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RESEARCH COMMUNICATION

Factors Associated With Smoking, Quit Attempts and Attitudes towards Total Smoking Bans at University: A Survey of Seven Universities in England, Wales and Northern Ireland

Walid El Ansari^{1*}, Christiane Stock²

Abstract

Objectives: This study assessed the associations between socio-demographic, health and wellbeing variables (independent variables) and daily smoking, attempts to quit smoking, and agreement with smoking ban (dependent variables). **Methods:** Data from 3,706 undergraduate students were collected from seven universities in England, Wales, and Northern Ireland using a standardised questionnaire. **Results:** About 15.8% of the whole sample reported daily smoking, while 12% were occasional smokers. Smoking was significantly more prevalent among males, but the difference was due to a higher rate of occasional smokers. About every second smoker (55%) had attempted to quit smoking. Almost 45% of the whole sample agreed or strongly agreed with implementing a total smoking ban on campus. Daily smoking was more likely among students with not sufficient income, students whose fathers had at least a bachelor degree; and, students who reported binge drinking. Conversely, daily smoking was less likely among students who rated their health as very good/ excellent, those who ate ≥ 5 portions of fruit or vegetables, and those who had never taken illicit drugs. Previous attempt/s to quit smoking were more likely among students who have never taken illicit drugs and those who agreed with a total smoking ban; and less likely among those with not sufficient income. Daily smokers were less likely to report quit attempts as compared to occasional smokers. An agreement with smoking ban was more likely among students who rated their health as very good/ excellent, those who ate ≥ 5 portions of fruit or vegetables daily, and those who had never taken illicit drugs, but less likely among daily smokers. **Conclusion:** Favourable health practices and positive attitudes towards smoking ban were associated with each other. Interventions would need to comprise multi-component programmes that do not solely focus on smoking prevention/cessation, but also on other health promoting practices as well.

Keywords: University students - health and wellbeing - smoking ban - multi component health programmes

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Introduction

Smoking among university students is a major public health concern globally, regardless of country, university, years (duration) of the course, or discipline of study (Erdogan and Erdogan 2009; Patelarou et al., 2011; Al-Kaabba et al., 2011; Huang et al., 2011; Al-Naggar et al., 2011).

Several factors contribute to smoking in this young adult group. For the majority of students, the time period of university education represents progression to adulthood and freedom to make independent choices (Lee et al., 2005), including smoking. The newly found independence experienced by college students provides many with novel opportunities to experiment with psychoactive substances such as alcohol, tobacco and illicit drugs (Wetter et al., 2004). Time at university also encompasses stresses for students trying to achieve success in their academic goals despite possible financial constraints (El Ansari

and Stock, 2010), increasing academic pressures and uncertain career prospects (Chatterjee et al., 2011). For some students these features could mean that they move from prior experimenting with cigarettes to more frequent, steady or heavier use, given that smoking behaviour is unlikely to occur if it does not start during adolescence or young adulthood (United States Department of Health and Human Services 1994), and that stress is consistently associated with initiation to smoking (Byrne et al., 1995). In addition, reports suggest that there is also an increase in intensive tobacco marketing strategies specifically targeted at college student populations (Rigotti et al., 2000), and there has been a recent trend for college students to start smoking (Wetter et al., 2004).

From a public health perspective, university students' lifestyle characteristics including tobacco smoking are important. The attitudes and behaviours that students garner during their higher education years are not only likely to sustain throughout their lifespan, but to

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also impact on society at large due to students' future roles within their immediate/extended families, and as decision-makers, leaders and role-models e.g. employees. Further, high smoking rates among college students have been reported (Solberg et al., 2007), and current full-time college students are at increased risk for future smoking, compared with same-age peers not attending college (Gilpin et al., 2005). In addition, the young adult and university years represent a critical transition period in the use of cigarettes, suggesting that smoking in this population is more "changeable and mutable" compared to older, more established smokers (Wetter et al., 2004). Hence, college years may represent a window of opportunity to early cessation (Thomas et al., 2010). Smoking in the UK continuously decreased from the 1970s onwards, where around a fifth (22%) of men (aged ≥ 16 years) and of women (20%) smoke nowadays (Office for National Statistics, 2011). However, the same report showed that the smoking prevalence for people aged 20–24 is higher at 31% (Office for National Statistics, 2011). An international comparison of adolescent smoking across Europe reported the prevalence of smoking in the past 30 days of adolescents in the UK (22%) to be lower than the EU average (29%) (ESPAD, 2007). This seems to be also true for university students where comparative research on students' health behaviour indicated that UK students smoking rates ranged in the mid of all countries studied (Steptoe et al., 2002).

