

# BMJ Open Using an extended theory of planned behaviour to predict smoking cessation counsellors' intentions to offer smoking cessation support in the Taiwanese military: a cross-sectional study

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## ABSTRACT

**Objectives** To use the extended theory of planned behaviour (TPB) to predict smoking cessation counsellors' intentions to offer smoking cessation support.

**Design** Cross-sectional study

**Setting** Taiwanese military

**Participants** A survey of 432 smoking cessation counsellors was conducted in 2017.

**Primary and secondary outcome measures** All participants completed a self-administered questionnaire that solicited information concerning demographics, smoking behaviour, self-rated suitability for being a counsellor, the knowledge and skills learnt from training courses and the TPB construct.

**Results** The factors of perceived behavioural control ( $\beta=0.590$ ,  $p<0.001$ ), self-rated suitability for being a counsellor (acceptable vs not suitable,  $\beta=0.436$ ,  $p=0.001$ ; suitable vs not suitable,  $\beta=0.510$ ,  $p<0.001$ ), knowledge ( $\beta=0.298$ ,  $p=0.020$ ) and professional specialty (military doctor vs non-military doctor,  $\beta=0.198$ ,  $p=0.034$ ) were found to be correlated with intention. However, attitude, subjective norms and descriptive norms were determined to be non-significant correlates. The model explained 59.7% of the variance for the intention to offer smoking cessation support ( $F[12,343]=44.864$ ,  $p<0.001$ ).

**Conclusions** To encourage smoking cessation counsellors to offer cessation support to smokers, policies should aim to increase their perceived behavioural control, knowledge and self-rated suitability for being a counsellor.

## INTRODUCTION

Smoking prevalence has decreased annually since the implementation of tobacco control policies. From 2007 to 2015, smoking rates for men and women dropped from 39% to 35% and 8% to 6%, respectively.<sup>1 2</sup> However, the smoking rate among military members is higher than among the general population.<sup>3</sup> In Taiwan, approximately 32% of military personnel reported being a current smoker

## Strengths and limitations of this study

- The study sample was selected from the Taiwanese military.
- Analysis is based on the theory of planned behaviour (TPB), which accounts for subjective norms and descriptive norms.
- TPB constructs, knowledge, skills, professional confidence and smoking behaviour were included in the model.
- The model explained 59.7% of the variance for the intention to offer smoking cessation support among smoking cessation counsellors.
- This was a cross-sectional study, and the causal relationship between the factors and the intention to offer smoking cessation support must still be further explored.

in 2014,<sup>4</sup> exceeding the smoking rate of 16.4% in the adult population.<sup>5</sup>

Tobacco use negatively affects fitness and health. Some studies have indicated that military personnel who smoke tend to lack the fitness to serve and have high training costs.<sup>6 7</sup> Furthermore, cigarette smoking was related to a higher risk of hospitalisation.<sup>8</sup> As a result, more strategies to reduce smoking among military personnel are necessary.

Health professionals, such as doctors, dentists, pharmacists, nurses and midwives, are the first line of contact with the public, and thus are a valuable means of disseminating information and advice concerning smoking cessation.<sup>9</sup> However, reports have indicated that these professionals have relatively low intentions of taking actions to help patients stop smoking.<sup>10–13</sup> The major barriers to delivering smoking cessation advice were lack of training, knowledge and

access to smoking cessation resources.<sup>12 14 15</sup> Some studies have indicated that healthcare professionals who received relevant training were more likely to assist patients with smoking cessation and had more success encouraging smoking abstinence among patients than untrained professionals.<sup>15 16</sup> Thus, training is an effective means of increasing health professionals' motivation and ability to provide patients with smoking cessation support.

