

Original article

Prevalence and Epidemiological Characteristics of Recurrent Herpes Labialis among Dental Students at the University of Benghazi

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Abstract

Recurrent herpes labialis (RHL) is an HSV-1 infection with clinical and psychosocial manifestations. Dental students are predisposed through patient contact and academic stress; however, data on Libyan cohorts are scarce. This study assessed the prevalence, epidemiology, and quality-of-life impact of RHL in dental students at the University of Benghazi. A cross-sectional, questionnaire-based study was conducted among first- to fourth-year and internship students at the Faculty of Dentistry, University of Benghazi. A validated, structured, self-administered online questionnaire was distributed electronically. Data were analysed in SPSS v26 using descriptive statistics and the chi-square test ($p < 0.05$). Of 191 respondents (84.3% females; median age 25 years), 69 (36.1%) reported a history of RHL. Positive family history was the only variable significantly associated with RHL (55.3% vs 26.9%; $p = 0.002$); gender, academic year, smoking, and age were not significant (all $p > 0.05$). The majority of affected students reported a single episode per year (56.7%), mild severity (60.3%), and resolution within one week (52.9%), with most lesions on the lateral lip. The main triggers were fever/common cold (62.3%) and stress (44.9%). Only 15.2% consulted a physician, and 60.3% received no treatment during episodes despite their health-professional training. The overall quality-of-life impact was modest and did not differ significantly by RHL status ($p = 0.435$). However, among affected students, symptom severity was significantly associated with quality-of-life impairment ($p = 0.041$). To our knowledge, this is the first epidemiological study of RHL among Libyan dental students.

Keywords. Recurrent Herpes Labialis, HSV-1, Dental Students, Prevalence in Libya, Quality of Life.

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Introduction

Recurrent Herpes labialis (RHL) is a viral infection mainly caused by herpes simplex virus type 1 (HSV-1), starting as small sores or blisters at the site of the infection on the skin. The healing process of this primary infection is followed by the spread of the virus to the sensory nerve axons; this infection will remain dormant for life due to the latent infection in various ganglia [1]. Prodromal symptoms can be experienced prior to the appearance of the lesion, such as pain, burning, tingling, lasting for a few hours; this can be explained by the replication of the virus in the endings of the sensory nerves [2]. Thenceforth, vesicles at the vermilion border of the lips develop adjacent to the skin; then they rupture, become ulcerated, and are covered by a hard scab that falls off and leads to complete healing without scar formation within seven to ten days [3,4]. Multiple triggering factors can cause the recurrence of the labial HSV, such as fatigue, stress, trauma, menstrual cycle, exposure to sunlight, and fever. All these factors can lead to the reactivation and replication of the virus, and then this virus will return to the primary infection site [2,4].

This viral infection usually occurs in children through infected people; whether they were initially infected or had recurrent infections, it could spread by direct exposure to the lesions or bodily fluids or by respiratory droplets [2,3]. Immediate treatment with topical antiviral drugs will help in the reduction of the duration of symptoms, and the prevention of relapses can be obtained by using antiviral drugs before the appearance of the symptoms as a prophylactic treatment [2]. Furthermore, prevention of the recurrent episodes of this viral infection can be done by avoiding the causative triggers [5]. The infection with HSV-1 is considered one of the most common human viral infections in the world and is considered exceedingly prevalent; the WHO reported that 3.7 billion people under the age of 50 were infected with HSV-1 worldwide [6].

It was estimated that the prevalence of RHL was approximately 2.5 per 1000 patients globally; there was a significant variation between different countries, with females showing a higher frequency [7]. Recurrent herpes labialis has clinical and psychosocial implications, whether it was in the health field in general or in dental students in particular, as dental students are considered to be a vulnerable entity to this type of infection due to patient contact as well as the stress they are subjected to during their study. However, data on the epidemiology in Libyan cohorts are rare. This study aims to assess the prevalence, epidemiology, and consequences on the quality of life of dental students.

Methods

Study design and setting

This was a cross-sectional online questionnaire-based study aimed to assess the prevalence, recurrence patterns, and associated risk factors of Recurrent Herpes Labialis among enrolled dental students at the University of Benghazi during the academic year of 2026.