Periodic or yearly national monitoring of university students' health and lifestyle seems to be missing in the UK, in contrast to the US where regular nation-wide surveys among students are undertaken (e.g. American College Health Association, 2006 and 2007). Therefore, accurate data on prevalence and correlates of university students' smoking in the UK seems limited to few cross-sectional surveys conducted among populations from only one university (Steptoe et al., 2002), or even from only one educational discipline (Boland et al., 2006). In contrast to such lack of research on and details of university students' smoking habits in the UK, cigarette smoking practices among American college students are relatively well described. A review (Patterson et al., 2004) summarized the correlates of smoking among students, categorising them into demographic correlates (e.g. gender/ race); socio-environmental correlates including living arrangement and lifestyle (e.g. alcohol consumption, binge drinking, physical activity, use of illicit drug/s); and, psychological (e.g. mood, stress and attitudes) correlates of smoking.

The majority of adolescents who smoke have tried to quit smoking (Hollis, 2003). Quantitative surveys and qualitative studies of the motivation of adolescents to quit smoking described several aspects that were associated with quitting e.g. disliking the smell of cigarettes, costs, as well as health concerns (Vuckovic et al., 2003; Aung et al., 2003). However less is known about such factors associated with quitting smoking among university students.

On the one hand, smoking as well as quit attempts among students are associated with multiple features. For instance, whether or not smoking is prohibited on

campus or other university premises represents one of the environmental factors influencing tobacco use (Patterson et al., 2004). Therefore introducing a total ban of smoking on university campuses is a relevant policy directive that could limit cigarette smoking among students given the overall relevance of smoking restrictions on smoking prevalence (Chaloupka, 1999). Many universities and colleges seem still not to have a total smoking ban on campus, allowing for tobacco use in several outdoor locations (Boynton Health Service, 2008). This in turn sustains the visibility of smoking on campus, and could contribute to promoting a norm that smoking is an acceptable social behaviour (Sanem et al., 2009).

On the other hand, research has shown that the successful implementation of policies limiting the availability of drugs may fail if it is rejected by students (Lockwood and Saunders, 1993). In contrast, in Taiwan, there were changes in smoking behaviour among college students following implementation of a strict campus smoking policy (Chuang and Huang, 2011). It is therefore relevant to explore students' attitudes towards a total ban of smoking on campus, before undertaking steps to implement such campus-wide smoking bans.

The aim of the study was to assess the associations between a range of socio-demographic, health and wellbeing variables as independent variables and daily smoking, attempts to quit smoking, and agreement with smoking ban as dependant variables. Data from undergraduate students were collected from seven universities in the England, Wales, and Northern Ireland. The four specific objectives were to: describe the prevalence of smoking, attempts to quit smoking and attitudes towards smoking ban; assess the variables associated with daily smoking; assess the variables associated with attempts to quit smoking; and, assess the variables associated with agreement with total smoking ban on university premises.

Materials and Methods

Sample, Procedures and Data Collection

The current analysis is based on data collected as part of the General Student Health Survey (El Ansari et al., 2007) implemented in the UK and other European (El Ansari et al., 2010) and African (Khalil 2011; Khalil et al., 2011) countries.

The UK data comprised 3,706 students (765 males and 2,699 females; mean age 24.9 years, SD 8.6 years). Data was collected between 2007–2008 simultaneously at seven universities in three countries of the UK: England (University of Gloucestershire, Bath Spa University, Oxford Brookes University, University of Chester, Plymouth University); Wales (Swansea University); and the Republic of Northern Ireland (University of Ulster), and data were confidential and protected at all stages of the study. Selection of the universities was premised on research interests, existing contacts and history of successful previous collaboration. Each participating institution provided ethical approval. Towards the middle of the term/semester, self-administered questionnaires were distributed to students attending regular lectures of

randomly selected courses at the universities during the last 10–15 minutes of their classes. Students' participation was anonymous and voluntary, no incentives were provided, and each questionnaire had an information sheet attached that clarified the research objectives. A representative sample of students was sought at each participating site, and participants were informed that by completing the questionnaire, they agreed to participate in the study. All data were computer entered at one site using the software Teleform®, thus maximising the quality assurance and minimising errors of data entry. Based on the number of returned questionnaires, the response rates were ≈80%.

Health and Wellbeing Questionnaire

The current study was a general student health and wellbeing survey similar to studies of student health undertaken in a number of countries (El Ansari et al., 2010; 2011). Students completed the questionnaire (133 items) that comprised socio-demographic data (e.g., gender, age), self-reported health information, as well as lifestyle questions (health behaviours e.g. nutrition, physical activity (PA), smoking and alcohol consumption), social support, and university study related questions.

