were significant relations between frequent face washing through the day and severity of acne. Also, this study showed that there were significant relation between severity of acne and total personal hygiene habits as use facial cleansers for the skin, these results agreement with Huang et al .,(2019) who reported that were significant relations between frequent face washing through the day and severity of acne ($P= < .001$).

Regarding relation between excessive sweating during exercise and acne severity, this study showed that there was significant relation between severity of acne and excessive sweating during exercise, this results agreement with Zari et al., (2017) entitled The association between stress and acne among female medical students in Jeddah, Saudi Arabia who reported that there was significant relation between

severity of acne and excessive sweating during exercise ($p = >0.05$). From investigator point of view sweat can lead to clogging of pores and sweating of skin may keep acne-causing bacteria in place.

Regarding relation between another risk factors and severity of acne as sleep enough through day, suffer from constipation, use electronic devices a lot as computer \ Mobil and use social media. Concerning relation between severity of acne and sleep enough through day, this study showed that there was significant relation between severity of acne and sleep enough through day, this study agreement with Harlim A., (2020) who reported that there was significant relation between severity of acne and sleep enough through day. From point of view lack of sleep has been shown to cause stress in the body, which can spike cortisol. A spike in cortisol can then lead to inflammation and an increased production of sebum which results in clogged pores and eventually, breakouts

Regarding relation between use electronic devices a lot as using computers and severity of acne, this study showed that, there was significant relation between using computers a lot and severity of acne, this results agreement with Wei et al., (2020) entitled " The epidemiology of adolescent acne in North East China" who reported that there was significant relation between using computers a lot and severity of acne. From investigator point of view exposure to visible light on short wave from smartphones and tablets can increase the spread of staphylococcus aureus, which may lead to an increase severity of acne

concerning relation between constipation and severity of acne, this current study showed that there was significant relation between constipation and severity of acne, this study disagreement with Silverberg et al., (2019) entitled " Epidemiology and extra cutaneous comorbidities of severe acne in adolescence: a US population-based study "who reported that there was no significant difference between severity of acne and constipation. From investigator point of view constipation is also a symptom of poor gut health and gut-related conditions like small intestinal bacterial overgrowth. When students had an imbalance of gut bacteria, inflammation, or gut permeability that is lead to increase severity of acne.

Regarding relation between use social media and severity of acne, this study showed that there was significant difference between use social media and severity of acne, this study disagreement with Kaliyadan et al., (2021) who reported that there was significant difference between use social media and severity of acne ($p=0.147$). From investigator point of view preparatory school students had acne used social media for finding treatment for acne and some friends suggested wrong treatment that was effected on severity of acne.

Conclusion

Based on the results of the present study and research question the following conclusion includes: Preparatory school students with acne vulgaris had average knowledge about acne vulgaris; there was a significant relationship between sexes with total risk factor level. There was a significant relationship between total risk factors level and student's family history of acne vulgaris and there was a

significant relationship between the type of skin, total hormonal factors, total dietary habits, total hygiene habits, total using cosmetics products, and anthers habits with the severity of acne.

Recommendations

Based on the results of the present study and research question the following recommendations are suggested:

- Give health education for preparatory school students with acne vulgaris, parents and teachers about the spectrum of the problem, its complications, allow preparatory school students to seek help and not to be embarrassed as it's a common finding in their age and during their development; and to support students emotionally and to minimize their stress regarding acne vulgaris and increase their knowledge about acne and risk factors of acne.
- The study also recommends school nurses not only waiting for complains from students, as some of them may feel embarrassed by the question, but also going to their classes periodically, doing a quick check, reminding them of the nature of the disease, its spread, the ability of treatment and transferring the affected cases to the school clinic for more accurate examination and management.
- Apply further research in other setting for generalization.

Reference

- Allayali, A. Z., Asseri, B. N., AlNodali, N. I., Alhunaki, R. N. M., & Algloblan, S. F. G. (2017): Assessment of prevalence, attitude, and psychosocial Impact of Acne vulgaris among medical students in Saudi Arabia. *J Clin Exp Dermatol Res*, 8, 4.
- Chanana, M. (2018). Empirical study: relationship between self efficacy and academic performance. *International Journal of Health & Medical Sciences*, 1(1), 28-34. <https://doi.org/10.31295/ijhms.v1n1.36>
- De Vere Hunt, I. J., Howard, E., & McPherson, T. (2020): The impact of chronic skin disease in adolescence and the need for specialist adolescent services. *Clinical and experimental dermatology*, 45(1), 5-9.
- Dhurat, R., Shukla, D., Lim, R. K., Wambier, C. G., & Goren, A. (2021): Spironolactone in adolescent acne vulgaris. *Dermatologic Therapy*, 34(1), e14680.
- Faheim, S. S., & Hegazy, S. M. A. (2021): Effect of Educational Guideline on performance and attitude of Blind Adolescent Students Regarding Acne Vulgaris. *Tanta Scientific Nursing Journal*, 21(2), 121-142.
- Gabr, H. M., Al-Batanony, M. A., & Soliman, S. S. (2021): Acne Vulgaris among Egyptian Secondary School Adolescents: Prevalence, Complementary Alternative Treatment and Impact on Quality Of Life. *Egyptian Journal of Community Medicine*, 39(1).
- Harlim, A. (2020): The Relationship between Sleep Quality and Students' Acne Vulgaris Severity at Medical Faculty Universitas Kristen Indonesia. *Journal of Advanced Research in Dynamical and Control System*.