Population and sampling

The study population consisted of undergraduate dental students from the 1st to 4th years and internship students at the Faculty of Dentistry, University of Benghazi. The required sample size was estimated using the Raosoft Sample Size Calculator [8], based on 95% confidence level, a 5% margin of error, and an assumed prevalence of 50%, yielding a minimum of 314 participants. A non-probability convenience sampling technique was employed, and the questionnaire was distributed electronically to all students across the academic years.

Data collection

Data were collected via a structured, validated self-administered online questionnaire, adapted from previous studies of recurrent herpes labialis among dental and health-related students [9,10]. The questionnaire included an introduction and six sections: demographics, history of recurrent herpes labialis, clinical features, triggering factors, treatment practices, and the impact of the condition on quality of life. A brief description of herpes labialis accompanied by illustrative images were included before the relevant section to enhance participants' understanding and reduce misclassification. The questionnaire was distributed electronically to dental students via student-run communication groups. A link and QR code were shared along with a short message was sent at intervals throughout the data collection period to enhance participation.

Ethical Considerations

This study was conducted in accordance with ethical standards of Declaration of Helsinki. Ethical approval was obtained from the ethics and research committee at the Dental Faculty, University of Benghazi (approval number 419). Participation was voluntary. Before accessing the questionnaire, participants were provided with an introductory statement explaining the study objectives, confidentiality of response, and the right to withdraw at any time. Electronic informed consent was obtained from all participants by asking them to indicate their agreement before proceeding to the questionnaire.

Data Analysis

Data were analyzed using IBM SPSS Statistics (version 26.0). Descriptive statistics were presented as frequencies and percentages for categorical variables, and as mean $\pm$ standard deviation and range for continuous variables. The chi-square test was used to examine associations between categorical variables and RHL status, with odds ratios and 95% confidence intervals calculated where appropriate. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 191 dental students at the University of Benghazi completed the survey. Participants were predominantly females 161 (84.3%), with 30 males (15.7%), with a median age of 25 years. With respect to the academic level, the majority of respondents were fourth-year students (39.8%) followed by interns (25.7%). The majority reported no smoking history 180 (94.2%) and most had no known medical condition (92.1%). A positive family history was reported by 24.6% (n=47) of the participants, while 13.1% were uncertain (Table 1).

Of the 191 respondents, 69 (36.1%) reported a history of recurrent herpes labialis (RHL). The remaining 122 participants (63.9%) reported no prior episodes. This represents the primary outcome of the study (Figure 1).

Family history was the only variable significantly associated with HL ($p = 0.002$). All other variables (gender, smoking, academic year, and age) were not significant (all $p > 0.05$).

Table 1. Sociodemographic characteristics and RHL prevalence (N = 191)

Characteristic	n (%)	RHL n (%)	p-value
Total	191 (100%)	69 (36.1%)	
Gender			0.889
Female	161 (84.3%)	59 (36.6%)	
Male	30 (15.7%)	10 (33.3%)	
Academic year			0.658
First year	12 (6.3%)	2 (16.7%)	
Second year	16 (8.4%)	5 (31.2%)	
Third year	38 (19.9%)	14 (36.8%)	
Fourth year	76 (39.8%)	29 (38.2%)	

Internship	49 (25.7%)	19 (38.8%)	
Smoking			
Non-smoker	180 (94.2%)	67 (37.2%)	0.159
Smoker (any type)	10 (5.2%)	1 (10.0%)	
Family history of HL			
Yes	47 (24.6%)	26 (55.3%)	0.002*
No	119 (62.3%)	32 (26.9%)	
Don't know	25 (13.1%)	11 (44.0%)	

