



## Original Article

# The effectiveness of school educating program for betel quid chewing: A pilot study in Papua New Guinea

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## Abstract

**Background:** To investigate the effectiveness of educating program among primary and secondary school students in Papua New Guinea, where has the highest incidence of oral cancer all over the world.

**Methods:** A cross-sectional school based survey was arranged in primary and secondary school in Papua New Guinea in June, 2015. A self-administrated questionnaire was administered before and after education done by health experts from Taiwan. The subjects were chosen by random. The schools provided the students we educated and did the questionnaires on.

**Results:** Ninety five primary school students and 55 secondary school students in Papua New Guinea participated in the study. Before education, both groups lacked the knowledge that betel quid is harmful to health and had no motivation to quit betel quid consumption with the average score 4.580 out of the total score of 8 for primary school students, and the average score of 4.600 out of the total score of 8 for secondary school students. After education, improvements were noted in knowledge of betel quid among both groups, and reached the statistical significance for secondary school students (mean difference  $0.700 \pm 0.277$ , 95% CI 0.164–1.248,  $p$ -value = 0.018).

**Conclusion:** A great achievement was gained by a short time of education. To prevent the incidence and mortality of oral cancer in Papua New Guinea, education programs should be arranged aggressively and effectively.

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**Keywords:** Betel nut; Betel quid; Education; Papua New Guinea

## 1. Introduction

Betel nut chewing has been proven to be scientifically linked with several health diseases. It has several harmful effects to our health, as the International Agency for Research on Cancer concluded after reviewing the published medical research that chewing areca nut is carcinogenic to Humans.<sup>1</sup> However, it is commonly chewed in some countries, and

approximately 600 million people worldwide. After tobacco, alcohol, and caffeine, betel nut is the fourth most common addictive substance in the world.

Studies have linked the high incidence of oral cancer in some western Pacific island countries to the concurrent use of betel nut. The high incidence of oral cancer is associated with significant morbidity and mortality rates. The average worldwide mortality rate from oral cancer, based on a 5-year cumulative mortality rate, is less than 50%; however, mortality rates as high as 67% and 80% have been reported for some countries in the Western Pacific Region.<sup>2</sup>

According to the WHO 2008 statistics, Papua New Guinea (PNG) has the highest incidence rate of oral cancer in the world, with 32.3 per 100,000 people suffering from oral

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cancer.<sup>2</sup> A study of the impact of drug use in PNG pointed out that 89.6% of respondents had tried betel nut,<sup>3</sup> with 11.7 years old being the average age of their first try. According to the WHO STEPS survey done during March 2007 to March 2008 in PNG, 79% of respondents were current betel nut users, with 5.5 mean times of chewing per day.<sup>2</sup>

Several reports pointed out that betel quid chewing often started at a very young age. A cross-sectional study done in Taiwan revealed 50% of primary school students in aboriginal areas experience chewing betel quid,<sup>4</sup> including 30.1% habitual chewers. Similar results were reported in Karachi, Pakistan<sup>5</sup> with 74% of primary school children experienced betel quid and 35% chewed betel quid daily. Another study done in the Northern Mariana Islands revealed 63.4% of regular betel quid use among high school students.<sup>6</sup> Oral leukoplakia, a pre-cancer lesion caused by chronic betel quid chewing, was even noted in 13% of the school children surveyed.

Similarly, previous studies pointed out that people in PNG started consuming betel quid at an early age from 11.7 to 13 years old.<sup>2,3,7</sup> The WHO STEPS Data Book for PNG 2007–2008 indicated that 78.2% of males and 79.5% of females aged 15–24 years were current users of betel quid. 67.3% of the young males and 72.1% of the young females were noted as daily users.<sup>8</sup> It means betel quid chewing is more than a habit as it has developed into their culture, thus to educate in the younger age is the most important.

