Assessment of Undergraduate University Students' Knowledge and Awareness of Oral Cancers in Brunei Darussalam

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Authors' contributions

This work was carried out in collaboration among all authors. Author JHL designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors NAB and HAR managed the analyses of the study. Author JSD managed the literature searches. All authors read and approved the final manuscript.

Article Information

ABSTRACT

Aims: The objective of this study is to assess current level of awareness and knowledge of oral cancer among undergraduate students in Brunei Darussalam
Study Design: Cross-sectional study using self-administered questionnaire
Methodology: The English language self-administered questionnaires were distributed to a random sample of undergraduates in the two universities. The respective university representatives distributed the questionnaires to students from random modules. 184 students from UBD and 198 students from UTB were included. The questionnaire has been pretested by 5 university students before the study began.
Results: A total of 392 students completed the questionnaires. Only 46.4% of the students were aware of the term 'oral cancer' and mere 1.5% were able to identify oral cancer diagnostic tests. Overall oral cancer knowledge level was low with a mean knowledge score of 37.3% only.

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However, 76.3% (95%CI: 71.9, 80.3) were able to identify tobacco smoking as a risk factor followed by poor oral hygiene 55.5% (95%CI: 61.6, 71.2) and 53.3% (95%CI: 48.2, 58.3) chewing tobacco or betel nut**.**

Conclusion: Oral cancer awareness and knowledge among undergraduates is poor. Effective oral cancer promotion and education by relevant agencies are highly suggested, particularly in tertiary education settings.

1. INTRODUCTION

Oral cancer is a worldwide health concern being the 11th most common cancer in the world [1]. According to Cheong et al. [2], Brunei has one of the highest oral cancer incidence rates with 9.0/100,000 age-standard rates (ASR) for female across the world and the incidence trend for both genders is expected to increase up to 83.3% by 2020. The Brunei Health Information Booklet 2016 released by the Ministry of Health [3] identified lip, oral cavity and pharynx cancer as one of the top three causes of cancer deaths in the country with a total of 21 deaths in 2016, 18 of which were males.

Oral cancer is preventable and the risks can be lowered through lifestyle modification. Early intervention can greatly increase the survival rate of oral cancer while late diagnosis requires more aggressive therapies which can lead to functional impairment such as speech disorders, difficulty in masticating and swallowing and compromised oral health [4].

Panzarella et al. [5] investigated the reasons behind delayed diagnosis and found that the main cognitive reasons were 'personal experience with cancer', 'unawareness' and especially, 'knowledge of cancer'. In another study, Grant et al. [6] interviewed young oral cancer patients between 30-45 years old (n=15) in Scotland regarding recognising symptom and seeking professional help. They found that most patients did not associate their symptoms with oral cancer mainly because the lesions were often small and painless (n=12). The study also identified self-treatment such as the use of over the counter medication as a cause of delayed treatment ranging from days to months. However, it was noted that the small sample size cannot represent the oral cancer knowledge and awareness for all young cancer patients. This highlights the importance of recognising risk factors and early symptoms of oral cancer.

To the best of our knowledge, no assessment on knowledge and awareness of oral cancer in undergraduate students in Brunei Darussalam has been conducted so far. Thus, this study aims to determine the level of public awareness and knowledge of oral cancer. The result of this study can be used to assist future public health-education strategies to improve public awareness and knowledge about oral cancer.

2. MATERIALS AND METHODS

2.1 Study Design, Population and Sample

A cross sectional study conducted in two universities in Brunei Darussalam, namely Universiti Brunei Darussalam (UBD) and Universiti Teknologi Brunei (UTB). The English language self-administered questionnaires were distributed to a random sample of undergraduates in the two universities.

The following formula was used to calculate sample size for estimating a proportion of undergraduate students in an infinite (unknown) population.

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

Where:

n = sample size
Z = Z statistic for a level of confidence
P = Expected prevalence or proportion
d = Precision

A sample size of at least 385 participants is required to achieve precision of 5% (d=0.05) with expected proportion of 50% at 95% confidence level. Accounting for attrition and missing data, a 20% inflation was taken into consideration, therefore a total minimum sample of at least 462 university students were expected.

