Smoking Habit Among Malaysian Adolescent Athletes

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Abstract

Previous findings had reported that cigarette smoking can affect athletes’ physical fitness and decrease their performance. However, the study on this topic is scarce in Malaysia sports setting. Therefore, the objectives of this study were (a) to examine the percentage of cigarette smoking among Malaysian athletes; (b) to determine the factors contributed to the habits; and (c) to assess athletes' understanding and awareness on adverse effect of the habits. Prevalence of cigarette smoking in adolescent athletes was 9.33%. Most athletes (48.20%) started to smoke between 13 to 15 years. Breath carbon monoxide reading for smoker athletes was 7.52 ppm. Peers, family members and coaches were reported as the highest contributing factors to smoking habit. ‘Lung Cancer’ was reported as the most common adverse effect of smoking; however, ‘Wasting Money’ was the highest concern for athletes to stop smoking. Future studies should utilise a holistic approach intervention to increase the probability of successful cessation from smoking.

Keywords: Smoking, Adolescent Athlete, Breath Carbon Monoxide, Prevalence, Malaysia.

Introduction

Cigarette smoking has been proven as detrimental to one’s health. Some noted adverse effects of cigarette smoking on health include: cancer, psychological problems, injuries, violence and worst, death. While exercise and sports activities are said to have protective and preventive effect on high risk behaviours such as tobacco smoking and alcoholism, some studies had found that athletes particularly at younger ages, are...
more prone to be involved in these negative habits compared to non-athletes (Aaron et al., 1995; Nattiv, Purfur & Green, 1997; Nelson & Wechsler, 2001; Yusko, Buckman, White & Pandina, 2009;).

As individuals who are frequently in the spotlight, tobacco smoking athletes potentially display an unhealthy image to the public, especially toward young fans who look at these athletes as role models. Moreover, studies had reported that this habit can affect athletes’ physical fitness and decrease their performance. For instance, Conway and Cronan (1988) discovered that smoking was associated with lower exercise levels and lower physical endurance while Tchissambou et al. (2004) reported smokers to have lower VO$_2$max values than non-smokers.

Considering the importance of these issues, it is surprising that studies on athletic population are somewhat lacking compared to general population. The current study has three objectives; (a) to examine the percentage of cigarette smoking among Malaysian athletes by means of breath carbon monoxide assessment (BCO); (b) to determine the factors contributing to the habit; and (c) to assess athletes understanding and awareness on adverse effect of the habit.

**Methodology**

This was a cross-sectional study conducted among adolescent athletes under the State Sports Council or National Sports Council programs. Written consent was obtained from athletes and their coaches prior to data collection. Ethical approval was given by ISN Research Committee.

The instruments included (a) Smokerlyzer piCO$^+$ that measures an individual’s BCO to validate a person’s smoking status to specific range in parts-per-million (ppm); and (b) a modified questionnaire adopted from Global Youth Tobacco Survey (Centers for Disease Control and Prevention, 2011) that consisted of questions regarding socio-demographic characteristics, tobacco use prevalence, cessation, and knowledge and attitudes toward smoking. The cut-off point for breath CO reading to differentiate between adolescent smoker and non-smoker was set more than 4 ppm, as prescribed by Bedfont Scientific Ltd (2011).

Prior to completing the questionnaire, athletes were asked to provide two breath samples using the piCO$^+$ meter. The experimental procedures and the correct way to exhale into the CO meters where first demonstrated by the researchers. For each sample, athletes were asked to take a deep breath and hold it for 15 seconds. Once the athletes exhaled into the meter, the CO result and duration of exhalation was recorded, and the stopwatch was reset and restarted to time the 2 minute interval that was required to elapse before the collection of the following sample.

The standard cut-off point for adolescent smokers are: 0–4 ppm for a non-smoker, 5–6 ppm for those in the danger zone, 7–10 ppm for a smoker, 11–15 ppm for frequent smokers, and 16–25 for addicted smokers. In the current study, 6 ppm is taken as the cut-off point between smoker and non-smoker. Based on the cut-off point, athletes who were classified as smokers were given the questionnaire for ‘Smokers’ to fill up. For other athletes, they were given the ‘Non-Smoker’ questionnaire. Data analysis for the questionnaire was done using SPSS 21. Confidence interval was set at 95%, and p-value of less than 0.05 was considered as significant.

