

April 2021

## KNOWLEDGE AND BELIEFS OF ADOLESCENTS ABOUT ACNE: BASELINE AND POST-INTERVENTION ASSESSMENTS USING AN INTERACTIVE EDUCATIONAL TOOL

Mohammed Mehanna

*Assistant Professor, Faculty of Pharmacy, Beirut Arab University, Beirut, Lebanon, mmhanna@bau.edu.lb*

May Saab

*Assistant Professor, Faculty of Pharmacy, Beirut Arab University, Beirut, Lebanon,  
saabk.may79@bau.edu.lb*

Follow this and additional works at: <https://digitalcommons.bau.edu.lb/hwbjournal>



Part of the [Health and Physical Education Commons](#), and the [Public Health Education and Promotion Commons](#)

---

### Recommended Citation

Mehanna, Mohammed and Saab, May (2021) "KNOWLEDGE AND BELIEFS OF ADOLESCENTS ABOUT ACNE: BASELINE AND POST-INTERVENTION ASSESSMENTS USING AN INTERACTIVE EDUCATIONAL TOOL," *BAU Journal - Health and Wellbeing*: Vol. 3: Iss. 2, Article 3.

DOI: <https://doi.org/10.54729/2789-8288.1127>

This Article is brought to you for free and open access by the BAU Journals at Digital Commons @ BAU. It has been accepted for inclusion in BAU Journal - Health and Wellbeing by an authorized editor of Digital Commons @ BAU. For more information, please contact [journals@bau.edu.lb](mailto:journals@bau.edu.lb).

---

# KNOWLEDGE AND BELIEFS OF ADOLESCENTS ABOUT ACNE: BASELINE AND POST-INTERVENTION ASSESSMENTS USING AN INTERACTIVE EDUCATIONAL TOOL

## Abstract

*Acne vulgaris is a common inflammatory skin condition affecting teenagers around the globe. Lack of knowledge and false beliefs about acne are factors contributing to non-adherence to acne treatment that would result in treatment failure. Since acne is a highly prevalent skin condition in Lebanon, educating Lebanese adolescents about acne is vital to achieve a better treatment outcome. The aim of the present study is to assess the baseline knowledge of a sample of Lebanese adolescents using a self-administered questionnaire, and increase the level through an educational intervention (interactive audio-visual presentation). The knowledge score was assessed before and after the educational session and the assessment was repeated after one month to test the participants' retention of information. The results showed that the socio-demographic variations among individuals and the different sources of their information had no statistically significant effect on the knowledge score of participants ( $p > 0.05$ ) that was  $54.05 \pm 12.43\%$  at baseline. The knowledge score after conducting the educational session improved significantly by 39% ( $p$*

## Keywords

Acne, adolescents, education, knowledge

## 1. INTRODUCTION

Acne vulgaris is a common skin problem affecting around 80% of adolescents (Al Mashat, Al Sharif, & Zimmo, 2013; Hulmani, Bullappa, Kakar, & Kengnal, 2017). It is a chronic inflammatory condition of the pilosebaceous glands, that is manifested by the appearance of comedones, papules, pustules, and even cysts and nodules in severe cases, that would occasionally lead to scarring (Gollnick, Finlay, & Shear, 2008; L.E. Barnes, M.M. Levender, A.B. Fleischer, 2012). This skin condition is not considered a life threatening disease, however, it has a negative impact on adolescents quality of life; it may lead to depression, anxiety, and lowering their self-esteem (Augustin, Reich, Schaefer, Zschocke, & Rustenbach, 2008; Dréno, 2006; L.E. Barnes, M.M. Levender, A.B. Fleischer, 2012). Moreover, acne can affect social, professional and academic performance of individuals (Niemeier, Kupfer, & Gieler, 2006).

