



Association between Bubble Tea Consumption and Prevalence of Acne Vulgaris

Devina Subagio,¹ Asih Budiastuti,² Yulian Ludovicus Aryoko Widodo,³ Puguh Riyanto²

¹Undergraduate Medical Student, ²Department of Dermatology and Venereology, ³Department of Biology of Medicine and Biochemistry, Faculty of Medicine, Diponegoro University, Semarang, Central Java, Indonesia

ABSTRACT

Introduction: Acne vulgaris (AV) is one of the most common skin disorders among youth. A cross-sectional study was conducted to analyze the association between bubble tea consumption and the prevalence of acne vulgaris among medical students. **Method:** Subjects were obtained from consecutive sampling. There were 91 eligible subjects meeting inclusion criteria. Data was collected using questionnaires. Examinations were through the observation of photographs of lesions. Chi-square analysis was conducted at a 95% confidence interval ($p < 0.05$). **Results:** Data were collected from 91 medical students with a mean age of 19.62 ± 0.98 -year-old. The prevalence of acne was 58.2%, mainly at the age of 20 (37.7%). There is a significant association between consumption of bubble tea and the prevalence of AV ($p < 0.001$). **Conclusion:** Bubble tea consumption is associated with the prevalence of acne vulgaris.

Keywords: Acne vulgaris, bubble tea, medical students

ABSTRAK

Pendahuluan: Akne vulgaris merupakan salah satu penyakit kulit yang umum dialami pada dewasa muda. **Metode:** Penelitian observasional *cross-sectional* untuk mengetahui asosiasi konsumsi *bubble tea* dengan kejadian akne vulgaris. Sampel diambil dengan metode *consecutive sampling* menghasilkan 91 mahasiswa yang memenuhi kriteria inklusi dan eksklusi. Pengambilan data primer dengan kuesioner. Pemeriksaan fisik observasi kulit responden dengan foto. Analisis data menggunakan uji *Chi-Square* dengan tingkat kemaknaan $p < 0,05$. **Hasil:** Angka kejadian akne vulgaris adalah 58,2%, dengan rata-rata usia $19,62 \pm 0,98$; usia terbanyak penderita adalah 20 tahun (37,7%). Terdapat asosiasi bermakna antara konsumsi *bubble tea* dan kejadian akne vulgaris ($p < 0,001$). **Simpulan:** Penelitian ini menunjukkan hubungan bermakna antara konsumsi *bubble tea* dan kejadian akne vulgaris. **Devina Subagio, Asih Budiastuti, Yulian Ludovicus Aryoko Widodo, Puguh Riyanto. Asosiasi antara Konsumsi Bubble Tea dan Prevalensi Akne Vulgaris**

Kata kunci: Akne vulgaris, *bubble tea*, mahasiswa kedokteran

INTRODUCTION

Acne vulgaris (AV) is a chronic inflammatory disorder of the pilosebaceous follicle. This skin disorder can affect the level of confidence, even anxiety disorder.¹ Global Burden of Disease 2013 stated that acne vulgaris affects 85% population aged 12-25 years.² Indonesian Dermatology dan Cosmetics Association noted increasing cases of acne vulgaris.^{3,4} A study in Bandung (2016) reported AV prevalence was up to 60.71%.⁵

Acne vulgaris develops due to the following factors: hyperactivity of sebaceous gland by androgens that lead to sebum overproduction, follicular epidermal hyperproliferation, *Propionibacterium*

acnes colonization in pilosebaceous units which promotes inflammation.⁶ Milk, sugary food, tapioca, and fats are linked to an increase in acne breakouts.⁷

These days, teenagers generally consume bubble tea. Bubble tea is a tea-based drink that includes chewy tapioca balls, milk, and sugar. The high glycemic load from bubble tea can cause acute hyperinsulinemia, increasing androgen and IGF-18 associated with increased sebum production, a crucial factor of acne vulgaris formation.⁸⁻⁹ Study in Sydney revealed that hyperinsulinemia resulting from consuming a high glycemic food index is associated with acne breakouts.⁹ This study aims to analyze the association

between bubble tea consumption and acne vulgaris.

METHODS

Subjects

A cross-sectional design was conducted throughout July 2020. The subjects were students of the Faculty of Medicine, Diponegoro University, recruited by consecutive sampling. Ninety-one subjects ($n = 46$ with a history of bubble tea consumption and $n = 45$ without a history of bubble tea consumption) participated in this study.

