

5A's and 3A's Adolescent Smoking Interventions as Nicotine Dependence Endgame Initiatives in Sarawak, Malaysia

Running Title: 5A's and 3A's Approaches for Nicotine Dependence Endgame Initiatives

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Abstract Anti-smoking initiatives in Malaysia have the potential to reduce adolescent smoking, but their effectiveness and the need for research support remain important considerations. This study aimed to examine the efficacy of two smoking cessation interventions, the 5A's and 3A's, in reducing smoking among male adolescents in Samarahan, Sarawak. From September 2020 to June 2021, twelve communities were randomly assigned to the 5A's, 3A's, or control groups. A total of 519 participants aged 13-17 years provided data on demographics, smoking habits, nicotine dependency, motivation, carbon monoxide levels, and monthly cigarette consumption. The interventions' effectiveness was evaluated at 1, 3, 6 and 9 months. Analysis of covariance revealed no significant main effects of time or group on nicotine dependence, although age had a significant effect. Post hoc analyses showed significant group differences at multiple time points. For motivation, there was a significant main effect

of time, with Group 5A consistently demonstrating higher means. Significant group differences were observed at specific time points. Analysis of carbon monoxide levels indicated significant main effects for group and time, with Group 5A consistently exhibiting the lowest mean levels. Significant group differences emerged by the 6th month. Regarding the number of cigarettes smoked, significant group differences were found, with both Group 5A and Group 3A reporting lower levels compared to the control group. Our findings add to the existing body of knowledge on the success of initiatives aimed at reducing smoking rates among young people. However, there is still a need for additional investigations in this field to further advance our understanding.

Keywords Adolescent, Community Randomised Control Trial, Quit Smoking

1. Introduction

Investigations globally are striving to identify causes of and countermeasures for adolescent smoking. Their focus is reducing the prevalence of this harmful habit and its adverse effects [1]. It was reported that tobacco consumption rate was 19.3%, ranging from 1.5% to 65.5% [1]. The financial impact of smoking-related diseases, such as COPD and lung cancer, is enormous, exceeding MYR 3 billion in Malaysia, illustrating the significant impact of smoking on public health and economy. Smoking in Malaysia contributes to 10,000 deaths annually and 5.6 million years of life lost (YLLs), a concerning statistic underlining the importance of effective anti-smoking measures [2]. Smokers are often more likely to partake in risky behaviors, including premarital sex, alcohol consumption, and drug abuse, compared to non-smokers [3]. Smoking behavior typically initiates during adolescence, a phase marked by increased social influence susceptibility and experimentation desire [4]. Most adults who began smoking during adolescence tend to maintain the habit into adulthood. This pattern signifies the importance of early intervention and prevention strategies discouraging youth smoking [5]. Adolescents who begin smoking exhibit an increased likelihood of smoking-associated diseases and a decreased propensity to quit smoking [3]. Research has consistently shown the age group from 10 to 15 years as the critical window for initiating smoking due to susceptibility to peer pressure, social norms, and environmental influences [4]. Therefore, it's crucial to recognise that the smoking habit often continues into early adulthood [6, 7].

Many health organisations worldwide have adopted the 5A's approach to smoking cessation, as outlined in the Framework Convention on Tobacco Control (FCTC). This model, established through rigorous research, includes: Ask, Advise, Assess, Assist, and Arrange [8, 9]. Coleman [10] and Lando et al. [11] proposed an abbreviated approach, known as the 3A's or Brief Advice model, to address time constraints of the 5A model [12]. With growing adolescent smoking rates in educational institutions, there's a need to examine the effectiveness of these strategies in reducing smoking prevalence among Malaysian youth [3, 13]. A focused, chairside counselling approach may be crucial in assessing these models' efficacy in smoking cessation amongst adolescents. Using a streamlined method that emphasises the most impactful information could improve outcomes and enable better evaluation of the interventions' effectiveness. Current knowledge on the acceptability, feasibility, and effectiveness of smoking cessation treatments in Malaysia is limited despite the availability of qualified medical practitioners to aid smokers' quit attempts. Additional research and in-depth analysis are necessary to understand these factors better. Furthermore, there's a noticeable gap in scholarly research concerning the actual implementation of intervention strategies in Malaysian community or academic settings.

This study aimed to compare the efficacy of the 5A's and 3A's interventions in facilitating smoking cessation among adolescents, determining which approach was more effective in promoting smoking cessation in this age group.

2. Materials and Methods

2.1. Study Design, Population, and Sample

We conducted a three-arm parallel cluster randomised controlled trial involving male secondary school students aged 13-17 years from 99 rural clusters in the Kota Samarahan and Asajaya districts of Sarawak. The cluster was defined as the population in a village (cluster) not exceeding 1000 individuals [14]. Participants were randomly allocated into three groups: two experimental groups receiving either the 5A's or 3A's smoking cessation interventions, and no intervention for the Control group. The smokers were defined as an individual who has engaged in the act of smoking at least one cigarette within the previous 30-day period [15]. Out of the 29 eligible villages, seven hundred and sixty-four adolescent tobacco users aged thirteen to seventeen were initially recruited. Despite an eagerness to participate, 164 adolescents were excluded due to lack of parental consent. Furthermore, 81 adolescents were deemed ineligible after age matching procedures, leading to a final sample size of 519 participants. The study meticulously selected six villages from the Samarahan and Asajaya districts, ensuring representation of the three groups. Each group was represented by two villages chosen based on strict criteria, maintaining the sample's representativeness despite exclusions.

A rigorous analysis was conducted to determine the appropriate sample size using the two-proportion formula. A confidence interval of 95% was set, and the proportion estimates (π_1 and π_2) were 0.176 (17.6%) and 0.053 (5.3%) respectively. The formula was as follows:

$$n = c \frac{\pi_1(1-\pi_1) + \pi_2(1-\pi_2)}{(\pi_1 - \pi_2)^2} \quad [16]$$

where $c = 7.9$ for 80% power, thus, sample size = $7.9((0.176(1-0.176) + 0.053(1-0.053)) / (0.176-0.053)^2) = 103$ (each group). The resulting sample size for each group, after accounting for a non-response or loss of follow-up rate of 70%, was determined to be 175. The calculation did not incorporate a correction for clustering, assuming a negligible design effect [17].

2.2. Interventions and Follow-Ups

The study included two intervention methods: the 3A's Brief Smoking Cessation Intervention, requiring around a minute per component, and the 5A's smoking cessation intervention, needing roughly seven minutes.

In the 3A's intervention, "Ask" sought information about smoking duration and quantity. "Advice" delivered a personalised message urging smoking cessation, while