Successful management of acne depends on many factors, including accurate diagnosis and appropriate treatment. Nevertheless, patient non-adherence is the main reason of treatment failure (Baldwin, 2006). There are several approaches in order to overcome non-adherence. It includes the selection of a treatment regimen that would take into account the patient's preference, educating patients on how to use their medications, addressing patients expectations and limitations of treatment, and dispelling false beliefs about acne (Tuchayi, Alexander, Nadkarni, & Feldman, 2016). One of the most common misconception concerning acne management is that all oral contraceptives are effective in acne treatment (Taalsiewicz, Odłakowska, & Szczerkowska-Dobosz, 2012). Moreover, despite that topical drugs (i.e. benzoyl peroxide, tretinoin, clindamycin) were used extensively by acne patients, the lack of adequate knowledge about its properties and use led to undesirable side effects and failure of treatment (Tameez-ud-din et al., 2019). False beliefs have been also reported regarding the effect of hygiene on acne, as there was a wrong perception that frequent washing would improve acne (Al Mashat et al., 2013). Besides, the myth that diet is the main cause of acne is widespread among young population (Green & Sinclair, 2001).

A study conducted by Al Natour in Saudi Arabia found that there was a deficit in knowledge, and even wrong beliefs about acne vulgaris among adolescents (Al-Natour, 2017). Moreover, a study conducted in Turkey revealed that there was a high prevalence of acne vulgaris, yet, there was a lack in knowledge about this dermatological condition and its treatment options which necessitated education about its effective treatments and complications (Uslu et al., 2008). In Lebanon, a study conducted by Khattar et al. showed a high prevalence of acne vulgaris among young population (JA Khattar, Hamadeh GN, Rahi AC, 2010). Nonetheless, to our knowledge, there is no study regarding knowledge of Lebanese adolescents towards acne vulgaris, causes, predisposing factors and treatment. Therefore, the current work was conducted to assess the level of knowledge in a sample of Lebanese adolescents with respect to acne. Moreover, the researchers aimed to improve knowledge level of participants through the use of an educational tool and assess the degree of retention of the received information by participants over one-month period.

## 2. METHODOLOGY

### 2.1. Research design

This was a cross-sectional study conducted in Beirut Arab University (Beirut, Lebanon) among first level pharmacy students between March and April 2019. The protocol form of the study has been submitted to the institutional review board (IRB) committee, Beirut Arab University, Beirut, Lebanon, and it has been exempted with an IRB exemption number, 2020-H-0068-P-R-0409.

### 2.2. Sample size

Data was collected from 115 students, both males and females. Participants with incomplete data were excluded from the study. It should also be noted that the pharmacy curriculum at Beirut Arab University covers dermatological conditions and its treatments in

the fourth level. Hence, the enrolled students (first level) haven't yet acquire any specific medical information relevant to acne.

### 2.3. Data collection

Participants received a questionnaire (in English language) that was distributed by the researchers in person. The questionnaire was extracted from a previous study conducted by Koch et al. (Koch, Ryder, Dziura, Njike, & Antaya, 2008) with slight modification to match Lebanese community. It included twenty-six questions to assess baseline knowledge about acne vulgaris (Appendix). The questionnaire validity was assessed in the first step by three experts who checked for readability, comprehension, and reflection of the study purpose. In a second step, a pilot study was conducted on 15 participants representative of the studied sample, and according to the retrieved feedback, the questionnaire was modified. After filling the questionnaire, participants attended an audio-visual presentation in their classroom about acne vulgaris comprising interactive discussions as an educational intervention on acne knowledge. The designed educational tool contained accurate, updated, and appropriate information. The presented information was sufficient to answer all addressed questions in the survey. Subsequently, all enrolled participants completed a similar questionnaire to assess the effectiveness of the educational session. After one month, the questionnaire was again filled in person by the students to determine the degree of retention of information. The research team collected the data from the questionnaire, and then it was coded and fed into a personal computer.

### 2.4. Statistical analysis

Data were analyzed using the statistical Package for Social Sciences (SPSS) software version 23.0. Descriptive statistics were conducted on the studied variables, where the frequency of different categories was computed. Pearson's Chi square test was conducted to investigate any association between categorial variables (gender vs different variables). An independent samples t test was used to study the influence of variables on the students' knowledge level. Paired sample t-test analysis was also conducted to reveal the variation in the knowledge score before and after the educational session and if there is any change in the percentage knowledge score after 1 month. Results were considered statistically significant when  $p$  value was less than 0.05.

## 3. RESULTS

Among 115 students that were approached to take part in the survey, 97 decided to participate which represents 84.3% of subjects. Six did not complete the questionnaire after the educational session, resulting in a total of 91 final participants (79.1%). The socio-demographic data of the enrolled participants is illustrated in Table 1. More than 80% of the students were between eighteen and twenty years old, and 56 % of them were females.