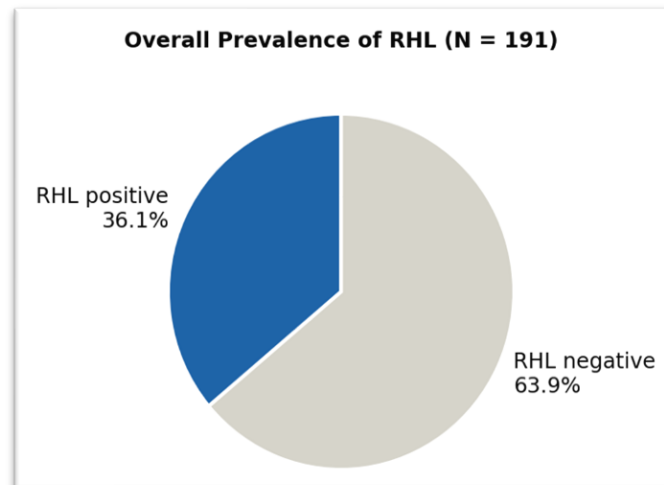


Figure 1. Overall prevalence of recurrent herpes labialis among dental students at the University of Benghazi

Among the affected students, episodes occurred once per year in 56.7% (n=38), twice in 20.9% (n=14), and three times or more in the remaining 22.4% (n=15). Most of the episodes were mild in nature 60.3%, (n=41) with a duration of less than one week (52.9%) (n=36), however, 4.4% (n=3) reported severe symptoms that affected their daily activities. Lesions most frequently appeared on the right side of the lip (38.8%) or left side of the lip (37.3%). The middle of the lip was affected in 11.9% of cases, and around the nose & other sites involvement was (11.9%).

The most commonly reported triggers were fever or common cold (62.3%), followed by stress (44.9%), then fatigue or reduced immunity (11.6%). The predominant symptoms were burning, itching and redness with percentages 59.4%, 58.0%, 56.5% respectively. Pain was reported by 37.7% and swelling by 27.5% (Table 2).

Table 2. Clinical characteristics of HL-positive students (n=69)

Variable	Category	n	%
Episodes per year **	Once	38	56.7
	Twice	14	20.9
	3 times	10	14.9
	4-5 times	3	4.5
	≥6 times	2	3.0
Symptom severity*	Mild	41	60.3
	Moderate	24	35.3
	Severe	3	4.4
Episode duration*	Less than 1 week	36	52.9
	1-2 weeks	29	42.6
	More than 2 weeks	3	4.4
Lesion location**	Right side of lip	26	38.8
	Left side of lip	25	37.3
	Middle of lip	8	11.9
	Around nose	8	11.9
Presenting symptoms‡	Burning sensation	41	59.4
	Itching	40	58.0
	Redness	39	56.5
	Pain	26	37.7
	Swelling	19	27.5

Episode triggers‡	Fever / Common cold	43	62.3
	Stress	31	44.9
	Unknown	16	23.2
	Fatigue / Low immunity	8	11.6
	Trauma to lips	5	7.2
	Sun exposure	2	2.9

*Excludes 1 participant with missing data.

** Excludes 2 participants with missing data.

‡ Multiple selections permitted;

