

# BMJ Open Tobacco cessation training in 6-year pharmacy schools in Japan: a cross-sectional survey

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## ABSTRACT

**Objectives** This study aimed to identify the extent of tobacco cessation training content, including the introduction of a comprehensive programme; and the presence of tobacco-related topics, including new tobacco products, school years and course of training, educators, and attitudes and policies relevant to tobacco education in pharmacy schools in Japan.

**Design** A cross-sectional survey.

**Setting** All pharmacy schools in Japan with a 6-year course of training were invited to participate.

**Methods** Pharmacy schools in Japan that agreed to participate in a web-based survey asking about tobacco cessation training, and attitudes and policies relevant to tobacco education.

**Primary and secondary outcome measures** The primary outcome was the number of pharmacy schools that introduced comprehensive tobacco cessation training in their curriculum. The secondary outcome was to clarify the curriculum coverage of 9 basic knowledge and 10 tobacco cessation-specific topics, including new tobacco products.

**Results** Of the 75 pharmacy schools with a 6-year course in Japan, 52 (74%) responded to the survey. While 27 (52%) schools reported that comprehensive tobacco cessation training would be beneficial, only 1 school had introduced it as a one-credit elective course in the fifth year. Basic knowledge topics for tobacco cessation listed in or related to the Model Core Curriculum were covered by 44%–65% of the schools, while practical skills were covered in 10%–19% of the schools. Only seven schools (14%) introduced the topic of new tobacco products in their curriculum.

**Conclusions** This study revealed that comprehensive tobacco cessation training is not generally offered in pharmacy schools in Japan. The Model Core Curriculum should revise its standards to implement updated tobacco cessation training programmes to keep up with new tobacco products and to train pharmacy students on counselling users of such products.

**Trial registration number** Tokyo University of Pharmacy and Life Sciences No. 17 – 14.

## INTRODUCTION

While cigarette smoking has decreased at the global level over the past 30 years,<sup>1</sup> tobacco smoking is one of the main risk factors for non-communicable diseases,<sup>2</sup> causing 11.5%

## Strengths and limitations of this study

- This is the first study to evaluate whether tobacco cessation topics are covered in the curricula of pharmacy schools in Japan.
- This survey was undertaken in a country with rapid growth of the market for heated tobacco products.
- The results might overestimate the curricular coverage of tobacco cessation training provided in pharmacy schools, because the data were self-reported.

(6.4 million) of global deaths in 2015.<sup>3</sup> Japan ranks seventh among the top 10 countries with the highest smoking population (China, India, Indonesia, the USA, Russia, Bangladesh, Japan, Brazil, Germany and the Philippines).<sup>3</sup> In Japan, while adult smoking rates declined over the 10-year period from 2007 (39.4% of men and 11.0% of women) to 2017 (29.4% of men and 7.2% of women),<sup>4</sup> more than 157 800 of its people are killed annually by tobacco-caused non-communicable diseases.<sup>5</sup> Because tobacco smoking and high blood pressure are the two major risk factors for adult mortality from non-communicable diseases in Japan, there is a major potential for population health gain if these factors are controlled.<sup>6</sup>

Smoking cessation is a major means of preventing smoking-related deaths worldwide. Healthcare professionals who receive training in smoking cessation are more likely to assess smoking status and assist their patients with quitting, compared with untrained controls.<sup>7</sup> Pharmacists, who are highly accessible healthcare professionals, should be poised to offer effective tobacco cessation programmes to patients. This is especially true in the USA and in several other countries, where basic knowledge of and practical skills for tobacco cessation counselling, in the form of comprehensive tobacco cessation training, are taught to most pharmacy students.<sup>8–10</sup> According to the recommendations of Rx for Change, the world's first comprehensive evidence-based

tobacco cessation training programme,<sup>11</sup> the ideal tobacco cessation training is to (1) expand tobacco cessation content into the curriculum, (2) ensure at least one faculty member has the necessary knowledge and skills to teach tobacco cessation and (3) dedicate 8 hours to tobacco cessation content.<sup>10 12</sup> To ensure that future pharmacists graduate with the knowledge and skills to solve public health problems, including tobacco dependence, health institutions and educational centres must include tobacco control in curricula and continuing education.<sup>12 13</sup>

In Japan, there are currently 75 pharmacy schools offering a 6-year training programme, which, together, have a total enrolment of 11 502 students per year.<sup>14</sup> Although the Japanese Model Core Curriculum for Pharmaceutical Education V.2015 was devised to fit the WHO eight-star pharmacist concept to ensure optimal pharmaceutical care and decision-making,<sup>15</sup> it has neglected tobacco cessation training. The Model Core Curriculum constitutes most (70% of credits) of the pharmacy curriculum in every school across Japan, with the remaining 30% being unique to each school.<sup>16</sup> Because the extent to which tobacco cessation education included in the curriculum depends on each school, we assessed the curricular coverage of tobacco cessation education provided in the pharmacy schools in Japan.