In the Taiwanese military, the Ministry of National Defense—Medical Affairs Bureau established a team of smoking cessation counsellors in 2011. Smoking cessation counsellors undergo an 8-hour training course to acquire the knowledge and skills necessary to help smokers quit smoking. Each year, approximately 400 smoking cessation counsellors are trained. These smoking cessation counsellors are widely distributed in various units of the military to assist with the process of quitting smoking and to provide advice. However, smoking cessation counselling is secondary to the primary jobs of these counsellors; that is, their primary duty is not smoking cessation counselling. At the end of each year, the Ministry of National Defense—Medical Affairs Bureau publicly praises the outstanding smoking cessation counsellors; however, in 2015, only 36.8% of smoking cessation counsellors actually provided advice to smokers because there were no additional rewards or positive feedback to encourage them to engage in smoking cessation tasks.<sup>17</sup> Thus, it is crucial to understand the factors that motivate smoking cessation counsellors to actually offer smoking cessation tasks.

Ajzen and Fishbein<sup>18</sup> proposed the theory of reasoned action (TRA),<sup>18</sup> which postulates that people are rational individuals and their behaviour is intentional. Before taking an action, people consider the action and its outcomes and then decide whether to actually do it. The TRA considers two factors, attitude (ATT) and subjective norms (SN). Subsequently, Ajzen<sup>19</sup> proposed the theory of planned behaviour (TPB) to address perceived inadequacies of the TRA by adding perceived behaviour control (PBC). According to a review article, the TRA and its extension, the TPB, were most often used to predict health professionals' intentions, and had an overall frequency-weighted mean  $R^2$  of 0.59. In addition, PBC was the major predictor associated with intentions to adopt clinical behaviours.<sup>20</sup> One study indicated that all TPB variables were associated with intentions to provide tobacco treatment among dental hygienists.<sup>21</sup> Another study found that ATT and PBC were correlated with mental health professionals' intentions to help patients stop smoking in the Netherlands.<sup>10</sup> This demonstrated the efficacy of the TPB for explaining intentions among diverse types of professionals.<sup>20</sup> According to Ajzen, the TPB could include additional predictors to increase its explanatory power concerning variance in behavioural intentions.<sup>19</sup> Studies have reported that healthcare providers' knowledge, skills, professional confidence and their own smoking behaviour affected their likelihood of delivering tobacco cessation support.<sup>22–24</sup> The SN in

the TPB is an injunctive norm; however, a meta-analysis study discovered evidence that descriptive norms (DN) increased the variance explained in intention and had more influence than SN.<sup>25</sup> Some studies that examined professionals' intentions to help patients stop smoking did not consider DN. We extended the TPB by including DN, knowledge, skills, professional confidence and the smoking behaviour of health professionals.

To date, there has been no research exploring the factors related to the intentions of smoking cessation counsellors in the military to offer smokers smoking cessation support. To address this knowledge gap, this study used the extended TPB to predict smoking cessation counsellors' intentions to offer smoking cessation support to military members.

## METHODS

### Study design and participants

This cross-sectional study selected trained smoking cessation counsellors in 2017. The participants were informed of the study purposes, and self-administered questionnaires were distributed after acquiring the participants' consent. They filled out the questionnaire and consented at the end of the training course.

### Patient and public involvement

Participants were not involved in the design or conduct of this study.

### Measure

This study used a self-administered questionnaire to collect data. The content validity of the questionnaire was assessed by experts, including healthcare scholars, educators and physicians. In addition, the face validity of the questionnaire was established through pilot testing with 30 smoking cessation counsellors, revising, and finalising. The questionnaire solicited information regarding demographics, smoking behaviour, self-rated suitability for being a counsellor, knowledge and skills learnt from training courses, the TPB variables and DN.<sup>22–26</sup>

Demographic variables included age, sex, educational attainment (senior high school or below, higher vocational school and college or above), military service branch (army, navy, air force and other), military rank (officer, non-commissioned officer and enlisted), professional specialty (military doctor or non-military doctor) and years of service.

The participants were asked about their smoking status (question: 'Do you currently smoke?' answer: 'Yes' or 'No'). Responses for self-rated suitability for being a counsellor were not suitable, acceptable or suitable.

