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## **A case for identifying smoking in presentations to ED with suicidality**

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### Summary

#### Objective

To identify mental health and lifestyle factors predicting smoking among people at high risk of suicidal behaviour.

#### Method

Participants (n=363) completed self-report mental health and lifestyle measures at first appointment in a hospital clinic following presentation to ED for deliberate self-harm or suicidal ideation.

#### Results

The rate of daily smoking in this group, 61.4%, is more than four times the rate observed in the general population. Those with a history of previous deliberate self-harm were twice as likely to be smokers. Each one-point increase in poor health behaviours increased the odds of smoking by 22%.

#### Conclusions

Identifying and managing smoking and related lifestyle behaviours are important considerations in routine clinical assessments.

Key words: smoking, deliberate self-harm, ED clinic intervention

Traditional risk factors for suicide attempt include alcohol and drug abuse, depression, schizophrenia, unemployment, sociopathy, hostility, and living alone<sup>1</sup>. There is growing interest in links between smoking tobacco and suicidality<sup>1,2</sup> with reviews<sup>3</sup> finding a complex, likely bidirectional, relationship. A meta-analysis<sup>4</sup> of 15 prospective cohort studies (totalling 1,369,807 participants) found cigarette smoking significantly increased the risk of suicide for current smokers (pooled RR 1.81; 95% CI: 1.50-2.19) and previous smokers (pooled RR 1.28; 95% CI: 1.001-1.641), compared with never smokers, and a dose-response relationship, whereby suicide risk increased by 24% for each increment of 10 cigarettes/day (RR, 1.24; 95% CI: 1.20-1.28).

For over a decade, our Green Card Clinic (GCC) at St Vincent's Hospital<sup>5</sup> has provided a service to people presenting to the Emergency Department (ED) with suicidality (suicidal behaviours or suicidal ideation). These patients undergo routine psychiatric examination, including a risk assessment undertaken by psychiatry registrars in the ED, who makes a referral to the GCC for the next working day. This is usually as an outpatient but may be in a medical ward or Psychiatric Emergency Unit if they are admitted. Exclusion criteria for referrals included people who were from out of the local catchment areas (as they were unlikely to come); people who were psychotic, cognitively impaired or had insufficient English (as they were unlikely to be able to engage with the resources and process) and people who were already in a treatment situation with another clinician or service.

<sup>5,6</sup>. Patients completed the study measures prior to the first and subsequent appointments. The study was approved by the St Vincent's Human Research Ethics Committee.

The Fantastic Lifestyle Checklist (FLC) is one of the routine measures: it includes a smoking item<sup>6</sup> and we have previously reported smoking rates around 60%, far exceeding the general population<sup>5,6</sup>. However, we find that very few attenders and clinicians are aware of the association between cigarette smoking and suicidality.

This study aims to examine associations of cigarette smoking by comparing the self-report measures and clinical data available for smokers and nonsmokers in this high-risk group.

## **Methods**

### **Procedure**

All patients attending St Vincent's Hospital ED with deliberate self-harm or suicidal ideation had a routine medical and psychiatric examination, including a risk assessment, undertaken by psychiatry registrars. Those referred to the GCC were given a 'green card' with an appointment time for the next working day and telephone crisis contact numbers. Full details of the clinic processes have been described previously<sup>6</sup>. Patients completed the study measures on arrival to their first appointment. Participation was voluntary and patients provided informed consent as a first step prior to completing the measures. The study was approved by the St Vincent's Human Research Ethics Committee.

### **Participants**

From 2007 to 2014, of the 563 patients who attended their first appointment at the GCC ('attendees'), a total FLC score was available for 363 participants. Demographic and clinical variables collected included age, sex, marital status, method of deliberate self-harm and psychiatric diagnosis, as well as measures of depression, anxiety and stress.

### **Measures**

The FLC<sup>7</sup> is a 25-item instrument assessing 11 lifestyle domains using the acronym FANTASTIC (family, friends, activity, nutrition, toxins, alcohol, stress, sleep, personality type, insight and career). Each item is scored on a 3-point Likert scale from 0 (*hardly ever*), 1 (*some of the time*), to 2 (*almost always*). The authors report a high test-retest correlation coefficient of 0.88<sup>7</sup> and a reasonably high internal reliability coefficient (Cronbach's alpha) of 0.75<sup>8</sup>. We have previously modified the tobacco item to reflect current smoking habits; scores now correspond to 'daily use', 'occasional use' and 'none'. We have previously reported a factor analysis of the FLC, producing three factors: *positive life investments*, relating to an individual's ability to communicate well, establish positive relationships, and obtain satisfaction from their job or role; *poor emotional regulation*, including anger, hostility and aggression, lack of patience and anxiety; and *poor health behaviours*, including poor diet, ineffective sleeping patterns and substance use<sup>6</sup>. For the present analysis, cigarette smoking was removed from the total score on this component. Higher scores on *positive life investments* suggest better adjustment, while higher scores on *poor emotional regulation* and *poor health behaviours* suggest more negative adjustment and behaviours.