**Result**

The total number of athletes screened for smoking status was 654; 369 (56.42%) of them were male and 285 (43.57%) were female. The mean age of total participants was 17.68±2.08 years. Most of the
participants were Malay (457, 70.09%), this is followed by Chinese (82, 12.57%), Indian (19, 2.92%) and Others (94, 14.42%).

61 (9.33%) of the athletes were categorized as smokers. This included 60 (98.36%) male and 1 (1.64%) female athletes. In the smoker athletes, the initiation age of smoking was reported at 14.82±2.11 years old with the earliest initiation age recorded was 9 years. For most smoker athletes, smoking started between 13 to 15 years old (48.20%). Further analysis revealed that the initiation age of smoking was inversely related with the frequency of daily smoking (r= -0.286, p<0.01). The mean duration for smoking among the athletes was 3.78±2.34 years. On average, athletes smoked about 5 cigarette sticks in one day. Table 1 shows the mean of daily cigarette sticks smoked by athletes according to their initiation age.

<table>
<thead>
<tr>
<th>Initiation age (years)</th>
<th>Number of athletes (%)</th>
<th>Mean of daily cigarette sticks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1.67</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>3.33</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>1.67</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>5.00</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>10.00</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>23.33</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>15.00</td>
<td>6</td>
</tr>
<tr>
<td>16</td>
<td>18.33</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>10.00</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>11.67</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

Athletes usually smoked after they finished their training session (Table 2). The mean BCO reading for smoker athletes was 7.52 ppm and in non-smoker is 2.01 ppm (p<0.00). For smokers, the minimum BCO reading was recorded at 5.50 ppm while the maximum reading was at 21.50 ppm.

<table>
<thead>
<tr>
<th>Time of smoking</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before sports training</td>
<td>29.31</td>
</tr>
<tr>
<td>During sports training</td>
<td>1.75</td>
</tr>
<tr>
<td>After sports training</td>
<td>56.14</td>
</tr>
<tr>
<td>Other times (after meal, etc.)</td>
<td>35.09</td>
</tr>
</tbody>
</table>

Table 3 Mean BCO reading by different initiation age group

<table>
<thead>
<tr>
<th>Initiation age group (years)</th>
<th>Number of athletes (%)</th>
<th>Mean BCO reading (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤12</td>
<td>11.48</td>
<td>10.43</td>
</tr>
<tr>
<td>13 to 15</td>
<td>45.90</td>
<td>9.93</td>
</tr>
<tr>
<td>16 to 18</td>
<td>37.70</td>
<td>9.82</td>
</tr>
<tr>
<td>No answer</td>
<td>4.91</td>
<td>8.67</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

52 (92.85%) of smoker athletes reported that they have tried at least once, to stop smoking. In terms of the contributing factors to initiate smoking, ‘Peers’ was reported as the highest (27, 72.97%). This was
followed by ‘Family Members’ (18, 48.64%), ‘Coaches’ (16, 43.24%) and ‘Trying for Fun’ (21, 56.75%).

Regarding the sources of cigarettes, most athletes (54, 96.42%) bought them personally. They also obtained cigarettes from their friends (46, 82.14%), family members (30, 53.57%) and coaches (28, 50.00%).

Almost all of the smoker athletes (58, 98.31%) knew that smoking had negative effects on their body. Figure 1 shows the adverse effects of smoking, as reported by athletes. ‘Lung Cancer’ was the most reported adverse effect (53, 86.33%), followed by ‘Yellow Teeth’ (48, 80.00%) and ‘Lung Cancer to Passive Smoker’ (35, 58.33%).

Figure 1 Adverse effects of smoking as reported by athletes

![Graph showing adverse effects of smoking](image)

56 (94.92%) smoker athletes stated that they wanted to quit smoking due to various reasons (Figure 2). ‘Wasting money’ was reported as the highest concern, followed by ‘Awareness that smoking is dangerous’, and ‘Health problem’.