The participants evaluated the level of perceived knowledge and skills that increased due to the training course. The evaluation items were designed according to the content and purpose of the training course. Knowledge was measured using five questions concerning professional knowledge, a counsellor's job responsibilities, a

counsellor's work activities, the hazards of smoking and the national army tobacco prevention project; responses to each question were made using a five-point Likert-type scale with response choices ranging from 1 (strongly disagree) to 5 (strongly agree). A mean score was derived, and a higher score more strongly indicated that a participant had acquired knowledge from the training course. The scale exhibited adequate internal consistency ( $\alpha=0.91$ ). Skills were measured with six questions concerning consultation skills, the ability to communicate between units, the use of smoking cessation resources, the provision of education, the development of intervention methods and the assessment of the effectiveness of interventions. Responses ranged from strongly disagree (1) to strongly agree (5), again using a Likert-type scale. A mean score (range=1–5) was derived, and the scale exhibited adequate internal consistency ( $\alpha=0.95$ ).

TPB variables included ATT, SN, PBC and intention. The questionnaire was designed according to guidelines in Ajzen<sup>27</sup> and another study.<sup>26 27</sup> Each question was answered on a seven-point scale (ranging from strongly disagree to strongly agree). ATT was assessed by the question: 'The smoking cessation counsellors have an effective role in smoking cessation in the military'. The SN included two subscales (military smokers and superior officers) based on normative beliefs (NB) and motivations to comply (MC). NB included two statements: 'Most military smokers think that a smoking cessation counsellor should offer them smoking cessation support' and 'Most superior officers think that a smoking cessation counsellor should offer military smokers smoking cessation support'. Cronbach's alpha was 0.70. MC was evaluated by responses to the following statements: 'I am willing to comply with military smokers' wishes that I offer them smoking cessation support' and 'I am willing to comply with superior officers' wishes that I offer military smokers smoking cessation support'. Cronbach's alpha was 0.81. Each NB was multiplied by the corresponding MC. The DN was measured by responses to the statement 'Most of my smoking cessation counsellor's colleagues offer military smokers smoking cessation support'. PBC was measured by responses to the statement 'I feel confident that I could offer military smokers smoking cessation support if I wanted to'. Intention was assessed by responses to one item: 'I want to offer smoking cessation support'.

### Data analysis

Statistical analysis was conducted using the IBM SPSS Statistics V.22.0. Continuous variables (age, years of service, knowledge and skills) were represented as mean and SD. Categorical variables (sex, educational attainment, military service branch and military rank) were represented as frequencies and percentages. The TPB was scored by calculating the mean and SD. In addition, independent t-tests, one-way analysis of variance and Pearson correlation were performed to assess the differences between demographics and the main outcome

variable. Furthermore, we predicted the intention to offer smoking cessation support using a linear regression model. Variation inflation factor (VIF) analysis was used to detect multicollinearity among the independent variables. When VIF was  $\geq 10$ , the variable was removed.

## RESULTS

### Demographics

The overall response rate was 100%. The mean age of participants was 27.72 years (SD=5.57), and the majority were male (n=300, 70.6%). Most respondents had graduated from college or above (n=215, 50.5%). Regarding military service branch, nearly half the participants served in the army (n=220, 51.6%), 18.5% (n=79) in the navy, 16.0% (n=68) in the air force and 13.8% (n=59) in other capacities. Most respondents were non-commissioned officer (n=217, 51.5%). Approximately half

**Table 1** Demographic characteristics of the sample (n=432)

Variables	n (%)/mean $\pm$ SD
Age	27.72 $\pm$ 5.57
Sex	
Male	300 (70.6)
Female	125 (29.4)
Educational attainment	
Senior high school or below	132 (31.0)
Higher vocational school	79 (18.5)
College or above	215 (50.5)
Military service branch	
Army	220 (51.6)
Navy	79 (18.5)
Air force	68 (16.0)
Other*	59 (13.8)
Military rank	
Officer	83 (19.7)
Non-commissioned officer	217 (51.5)
Enlisted	121 (28.7)
Professional specialty	
Non-military doctor	177 (44.9)
Military doctor	217 (55.1)
Years of service	4.86 $\pm$ 5.10
Smoking	76 (17.6)
Self-rated suitability for being a counsellor	
Not suitable	63 (15.1)
Acceptable	207 (49.8)
Suitable	146 (35.1)
Knowledge $\dagger$	4.02 $\pm$ 0.58
Skills $\dagger$	3.86 $\pm$ 0.68

\*Others included military police force, reserve force and others.