The Short-Form Health Survey (SF-12)<sup>9</sup> is a 12-item measure of health-related quality of life, comprising a Mental Component Score (MCS) and a Physical Component Score (PCS). Low scores indicate that physical or mental health problems are interfering with social and occupational functioning: 40-49 (*mild level of disability*), 30-39 (*moderate level of disability*) and <30 (*severe level of disability*). High test-retest (two week) correlations of 0.76 and 0.89 have been reported for the MCS and PCS respectively<sup>9</sup>.

The Depression Anxiety and Stress Scales-21 Item Version (DASS-21)<sup>10</sup> measures levels of depression, anxiety and stress. Respondents rate the extent to which they have experienced symptoms over the past week on a 4-point Likert scale ranging from 0 (*never*) to 3 (*almost always*). Higher scores indicate higher levels of depression, anxiety, and stress. The DASS has high convergent validity with other measures of depression and anxiety and a factor structure consistent with the manner in which items are allocated to subscales<sup>11</sup>.

### **Data analysis**

Data were analysed using IBM SPSS Statistics (version 21). Participants were divided into those who reported cigarette smoking during the previous 12 months, and those who reported no smoking. These two groups were then compared on a range of psychological variables described above. Continuous variables were analysed using one-way ANOVA, while categorical variables were analysed using chi-square. All variables were then entered into a logistic regression to assess their independent relationship with cigarette smoking. For the regression model, age was divided into three categories, and all other continuous variables were categorised into binary variables using a median split.

### **Results**

Of the 363 participants, 61.4% (n = 223) reported either daily or occasional smoking over the past month (136 daily smokers, 87 occasional smokers). There were no significant differences between daily and occasional smokers on any measures: these groups were combined as current smokers. Compared to nonsmokers (shown in Table 1), smokers were younger and rated significantly lower on positive life investments and significantly higher on poor emotional regulation. Smokers scored significantly higher on each of the DASS domains

and the SF12 mental health scale, and were significantly more likely to have engaged in previous deliberate self-harm and to present with a substance use disorder but not major depression.

In the logistic regression analysis (Table 2), smoking was twice as likely among those aged 18-25 years as it was among those aged 36 years or older. Those with a median or higher score on poor health behaviours had three times the odds of cigarette smoking, while those with a substance use diagnosis were more than twice as likely to smoke as those with an “other” diagnosis. Those with a history of previous deliberate self-harm were twice as likely to be current smokers.

## **Discussion**

In this sample of individuals with recent suicidality, the rate of daily or occasional smoking was 61.4%. This is over four times the rate observed in the general population (approximately 14%)<sup>12</sup> and double that typically observed among those with a mental health disorder (36%)<sup>13</sup>.

Although there was no difference between smokers and nonsmokers in the prevalence of depression diagnosis, DASS scores showed higher severity of depressive symptoms among smokers, indicating that the higher burden of depression among smokers is not detected by diagnosis alone. Compared to nonsmokers, smokers also reported poorer emotional regulation and positive life investments (such as good relationships or a satisfactory job/role) and were more likely to report previous deliberate self-harm. While these findings are cross-sectional and do not imply causality, they support previous research reporting a relationship between smoking, negative affect and suicidal behaviour.

In the regression analysis, factors related to physical health (poor health behaviours, substance use disorder) were significant predictors of cigarette smoking, including higher rates of prescribed/nonprescribed substance use on the lifestyle checklist, substantiated by the clinician assessment, and behaviours such as poor diet, poor sleeping patterns and little/no exercise. These behaviours may be less likely to be assessed by clinicians during routine assessments, yet the current findings point to their importance.

We found that a significant difference between smokers had significantly poorer scores on mental health measures but not of SF12 physical health scores. This suggests that, in this relatively young group, while the mental health score reflects emotional distress, this has not translated into poor physical health. Thus, identifying and managing smoking among people at high risk of self-harm is an early intervention that could potentially have positive effects on lifestyle behaviours and subsequent longer term physical and mental health.