Table 1: Socio-demographic data of participants

<b>Variables</b>	<b>Frequency</b>	<b>%</b>
<b>Gender</b>		
Male	35	38.5
Female	56	61.5
<b>Age</b>		
17	5	5.5
18	49	53.8
19	27	29.7
20	4	4.4
21	4	4.4
22	2	2.2

Data about acne information among participants are represented in Table 2. Prevalence of acne was found to be 67.1 % of the total sample, which was in agreement with a previous study conducted on medical students in Pakistan (69.9%) (Tameez-ud-din et al., 2019). Around half of participants (49.5%) had mild acne, 16.5 % had moderate case and only 1.1 % had severe acne.

Table 2: Information about acne among participants

<b>Variables</b>	<b>Frequency</b>	<b>%</b>
<b>Has a doctor ever seen you for your acne?</b>		
No	57	62.6
Yes	34	37.4
<b>Would more information about acne be helpful for you?</b>		
No	14	15.4
Yes	77	84.6
<b>How much do you know you feel about acne?</b>		
Nothing	5	5.5
A little	41	45.1
Some	41	45.1
A lot	4	4.4
<b>How severe is your acne today?</b>		
I do not have acne	30	33.0
Mild	45	49.5
Moderate	15	16.5
Severe	1	1.1
<b>How much does your acne bother you?</b>		
It does not bother me	38	41.8
It bothers me a little	33	36.2
It bothers me most of the time	15	16.5
It bothers me almost all the time	5	5.5

Among the 30 students (33%) which reported that they had no acne, none was bothered from his/her skin condition, whereas among the 45 students (49.5%) who had mild case, 7 (7.7%) were not bothered, 24 (26.4%) were little bothered, and only 12 (13.2%) and 2 (2.2%) were bothered most of the time and all the time, respectively (Table 3).

Table 3: The effect of severity of acne on the degree of bothering

Severity of acne	Bothering effect of acne							
	It does not bother me		It bothers me a little		It bothers me most of the time		It bothers me all the time	
	N	%	N	%	N	%	N	%
<b>No acne</b>	30	33.0	0	0.0	0	0.0	0	0.0
<b>Mild</b>	7	7.7	24	26.4	12	13.2	2	2.2
<b>Moderate</b>	0	0.0	9	9.9	3	3.3	3	3.3
<b>Severe</b>	1	1.1	0	0.0	0	0.0	0	0.0
<b>Total</b>	38	41.8	33	36.2	15	16.5	5	5.5

The association between the gender and how acne is perceived by participants is represented in Table 4. The results revealed insignificant association between gender and the need to visit the doctor, the severity of acne and even the degree of bothering ( $p$  value  $>0.05$ ). On the other hand, gender had a significant association with the need for more information about acne and the extent of knowledge as perceived by the participants ( $p$  value 0.028 and 0.014, respectively).

Table 4: The association between gender and different variables

	Frequency (%)		Chi -square	<i>p</i> value
	Gender			
	Male	Female		
<b>Have seen a doctor</b>				
Yes	10 (10.99)	24 (26.37)	1.878	0.189
No	25 (27.47)	32 (35.16)		
<b>Need more info. About acne</b>				
Yes	25 (27.47)	52 (57.14)	7.597	0.014
No	10 (10.99)	4 (4.39)		
<b>How much you know about acne</b>				
Nothing	5 (5.49)	0 (0)	9.102	0.028
A little	16 (17.58)	25 (27.47)		
Some	13 (14.28)	28 (30.77)		
A lot	1 (1.1)	3 (3.30)		
<b>Severity of acne</b>				
No acne	12 (13.19)	18 (19.78)	1.806	0.614
Mild	17 (18.68)	28 (30.77)		
Moderate	5 (5.49)	10 (10.99)		
Severe	1 (1.10)	0 (0)		
<b>Bothering effect</b>				
Not bothering	17 (18.68)	21 (23.08)	1.580	0.664
Bothering a little	10 (10.99)	23 (25.27)		
Bothering most of the time	6 (6.59)	9 (9.89)		
Bothering almost all the time	2 (2.20)	3 (3.30)		

The major source of information that participants have gained their knowledge from was internet (72.5%), followed by doctors (45%), friends (40.7%), relatives (35.2%), television programs (22%) and others such as school, patients, magazines, facialists, radio, newspapers and parents (Figure 1).