Smoking (2 items) and **attempt/s to quit smoking** (1 item): students were asked “Within the last three months, how often did you smoke? (cigarettes, pipe, cigarillos, cigars)” (three response scales: daily, occasionally, never). Participants who smoked daily were further asked: “If you smoke daily: How many cigarettes do you smoke on average?”. Attempt/s to quit smoking were measured by asking smokers: “Have you tried to quit smoking within the last 12 months?” (two response scales: yes, no) (Hurrelmann and Kolip, 1994).

Illicit drug/s use (1 item): students responded to the question “Have you ever use/used drugs?” (three response scales: Yes, regularly; Yes, but only a few times; Never). Agreement with total smoking ban (1 item): students were asked about the extent of their disagreement/ agreement with the statement “There should be no smoking on the university premises at all” (five point scale: strongly disagree, disagree; neutral; agree; strongly agree).

Socio-economic status of each of the student's parents (1 item): measured by the question “What is the highest degree that your parents have?” asked twice (once for the student's father and the other for student's mother) with 6 response options: No formal education; GCSE; A Level or vocational; Bachelor's degree; Master's degree; Ph.D. or equivalent.

Income sufficiency (subjective economic situation) (1 item): students were asked how sufficient they considered the amount of money they have at their disposal (four-point scale: totally sufficient, sufficient, rather not sufficient, not sufficient at all).

Self-rated health (1 item): Self-rated health status was measured by “How would you rate your health in general?” with a 5-point scale response format (1 = “excellent”, 2 = “very good”, 3 = “good”, 4 = “fair”, 5 = “poor”) as used in the German Federal Health Survey (Potthoff et al., 1999) (similar to wording of the American College Health Association, 2007).

Low Physical Activity (PA) (1 item): defined as achieving 0 vigorous and 0 or 1 day of moderate exercise in the past 7 days (Seo et al., 2007; El Ansari et al., 2011b). This was computed from two types (levels) of PA that were measured. Vigorous exercise (1 item): “On how many of the past 7 days did you participate in vigorous exercise for at least 20 minutes?” (ratings ranged from 0 to 7 days [Haskell et al 2005]). Moderate exercise (1 item): “On how many of the past 7 days did you participate in moderate exercise for at least 30 minutes?” ratings ranged from 0 to 7 days (Haskell et al., 2005).

Frequency of binge drinking (1 item): measured by the question “Over the last 30 days: How many times (if any) have you had five or more drinks in a row?” (A ‘drink’ is a glass of wine (ca 15 cl), a bottle or can of beer (ca 50 cl), a shot glass of spirits (ca 5 cl) or a mixed drink, with answer options ‘none’, ‘1’, ‘2’, ‘3–5’, ‘6–9’, or ‘10 or more’ times] (Hurrelmann and Kolip, 1994).

Fruit or vegetable consumption: a food frequency questionnaire (12 items in total) measured students' consumption of food items (e.g. fresh fruits, raw and cooked vegetables and salads). The introductory question “How often do you eat the following foods?” asked about the frequency of students' routine consumption of fruits and vegetables separately (5-point scale: several times a day, daily, several times a week, 1–4 times a month, never). The questions were very similar to other food frequency questionnaires that had been validated e.g. (Osler and Heitmann, 1996; Roddam et al., 2005).

Other Variables Employed In the Analysis

Quality of one's life (1 item): measured by the question: “If you consider the quality of your life: How did things go for you in the last four weeks?” The item was based on the COOP/WONCA charts (Bruusgard et al., 1993) with the 5 response categories ranging from ‘1 = very badly’ to ‘5 = very well’.

Health awareness (1 item): general health awareness was measured by: “To what extent do you keep an eye on your health?”, with a four-point response scale (1 = ‘not at all’, 4 = ‘very much’).

Burdens of university study (1 item): this item appraised the burdens associated with university study in general. Students responded to the question “To what extent do you feel burdened in the following areas: Studies in general?” (6 point Likert scale: Not at all – Very much).

Depressive Symptomatology (20 items): The Modified Beck Depression Inventory (M-BDI) was employed [Beck et al., 1996]. The amendment of the original BDI included two considerations: (a) the four items per symptom that measured the specific symptom's intensity in the original BDI were substituted by a single statement per symptom with a six point Likert scale measuring its frequency in the last 4 weeks (past few days in the current questionnaire) (with the 0 = ‘Never’, 5 = ‘Almost Always’). For the analysis, the cut-off was set above fifth quintile. In our sample, Cronbach's alpha of the M-BDI scale (depression score) was 0.93.

Perceived stress (4 items): Cohen's Perceived Stress Scale (PSS) in its 4 item short form [Cohen et al., 1983] assessed the extent to which participants considered life

situations to be stressful. In our sample, Cronbach’s alpha of the PSS was (stress score) 0.59.