2.2 Data Collection Procedure

The student council representative of UTB was the point of direct contact for principal investigator. The representative distributed the questionnaires to class leaders whom disseminated the questionnaire to students of respective classes. As for UBD, the investigator approached the programme leader of Islamic Civilization to disseminate the questionnaire as this is a compulsory module to all UBD students regardless of faculty. Students could contact investigators via email for UTB students and in person for UBD students regarding any enquiries or issues. Before the study began, the questionnaire had been pretested by 5 university students to clarify any unclear items or terms.

2.3 Instrument

The questionnaire has 21 questions and was estimated to take between 10-15 minutes to complete. The questionnaire consists of five parts. The first part includes sociodemographic information such as age, gender, faculty, current education level and ethnicity. Part two of the questionnaire explores the habits of the participants including smoking, alcoholic beverage consumption, frequency of dental visits and oral screening experience. Next, the questionnaire assessed oral cancer awareness and knowledge by questions on signs, symptoms and risk factors of oral cancer followed by preferred oral cancer awareness promotion methods. Question 14, 15 and 16 were constituted to assess the knowledge of participants. All options except 'Don't Know' for all three questions and 'Teeth' for question 14 were correct statements and respondents were awarded 1 point for each option they selected with the maximum being 26 points.

2.4 Data Analysis

Data cleaning was done to address missing values and categories. Data analysis using R Studio v.4.3.3. was conducted to describe the numerical data using descriptive statistics such as mean and standard deviation and categorical data using proportions, prevalence and percentages. Inferential analysis was conducted to compare between sociodemographic characteristics and oral health awareness and knowledge using independent-t test, one way ANOVA and chi-square test as indicated. P-values that were less than 0.05 was considered statistically significant (two-tailed).

3. RESULTS AND DISCUSSION

3.1 Sociodemographic Characteristics

A total of 392 university students returned the completed questionnaires (92% response rate). Table 1 describes the sociodemographic characteristics of the participants where 194 students were from UBD (49.5%) and 198 students were from UTB (50.5%). Majority of the sample were female students (68.6%) and mean (SD) age was 20.9 years ($\pm$2.0), ranging from 18 to 29 years old. Ethnical breakdown of the sample consists of Malay (86.7%), followed by Chinese (7.9%) and others (5.4%) including Malay-Chinese, Iban, Dusun, Korean, Latino, Indonesian, Filipino, Indian, Dutch-Japanese and Russian. Prevalence of smoking and consuming alcohol among the sample was 5.1% (95%CI: 3.2, 7.9) and 3.1% (95%CI: 1.7, 5.4), respectively. Prevalence of routine dental check-up for less than once a year and more than twice a year were 46.0% (95%CI: 40.9, 51.0) and 12.8% (95%CI: 9.7, 16.6), respectively.

3.2 Awareness

Table 2 presents the awareness level of participants. 46.4% (95%CI: 41.4, 51.5) of participants have heard of the term oral cancer. Out of these participants, 1.5% (95%CI: 0.6, 3.5) knew someone with oral cancer and 43.1% thought that early diagnosis improves recovery from oral cancer. Other than that, only 1.5% (95%CI: 0.6, 3.5) of these participants were able to identify oral screening, orthopantomogram (OPG), MRI-scans, CT-scans, and biopsy as oral cancer diagnostic/screening tests.

3.3 Knowledge

Figs. 1, 2 and 3 present the breakdown of answers for sites of oral cancer development, symptoms and risk factors respectively. The top three sites reported for oral cancer development was gums 62.0% (95%CI: 57.0, 55.8), inside of cheek 48.7% (95%CI: 43.7, 53.8), tongue 43.1% (95%CI: 38.2, 48.2). In terms of symptoms of oral cancer (Fig. 2); the top three options were a lump or swelling 60.5% (95%CI:55.4, 65.3), difficulty in chewing, swallowing or moving the jaw or tongue 52.8% (95%CI: 47.7, 57.8) and pain or soreness 52.6% (95%CI: 47.5, 57.6). The top three chosen risk factors were smoking tobacco 76.3% (95%CI: 71.9, 80.3), poor oral hygiene 55.5% (95%CI: 61.6, 71.2) and chewing tobacco/ betel nut 53.3% (95%CI: 48.2, 58.3).