Study Protocol

The inclusion criteria were active students of the Faculty of Medicine, Diponegoro University,

Alamat Korespondensi email: devinasbg@gmail.com

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aged 17-23 years, and willing to participate by signing the informed consent. The exclusion criteria were under skin treatment, have used acne treatment within the last three months, and smoker. Before collecting data, the interviewer explained the aim of this study; respondents were then asked to sign informed consent regarding involvement in this study. The ethical committee approved this study of Diponegoro University (Number: 152/EC/KEPK/FK-UNDIP/VI/2020). There was no conflict of interest or any sponsorship for this study.

Demographic characteristics, such as personal medical history and bubble tea consumption, were evaluated using a self-reported questionnaire validated by dermatologists. Students were considered to drink bubble tea if they consumed it at least two times per week in the last four months. Based on BMI criteria for Asian population,¹⁰ nutritional status was grouped into underweight (BMI <18.5 kg/m²), normal-weight (BMI 18.5-22.9 kg/m²), and overweight-obese (BMI >23 kg/m²). Dermatologist performed physical examinations. The diagnosis of acne vulgaris was confirmed using lesion counting based on the number of inflammatory eruptions (papule, pustule, nodule, or cyst) were found.¹¹

Statistical Analysis

Data were analyzed using the chi-square test. A p-value of <0.05 was considered significant.

RESULTS

A total of 91 respondents participated in this study. The average age of the respondents was 19.62 + 0.98-year-old; primarily female (63.7%). The respondents' sociodemographic characteristics are shown in Table 1.

Acne vulgaris (AV) was more common among respondents >20 years of age (58.5%) compared to <20 years of age (41.5%) but not statistically significant ($p > 0.05$). Overweight and obese respondents had a higher acne prevalence (56.6%) but not statistically significant ($P > 0.05$). Most respondents with acne vulgaris are in the BMI category >23 (56.5%). The rate of acne was significantly higher ($P < 0.001$) among students who had a family history (90.6%) compared to those without such a history (9.4%).

A total of 36 respondents (58.2%) had AV,

67.9% had a history of consuming bubble tea in the last four months. Statistical chi-square analysis showed that bubble tea consumption and acne vulgaris were significantly associated ($p < 0.001$; Table 2). Respondents with a history of bubble tea consumption were 5.9 times more likely to have acne than respondents who did not consume bubble tea in the last four months (OR = 5.93; 95% CI: 2.35-14.94).

DISCUSSION

The prevalence of acne vulgaris in the present study was 58.2%. The association between bubble tea consumption and acne vulgaris prevalence was significant (chi-square $p < 0.001$).

Bubble tea contains sugar, milk, and tapioca. Previous studies stated that individuals who consumed sugary food, milk, and tapioca were more likely to have acne vulgaris.^{5,12} This result was consistent with the theory that milk intake and the high sugar level are associated with acne vulgaris.^{5,13} The presence of amino acids in milk triggered insulin secretion and induced insulin-like growth factor-1 (IGF-1) synthesis, and a high level of IGF-1 stimulated pilosebaceous units and androgen activity.¹³ Both processes stimulate sebum production, which is the pathogenic factor in acne

vulgaris.^{14,15}

Previous studies had confirmed the association between sugar and tapioca contained in bubble tea associated with acne.^{8,16} Sugar and tapioca are foods with a high glycemic index;⁸ and a high sugar level promote a condition called hyperinsulinemia.¹⁷ Hyperinsulinemia will stimulate androgen secretion to increase sebum production, which is critical in acne vulgaris. Hyperinsulinemia affects the circulated insulin-like growth factor-1 (IGF-1) level.¹⁶ This condition leads to increased keratinocyte proliferation and sebum production. This cycle contributes to the pathogenesis of acne vulgaris.¹⁸

Most respondents with acne vulgaris in this study are BMI >23 kg/m² (56.5%). A study in Norway found that respondents who had BMI >23 kg/m² were about 2.1 times more likely to have acne than another group (OR = 2.1; 95% CI: 1.3-3.4).¹⁵

We also found that the rate of acne was significantly higher among students who had a family history of acne (90.6%) compared to those without such a history (9.4%) ($P < 0.001$). This result was consistent with a study in Jeddah that acne's prevalence was higher

Table 1. Distribution of respondents based on sociodemographic characteristic and BMI