The findings are limited in their generalisability as the participants are all from inner city hospital clinic, with a somewhat selected population and potential pool of respondents as only 64% (363/563) provided data. Additionally, previous research has demonstrated that the relationship between smoking and suicidality is complex and there may well be subgroups who are affected in different ways. For example, some individuals may develop suicidal ideation after they begin cigarette smoking, while others may begin or increase smoking as a response to suicidal thoughts. Regardless of causality, strong evidence suggests that smoking cessation is associated with a reduction in suicidal ideation and depression, with effect sizes the same or better than those observed when taking antidepressant medications<sup>14</sup>.

Our lifestyle data are taken from a clinical setting as part of routine outcome measures. We have found the FLC useful when working with people presenting with deliberate self-harm and suicidal ideation, and suggest routine questions on smoking, provision of information about effects of smoking, and using the opportunity to encourage improvement in lifestyle behaviours (*less poor health behaviours and poor emotional regulation and more positive life investments*).

We have now developed an online method of data collection which provides immediate feedback of the data on lifestyle, mood and wellbeing, as well as a list of the attender's own priorities, and minimises missing data which is a problem in pen and paper measures in routine practice. We believe it is important that patients and their clinicians have this information to enable a conversation about making changes with the potential to have a positive impact on mental and physical health following presentation with suicidality<sup>4,6,14</sup>.

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**Table 1. Characteristics of GCC patients by current smoking status**

	Smokers n = 223	Nonsmokers n = 140	<i>p</i>
Mean (SD)			
Age in years	29.91 (9.52)	34.27 (11.70)	<.001
Poor emotional regulation	7.66 (2.27)	6.95 (2.45)	.005
Poor health behaviours	9.48 (2.67)	7.87 (2.67)	<.001
DASS depression	27.57 (10.60)	23.80 (11.92)	.003
DASS anxiety	21.11 (11.00)	15.05 (10.88)	<.001
DASS stress	25.69 (10.05)	22.26 (11.07)	.003
SF-12 mental health	30.80 (12.23)	28.30 (9.26)	.032
SF-12 physical health	50.87 (10.98)	50.08 (9.42)	.478
% (n)			
Gender (male)	41.70 (93)	42.86 (60)	.829
Previous suicidal behaviour	55.61 (124)	33.81 (47)	<.001
Psychiatric diagnosis#			
Substance use disorder	25.56 (57)	11.43 (16)	.003
Major Depression	32.29 (72)	34.29 (48)	
Anxiety Disorder	13.45 (30)	11.43 (16)	
Other*	28.70 (64)	42.86 (60)	

#Diagnosis made clinically using DSM criteria by clinician (psychiatrist, clinical psychologist or psychiatric clinical nurse consultant) and discussed at weekly review meeting

\* The majority of people in the “other” category were either experiencing a situational crisis or adjustment disorder

**Table 2. Logistic regression analysis predicting cigarette smoking**

	OR (95% CI)	<i>p</i>
Age in years		
18-25	1.95 (1.01-3.79)	.047
26-35	1.44 (0.75-2.27)	.269
36+	ref	
Gender (male)		
Female	ref	
Male	1.17 (0.67-2.03)	.582
Positive life investments		
Below median (7.00)	ref	
Median or above	1.00 (0.58-1.74)	.990
Poor emotional regulation		
Below median (7.20)	ref	
Median or above	0.89 (0.50-1.59)	.697
Poor health behaviours		
Below median (7.00)	ref	
Median or above	3.02 (1.78-5.11)	<.001
DASS depression		
Below median (26.00)	ref	
Median or above	1.40 (0.75-2.64)	.292
DASS anxiety		
Below median (18.00)	ref	
Median or above	1.64 (0.86-3.14)	.135
DASS stress		
Below median (28.00)	ref	
Median or above	0.97 (0.49-1.93)	.937
SF-12 mental health		
Below median (27.00)	ref	
Median or above	1.16 (0.66-2.04)	.604
SF-12 physical health		
Below median (52.00)	ref	
Median or above	1.20 (0.69-2.07)	.518
Previous DSH		
No	ref	
Yes	2.10 (1.25-3.53)	.005
Psychiatric diagnosis		
Other	ref	
Substance use disorder	2.66 (1.22-5.80)	.014
Major depression	1.29 (0.70-2.35)	.413
Anxiety disorder	1.73 (0.75-4.02)	.200