$\dagger$ Ranges from 1 to 5.

**Table 2** Mean, SD and bivariate correlations for TPB variables (n=432)

TPB variables	Mean± SD	Intention	
		R	P value
Intention*	5.16±1.28	–	
ATT*	4.44± 1.37	0.413	<0.001
SN†			
Military smokers	20.78± 10.34	0.407	<0.001
Superior officers	21.42± 10.64	0.450	<0.001
DN*	4.45± 1.39	0.353	<0.001
PBC*	5.01± 1.24	0.730	<0.001

\*Ranges from 1 to 7.

†Ranges from 1 to 49.

ATT, attitude; DN, descriptive norms; PBC, perceived behaviour control; SN, subjective norms; TPB, theory of planned behaviour.

were military doctors (n=217, 55.1%). The mean years of service was 4.86 years (SD=5.10). Approximately, 18% were smokers. Most participants self-rated their suitability for being a counsellor as acceptable (n=207, 49.8%). The mean knowledge and skills were 4.02 (SD=0.58) and 3.86 (SD=0.68), respectively (table 1).

### TPB construct

Mean scores for intention, ATT, DN and PBC were above the scale midpoint, but the SN was low (table 2). The mean score of the study participants for intention to provide smoking cessation support was 5.16 on a scale of 1–7. The mean ATT was 4.44 on a scale of 1–7. The SN included two subscales: military smokers had a mean score of 20.78 on a scale of 1–49 and superior officers had a mean score of 21.42 on a scale of 1–49. The mean score for DN was 4.45 on a scale of 1–7. The mean PBC score was 5.01 on a scale of 1–7.

### Factors associated with the intention to provide smoking cessation support

In the univariate analysis, military rank, professional specialty, self-rated suitability for being a counsellor, knowledge and skills were significantly related to the intention to offer smoking cessation support (table 3). The TPB variables of ATT, SN (military smokers), SN (superior officers), DN and PBC were positively correlated with the intention to provide smoking cessation support (table 2). Table 4 presents the results of the linear regression analysis of the intention to offer smoking cessation support. After adjusting for the significant demographics and TPB variables, professional specialty ( $\beta=0.198$ ,  $p=0.034$ ), self-rated suitability for being a counsellor (acceptable vs not suitable,  $\beta=0.510$ ,  $p=0.001$ ; suitable vs not suitable,  $\beta=0.510$ ,  $p<0.001$ ), knowledge ( $\beta=0.298$ ,  $p=0.020$ ) and PBC ( $\beta=0.590$ ,  $p<0.001$ ) were significantly associated with the intention to offer smoking cessation support. The model explained 59.7% of the variance for the intention to offer smoking cessation support ( $F=44.864$ ,  $p<0.001$ ).

**Table 3** Univariate analysis of demographics and intention to offer smoking cessation support of the sample (n=432)

Variables	Intention	
	Mean±SD/R	P value
Age	0.016	0.746
Sex		0.625
Male	5.19± 1.31	
Female	5.12± 1.20	
Educational attainment		0.911
Senior high school or below	5.17± 1.28	
Higher vocational school	5.10± 1.39	
College or above	5.17± 1.24	
Military service branch		0.235
Army	5.16± 1.19	
Navy	5.15± 1.51	
Air force	4.96± 1.32	
Other*	5.42± 1.18	
Military rank		0.022
Officer	5.46± 1.19	
Non-commissioned officer	5.01± 1.30	
Enlisted	5.21± 1.26	
Professional specialty		0.029
Non-military doctor	5.03± 1.31	
Military doctor	5.32± 1.24	
Years of service	–0.022	0.658
Smoking		0.255
No	5.20±1.27	
Yes	5.04±1.33	
Self-rated suitability for being a counsellor		<0.001
Not suitable	4.29±1.62	
Acceptable	5.11±1.12	
Suitable	5.63±1.11	
Knowledge†	0.465	<0.001
Skills†	0.467	<0.001

\*Others included military police force, reserve force and others.