- Hassan, R. A., Nofal, A. A., & Hussin, N. N. (2019): Prevalence and Risk Factors of Acne Vulgaris in Adolescents in Belbis City, Sharkia Governorate, Egypt: A Cross-Sectional Study. *The Egyptian Family Medicine Journal*, 3(1), 1-14.
- Hastuti, R., Mustifah, E. F., Alya, I., Risman, M., & Mawardi, P. (2019): The effect of face washing frequency on acne vulgaris patients. *Journal of General-Procedural Dermatology and Venereology Indonesia*, 35-40.
- Heng, A. H. S., & Chew, F. T. (2020): Systematic review of the epidemiology of acne vulgaris. *Scientific reports*, 10(1), 1-29.
- Huang, X., Zhang, J., Li, J., Zhao, S., Xiao, Y., Huang, Y., & Shen, M. (2019): Daily intake of soft drinks and moderate-to-severe acne vulgaris in Chinese adolescents. *The Journal of pediatrics*, 204, 256-262.
- Journal of Nursing Education and Research*, 9(1), 54-56.
- Kaliyadan, F., Alsultan, H. A., & Alsaqer, H. S. (2021): The effect of social media on treatment options for acne vulgaris. *IJMDC*, 5, 140-145.
- Kaminsky, A., Florez-White, M., Bagatin, E., Arias, M. I., & Iberian Latin American Acne Studies Group (GILEA-Grupo Ibero-Latinoamericano de Estudio del Acne). (2019): Large prospective study on adult acne in Latin America and the Iberian Peninsula: risk factors, demographics, and clinical characteristics. *International journal of dermatology*, 58(11), 1277-1282.
- Mahmoud, A. M., Hamed, A. F., Hegazy, E. M., & Sadek, E. A. (2019): Prevalence rate, risk factors of acne vulgaris and its impact on the quality of life among teen-agers in Qena city, Upper Egypt. *SVU-International Journal of Medical Sciences*, 2(1), 10-18.
- Mohamed, A., Ibrahim, H., El Magrabi, N., & El-aty, A. (2018): KNOWLEDGE AND ATTITUDE OF ADOLESCENT STUDENTS ABOUT ACNE VULGARIS AT SECONDARY SCHOOLS IN ASSIUT CITY. *Mansoura Nursing Journal*, 5(2), 27-36.
- Monib, K. M., Salem, R. M., Alfallah, A. A., & EL-Sayed, S. E. (2020): Risk Factors for Acne Vulgaris Development. *Benha Journal of Applied Sciences*, 5(5 part 2), 5.
- Patidar, D., Patidar, K., & Dabhi, H. (2021): A Study to assess the effectiveness of Structured Teaching Programme on knowledge regarding prevention on Acne vulgaris among the adolescents at selected high schools of Mehsana City. *International*
- Perera, M. P. N., Peiris, W. M. D. M., Pathmanathan, D., Mallawaarachchi, S., & Karunathilake, I. M. (2018): Relationship between acne vulgaris and cosmetic usage in Sri Lankan urban adolescent females. *Journal of cosmetic dermatology*, 17(3), 431-436.
- Shrestha, S. (2018): Correlation of hormonal profile and lipid levels with female adult acne in a tertiary care center of Nepal. *Journal of Nepal Health Research Council*, 16(2), 222-227.
- Silverberg, J. I., & Silverberg, N. B. (2019): Epidemiology and extracutaneous comorbidities of severe acne in adolescence: a US population-based study. *British Journal of Dermatology*, 170(5), 1136-1142.
- Suryasa, I. W., Rodriguez-Gámez, M., & Koldoris, T. (2021). Health and treatment of diabetes mellitus. *International Journal of Health Sciences*, 5(1), i-v. <https://doi.org/10.53730/ijhs.v5n1.2864>
- Sutaria, A. H., Masood, S., & Schlessinger, J. (2020): Acne vulgaris. *StatPearls*[Internet].

- Wei, B., Pang, Y., Zhu, H., Qu, L., Xiao, T., Wei, H. C., & He, C. D. (2020): The epidemiology of adolescent acne in North East China. *Journal of the European Academy of Dermatology and Venereology*, 24(8), 953-957.
- Yamane T., (1967): *Statistics, An Introductory Analysis*, 2nd ed. New York: Harper and Row, Chapter 7, P. P., 190: 192.
- Yang, J., Yang, H., Xu, A., & He, L. (2020): A Review of Advancement on Influencing Factors of Acne: An Emphasis on Environment Characteristics. *Frontiers in public health*, 8, 450.