Educational achievement (i.e. academic performance - 2 items) measured as: (1) students’ internal reflection on their academic achievement in terms of the importance they attach to achieving good grades in their studies (El Ansari and Stock, 2010) “How important is it for you to have good grades at university?” (four response categories, 1 = ‘not at all important’ to 4 = ‘very important’); and, 2) students’ subjective comparative appraisal of their overall academic performance in comparison with their peers “How do you rate your performance in comparison with your fellow students?” (five response categories, 1 = ‘much worse’, 5 = ‘much better’).

Statistical analysis

The data was analysed using SPSS statistical package version 16.034, with significance level set at $p < 0.05$. Chi-square (χ^2) test compared the frequencies in the different categories of smoking, the number of cigarettes smoked, quit attempts, and attitudes towards smoking ban between male and female students. Multi-factorial logistic regression analysis with enter mode examined the association of several factors (gender, university, income sufficiency, educational degree of the father, educational degree of the mother, binge drinking, level of physical activity, self-rated health, fruit and vegetable consumption, illicit drug use, perceived stress, depression symptomatology, academic performance, importance of good grades, and burdens of university studies) with daily smoking as dependent variable.

A second multi-factorial logistic regression model examined the association of several characteristics (gender, university, income sufficiency, educational degree of the father, educational degree of the mother, binge drinking, level of physical activity, self-rated health, fruit and vegetable consumption, illicit drug use, perceived stress, depression symptomatology, academic performance, importance of good grades, burdens of university studies, frequency of smoking, and agreement with smoking ban) with attempt to quit smoking as dependent variable. This analysis was only performed among students reporting to be daily or occasional smokers (n=911).

In a third model, we examined the association of several factors (gender, university, income sufficiency, educational degree of the father, educational degree of the mother, binge drinking, level of physical activity, self-rated health, fruit and vegetable consumption, illicit drug use, perceived stress, depression symptomatology, academic performance, importance of good grades, burdens of university studies, and daily smoking) with agreement with total smoking ban on university premises as dependent variable.

Results

Socio-Demographic Characteristics and Educational Features of the Sample

The sample (N=3,706) included 406 students from Swansea University (7.8%; mean age 25 +/- 7.4 SD); 474 students from the University of Ulster (8.2%;

Table 1. Smoking, Quit Attempts and Attitudes Towards Total Smoking Ban Among University Students

| Variable | Whole Sample | | Females | | Males | |
|-----------------------------------------------------------------------|--------------|---------|---------|---------|-------|---------|
| | N | Valid % | N | Valid % | N | Valid % |
| Smoking (last 3 months) p: 0.019 | | | | | | |
| Daily | 555 | 15.8 | 422 | 15.9 | 109 | 14.7 |
| Occasionally | 421 | 12 | 290 | 11 | 109 | 14.7 |
| Never | 254 | 72.2 | 1936 | 73.1 | 525 | 70.6 |
| Number of cigarettes smoked p: 0.123 | | | | | | |
| 1-10 cigarettes | 421 | 65.2 | 307 | 64.1 | 90 | 68.2 |
| 11-20 cigarettes | 198 | 30.7 | 154 | 32.2 | 33 | 25 |
| >20 cigarettes | 27 | 4.2 | 18 | 3.8 | 9 | 6.8 |
| Attempted to quit smoking (n=555) p: 0.234 | | | | | | |
| Yes | 294 | 55 | 220 | 53.7 | 60 | 58.3 |
| No | 341 | 45 | 190 | 46.3 | 43 | 41.7 |
| Attempted to quit smoking (n=421) p: 0.489 | | | | | | |
| Yes | 147 | 46.5 | 101 | 46.8 | 42 | 47.7 |
| No | 169 | 53.5 | 115 | 53.2 | 46 | 52.3 |
| There should be no smoking on the university premises at all p: 0.003 | | | | | | |
| Strongly disagree | 996 | 27.8 | 744 | 28 | 199 | 26.5 |
| Neutral | 966 | 26.9 | 720 | 27.1 | 192 | 25.1 |
| Agree/strongly agree | 163 | 45.3 | 1196 | 44.9 | 359 | 47.9 |