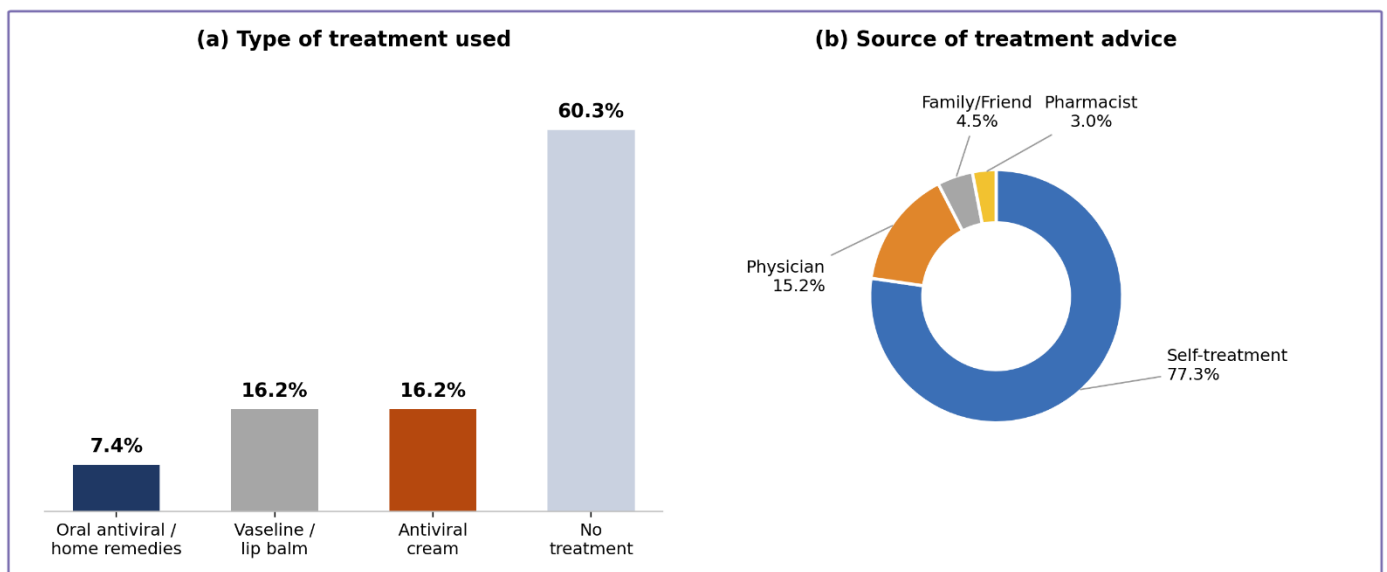


Figure 2. Treatment-seeking behaviour among HL-positive dental students. (a) Type of treatment used during episodes (n = 68). (b) Source of treatment advice (n = 66)

Despite being students of a health profession, 60.3% of HL-positive students (n=41) reported taking no treatment during episodes. Among the 39.7% (n=27) who sought some form of treatment, antiviral cream was used by 16.2% (n=11) and Vaseline/lip balm by a further 16.2% (n=11), while oral antiviral tablets (4.4%, n=3) and home remedies (2.9%, n=2) accounted for the remainder. Among those who sought treatment, self-treatment was the predominant source of advice (77.3%); 15.2% consulted a physician, 4.5% relied on friends or family, and 3.0% obtained guidance from a pharmacist (Figure 2).

All 191 participants responded to the quality of life (QOL) question, which asked how much cold sores affected their appearance, confidence, eating, speaking, and social life. Results are presented in Figure 3. Overall, 35.6% of all students reported no QOL impact, 31.9% reported slight impact, 20.4% reported moderate impact, and 12.0% reported marked impact ("very much" or "extremely"). While HL-positive students were more likely to report a "little" impact (42.0% vs 26.2%).

Although HL-positive students were more likely to report "a little" impact (42.0% vs 26.2%), the difference was not statistically significant ($\chi^2(2) = 1.66$, $p = 0.435$). However, within the HL-positive group, a significant relationship was found between symptom severity and QOL impairment ($\chi^2(4) = 9.94$, $p = 0.041$), with students experiencing severe symptoms reporting considerably greater impact on daily life. This suggests that the psychological and functional burden of HL is primarily driven by episode severity rather than simply by the presence of a history of the condition.

Figure 3. Self-reported quality of life impact by HL status (n=191)