Figure 2 Reasons to quit smoking as reported by athletes

![Graph showing reasons to quit smoking](image)

However, athletes still continued to smoke due to ‘Boredom’ (24, 66.67%), ‘Peer Pressure’ (23, 63.89%), ‘Addiction’ (22, 61.11%), ‘Easy to obtain cigarette’ (20, 55.56%) and ‘Habit’ (20, 55.56%). Besides, athletes also reported that they smoked when they saw people around them smoking (18, 50.00%). 51.7% (31) of smoker athletes agreed that smoking habit had the potential to negatively affect their sports performance.
Regarding the ‘No Smoking’ advertisement, 499 (79.84%) of all athletes in this study reported that they had seen at least one signboard on the No Smoking campaign around the hostel, training ground or competition venue. Only 84 (16.93%) out of these stated that the advertisement was effective to educate and warn them about the danger of smoking, while 415 (83.06%) felt that the advert was not enough to achieve the aforementioned objective.

**Discussions**

**Prevalence of Smoking in Athletes**

The idea that participating in sports reduces high-risk behaviour such as smoking, has found mixed results. Some studies reported that being active in sports and physical activity decreases the risk of smoking habit (Lee et al., 2005) while other study found no relation between sports participation and smoking habit. However, Lim et al. (2006) found that adolescent students who performed physical activity for 1 hour per week involved less with smoking.

While the prevalence of smoking for athletes seems to be lower, smoking and sports is not a compatible pair and all athletes should be non-smoking. One of the objectives of Dasar Sukan Negara Malaysia (1988) is to develop a healthy, disciplined and united society via sports participation. Smoking however, contradicts this objective. Moreover, people usually view athletes as positive role model; therefore smoking is certainly not a fitting criterion for the image.

Similar to studies in non-athlete setting, more male adolescent athletes in this study were reported as smokers compared to females. The trend is also identical in the adult population. For example, Yaacob and Harun (1994) reported that only 6 females out of 766 adults in Kelantan were reported as smokers. Similar findings were reported by Al-Naggar, Al-Dubai, Al-Naggar, Chen and Al-Jashamy (2011) where more male university students (41.2%) were found to be smokers compared to females (17.5%).

The low number of female smokers reported can be associated with the sociocultural stigma in Asian countries where cigarette smoking is traditionally considered as indecent and rude behaviours for females. However the prevalence of female smokers is predicted to increase in future, as several factors can contribute directly to the upward trend, as pointed in the report by Malaysia National Health and Morbidity Survey 1996-1997, (as cited in Morrow and Barraclough, 2003):

“modernisation, changes in women’s role in society, social interests and smokers’ perception and experience regarding the maintenance of lower body weight, which has resulted in the higher prevalence of smoking elsewhere, may well change the future pattern of smoking in Malaysian women” (p.24).

In recent years, some studies have already indicated the growing number of female smokers in Malaysia. For example Manaf and Shamsuddin (2008) reported that in 408 female college students about 18% were smokers; while Kin and Tan (2008) found that 20% of girls and young women between 13 to 25 years old in Malaysia had tried cigarette smoking.

**Age at Smoking Initiation**

Athletes in this study initiated smoking around 14 years, and the earliest starting age reported was 9 years. Smoking initiation age was also found to be inversely related with the number of cigarettes smoked. This means that athletes who started to smoke at earlier age were more prone to smoke a higher number of daily cigarettes, and vice versa.
Past studies have revealed that early initiation age of smoking is a strong predictor for adolescents to become heavy smokers, develop nicotine dependence and lower their chance to quit smoking. For example, Lim et al. (2010) reported that in a study involving 397 adolescent smokers in Johor, the age of smoking initiation was found to be as early as 4 years old and peaked around 11 years old. Lim et al. further reported that the age of smoking initiation was inversely related to addiction level which means that adolescents who started to smoke earlier will have higher addiction level. Chen and Millar (1998) reported similar finding where adults who started smoking in early adolescent have almost 3 times odds to become heavy smokers compared to those who started at late adolescent, and they also have lower probability of quitting.

On the other hand, Breslau and Peterson (1996) investigated the influence of age of initiation and other factors on smoking cessation and found that among those young adults who started smoking below 13 years, about 75% of them developed nicotine dependence; and the cessation rate was the lowest compared to other groups who started smoking at later age. Thus Breslau and Peterson suggested the probability of effectiveness of programs to delay smoking initiation in order to improve successful cessation.