* Gender differences based on Chi-Square (χ^2) test

Table 2. Correlates of Daily Smoking Among University Students

| Variable | Daily smoking (n=1942) | |
|---------------------------------------------------|------------------------|------------------|
| | OR | 95% CI |
| Male gender | 0.8 | 0.58-1.11 |
| Income | 1.35 | 1.16-1.56 |
| (from always sufficient to not at all sufficient) | | |
| At least bachelor degree of the father | 1.55 | 1.07-2.23 |
| Binge drinking | 1.66 | 1.21-2.26 |
| (> 5 drinks on one occasion) | | |
| Low physical activity | 1.26 | 0.94-1.67 |
| Self-rated health (very good/excellent) | 0.5 | 0.38-0.67 |
| Eating ≥ 5 portions of fruit or vegetable daily | 0.56 | 0.34-0.93 |
| Never taken illicit drugs in life | 0.33 | 0.25-0.43 |

OR (odds ratios) were adjusted for all other variables in the table and for the following variables: university, at least bachelor degree of the mother, perceived stress, depression symptomatology, academic performance (from poor to high), importance of good grades (from low to high), burdens of university studies (strongly/very strongly); Bold values indicate statistical significance at $P < 0.05$

mean age 25.2 +/- 7.7 SD); 970 from the University of Gloucestershire (43.6%; mean age 23.3 years +/-8.4 SD); 993 from the University of Chester (13.1%; mean age 26 +/- 9.2 SD); 485 from Bath Spa University (22.6%; mean age 22.2 +/- 6.9 SD); 169 from Plymouth University (56.2%; mean age 24.6 +/- 7.2 SD); and, 208 students from Oxford Brookes University (10.8%; mean age 31.6 +/- 10.4 SD). Females were more represented at most sites (77.8%), possibly a manifestation of the type of Schools at the collaborating universities (e.g. Schools of Health Sciences, of Nursing, or of Health & Social Care, etc.). The majority of the sample were attending year 1 or 2 of studies (74%). Most of the participants were enrolled

Table 3. Correlates of Attempt/s to Quit Smoking (Among Daily and Occasional Smokers)

| | Attempt to quit smoking (n=911) | |
|----------------------------------------------------------|---------------------------------|------------------|
| | OR* | 95% CI |
| Never taken illicit drugs in life | 1.77 | 1.26-2.45 |
| Income (from always sufficient to not at all sufficient) | 0.69 | 0.58-0.83 |
| Male gender | 0.83 | 0.56-1.21 |
| At least bachelor degree of the father | 0.91 | 0.58-1.44 |
| Self-rated health (very good/excellent) | 1.29 | 0.92-1.80 |
| Low physical activity | 1.3 | 0.91-1.88 |
| Eating \geq 5 portions of fruit or vegetable daily | 0.9 | 0.53-1.55 |
| Binge drinking (> 5 drinks on one occasion) | 0.97 | 0.67-1.40 |
| Daily smoking (vs occasional) | 0.47 | 0.34-0.67 |
| Agreement with smoking ban | 2.14 | 1.41-3.24 |

* OR (Odds ratios) were adjusted for all other variables in the table and for the following variables: university, at least bachelor degree of the mother, perceived stress, depressive symptomatology, quality of life, academic performance (from poor to high), importance of good grades (from low to high), burdens of university studies (strongly/very strongly); Bold values indicate statistical significance at $P < 0.05$

Table 4. Correlates of Agreement with Total Smoking Ban on University Premises

| | Attempt with total smoking (n=1933) | |
|----------------------------------------------------------|-------------------------------------|------------------|
| | OR* | 95% CI |
| Income (from always sufficient to not at all sufficient) | 1.05 | 0.94-1.18 |
| Male gender | 1.09 | 0.85-1.40 |
| At least bachelor degree of the father | 1.01 | 0.74-1.39 |
| Self-rated health (very good/excellent) | 1.28 | 1.04-1.56 |
| Low physical activity** | 0.95 | 0.75-1.20 |
| Eating \geq 5 portions of fruit or vegetable daily | 1.71 | 1.25-2.33 |
| Binge drinking (>5 drinks on one occasion) | 0.81 | 0.66-1.01 |
| Never taken illicit drugs in life | 1.47 | 1.17-1.86 |
| Daily smoking (versus occasionally or never) | 0.05 | 0.03-0.09 |

* OR (Odds ratios) were adjusted for all other variables in the table and for the following variables: university, at least bachelor degree of the mother, perceived stress, depression symptomatology, quality of life, health awareness (high/rather high), academic performance (from poor to high), importance of good grades (from low to high), burdens of university studies (strongly/very strongly); Bold values indicate statistical significance at $P < 0.05$

in health science modules (71.1%), followed by social sciences (17.7%), sport, sport development and exercise modules (8.1%) and natural sciences (3.1%).

