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Evaluation of Effectiveness of the 3A3R Educational Intervention Program for Betel Nut Addicts

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Abstract

The study has assessed the effectiveness of the 3A3R educational intervention program for betel nut addicts. Effectiveness was measured on improvements in the following indicators: awareness of risks of betel nut use, perceived susceptibility to oral disease, perceived severity of oral cancer, betel-nut related behavioral changes, and frequency of betel nut use. Subjects were composed of the patients of 23 dental clinics. We employed the 3A3R (Ask, Advise, Assess, Relevance, Risk, Rewards) methodology to visiting patients as a way to educate them on the risks of betel nut use. Analysis included paired t-tests and ANOVA on the pre-test and post-test on the relevant variables. Patients displayed an increase in awareness of risks, perceived susceptibility, and perceived severity. More than 32% patients moved one stage forward in quitting betel nut use in one week. Betel nut use also fell by an average of 7.77 nuts. The 3A3R intervention program is effective for improving patients’ awareness; perceived susceptibility to oral disease; perceived severity of oral cancer; helping patients for the quitting process and reducing the betel nut intake. We recommend the standardization and implementation of the 3A3R intervention in hospitals for the purpose of helping betel nut addicts.

Key words: Betel nut, oral cancer, addiction, prevention, awareness, Taiwan.

1. Introduction

Cancer is one of the most killer diseases in the world. Chronic diseases such as cardiovascular disease, cancer, chronic respiratory diseases and diabetes, constitute more than 2/3rd of all deaths in the world [1]. Oral cancer is one of the most prevalent cancers especially among the alcohol, tobacco and betel nut abusers [2, 3]. The major risk of long-term betel nut use is the increased risk of oral cancer. The International Agency for Research on Cancer has employed epidemiology and animal studies to confirm that the betel nut is a type-1 carcinogen for humans [4]. A recent study has indicated that betel nut consumers have 123 folds augmented risk of oral cancer than non users [5]. Betel nut abuse is significantly associated with several adverse health effects, such as gum disease, metabolic syndrome, sub-mucosal fibrosis, hypertension and cardiovascular mortality, oral and pharyngeal cancer [6–8].

Betel nut consumption (chewing) is highly prevalent in South Asia (India, Pakistan and Nepal), Southeast Asia (e.g. Cambodia, Vietnam, Taiwan, Malaysia, Indonesia, Papua New Guinea, and the Philippines) and the Western Pacific islands [9]. According to the Department of Health, the major cause of death in Taiwan in 2011 was malignant tumors. In terms of individual cancers, oral cancer stands as fifth most prevalent. Oral cancer was the fourth major cause of cancer-related deaths among males in Taiwan. Standardization procedures based on the ten most prevalent cancers in Taiwan show that oral cancer was more prevalent in 2011 than it was in 2010. Oral cancer is a rising public health problem that Taiwan cannot ignore. 2011 statistics show that the median in age of those who have died due to oral cancer is under 60, which is 10 to 20 years earlier than the median for other cancers. In 2011, Taiwan has 6,000 new oral cancer cases. Of those 6,000 new oral cancer cases, 2,400 led to death, with 90% of the cases being associated with betel nut use [10]. Helping betel nut users to quit their use will lead to a reduction in the oral cancer rate.
Research has shown that health education and consulting has effectiveness in helping smokers quit smoking [1]. Taiwan does not have a similar clinic for helping citizens to quit betel nut use. Due to the lack of such resource, this study gained the cooperation of dentists in performing oral cancer screenings and intervention employing the 3A3R structure, which stands for Ask, Advise, Assess, Relevance, Risk, and Rewards, to encourage quitting betel nut chewing. The study tried to assess the effectiveness of the 3A3R educational intervention program for betel nut addicts. Effectiveness was measured on improvements in the following indicators: awareness of risks of betel nut use, perceived susceptibility to oral disease, perceived severity of oral cancer, betel-nut related behavioral changes, and frequency of betel nut use.

2. Materials and Methods

2.1 Study place and population

The study was conducted in Hualien Province, Taiwan during the 2009 calendar year. Twenty-three dental clinics administered the study. All targeted patients were being approached for the study explaining the objective and intervention procedure. However participation in the study was exclusively voluntary and no further emphasize was made in this regard to participate. A total of 288 persons participated at the beginning. However, finally 221 participants (76.7%) completed. The rest (67 respondents) was discarded due to incomplete questionnaires.