Variable	AV Incidence		Total n (%)	p-value
	Positive	Negative		
Age (years)				
<20 (%)	22 (41.5)	19 (50)	41 (45)	0.422*
≥20 (%)	31 (58.5)	19 (50)	50 (55)	
Gender				
Male (%)	20 (60.6)	13 (39.4)	33 (36.3)	0.73*
Female (%)	33 (56.9)	25 (43.1)	58 (63.7)	
BMI, kg/m²				
<18.5 (%)	0 (0)	1 (2.6)	1 (1.1)	0.264*
18.5-22.9 (%)	23 (43.4)	20 (52.6)	43 (47.3)	
>23 (%)	30 (56.6)	17 (44.7)	47 (51.6)	
Family history of AV				
Yes (%)	48 (90.6)	17 (44.7)	65 (71.4)	<0.001*
No (%)	5 (9.4)	21 (55.3)	26 (28.6)	

*Chi-square, BMI = body mass index, n = number of respondents

Table 2. Association between bubble tea consumption and prevalence of acne vulgaris

Bubble tea consumption in the last 4 months	Acne Vulgaris Incidence		p-value	PR (95% CI)
	Positive n	Negative n		
Yes	36 (67.9)	10 (26.3)	< 0.001*	5.93 (2.35-14.94)
No	17 (32.1)	28 (73.7)		
Total	53 (58.2)	38 (41.8)		

*Chi-square, n= number of respondents, PR = prevalence ratio, CI = confidence interval.



among students who had a family history of acne (69.3%).¹⁹ A study in Middle Africa also showed that acne vulgaris was associated with a family history (70.86%).²⁰

We did not assess the impact of other personal factors such as personal hygiene. Therefore, further research with a more extensive and

heterogenous sample size evaluates the effect of different individual factors such as hygiene, which is required to demonstrate more specific results on consuming bubble tea in acne vulgaris.

CONCLUSION

This study shows an association between

bubble tea intake and acne prevalence. Further research with a more extensive and heterogenous sample size that evaluates the impact of other personal factors such as hygiene is required to demonstrate a more specific effect of consuming bubble tea in acne vulgaris.

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Appendix 1. Self-reported questionnaire

Petunjuk: Silanglah (X) jawaban sesuai dengan keadaan saudara.

Tanggal:

Kode:

A. IDENTITAS

1. Nama :
2. Usia :
3. Jenis Kelamin :
4. Angkatan:

B. PEMERIKSAAN FISIK

1. Berat Badan :
2. Tinggi Badan :

C. DAFTAR PERTANYAAN

Petunjuk pengisian: Berilah tanda silang (x) pada pilihan yang tersedia dan pilih sesuai dengan keadaan yang sebenarnya.

PERTANYAAN

1. Apakah anda mengetahui apa itu *bubble tea*?
 - a. Ya
 - b. Tidak
2. Apakah saudara mengonsumsi *bubble tea* 4 bulan terakhir?
 - a. Ya
 - b. Tidak
3. Berapa kali saudara mengonsumsi *bubble*

tea? (Apabila jawaban nomor 2 menjawab TIDAK, pilih option E)

- a. 1x perbulan
- b. 2x perbulan
- c. 3x perbulan
- d. >3x perbulan
- e. Tidak

4. Apakah keluarga kandung Anda ada yang menderita jerawat juga?

- a. Ya
- b. Tidak

5. Apakah saudara merasa jerawat saudara akan bertambah banyak bila mengonsumsi *bubble tea*?

- a. Ya
- b. Tidak

6. Apakah Anda mengetahui bahwa minuman yang mengandung gula berlebihan akan menimbulkan jerawat?

- a. Ya
- b. Tidak

Bila ya, pilih sumber informasi mana yang menyebutkan bahwa minuman yang mengandung gula berlebihan dapat menimbulkan jerawat*

- a. Internet
- b. *Textbook*
- c. Kuliah
- d. Media massa
- e. Lain-lain, sebutkan.....

7. Apakah jerawat Anda hanya terletak di daerah tertentu saja?

- a. Ya
- b. Tidak

Bila Ya, pilih letak munculnya jerawat* (*Jawaban boleh lebih dari 1 (satu))

- a. Pipi
- b. Dahi
- c. Hidung
- d. Dagur
- e. Leher

8. Pada saat jerawat muncul, apakah jerawat langsung timbul banyak (>5)?

- a. Ya
- b. Tidak

9. Apakah saat ini saudara sedang dalam perawatan obat jerawat dalam 3 bulan terakhir?

- a. Ya
- b. Tidak

10. Apakah saudara merokok?

- a. Ya
- b. Tidak