In order to prevent betel nut consumption in PNG, there is a clear demand for developing an effective health education program. Previous studies pointed out that health education benefits adolescent students in resisting the use of betel nuts.<sup>9</sup> Considering the large population of betel nut chewing at youth in PNG, such program should start early in school. Despite the effectiveness of dental health educating to prevent plaque accumulation was widely discussed,<sup>10</sup> the effectiveness of health educating to prevent betel nut chewing was less investigated in this population.

In PNG, Taiwan, India, and Sri Lanka, this is the first study to focus on the effectiveness of health education of elementary and high school students. Therefore, the aim of the present

study was to investigate the effectiveness of health education among primary school and secondary school students in PNG.

## 2. Methods

In June, 2015, the Department of Overseas Medical Centre, Changhua Christian Hospital, Taiwan initiated a program for oral cancer prevention in PNG. This study has been approved by the Institutional Review Board of Changhua Christian Hospital. This program was also supported by the Ministry of Health and Welfare, Republic of China (Taiwan). Professor Mu-Kuan Chen, the President of Taiwan Head and Neck society was the team leader of the volunteers. Students from Markham Road primary school, Koiari Park Adventist Secondary School in Lae city were selected to participate in a survey on oral cancer, betel quid and tobacco education. Lae city, Morobe Province, is the second-largest city in Papua New Guinea, its official languages are Tok Pisin and English.

Students at Markham Road primary school and Koiari Park Adventist Secondary school received 30 min lectures on topics in oral cancer, including epidemiology, etiologic, clinical appearance, clinical management and treatment. Lecture topics reflected material in the questionnaires. English is the language of instruction at Markham Road primary school and Koiari Park Adventist Secondary School, thus English is used as the lecturing language. Two student age groups were chosen to take part in the surveys (four classes of Students from Markham Road primary school, grade 4, who were around 10-year-old; and two classes of students from Koiari Park Adventist Secondary School, grade 10, who were around 16-year-old). The subjects were chosen by random; the school provided the classes and students we educated and did the questionnaires on. The percentages of the study subjects for four classes of primary schools was 100/1000 (10%), and two classes of secondary school students was 65/447 (14.54%). One public primary school and one private secondary school were chosen that helped to avoid sample bias.

All students were measured at baseline and after the 30 min of lectures post-test on their oral cancer, betel nuts and tobacco cessation knowledge. They were allowed 15 min to write the

Table 1  
Questionnaire scoring of primary school students.

| Questionnaire  | Pre-test             | Post-test            | <i>p</i>     |
|--|----------------------|----------------------|--------------|
| Knowledge (Mean ± SD)  |                      |                      |              |
| Can Betel quid cause oral cancer?  | 0.810 ± 0.394        | 0.894 ± 0.309        | 0.102        |
| Will chewing Betel quid cause throat cancer?                                   | 0.670 ± 0.473        | 0.737 ± 0.443        | 0.310        |
| Do you think chewing Betel quid is harmful to your health?                     | 0.350 ± 0.479        | 0.411 ± 0.495        | 0.387        |
| Do you know of any disadvantages of chewing Betel quid?                        | 0.810 ± 0.394        | 0.590 ± 0.495        | <0.001*      |
| How does chewing Betel quid affect the heart?                                  | 0.420 ± 0.222        | 0.405 ± 0.197        | 0.625        |
| Do you think chewing Betel quid will increase your capacity to study?          | 0.420 ± 0.496        | 0.463 ± 0.501        | 0.546        |
| Do you think chewing Betel quid can stimulate your salivation?                 | 0.650 ± 0.479        | 0.632 ± 0.485        | 0.790        |
| Does chewing Betel quid have any effect on pregnancy?                          | 0.450 ± 0.500        | 0.779 ± 0.417        | <0.001*      |
| <b>Overall</b>   | <b>4.580 ± 1.363</b> | <b>4.911 ± 1.363</b> | <b>0.092</b> |
| Motivation (Mean ± SD)   |                      |                      |              |
| If you ever get a chance, will you try to stop others from chewing betel quit? | 0.640 ± 0.482        | 0.611 ± 0.490        | 0.673        |

\**p*-Value < 0.05.

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