2.2 Instrument

The 3A3R structure is an edited version of the 5A5R structure used to help people quit smoking. The original 5A5R structure stood for the following tasks: Ask about tobacco use, Advise to quit, Assess willingness to make an attempt to quit, Assist in an attempt to quit, Arrange a follow up; Relevance, Risks, Rewards, Roadblocks, Repetition. Research has shown the 5A5R structure to be effective in interventions with addicted smokers [11]. The current research references the use of 5A5R in intervention programs as its model as it is already proved to be convenient for international community familiar with the 5A5R structure. The simplified 3A3R version includes in the current study for quitting betel nut is the following.

1. Ask

2. Advise (educate and encourage quitting):
   This section includes the 3R portion: Risk (the dangers of using betel nut), Relevance (making the situation personal), and Reward (the benefits of quitting betel nut).

3. Assess (strengthen motivation and evaluate willingness to quit)

More details are depicted in table 1.

This research took place in Hualian dental clinics. To confirm the results of the study, we have chosen multiple indicators: awareness of the risks of betel nut, perceived susceptibility to illness through betel nut use, perceived severity of oral cancer, changes in betel nut use, and the progress through the stages of quitting betel nut.

After necessary piloting, questionnaires were developed to obtain the relevant information pertinent to the research purpose. Included in the questionnaire were five main indicators: demographic factors, self-reported oral cavity problems, perceived susceptibility to oral cavity illness, perceived severity of oral cancer, changes in betel nut use, and the progress through the stages of quitting betel nut. The follow-up questionnaire contained the same indicators as the baseline, except the demographic factors as same participants answered the questionnaires. A nurse at the clinic administered the follow up questionnaire via phone.

The design of the questions for the indicators of perceived susceptibility and perceived severity follow those of Health Belief Model (HBM) by Becker & Rosenstock’s [12]. HBM posits that an individual’s health-related behavior stems from beliefs about the connections between certain behaviors and the possibility of health problems or benefits. In this case, we applied HBM to the behavior of quitting betel nut use.

For the indicator that specifying the changes through the stages of quitting betel nut, we drew from Prochaska and Diclemente’s Transtheoretical Model [13]. This model posits that changes in human behavior takes place in a dynamic process that consists of five stages as follow.
Pre-contemplation: I am not quitting betel nut use, nor do I plan to in the next 6 months. ii) Contemplation: I am not quitting betel nut use, but I plan to in the next 6 months. iii) Preparation: I have started to quit betel nut use, but I still occasionally chew betel nuts. iv) Action: I have started to quit betel nut use, but have not abstained for 6 months straight yet. v) Maintenance: I do not chew betel nuts and have not used betel nuts for over 6 months. In the 3A3R education method betel nut users are directed downward in the Transtheoretical Model, toward full abstinence. For example: moving from pre-contemplation to contemplation would imply a person previously did not consider quitting betel nut use but is now willing to begin the quitting process.

2.3 Procedure

Prior to the questioning from the dentist, the nurse informed the patients, who could be tentative participants of the study about the objective and procedure, emphasizing the ability to make inquiries and the fact of confidentiality. The first step was to ask patients whether they engaged in betel nut use. If met with a negative answer, the nurse would explain the dangers of betel nut use as a measure of preventative education. If met with an affirmative answer, the nurse would ask the patient whether he would be willing to proceed with the 3A3R betel nut education. If met with agreement, the nurse would help the patient fill out a pre-education questionnaire and proceed with the 3A3R intervention. After the 3A3R intervention, if the patient expressed a willingness to quit betel nuts, the procedure would continue with an evaluation as to whether the program was successful. Patients would also receive a post-education test on the dangers of betel nut use. Three days afterward, a nurse would call the patient to express concern and engage in eliciting awareness on the possibility of being afflicted by illness through betel nut use as well as the severity of oral cancer, changes in betel nut use, and the progress through the stages of quitting betel nut. Answers were recorded. The following flowchart displays the education process outlined by the 3A3R method.
2.4 Ethical issue

During the study time, Taiwan’s laws on human testing were more lenient. So we could not achieve any formal permission. However, we have strictly followed the WMA guidelines. We ran our study with principles that conform to the laws of today. On the 5th of July, 2012, the Department of Health declared new guidelines for human studies. These guidelines were aimed at studies using subjects who were underage, under the care of others, belonging to an indigenous tribe, pregnant, handicapped, mentally ill, or unable to give consent. (Guidelines regarding studies evaluating educational progress in schools were also given.)