Prevalence of Smoking, Attempts To Quit Smoking and Attitudes towards Total Smoking Ban

About 15.8% of the whole sample reported daily smoking, while 12% reported occasional smoking (Table 1). Smoking was significantly more prevalent among males, but the difference was only due to a higher rate of

occasional smokers. The majority of smokers smoked < 10 cigarettes per day, and only 4.2% smoked > 20 cigarettes per day. About every second smoker (55%) had attempted to quit smoking. Almost half of whole sample (45.3%) either agreed or strongly agreed with the implementation of a total smoking ban on campus, and only 27.8% voiced disagreement with such a policy. Agreement with a total smoking ban was higher among males than females.

Variables Associated With Daily Smoking

Table 2 shows the result of the multiple logistic regression analysis (daily smoking as dependent variable). Several variables were significantly associated with daily smoking. Daily smoking was more likely among: students who regarded their income as not sufficient, students whose fathers had at least a bachelor degree; and, students who reported binge drinking. Conversely, daily smoking was less likely amongst: students who rated their health as very good or excellent; those who reported eating \geq 5 portions of fruit or vegetables; and, those who had never taken illicit drugs in their life. All other variables included in the regression model (adjusted for in the analysis) did not display associations with daily smoking.

Variables Associated With Attempt/s to Quit Smoking

Table 3 shows the results of the multiple logistic regression analysis for variables associated with quit attempts as dependent variable among those students who smoked either daily or occasionally. Several variables were significantly associated with quit attempts. Previous attempt/s to quit smoking were more likely among students who have never taken illicit drugs in their life and less likely in those who regard their income as not sufficient. Daily smokers were less likely to report quit attempts as compared to occasional smokers. Attempt/s to quit smoking was positively associated with an agreement with a total smoking ban. All other variables including the variables adjusted for in the analysis did not display associations with quit attempts.

Variables Associated With Agreement with Total Smoking Ban on University Premises

Table 4 depicts the results of the multiple logistic regression analysis for variables associated with agreement with total smoking ban. Several variables were significantly associated with such agreement. An agreement with smoking ban were more likely among: students who rated their health as very good or excellent; those who reported eating at \geq 5 portions of fruit or vegetables daily, and among students who have never taken illicit drugs in their life. Daily smoking showed a strong negative association with agreement with smoking ban. All other variables including the variables adjusted for in the analysis did not display associations with an agreement with total smoking ban.

Discussion

College years appear to be of greater risk to smoking initiation and progress from intermittent and social smoking to more regular smoking (Nichter et al., 2006).

Indeed, globally, smoking among college students is increasing (Smith and Leggat, 2007; Baska et al., 2007), sometimes simultaneously when national trends of smoking are decreasing. For instance, in the USA, whilst national trends indicated a decrease in tobacco use among adolescents and adults (Kopstein, 2001), studies reported a spiky increase in cigarette smoking among college students, especially females (Rigotti et al., 2000).

In spite of such findings, in the UK, there seems no regular monitoring of smoking rates of university students, and very few studies have measured the prevalence of smoking across more than one university in the UK. The current study bridges this gap to provide a prevalence of smoking across seven universities in three countries of the UK, and the correlates associated with daily smoking, with attempts to quit smoking, and with agreement with total smoking ban on university premises (smoke-free environment). Given that research on tobacco use behaviour among university students has provided precious information to the public health community (American College Health Association, 2009), data from the current study quantifies the smoking challenges, and also acts as a baseline for future follow up and comparisons amongst university student populations.

In relation to the first objective, the study described the prevalence of smoking, attempts to quit smoking and attitudes towards smoking ban. As for the prevalence of smoking, about 15.8% of the UK sample reported daily smoking, while 12% reported occasional smoking (during the last three months). Our 15.8% daily smoking level was comparable to the USA, which was 7.2% overall, but ranged from 15% (in two-year college students) to 4.2% (in four-year college students) (Sanem et al., 2009); and to the level found in Turkey (16.1% daily smokers and 9.0% occasional smokers) (Aslan et al., 2006). However, the levels of our UK sample were a little lower than those reported among nursing students in Greece (Patelarou et al., 2011), where 33.1% were current smokers (smoking cigarettes daily or occasionally within the past month). Nevertheless, the lower levels in the UK compared to Greece might be underestimated, considering that our questionnaire inquired about smoking during the last three months, whilst in Greece (Patelarou et al., 2011) the questionnaire inquired about smoking during the past month. Such different time periods of recall employed in different studies renders direct comparisons of smoking prevalence difficult. For instance, in Saudi Arabia (Al-Kaabba et al., 2011), 17.6% of a sample of medical students were current smokers. Whilst our UK sample compared favourably with this level, the Saudi study measured smoking status by whether the student had smoked on one or more days in the 30 days preceding the survey (Al-Kaabba et al., 2011). Similarly, of 3,659 students from four state and six private universities in Turkey (Erdogan and Erdogan, 2009), one third of respondents were regular smokers, and 14.8% were occasional smokers. Whilst our UK estimates again seem to compare favourably with these levels reported from Turkey, smoking status in Turkey (Erdogan and Erdogan, 2009) was measured by a closed-ended question (do you smoke?) with three choices: yes (regular smokers),