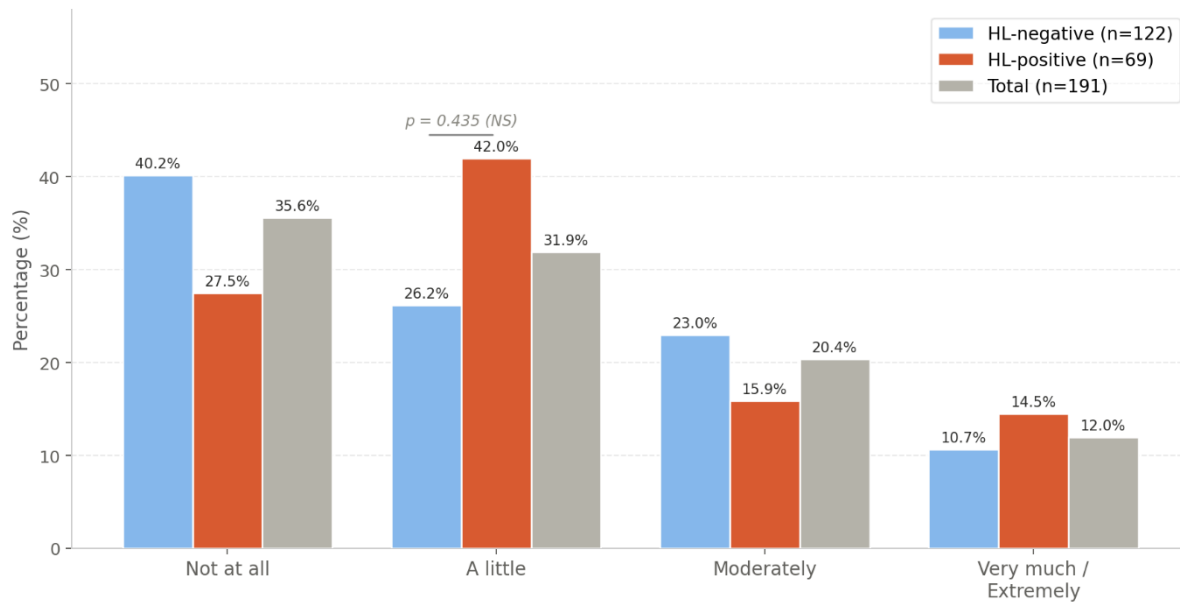


Figure 3. Distribution of self-reported quality of life impact by HL status (full sample, n=191).

Discussion

Our study aimed to assess the epidemiology of recurrent herpes labialis among dental students. The cross-sectional survey found that 36.1% of dental students at the University of Benghazi reported a history of this infection. This number is higher than the pooled global adult prevalence of 17% (and 15% for 2 African studies) reported in the meta-analysis from Twenty-eight studies by Rodríguez-Archilla and Guerrero-Campos [11], the 28.3% reported among Egyptian dental students by Ghalwash *et al.*, [10], and the 26.4% lifetime prevalence among Jordanian University students reported by Sawair *et al.*, [12] while remaining below the 44.7% annual and 52.5% lifetime prevalence documented among Turkish health-school students by Celik *et al.* [9]. Our finding is consistent with the regional epidemiology of HSV-1, which continues to be highly prevalent in the MENA region (Middle East and North Africa) [4].

Among the associated factors, the only variable that showed significant association with RHL is family history ($P=0.002$); more than half (55.3%) of the students had a positive family history of RHL versus only 26.9% of those without. These findings align closely with Ghalwash *et al.* Egyptian cohort [10], where family history was the only independent predictor (AOR = 7.07). This link between family history and RHL is reasonable and supported by previous studies [13]. Moreover, associations between genetic susceptibility, frequency, and severity of recurrent herpes labialis have also been reported. Other variables such as gender, academic year, smoking, and age showed no significant association (all $p > 0.05$). This absence of a gender effect is similar to both Celik *et al.* [9] and Sawair *et al.* [12], who similarly found no relationship with sex; the heavily female sample (84.3%) nonetheless limits power to detect such an association here.

The clinical characteristics of RHL in our sample were predominantly mild and self-limiting. Most affected students (56.7%) reported a single episode per year, while less than a third (22.4%) experienced three or more episodes of RHL; having a single episode annually is similar to 35.4% who reported one episode annually in the Egyptian cohort [10]. Having multiple annual recurrences is broadly comparable to 51.2% of the Jordanian cohort reporting at least two annual episodes [12], and the episodes were most often mild (60.3%) and resolved within a week (52.9%). Likewise, the mild-to-moderate predominance was reported elsewhere [10]. Lesions appeared on the lateral lip position with almost equal distribution (right 38.8%, left 37.3%), which matches reports of other studies [9,12,15], indicating lateral lip involvement without preference on either side.