2.5 Statistical Analysis

We employed SPSS for Windows, version 18.0 to code and analyze the questionnaires. For the data analysis, we used descriptive statistics to look at demographics and the stages of quitting. Paired t-tests compared the pre-test and post-test data for the following indicators: self-reported oral cavity problems, perceived susceptibility to oral cavity illness, perceived severity of oral cancer, changes in betel nut use, and the progress through the stages of quitting betel nut. The t-tests were to tell us whether the 3A3R educational process was effective at changing these indicators’ values. One-way ANOVA analyzed the differences in age and demographic factors, with alpha at 0.05.

3. Results

3.1 Demographic information

The sample included 137 (72%) males and 84 (38%) females. Those with high school or vocational school as their highest form of educational attainment constituted the highest proportion of betel nut users 29.4%), followed by middle school (26.7%) and elementary school (25.3%). Seventy nine (35.7%) were engaged in service sector, while 25 participants (11.3%) were in agricultural sector. The average of age is 46.3 years old.

3.2 The effectiveness of 3A3R in moving participants through the stages of quitting and its relationship to demographic factors

Three classes that can describe the movement in the Trans theoretical Model exist, the first being behavioral improvement: Subtract the points on the pre-test from those of the post-test to arrive at a number above zero. Behavioral stasis: Subtract the points on the pre-test from those of the post-test to arrive at zero. Behavioral deterioration: Subtract the points on the pre-test from those of the post-test to arrive at a number below zero. During the pre-test, we found 16 subjects already in the maintenance stage. However, during the post-test one subject regressed to the preparation stage. We subtracted the 15 subjects constantly in the maintenance stage from this analysis, Leaving 206 data points. The analysis did not show any significant connection between demographic variables (sex, education level, and age) and change through the stages to quitting.

3.3 Movement through the stages of quitting betel nut use

Table 3 displays the movement through the stages of quitting betel nut use due to the 3A3R
At the time of the pre-test, 50 participants were either in the precontemplation stage or were unwilling to quit betel nut use. At the time of the post-test, 22 of these 50 participants (44%) were still in the precontemplation stage; 17 (34%) had made plans to quit; 9 (18%) had reduced their betel nut intake, entering the preparation stage; 2 (4%) had entered the action stage, having abstained from betel nut – though not yet at the 6-month abstinence point.

At the pre-test, 61 participants were in the contemplation stage, planning to take action toward quitting betel nut use within six months. At the post-test, 17 of these subjects (27.87%) had already reduced their betel nut use, entering the preparation stage. Another 7 (11.48%) had begun to abstain from betel nut use, entering the action stage.

On the pre-test, 77 subjects indicated they were in the preparation stage and were ready to take action toward quitting. Of those, 53 (68.83%) were still in the preparation stage at the time of the post-test. But 14 (18.18%) had taken action in quitting. On the pre-test, 17 subjects indicated they were in the action stage and were taking action toward quitting. At the post-test, 3 subjects had moved into the maintenance stage; 2 had returned to the contemplation stage; and 1 had returned to the precontemplation stage. During the pre-test, 16 subjects reve-
aled themselves to have abstained from betel nut use for at least 6 months, which classified them as being in the maintenance stage. One of these subjects returned to the preparation stage at the time of the post-test.

3.4 Comparison of pre-test and post-test in light of the 3A3R intervention

Table 4 describes the indicators used in the intervention: self-reported oral cavity problems, perceived susceptibility to oral cavity illness, perceived severity of oral cancer, changes in betel nut use, and the progress through the stages of quitting betel nut. Subjects on average, reduced their betel nut intake by 7.77 nuts. Subjects also showed an increase in knowledge as pertains to the risk that betel nut usage poses, with an average increase of 0.665 points as per our scoring system. In addition, subjects demonstrated an average increase in perceived susceptibility, at 0.78 points. Finally, average perceived severity increased by 0.584 points.