sometimes (occasional smokers) and no (nonsmokers); i.e. there seemed no time recall limits in the question. Similarly, in Malaysian university students (Al-Naggar et al., 2011), the prevalence of smoking among males and females were 41.2% and 17.5% respectively, however the authors do not clarify whether these levels were for daily, occasional or ever smokers which renders comparison with our sample difficult. Likewise, in India (Chatterjee et al., 2011), a study of tobacco use among medical and non-medical students (864 participants) indicated that 28.5% of study subjects reported tobacco use at the time of the survey, but the prevalence rate was lower for medical (18.3%) than nonmedical (43.3%) students. It is difficult to compare our UK rate of 15.8% who reported daily smoking with Chatterjee et al.'s (2011) rate of 28.5% who were current tobacco users (those who used tobacco at least once in the last 7 days). Such methodological limitations and measurement inconsistencies (e.g. none or different time recall limits in the question; lack of clarity as to whether the reported prevalence levels represent daily, occasional or ever smoking) would need to be addressed in future research in order to facilitate comparisons. An additional point to note is that self-reported smoking rates may underestimate actual current smoking: evidence suggested that numerous young adult college smokers do not classify themselves as 'smokers' (Levinson et al., 2007), given their high prevalence of intermittent (e.g., nondaily) smoking (Grimshaw and Stanton, 2006).

In connection with the prevalence of attempts to quit smoking, the current UK sample showed that about every second daily smoker (55%) had attempted to quit smoking (46.5% among occasional smokers). This is in agreement with other research that reported that the majority of adolescents who smoke have tried to quit smoking (Zhu et al., 1999; Hollis, 2003); and also in support of a recent study of medical students in Berlin, where over 60% of smokers indicated that they wished to stop smoking and 54% had tried to quit for ≥ 24 hours at least once (Kusma et al 2010). Similarly, in Brazil, among medical students who were smokers, 67.3% had tried to quit smoking, 96% believed themselves able to do so, and 87.2% intended to quit smoking (Stramari et al., 2009). In addition, our finding that quit attempts were more common among smokers who agreed with a total smoking ban (Table 3) indicated that a smoking ban is likely to support quit attempts of students.

As regards the agreement with a total smoking ban on campus, the current study showed that about half of the students agreed with such ban on campus; another quarter was neutral; and one quarter disagreed with such a policy. In a study among Turkish students (Aslan et al., 2006), the percentage of students agreeing with a smoke free policy at university was 70%, seemingly higher than in our sample. However the formulation of the questionnaire item that inquired about the total smoking ban in the current study was not identical to the item employed in the Turkish study (i.e. there was no 'neutral' answering option in our study, which might have increased the positive answers). Other research found that non-smoking students have the most favourable attitudes towards smoking ban which is supported by our findings (Loukas et al., 2006).

Likewise, in Malaysian university students (Al-Naggar et al., 2011), smokers had negative attitudes toward tobacco control policies (e.g. smoking should ban in public places; penalty should be given to smokers in public places) compared to non smokers which is also supported by our findings. Despite that more than 50% of college students reported beginning or substantially increasing smoking behaviour in college (Wetter et al., 2004), nevertheless an encouraging point is that in Taiwan, the implementation of a strict campus smoking policy showed that smokers modified their smoking behaviour and attitude: they felt that smoking was unwelcome, and thus reduced smoking in campus and thought about quitting (Chuang and Huang, 2011).

As for the study's second objective, three variables were positively associated with daily smoking (students who regarded their income as not sufficient, students whose fathers had at least a bachelor degree; and, students who reported binge drinking). Our finding that at least bachelor degree of the father was significantly positively associated with daily smoking among university students is difficult to interpret and seems in contrast with similar studies. For instance, in Pakistan, college students having fathers with no formal schooling were more about twice as likely to smoke as compared to those whose fathers had some degree of education (Rozi et al., 2007). As regards alcohol consumption (binge drinking), our findings are in agreement with published studies that showed that smoking by college students is associated with using alcohol (Patterson et al., 2004; Cooper et al., 2011). We are also in agreement with findings from Brazil, where among medical students, factors significantly associated with the smoking habit included regular alcohol consumption (Stramari et al., 2009).