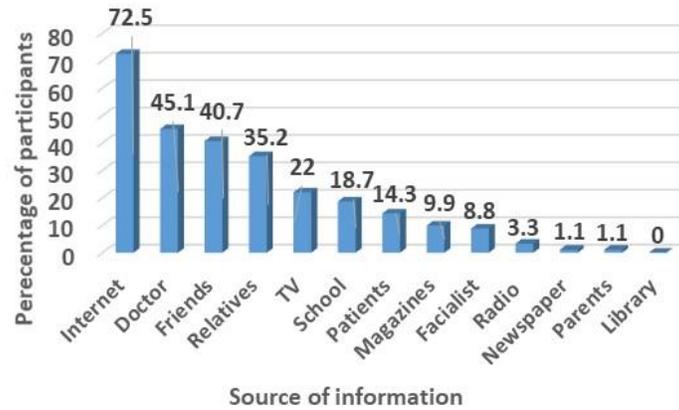


Fig.1: Various sources of information concerning acne as reported by the study participants

Students’ general knowledge about acne, including its causes, predisposing factors and mode of action of medications is demonstrated in Figure 2. The highest percentage of participants have answered correctly about the mode of action of antibiotics (83.52 %), followed by 60.4% who knew that acne is a disorder of the sebaceous follicle and 57.1% were aware that acne treatment needs more than one month to notice improvement. Less than 50 % of participants have answered correctly the rest of general questions, where the least percentage of students knew that bacteria are the main cause of acne (20.9%).

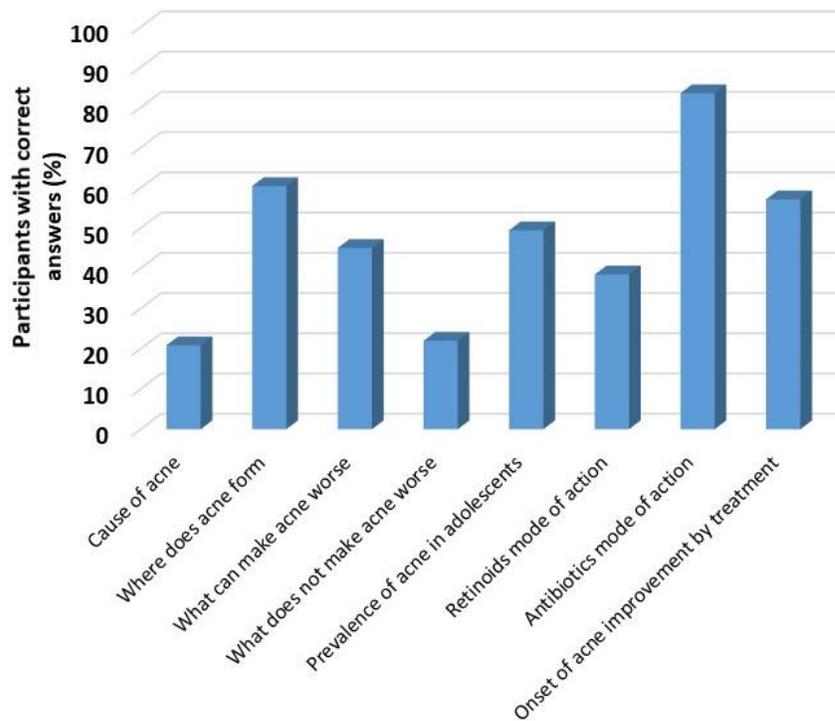


Fig. 2: Knowledge of participants about acne, causes, predisposing factors and mode of action of medications (expressed as percentage with correct answers)

Students' knowledge about acne management is demonstrated in Figure 3. More than 90% of participants have answered correctly the questions that are related to the effect of hormones on acne (93.41 %) and if some medications would aggravate acne (92.31 %). On the other hand, a low percentage of correct answers was recorded for the question addressing that acne blackheads are formed by dirt (15.38 %), and that suggesting that acne can be cured (5.49%).