†Ranges from 1 to 5.

## DISCUSSION

To the best of our knowledge, this is the first study to use the extended TPB to explain the intention to offer smoking cessation support among smoking cessation counsellors in the military. This study demonstrated that the level of a smoking cessation counsellor's intention to offer smoking cessation support in the Taiwanese military was above the scale midpoint (5.16 on a scale of 1–7). The model explained 59.7% of the variance for the intention to offer smoking cessation support, which was higher than in other research.<sup>28</sup> Our study determined that PBC was the most critical factor influencing the intention to offer smoking cessation support among this sample of

**Table 4** Linear regression of intention to offer smoking cessation support of the sample (n=432)

Variables	Intention	
	$\beta$ (95% CI)	P value
<b>Military rank</b>		
Officers	Reference	
Non-commissioned officers	-0.133 (-0.364 to 0.098)	0.258
Private	<0.001 (-0.265 to 0.264)	0.997
<b>Professional speciality</b>		
Non-military doctor	Reference	
Military doctor	0.198 (0.015 to 0.380)	0.034
<b>Self-rated suitability for being a counsellor</b>		
Not suitable	Reference	
Acceptable	0.436 (0.180 to 0.692)	0.001
Suitable	0.510 (0.226 to 0.793)	<0.001
Knowledge*	0.298 (0.047 to 0.549)	0.020
Skill*	0.031 (-0.183 to 0.245)	0.775
<b>TPB variables</b>		
ATT†	0.068 (-0.006 to 0.141)	0.072
<b>SN‡</b>		
Military smokers	0.002 (-0.010 to 0.014)	0.711
Superior officers	0.007 (-0.005 to 0.019)	0.237
DN†	-0.025 (-0.101 to 0.050)	0.509
PBC†	0.590 (0.496 to 0.685)	<0.001

F=44.864,  $p < 0.001$ ,  $R^2 = 61.1\%$  and adjusted  $R^2 = 59.7\%$ .

\*Ranges from 1 to 5.

†Ranges from 1 to 7.

‡Ranges from 1 to 49.

ATT, attitude; DN, descriptive norms; PBC, perceived behaviour control; SN, subjective norms; TPB, theory of planned behaviour.

smoking cessation counsellors. In addition, knowledge, self-rated suitability for being a counsellor and professional speciality were also related to the intention to offer smoking cessation support. However, ATT, SN and DN were unrelated to the intention to offer smoking cessation support. The findings of this study may have implication for designing strategies to encourage healthcare professionals to provide smoking cessation services.

The mean score for the intention to offer smoking cessation support among smoking cessation counsellors was 5.16, which was higher than that of the staff at a state psychiatric hospital in the USA (4.3).<sup>28</sup> This may be because patients with mental illnesses were less likely to receive advice to quit smoking than those without mental illnesses.<sup>29</sup>

A systematic review of the literature concerning the factors influencing health professionals' intentions related to clinical practice discovered that the TRA or its extension, the TPB, was most often used. Different studies using social cognitive theories to explain healthcare professionals' behavioural intention demonstrated