4. Discussion

The results of the study demonstrate that this method (3A3R) is effective for quitting betel nuts. The numbers show that few of the participants who were considering quitting (i.e., those in the contemplation or preparation stages) at the pre-test gave up that idea, with only 7.4% (14 out of 188) of them moving to the pre-contemplation stage. In total, 36.16% (68 out of 188) of the participants moved forward one stage, and of those in the pre-contemplation or contemplation stages, 50% moved forward one stage. Moreover, the fact that few of our participants in the action stage moved showing that this intervention tended to be more useful to those who were in the thought-related stages. One possible reason for 3A3R’s effectiveness is the model’s second step: Advise, which includes Risk, Relevance, and Reward. Borrowing this method from the work of Prochaska and DiClemente [13], we emphasized the risk of betel nut use, drawing on relationships and other personally relevant factors, to arouse self-evaluation among the participants. The evaluation of the pros and cons of betel nut usage were likely to have assisted subjects in assessing their environmental influences to move forward in the process of quitting. Due to the limited duration of the study, our intervention did not include the other elements of Prochaska and DiClemente’s methods, namely stimulus control, counterconditioning, reinforcement management, self-liberation, and relationship assistance [13]. Despite this limitation, our study resulted in only 17.6% (3 out of 17) of participants regressing from the action stage.

Previous study on addiction has demonstrated that education is important factor rather than employment as higher education leads to less of smoking [14]. The current study has demonstrated that higher education leads more betel nut chewing. Therefore social autopsy and considering ethnic and cultural backgrounds is warranted. A survey on the betel nut use of transportation employees in central Taiwan has shown that individuals who are aware of the health risks that betel nut chewing poses will be more willing to quit Of those who use betel nut, 75% have considered quitting at least once. [15]. Our study’s 3A3R intervention program increased awareness of the health risks, as well as perceived susceptibility and perceived severity. One tangible result was an average decrease in betel nut use; 7.77 less nuts per person. [13]. Overall, despite the short time limitations imposed on the intervention process, our method showed effective results.

Other research on this subject has showed the effectiveness of consulting medical professionals and the frequency of those consultations on assisting individuals who wish to quit smoking and drinking [16-20]. However, no similar results have been shown for similar interventions working for quitters of betel nut. Nor do clinics for individuals who wish to quit betel nut currently exist in Taiwan. For these reasons, we have no similar literature with which to compare our study. Moreover, the act of quitting smoking differs greatly from that of quitting betel nut use. While cigarettes contain the addictive chemical nicotine, betel nuts do not contain any addictive chemicals. Thus, it would be inappropriate to employ information on the interventions aimed at smoking in the realm of betel nut use.

The principles of the Transtheoretical Model, by Weinstein, Rothman and Sutton emphasizes on using different forms of interventions for patients at different stages [21]. Our research merely used
the Transtheoretical Model. Without using it to determine intervention measures; our main focus was to examine the possibility of expanding the use of such a model via the 3A3R system. This does not affect the original purpose of the Transtheoretical Model. In the design of this study, we proposed treating each patient in an equal manner via a single educational intervention measure that would be convenient for clinical use. This allowed us and the participating clinics to cut down on the time costs involved in classifying each patient.

This research was made possible by 23 participating dental clinics and their willing patients. This subject pool itself might have participants who are already suffering from oral illnesses, which is why the sample and timing (i.e., seeking dental care) were suitable for the 3A3R intervention. The success of this research implies that expanded studies would be effective, such as in involving schools, hospitals, and the department of health in 3A3R interventions.

4.1 Study Limitations

The dental clinics in which the study took place were all in Hualian. As the population of Hualian differs in some ways from those of more populated areas, generalizing these results might be premature. The time limitation, as its name suggests, was also a limitation. Our study employed a follow-up call from nurses only 3 days after the pre-test. Future studies should consider longer, sustained follow-up.

5. Conclusion

Betel nut chewing is becoming a global health problem especially in the Asia, Western Pacific, Micronesia and few parts of Latin America. Therefore the current study has importance for necessary intervention to quitting betel nut chewing. However a large-scale study is warranted before universalization of the intervention.

References


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