**Risk factors for smoking habit**

Since most athletes started to smoke when they were at lower secondary school age, it is not surprising that besides family members, peers also emerged as the main determinant factors. In sedentary settings, having friends or family members who smoke is also frequently found to have strong correlation with adolescent’s smoking habit (Naing et al., 2004; Lim et al., 2006; Khairani et al., 2007; Rapeah et al., 2008; Lim et al., 2010). In a study on secondary school male smokers, Shamsuddin and Haris (2000) reported that the habit is worsen if adolescents have a negative role model at home such as a father or elder siblings who smoke; and factor such as lack of parental supervision contributes more damage to this habit. On the other hand, Khairani, Norazua and Zaiton (2007) stated that adolescents usually like to experiment smoking together with their friends, and they may initiate smoking to fit in with their peer group and feel more accepted.

Adolescent athletes regularly spend most of their daily hours at the training venue after they finish school. Therefore in the current study, the finding that coaches who smoke emerged as one of the determinants for adolescent athletes’ smoking habit is predictable. Bloom, Durand-Bush, Schinke and Salmela (1998) had stressed that coaching usually goes beyond sports, and involves personal dimension. Athletes will find that coaches leave huge impact on them and their development whether as an athlete or as a person. Hence a respectable coach who cares about his athletes’ well being will not smoke in front of their athletes, knowing that the athletes will pick up the habit as well.

**Athletes’ sources of cigarettes**

Most of the athletes in the current study bought cigarettes using their own pocket money. Athletes in Malaysia are given a monthly allowance based on their level of participation and sports achievement. For most athletes in this study, they were state level athletes who receive around RM 150 to RM 400 monthly, with the amount varying between states. The State Sports Council has a responsibility to ensure that this money is used appropriately.

The allowance is provided as a token for athletes to work harder to improve their performance in sports competition. Yet if the money is used to buy cigarette, this is inappropriate and illegal. Furthermore, adolescents below 18 years old in Malaysia are prohibited to possess cigarettes, and they cannot legally buy them. The finding is a proof that law reinforcement on tobacco trade in our country is still lacking and ineffective.
In addition to buying their own cigarettes, athletes also obtained cigarettes from their coaches. Again, coaches are supposed to be mentors to athletes. By smoking in front of athletes and providing them with cigarettes, coaches are reflecting irresponsible attitudes. Therefore it is suggested that coaches should be educate about this matter as well.

Athletes’ Awareness

Most athletes who smoke understand that smoking causes numerous side effects to their health and they wanted to quit smoking. It is interesting that in this study, addiction was not the number one reason athletes believed why they continued to smoke. Instead, the athletes believe it is due to boredom. Athletes in the states are mostly not hostel-bound; therefore they don’t have a strict schedule to adhere to. Too much free time and lack of monitoring by their guardian may be the reasons behind their involvement with smoking.

Interestingly, the main reason that causes athletes to think about quitting is not related to health. Instead it is due to wasting money. Albeit their knowledge about side effects of smoking, athletes apparently do not perceive health as a priority for them to avoid smoking.

Use of breath carbon monoxide (BCO) to determine smoking habit

Breath carbon monoxide (BCO) is a non-invasive, cost-effective and an immediate method to assess smoking habits (Deveci, Deveci, Acik & Ozan, 2004; MacLaren et al., 2010; Ng & Yee, 2012; Cunningham & Hornbrey, 2015). Additionally, BCO has also been found to have high correlation with carboxyhaemoglobin level (Wald, Idle, Boreham, & Bailey, 1981) where the correlation coefficient between carboxyhaemoglobin (COHb) and alveolar BCO was reported to be 0.97. Therefore the use of BCO to detect smoking status in adolescents is highly recommended as a replacement for invasive and elaborate screening method like blood sampling.

Conclusion

It is suggested that smoking cessation program should integrate multi-dimensional factors to enhance the effectiveness and cessation rate. In a recent study by Afiah, Rahmah, Salmiah, Fazilah and Shamsul Azhar (2012), the involvement of a religious personality was found to be a protective factor against smoking. Perhaps this factor can be incorporated into smoking cessation program for adolescents in future, besides other factors such as pharmacological and behavioural intervention. It is also recommended that future studies include interventions that target both smokers and their determinants, and utilise a more holistic approach in order to ensure long-term abstinence from smoking and successful cessation among adolescence.

Reference