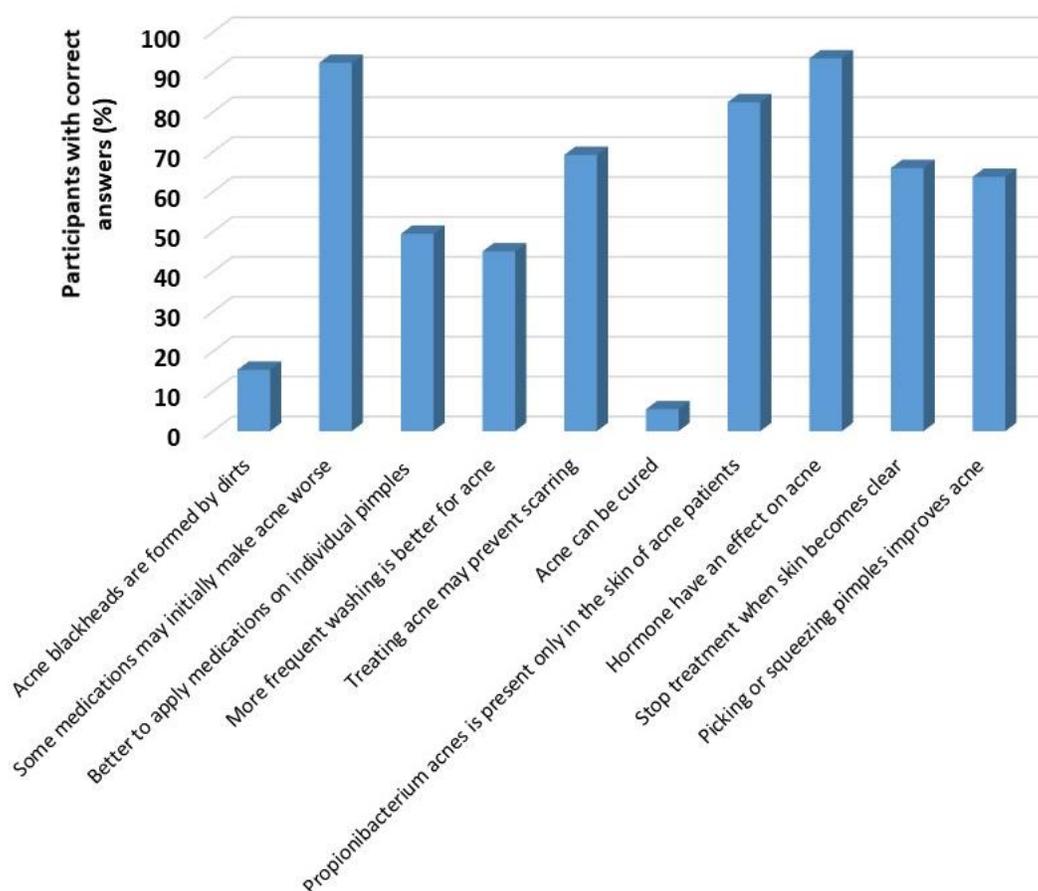


Fig. 3: Knowledge of participants about acne management (expressed as percentage with correct answers)

The mean percentage knowledge of the studied sample before the educational session, immediately after the session, and one-month post-intervention are illustrated in Figure 4. The mean percentage knowledge score at baseline was  $54.05 \pm 12.43\%$ . It should also be noted that the socio-demographic background (age and gender) and acne status and its impact on individuals (severity of acne and bothering effect) did not show any statistically significant effect on the percentage knowledge of participants, and neither did the variation in the source of information, recording a  $p$  value greater than 0.05 (data not shown). The percentage knowledge score after the educational session recorded an average of  $75.21 \pm 12.38\%$ , which was considered significantly higher than that of pre-intervention according to the paired sample t-test with a  $p$  value of 0.0001 (Table 5). After one-month post-intervention, the calculated score was  $72.59 \pm 12.58\%$  which isn't

significantly different ( $p=0.083$ ) when compared to that directly measured after the educational session (Table 5).