Table 1. Descriptive statistics of undergraduate participants (n = 392)

Variable	n	(%)	(95%CI)
Age (Mean, SD)	20.9	2.0	(20.7, 21.2)
Gender			
Male	123	31.4	(26.9, 36.3)
Female	269	68.6	(63.7, 73.1)
University			
UBD	194	49.5	(44.4, 54.5)
UTB	198	50.5	(45.5, 55.6)
Faculty			
Academy of Brunei Studies	15	3.8	(2.2, 6.4)
Faculty of Arts and Social Sciences	91	23.2	(19.2, 27.8)
Faculty of Science	45	11.5	(8.6, 15.2)
Institute of Health Science	21	5.4	(3.4, 8.2)
School of Business and Economics	27	6.9	(4.7, 10.0)
School of Design	25	6.4	(4.3, 9.4)
School of Engineering	64	16.3	(12.9, 20.4)
School of Applied Sciences and Mathematics	61	15.6	(12.2, 19.6)
School of Business	43	10.9	(8.1, 14.6)
Ethnicity			
Malay	340	86.7	(82.9, 89.9)
Chinese	31	7.9	(5.5, 11.2)
Others	21	5.4	(3.4, 8.2)
Smoke or chew tobacco			
Yes	20	5.1	(3.2, 7.9)
No	372	94.9	(92.1, 96.8)
Drink alcoholic beverages			
Yes	12	3.1	(1.7, 5.4)
No	380	96.9	(94.6, 98.3)
Routine check-up			
>2/year	50	12.8	(9.7, 16.6)
2/year	52	13.3	(10.1, 17.1)
1/year	110	28.1	(23.7, 32.8)
<1/year	180	46.0	(40.9, 51.0)

n = frequency, % = percentage, CI = Confidence interval

Table 2 Respondent awareness assessment (n = 392)

Awareness	n	%	95%CI
Have you heard about oral cancer?			
Yes	182	46.4	(41.4, 51.5)
Do you know anyone with oral cancer?			
Yes	6	1.5	(0.6, 3.5)
Do you think that early diagnosis improves recovery from oral cancer?			
Yes	169	43.1	(38.2, 48.2)
Do you know about any diagnostic/screening test that can be done for oral cancer?			
Yes	6	1.5	(0.6, 3.5)

n = frequency, % = percentage, CI = Confidence interval

Most of the participants 74.0% (95%CI= 69.3, 78.2) stated that oral cancer incidence rate is the same in both genders. Majority of the participants (91.8%) were interested in receiving more information regarding oral cancer and the most preferred methods were information pack/ leaflet (48.7%), seminars (38.0%), lectures (13%) and others (12.5%) which includes awareness

campaign, games and activities, via e-mail, infographics and posters, social media, and online videos.

Overall, the mean knowledge score was 39.3% (SD= ±22.1) and lower quartile of 23.1%, median of 38.5% and upper quartile of 53.9%. A one way ANOVA was conducted to compare knowledge scores and faculty, and it was found that only Institute of Health Sciences had significantly higher mean knowledge score compared to all other faculties (P=.05) as presented in Table 3. No significant relationship was established between knowledge score and other sociodemographic factors.