The leading triggers were fever or common cold (62.3%) and stress (44.9%), concurring with reports in the Jordanian cohort [12], while disagreeing with the Egyptian study, where stress (65.8%) was ahead of common cold (51.3%) [10], this difference is more likely related to the recall bias or cohort specific stressor rather than a true difference. The link between psychological stress and RHL is well established; a meta-analysis of prospective studies established a positive association between psychological stress and symptomatic HSV episodes [14]. This relationship is particularly relevant to dental students, who are exposed to considerable psychological stress due to the demanding academic curriculum and clinical requirements. Moreover, Libya's prolonged political instability represented a sustained psychological stressor that may have contributed to the higher symptomatic prevalence in the study population, consistent with the established stress-reactivation pathway [14].

A notable finding is the disconnection between health students' knowledge and their self-care behaviour. Even though they were studying a health-related field, nearly six in ten (60.3%) took no treatment at all during outbreaks. Among those

who did seek some form of care, only 16.2% used antiviral cream. Self-management was the dominant approach, reported by 77.3% of students, while physician consultation remained rare at just 15.2%.

This pattern is closely seen across the region: only 20.1% used antivirals and 16.1% received physician-directed treatment in Turkey [9], and in Jordan roughly half of cases treated their lesions, but only 18.2% used antivirals and just 26.3% sought advice from a medical practitioner [12]. The repeated appearance of this finding underscores a stubborn gap between knowledge and practices of HSV-1; simply health students being aware of the infection doesn't translate into proper antiviral use when it matters.

Overall impact on quality of life was modest (35.6%) reported no effect, and only 12% showed a marked effect. The difference between RHL-positive and RHL-negative students was not significant ($p = 0.435$). However, within the affected group, symptom severity was significantly associated with QOL impairment ($p = 0.041$), indicating that the burden of RHL is driven by episode severity rather than by the mere presence of a history of the condition. This agrees with Ghalwash *et al.*, [10], who linked QOL impairment to severity and recurrence frequency rather than to diagnosis alone.

Implications

Because effective management options exist, which are the topical and systemic antivirals reviewed in the literature [2] and over-the-counter topical agents of demonstrated benefit [5], the low antiviral uptake observed here represents a missed opportunity rather than an absence of available treatment. Given that earlier intervention shortens episode duration and that prophylactic antivirals can reduce recurrences, embedding HSV self-management and infection-control teaching into the undergraduate dental curriculum is warranted, both to reduce students' own symptom burden and to limit the risk of occupational and cross-infection transmission during clinical training. Beyond pharmacological options, incorporating psychosocial stress-reduction strategies and lifestyle modification may benefit affected students' quality of life and warrants further investigation [13].

Strengths and limitations

A key strength of this study is that it provides the first epidemiological data on RHL among Libyan dental students, addressing a clear regional gap. Several limitations should nonetheless be acknowledged; the cross-sectional design limits causal inference. Diagnosis relied on self-report without clinical or laboratory confirmation, introducing potential recall and misclassification bias despite the use of explanatory images. Convenience sampling and the marked female predominance limit generalisability and constrain subgroup analysis. Moreover, the achieved sample of 191 fell short of the calculated minimum of 314 required for a 95% confidence level; the study was therefore underpowered to detect weaker subgroup associations, such as gender and smoking. The single-institution setting may also limit generalisability to dental students elsewhere in Libya. Larger multi-centre samples with more balanced gender representation and, where feasible, clinical verification are recommended.

Conclusion

Recurrent herpes labialis was common among dental students at the University of Benghazi, affecting just over one-third of respondents. Family history was the only factor significantly associated with the condition, while fever or common cold and stress were the predominant triggers. Despite their health-profession training, most affected students took no treatment during episodes and few consulted a physician, revealing a clear knowledge-to-practice gap. Although the overall impact on quality of life was modest, impairment was significantly greater among those with more severe episodes. To the best of our knowledge, this is the first study to describe the epidemiology of recurrent herpes labialis among Libyan dental students. Integrating education on HSV-1 self-management and appropriate antiviral use into the dental curriculum is recommended to address this gap.

Conflict of interest. Nil

Authors' contributions

Both authors contributed to the conception and design of the study, data collection, analysis, and interpretation of the results. Both authors were involved in drafting and critically revising the manuscript for important intellectual content, read and approved the final version submitted for publication, and agree to be accountable for all aspects of the work.

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Conflict of interest

The authors declare no conflicts of interest.

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