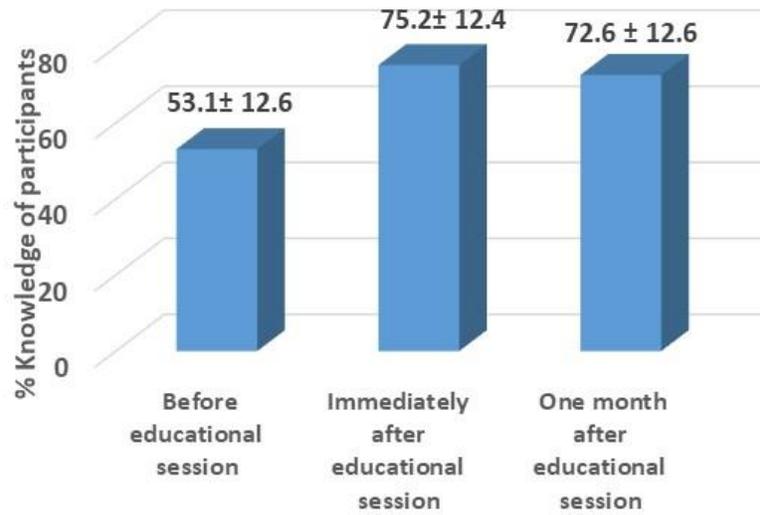


Fig. 4: Mean percentage knowledge of study participants at different time points of the study.

Table 5: The significance of the educational tool on the level of knowledge of participants

	Mean	Std. deviation	Std.Error Mean	95% confidence interval of the difference		t	df	Sig (2-tailed)
				Lower	Upper			
Knowledge score before & immediately after the educational session	-22.16	10.81	1.13	-24.41	-19.91	-19.55	90	0.0001
Knowledge score immediately after the educational session & one month later	2.63	14.28	1.49	-0.35	5.59	1.75	90	0.083

#### 4. DISCUSSION

Acne is a skin condition that is commonly perceived worldwide in adolescents (Ghanem, Mostafa, Abu Hamamda, & Khmour, 2020; Raikar & Manthale, 2018). A lack of knowledge, misconceptions and wrong practices were constantly observed within acne patients (Darwish & Al-Rubaya, 2013; Zahr Allayali, Nassir Asseri, AlNodali, Nasser M Alhunaki, & Goblan Algoblan, 2017). Therefore, awareness of patients about their condition and its management are essential elements for adherence to treatment and to achieve the optimum outcome. Hence, the knowledge gap should be investigated. The students' acne information was examined prior to delivering an educational session. Our results revealed that the majority of students (> 80 %) were able to provide right answers regarding questions related to mode of action of antibiotic, hormonal effect, medications aggravating acne, and the absence of *Propionibacterium acnes* in acne free skin. This may be explained by the accuracy of such information that has been provided from certain sources. A relatively low percentage of participants (15-22%) were able to provide right answers regarding

the factors that won't worsen acne status, the cause of acne and the role of dirt in the formation of acne blackheads. The most frequently reported misconception was that acne can be cured, recording only 5.5% of correct answers. Similarly, in a study carried out by Al Anazi et al., a low percentage of subjects (10.4 %) knew the fact that acne is not curable (AlAnazi et al., 2017).

The students' overall level of knowledge was lower than expected since the participants relied mostly on internet as a source of information which would be often non-evidence based on. This was in alignment with a previous study where adolescents misconceptions about acne were mainly attributed to the inaccurate information they have received from different sources (Merlin, Kilkenny, Plunkett, & Marks, 1999). The second mostly reported source of information was the doctors, which may have provided them with accurate information, yet not sufficient. Moreover, it is noteworthy to state that the bothersome effect of acne was absent, or mildly present in the majority of the enrolled participants, which may have decreased their interest in seeking information from reliable resources, thus, resulting in such unexpected low level of knowledge. The different variables of the sample did not demonstrate any significant influence on the level of knowledge of participants ( $p>0.05$ ), therefore, it may be considered that the level of knowledge among all participants was similar.