4. DISCUSSION

4.1 Awareness

The oral cancer awareness among undergraduate students in this study is poor (46.4%) compared to a study conducted among students in Jordan [7] (91%) and Malaysia as reported in Al Dubai et al. [8] (92%) and Musa et al. [9] (85%). It is consistent with Hassona et al. [10] where only 45.6% of dental patients in Jordan were aware that cancer can occur in the mouth. This could be due to the lack of public health promotion and education in Brunei Darussalam.
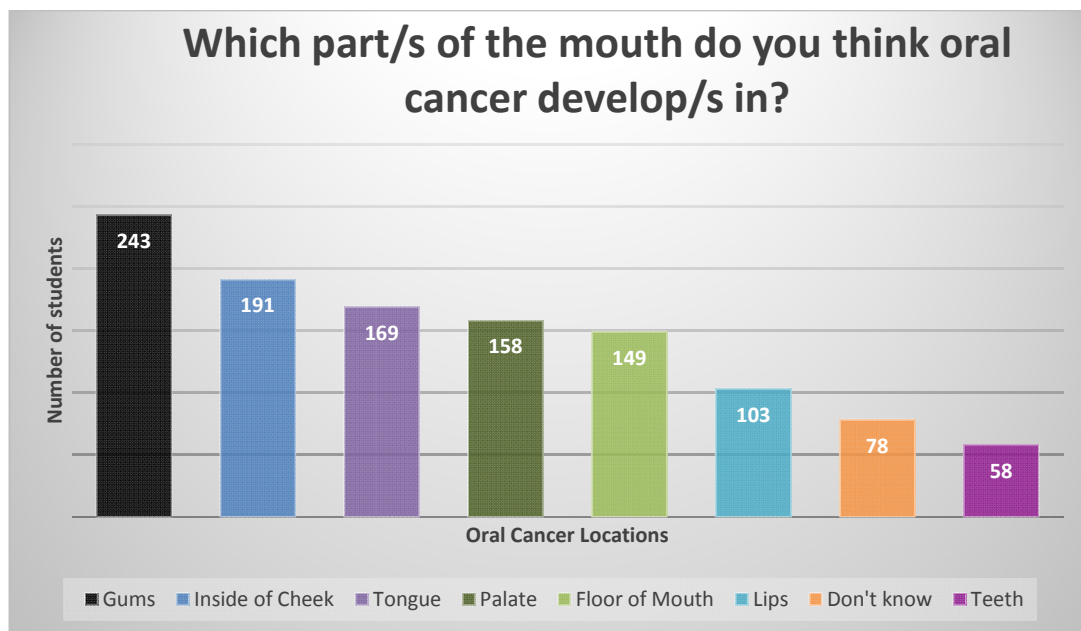

Fig. 1. Shows the breakdown of answers for sites of oral cancer development

Table 3. Relationship between mean knowledge score and faculty (Institute of Health Sciences as reference) (n = 392)

Faculty	Mean knowledge score		
	(%)	±SD	*P*-value [a]
Institute of Health Sciences	58.6	24.6	reference
School of Applied Sciences and Mathematics	40.6	18.3	.023
School of Engineering	40.6	20.4	.023
Faculty of Science	40.0	19.6	.017
School of Design	35.0	21.2	.004
School of Business and Economics	35.0	20.3	.004
Academy of Brunei Studies	31.1	23.9	.003
Faculty of Arts and Social Sciences	37.4	22.7	.001
School of Business	29.7	20.8	<0.001