different levels of efficacy with different types of professionals and behaviours.<sup>20</sup> Many studies have used the TPB as a framework to examine the intention to provide smoking cessation support and the results were not consistent. For example, two studies indicated that all TPB variables were associated with the intention to provide tobacco treatment among staff at a psychiatric facility and among dental hygienists.<sup>21 28</sup> Another study, examined by Blankers *et al*,<sup>10</sup> assessed mental health professionals' intentions for providing smoking cessation support to patients and discovered that ATT and PBC were the strongest identified correlates of intention. However, we determined that only PBC was a predictor of intention among smoking cessation counsellors in the military; ATT, SN and DN were not related to intention. The effect of ATT, SN and DN declined after controlling for TPB and other factors may due to the intercorrelation. Therefore, the predictors may be relevant and denoted that interventions aimed at increasing the intention to offer smoking cessation support should focus mainly on PBC and to a lesser extent ATT, SN and DN. In our study, approximately half of the smoking cessation counsellors were non-military doctors with insufficient professional knowledge regarding smoking cessation. Non-military doctors may have lower confidence in providing smokers smoking cessation support than military doctors, implying that training courses to improve PBC may be a key means of enhancing smoking cessation counsellors' intentions to offer smoking cessation support. In our study, ATT and intention were correlated in the univariate analysis but the relationship disappeared after controlling for the significant demographic and TPB variables, which was inconsistent with other studies.<sup>10 21 28</sup> The mean of ATT in the study was 4.44 (scores ranged from 1–7), which was lower than among staff at a psychiatric facility (4.69, scores ranged from 1–7) and among dental hygienists (4.0, scores ranged from 1–5).<sup>21 28</sup> This may be the reason why ATT was not a major factor for intention. In our study, neither the SN of military smokers nor that of superior officers was below the midpoint, and no relationship was evident between SN and intention, which was consistent with other studies of mental health professionals.<sup>10</sup> A possible explanation for this is that intention is an individual idea but SN emphasises the desires of others. Although we included DN as an additional predictor in the TPB, DN was not related to intention. This means that the influence of peers was low.

In our study, the correlation of knowledge and skills with intentions were similar in the univariate analysis. But after controlling for related factors, the association between skills and intentions was not significant. This finding was consistent with a systematic review that determined that the most commonly identified barrier to providing smoking cessation interventions in a hospital was a lack of knowledge.<sup>30</sup> However, a study indicated that knowledge and skill were related to physical therapists' intentions to counsel for smoking cessation.<sup>23</sup> It could be due to inconsistencies in measuring knowledge and skill.

In addition, skill was a more important factor of behaviour than knowledge as a prior systematic review study elaborated among health professionals.<sup>20</sup> Furthermore, the participants in our study were newly trained and their actual behaviour of providing smoking cessation support was unknown. As a result, the potential influence of skill on behaviour was still paying attention to and further studied. Military doctors, in our study, had higher intentions to offer smoking cessation support than non-military doctors, perhaps because military doctors received relevant medical training in school and possessed more smoking-related knowledge than non-military doctors. This finding also underscored the importance of knowledge. Thus, a training programme is a key method to strengthen smoking cessation counsellors' knowledge.

Smoking cessation counsellors who self-rated their suitability for being a counsellor as 'not suitable' had less intention of offering smoking cessation support than those who self-rated as 'acceptable' or 'suitable'. This indicated that counsellors' beliefs about their own capacities were a factor that increased the intention to offer smoking cessation support.<sup>24</sup>

This study was the first study to use the extended TPB to explore intentions to offer smoking cessation support in the military. However, this study had several research limitations. The study was a cross-sectional study, and the relationship between factors and the intention to offer smoking cessation support was correlational. The causal relationship must still be further explored. In addition, because the participants in the study were a representative sample in 2017, the results cannot be generalised to the entire population of smoking cessation counsellors in the military. However, we used a census study method to collect data, and the response rate was 100%; therefore, the bias of results was minimised.

## CONCLUSIONS

This study demonstrated that PBC was the strongest correlate of the intention of offering smoking cessation support among smoking cessation counsellors in the military. In addition, self-rated suitability for being a counsellor, professional specialty and knowledge were also correlated with intention. According to our findings, designing interventions to strengthen PBC would be a feasible strategy for increasing smoking cessation counsellors' intentions to offer smoking cessation support. Although intention significantly predicted behaviour,<sup>26</sup> future studies could evaluate the TPB construct on actual behaviour.

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**Contributors** SK, C-MC, F-GL and Y-LC designed the study and wrote the protocol. Y-LC, C-HL, S-LH, Y-WC and W-HF conducted literature searches and provided summaries of previous research studies. Y-LC and Y-CC conducted the statistical analysis. Y-LC wrote the first draft of the manuscript and all authors contributed to interpreting the results, and have approved the final manuscript.

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**Competing interests** None declared.

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