An audio-visual presentation was delivered to the students in the classroom that included interactive discussions to improve their level of knowledge and awareness about acne. A remarkable enhancement in their level of knowledge was recorded after the educational session which was statistically significant ( $p<0.01$ ). Moreover, the results obtained after one-month post-intervention revealed no statistical difference in their knowledge when compared to those recorded immediately after the intervention, thereby, the information provided during the educational session was well retained. Studies in different areas of medicine have proved that audio-visual health interventions serve as a valuable tool to educate patients and improve health status and are substantially more effective in improving patient knowledge than traditional approaches (Krishna et al., 2003; Stern, 2004). In a previous study, Koch et al. have used computerized intervention as an audio-visual tool to educate adolescent patients about acne. The researchers concluded that the level of knowledge increased significantly by 22% and it was retained after one month from the intervention (Koch et al., 2008).

In the current study, the notable rise in the participants' level of knowledge and the ability of the study sample to retain the information after a period of time would suggest that this audio-visual tool is successful and effective for patient education about acne.

## 5. CONCLUSION AND RECOMMENDATION

From our findings, it can be concluded that the remarkable improvement in the percentage of students' knowledge and its retention after one-month post-intervention would suggest that an interactive presentation is an essential tool to be adopted in schools for acne education. Such tool would actively engage participants and provide them with the opportunity of a platform for discussion that helps in correcting misconceptions and retaining information. Thereby, expanding the utility of such interventions in various educational institutions is vital to attain optimum therapeutic outcome.

## 6. LIMITATIONS

This study was conducted on a small sample size that may not represent the whole Lebanese adolescent population.

## REFERENCES

- Al-Natour, S. H. (2017). Acne vulgaris: Perceptions and beliefs of Saudi adolescent males. *Journal of Family & Community Medicine*, 24(1), 34–43. <https://doi.org/10.4103/2230->

- 8229.197180.
- Al Mashat, S., Al Sharif, N., & Zimmo, S. (2013). Acne awareness and perception among population in Jeddah, Saudi Arabia. *Journal of the Saudi Society of Dermatology & Dermatologic Surgery*, 17(2), 47–49. <https://doi.org/10.1016/j.jssdds.2013.05.003>.
  - AlAnazi, M., Alrubaian, M., Almutairi, A., AlKhraiji, A., Bogari, A., Alhurayyis, M., ... Alshafei, F. (2017). Assessment of Knowledge, Attitude and Practice Toward Diabetic Patients in Riyadh City, 2016. *International Journal of Advanced Research*, 5(2), 1268–1278. <https://doi.org/10.21474/ijar01/3279>.
  - Augustin, M., Reich, C., Schaefer, I., Zschocke, I., & Rustenbach, S. J. (2008). Development and validation of a new instrument for the assessment of patient-defined benefit in the treatment of acne. *JDDG - Journal of the German Society of Dermatology*, 6(2), 113–120. <https://doi.org/10.1111/j.1610-0387.2007.06540.x>.
  - Baldwin, H. E. (2006). Tricks for improving compliance with acne therapy. *Dermatologic Therapy*, 19(4), 224–236. <https://doi.org/10.1111/j.1529-8019.2006.00078.x>
  - Darwish, M. A., & Al-Rubaya, A. A. (2013). Knowledge, Beliefs, and Psychosocial Effect of Acne Vulgaris among Saudi Acne Patients. *ISRN Dermatology*, 2013, 1–6. <https://doi.org/10.1155/2013/929340>.
  - Dréno, B. (2006). Assessing quality of life in patients with acne vulgaris: Implications for treatment. *American Journal of Clinical Dermatology*, 7(2), 99–106. <https://doi.org/10.2165/00128071-200607020-00003>.
  - Ghanem, R. E., Mostafa, S. H., Abu Hamamda, N. K., & Khmour, M. R. (2020). Knowledge, attitudes, and practices of community pharmacists toward the management of acne vulgaris in Palestine: a cross-sectional study. *International Journal of Dermatology*. <https://doi.org/10.1111/ijd.14764>.
  - Gollnick, H. P. M., Finlay, A. Y., & Shear, N. (2008). Can we define acne as a chronic disease? If so, how and when? *American Journal of Clinical Dermatology*, 9(5), 279–284. <https://doi.org/10.2165/00128071-200809050-00001>.
  - Green, J., & Sinclair, R. D. (2001). Perceptions of acne vulgaris in final year medical student written examination answers. *Australasian Journal of Dermatology*, 42(2), 98–101. <https://doi.org/10.1046/j.1440-0960.2001.00489.x>
  - Hulmani, M., Bullappa, A., Kakar, S., & Kengnal, P. (2017). Knowledge, attitude and practice towards acne vulgaris among acne patients. *International Journal of Research in Dermatology*, 3(1), 107. <https://doi.org/10.18203/issn.2455-4529.intjresdermatol20170797>.
  - JA Khattar, Hamadeh GN, Rahi AC, M. U. (2010). Common dermatologic diseases among students at a tertiary care center in Lebanon. *J Med Liban*, 58(4), 195–198.
  - Koch, P. E., Ryder, H. F., Dziura, J., Njike, V., & Antaya, R. J. (2008). Educating Adolescents About Acne Vulgaris. *Archives of Dermatology*, 144(2), 208–214. <https://doi.org/10.1001/archdermatol.2007.35>
  - Krishna, S., Francisco, B. D., Andrew Balas, E., König, P., Graff, G. R., & Madsen, R. W. (2003). Internet-enabled interactive multimedia asthma education program: A randomized trial. *Pediatrics*, 111(3), 503–510. <https://doi.org/10.1542/peds.111.3.503>
  - L.E. Barnes, M.M. Levender, A.B. Fleischer, S. R. F. (2012). Quality of Life Measures for Acne Patients. *Dermatologic Clinics*, 30(2), 293–300. <https://doi.org/10.1016/j.det.2011.11.001>
  - Merlin, K., Kilkenny, M., Plunkett, A., & Marks, R. (1999). The prevalence of common skin conditions in Australian school students: 4 tinea pedis. *British Journal of Dermatology*, 140(5), 897–901. <https://doi.org/10.1046/j.1365-2133.1999.02822.x>
  - Niemeier, V., Kupfer, J., & Gieler, U. (2006). Acne vulgaris - Psychosomatische aspekte. *JDDG - Journal of the German Society of Dermatology*, 4(12), 1027–1036. <https://doi.org/10.1111/j.1610-0387.2006.06110.x>