[a] One-way ANOVA

In your view, which of the followings are/is a symptom(s) of oral cancer?
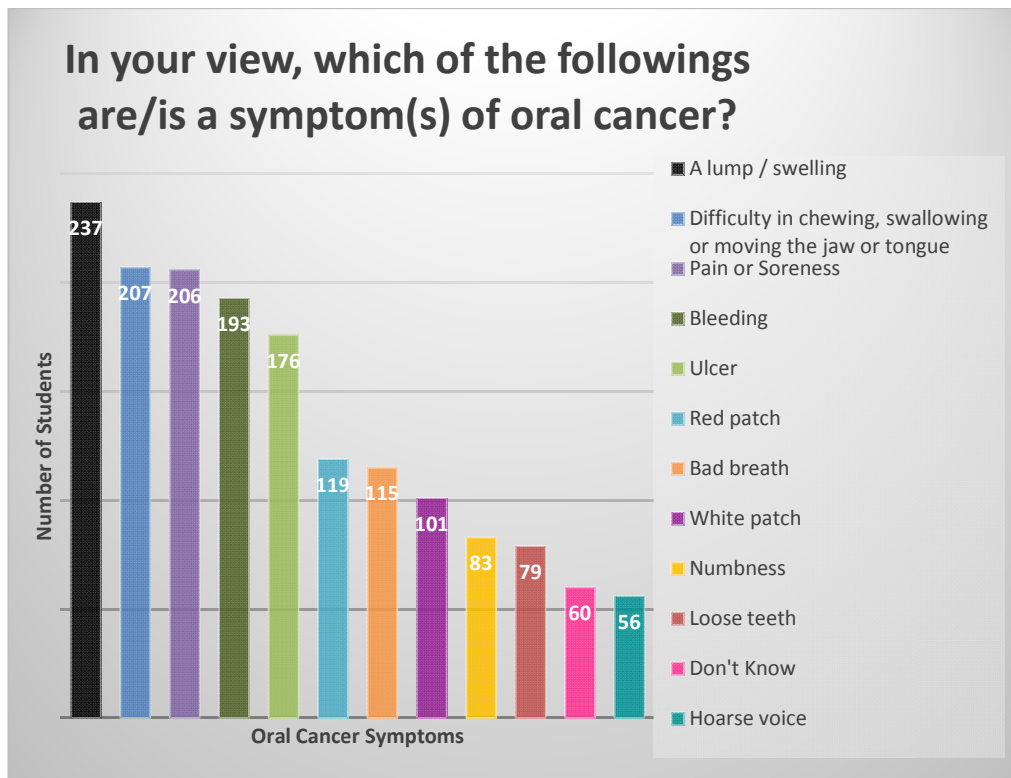
Fig. 2. Shows the breakdown of answer for symptoms of oral cancer

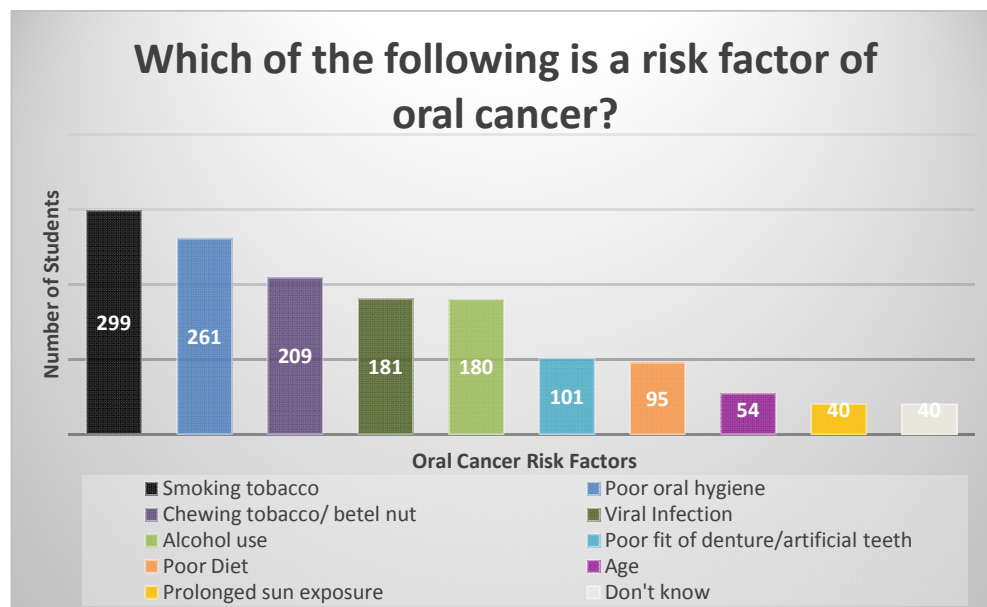## Which of the following is a risk factor of oral cancer?

Fig. 1. Shows the breakdown of answers for risk factors of oral cancer

Only a small portion of the participants (1.5%) were able to list some form of oral cancer diagnostic or screening tests. It was found that 66.7% of those were from Institute of Health Science. Hence, it was deduced that the participants have some form of medical background knowledge. Only 1 participant listed oral screening and other participants have listed

orthopantomogram (OPG), MRI-scans, CT-scans, and biopsy. The common identification steps begin with detailed intra- and extra-oral examination by healthcare professionals especially dentists followed by biopsy then imaging methods.