In connection with the study's third objective, attempts to quit smoking were more likely among students who have never taken illicit drugs in their life and those who displayed agreement with a total smoking ban. Conversely, attempts to quit smoking were less likely in daily smokers and those who regarded the income at their disposal to be not sufficient. An initial point to note is the definition of a 'smoker'. In the USA, less than half of college students who had smoked in the past month identified themselves as smokers; this suggested that college students employ a wide range of criteria to characterize who is a smoker, and that these criteria impacted on how motivated students are to quit smoking and their perception of requiring to 'quit smoking' (Berg et al., 2010). Indeed, college students who engage in occasional or social cigarette smoking were less likely to identify themselves as smokers and to attempt to quit; and denying being a smoker was associated with not attempting to quit smoking (Berg et al., 2009). In relation to the socio-economic status (income and father's education), generally, our findings are in agreement with published studies: a population-based nationally representative household survey in Serbia, where the poorest women and the least educated men were those least likely to quit smoking, suggested that ability to quit might be predicted by socio-economic status (Djikanovic et al., 2011). Similarly, in the UK, smokers from lower socio-economic groups were less likely to be successful

in a quit attempt than more affluent smokers, even when they accessed smoking cessation services (Hiscock et al., 2011), which is in support of our finding that previous attempt/s to quit smoking were less likely in those who regard their income as not sufficient. Studies across European countries (Leinsalu et al., 2007; Huisman et al., 2005) have shown that below average income and lower education level were strongly associated with smoking behaviour, and to a great extent, predicted a individual's aptitude to stop smoking.

In connection with the study's fourth objective (smoking permissibility on campus), our findings showed that although the agreement with a total smoking ban was higher among males than females, gender was not significantly associated with daily smoking among university students nor with attempt/s to quit smoking. This seems to be in contrast with other studies where some differences in smoking behaviour were apparent by gender (Huisman et al., 2005; McKee et al., 2005; Aslan et al., 2006). The lower proportions of females who agreed with a total smoking ban is in agreement with proposals that it is more arduous for women to quit, thought to be mediated by women's lower income, in comparison with men, or related to biological determinants (McKee et al., 2005; World Health Organization, 2003). Indeed gender has been proposed as a predictor of smoking (Al-Naggar et al., 2011), and quitting (Osler et al 1999). Nevertheless, in Taiwan, there were changes in smoking behaviour among college students following implementation of a strict campus smoking policy, where the reasons cited by the smoker students for the behaviour change comprised four themes: a changed smoking experience, change in social norm, the respect for law, and concern for others' health (Chuang and Huang, 2011). Likewise, in the USA, enforcing an outdoor smoking ban using a multiple component package increased compliance with the non-smoking policy on college campus (Harris et al., 2009). Such ban on campus might be particularly relevant for students attending courses of shorter duration: in the USA (Sanem et al., 2009), it was suggested that two-year colleges were unlikely to be able to address student tobacco use by intervening upon student demographic characteristics or occupation choice; however, a policy prohibiting on-campus tobacco use may instigate students to reduce or entirely quit their tobacco habit. Furthermore, smoke-free policies on campus could have broader effects not only in reducing smoking behaviour on campus and the associated ground clean-up costs of cigarette butt waste, but also on (environmental) second hand smoke and the greater environment as cigarette butts are often thrown hastily on the ground, making their way to waterways and then oceans and beaches (Sawdey et al., 2011).

This study has limitations, hence generalization of the findings requires caution. Data was self reported and elements of recall bias, sociability and social desirability cannot be ruled out. In cross-sectional studies relationships are associations and not causations, and such designs do not allow for an exploration of temporal relationships and the direction of the effects. Students completed the questionnaires towards the end of a lecture, so those who did not attend that given lecture (possibly due to a

health reason) did not have an opportunity to participate in the study. The study examined seven universities in the UK, and despite 'widening' our data collection in an attempt that the selection of students would be representative of their universities, our sample remains a convenience sample. However, convenience samples are not uncommon in student surveys in Hong Kong (Lee and Loke, 2005), USA (Richards et al., 2006), or Australia (Hsieh, 2004). Similarly, in the USA, universities and colleges self-selected themselves to participate in the American College Health Association National College Health Assessment survey (American College Health Association, 2006). Future studies would need to address these limitations

In conclusion, a critical point is that the findings of the current study indicated that students with favourable health practices regarding fruit intake and other drug use and those who feel healthy were more likely to support non-smoking policies. In agreement with this, low fruit consumption, binge drinking, other drug use and poor self-rated health were associated with smoking; and conversely, those who have never taken illicit drugs were more likely to attempt quitting smoking. This overall finding, that some favourable health practices and attitudes were associated with each other, suggested that interventions comprising multi-component programmes that do not solely focus on smoking prevention and cessation, but also on other health promoting practices as well are appropriate of university students.

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