- Raikar, D. R., & Manthale, N. S. (2018). A cross sectional study of self-medication for acne among undergraduate medical students. *International Journal of Research in Dermatology*, 4(2), 211. <https://doi.org/10.18203/issn.2455-4529.intjresdermatol20181821>
- Stern, R. S. (2004). Dermatologists and office-based care of dermatologic disease in the 21st century. *Journal of Investigative Dermatology Symposium Proceedings*, 9(2), 126–130. <https://doi.org/10.1046/j.1087-0024.2003.09108.x>
- Taalsiewicz, K., Odłakowska, A., & Szczerkowska-Dobosz, A. (2012). Evaluation of knowledge about acne vulgaris among a selected population of adolescents of Tricity schools. *Postepy Dermatologii i Alergologii*, 29(6), 417–420. <https://doi.org/10.5114/pdia.2012.32388>
- Tameez-ud-din, A., Malik, I. J., Bhatti, A. A., Tameez Ud Din, A., Sadiq, A., Khan, M. T., Arshad, D. (2019). Assessment of Knowledge, Attitude, and Practices Regarding Self-medication for Acne Among Medical Students. *Cureus*, 11(8). <https://doi.org/10.7759/cureus.5510>
- Tuchayi, S. M., Alexander, T. M., Nadkarni, A., & Feldman, S. R. (2016). Interventions to increase adherence to acne treatment. *Patient Preference and Adherence*, 10, 2091–2096. <https://doi.org/10.2147/PPA.S117437>
- Uslu, G., Şendur, N., Uslu, M., Şavk, E., Karaman, G., & Eskin, M. (2008). Acne: Prevalence, perceptions and effects on psychological health among adolescents in Aydin, Turkey. *Journal of the European Academy of Dermatology and Venereology*, 22(4), 462–469. <https://doi.org/10.1111/j.1468-3083.2007.02497.x>
- Zahr Allayali, A., Nassir Asseri, B., AlNodali, N. I., Nasser M Alhunaki, R., & Goblan Algoblan, S. F. (2017). Assessment of Prevalence, Knowledge, Attitude, and Psychosocial Impact of Acne Vulgaris among Medical Students in Saudi Arabia. *Journal of Clinical & Experimental Dermatology Research*, 08(04). <https://doi.org/10.4172/2155-9554.1000404>