4.2 Knowledge

Although the mean knowledge score was low (39.3%) the majority of the students were still able to identify common site and risk factors of oral cancer. In this study, participants determined gums (62.0%), inside of cheek (48.7%) and tongue (43.1%) as sites of oral cancer. This result corresponds with the clinical location of oral squamous cell carcinoma (OSCC) which represents more than 90% of all oral cancers, with the most prevalent being tongue and floor of mouth followed by buccal mucosa and gingiva [11,12].

In terms of risk factors, tobacco smoking (76.2%) and betel nut/ tobacco chewing (53.3%) were identified. Betel quid, cigarette smoking and alcohol consumption are common risk factors worldwide [13]. There is a strong link between ethnicity and oral cancer incidence mainly due to cultural habits such as areca nut and betel quid chewing practice in South Asian cultures. At the same time, users and sellers are not aware of the health risks of such habits [14]. This highlights the importance of oral cancer awareness and knowledge of the public about early signs and risk factors of oral malignancy. The impact of cigarette smoking and poor oral hygiene distress the oral health by increasing incidence and severity of oral cancer and debilitate patient response to therapy [15].

Oral cancer often manifest as erytholeukoplastic lesions initially represented by well demarcated, red and white patches that persisted for more than 3 weeks and often not accompanied with pain [11]. Less than half of the participants identified red patches (30.4%) and white patches (25.8%) as symptoms of oral cancer while the most prevalent symptoms identified by participants were 'a lump or swelling' (60.5%), 'difficulty in chewing, swallowing or moving the jaw or tongue' (52.8%), and 'pain or soreness' (52.6%). All three symptoms are often presented in advanced stages of oral cancer and often involve neck metastases [11].

The results of this study coincide with previous studies, the top answer for common oral cancer risk factor was tobacco smoking and most common sign of oral cancer identified was a lump in the oral cavity. Similarly, a relatively smaller percentage of participants were able to identify white and red lesions [16-19].

Majority of the participants (74.0%) stated that both genders have the same probability of developing oral cancer. Rao et al. [20] reviewed the epidemiology of oral cancer in Asia and concluded that oral cancer generally affects the male population more than female. This is supported by Ariyoshi et al. that found a 1.45 male to female ratio in Japan and by Halbould et al. 1.65 in Yemen [as cited in 20]. However, there has been a drift in oral cancer prevalence among gender with increasing cases in young women which may be due to lifestyle changes over the decades [21].

A large portion of the participants (91.8%) expressed interest in learning more regarding oral cancer. Health promotion centres can raise oral cancer awareness according to the preferred methods explored in this study namely, distributing information leaflets, email subscriptions, hold awareness campaigns and making use of social media platform. Dentists and doctors also play an active role in instilling awareness in patients. It was found that majority of the participants (46.0%) visited the dental clinic less than once a year. Brunei Darussalam has 14 government subsidised dental clinics across the nation which offer routine oral examinations at an affordable cost. The community is advised to take advantage of such privilege and receive asymptomatic screening at least once a year.

The results of this study should be interpreted within its limitations. Use of different questionnaire may not allow for direct comparison with previous studies. Cross-sectional study may have limited prospective implications. Hence, further prospective experimental studies with educational or awareness interventions and use of more extensive questionnaire would determine effective ways to raise public awareness and knowledge on oral cancer among university students.

5. CONCLUSION

In conclusion, oral cancer awareness and knowledge among university students in Brunei Darussalam is low but students were able to

identify the major oral cancer sites and risk factors. Students have a positive attitude towards learning more about oral cancer. Relevant authorities such as Health Promotion Centre can disseminate digital education materials via social media and organise awareness campaigns or talks in various settings such as schools and other public places. At the same time, dentist and oral hygienist should be well informed and trained to perform oral cancer screening.

CONSENT AND ETHICAL APPROVAL

The study protocol has been approved by Institute of Health Science Research and Ethics Committee (UBD/PAPRSBIHSREC/2018/115). Written consent was obtained prior to participation of this study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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