In addition, to assess the curricular coverage of basic knowledge of tobacco cessation training and the related practical skills, we aimed to identify the extent of incorporation of the health effects of new tobacco products, including heated tobacco products. While cigarettes have generally been the most popular tobacco product in Japan (as opposed to traditional options, such as cigars, pipes and oral snuff), heated tobacco products accounted for 20.9% of Japan's tobacco market in 2018 versus 12% in 2017.<sup>17</sup> Branded types of heated tobacco products sold in Japan include tobacco microcapsules (Ploom), sticks (Glo) and mini-cigarettes (IQOS), which are designed to heat tobacco for avoiding combustion to generate nicotine aerosol. Because nicotine-containing e-cigarettes are regulated under the Japanese Pharmaceutical Affairs Law, as a pilot testing area, Japan accounted for more than 90% of the heated tobacco products market among more than 30 countries in 2017.<sup>18</sup> According to a WHO report, at present, there is no evidence that heated tobacco products are less harmful than conventional tobacco.<sup>19</sup> Because heated tobacco products and e-cigarettes have been gaining popularity,<sup>20</sup> pharmacists will be required to provide counselling to users of those products. Given that tobacco cessation training should be tailored to each country's circumstances,<sup>21</sup> we also measured coverage of heated tobacco products in the tobacco cessation curricula of pharmacy schools in Japan.

## METHODS

### Study design

The study involved a cross-sectional web-based survey.

### Setting and participants

Because we targeted all 75 accredited pharmacy schools offering 6-year training programmes to educate pharmacists in Japan, we had no exclusion criteria. We sent these schools a survey invitation letter, requesting one faculty member who was responsible for coordinating school courses to respond to a web-based survey through SurveyMonkey (SurveyMonkey, Palo Alto, CA, USA) in February 2018. Data were collected from February to June 2018. This was followed by two reminder letters in March and April, and a telephone call in May 2018. The study was conducted at Tokyo University of Pharmacy and Life Sciences (TUPLS). The study protocol was approved by the institutional review board of TUPLS.

### Measures

We collected information using an 18-item survey, titled 'Questionnaire about Tobacco Cessation Education in Six-Year Pharmacy Schools' (online supplementary file 1), consisting of a combination of closed- and open-ended questions.

### Variables

The primary outcome was to identify the number of pharmacy schools that introduced comprehensive tobacco cessation training in their curriculum. We defined *comprehensive* tobacco cessation training as providing pharmacy students with tobacco cessation-related knowledge and skills in one course. The secondary focus was to clarify the curriculum coverage of 9 basic knowledge and 10 practical topics, including new tobacco products, for tobacco cessation training. We defined those tobacco cessation-related educational contents based on the Rx for Change programme.<sup>11</sup> Our dependent variable measured the total number of tobacco cessation training topics that the school covered, which presented an overall picture of the coverage of the comprehensive tobacco cessation training programmes.

We collected the following information through the survey: (1) whether or not the school had introduced tobacco cessation training programmes as a required/elective course (one item); (2) whether or not tobacco cessation training should be introduced in pharmacy education (one item); (3) school curriculum coverage of each tobacco cessation training topic (four items); (4) smoke-free/tobacco-free policies on campus (six items); (5) whether the school offered tobacco education for students and staff (three items); and (6) characteristics of the participating pharmacy schools (three items): public/private, location, and respondent's name and e-mail address (optional). Regarding introduced topics, additional questions addressed the style of education, including the ways in which tobacco cessation training is integrated into curricula; the student year in which the educational content is offered; methods of learning, that is, lectures or problem-based learning; and the teacher's background (faculty member or external lecturer; whether or not a board-certified member of the Japan

Society for Tobacco Control as a tobacco cessation specialist; and physician, nurse, pharmacist with/without clinical expertise). Information on policies was collected to provide potential confounders in the process of introducing tobacco-related topics in school curricula.<sup>22</sup> We assessed whether the school had written policies regarding a campus smoking ban, tobacco cessation initiatives, protection from secondhand smoke exposure and new tobacco product use.

### Patient and public involvement

Because the survey focused on topics of tobacco cessation training among pharmacy schools, patients were not directly involved in this study.

### Statistical analysis

All data were analysed using JMP Pro V.14 (SAS Institute, Cary, NC, USA). Because we aimed to make an inventory of tobacco cessation training in pharmacy curricula in Japan, we requested all 6-year pharmacy schools to answer the questionnaire. We estimated a response rate of approximately 70% (52 schools) based on a previous survey regarding pharmacy education in Japan.<sup>23</sup> To summarise the responses, values were reported as means and SD, ranges or frequency in percentages. We compared the characteristics of the participating pharmacy schools and the survey responses using Fisher's exact test for categorical variables and analysis of variance for continuous ones.

Our assumption regarding the ideal sample size was  $\geq 47$  participants and included an SD of 5 with a two-sided significance level, 80% power and 5%  $\alpha$ -error. In that calculation, we estimated that the mean was nine topics (four listed and five related) in the schools that introduced tobacco cessation training in their coursework; two other groups only listed four topics: one did not deliver tobacco cessation training, and another had been considering their implementation.

All probability values for statistical analyses were two-tailed, and  $p < 0.05$  was regarded as statistically significant.

## RESULTS

### Study flow

Of the 57 private and 18 public pharmacy schools in Japan, 55 responded to the survey (73% response rate). School location did not significantly differ between respondents and non-respondents. Three schools were excluded because of missing data on all 19 tobacco cessation training topics (online supplementary file 2).

### Characteristics of participating pharmacy schools

The characteristics of the pharmacy schools that participated in this study are shown in [table 1](#). Most were private schools (83%). Of the 52 responding schools, only one school responded that it conducted a comprehensive tobacco cessation training programme in the curriculum;

27 (52%) schools reported that it would be preferable to introduce tobacco cessation training in pharmacy education. Reasons for implementing such training included tobacco cessation support being a duty of pharmacists ( $n=18$ , 67%), the need for students to know about the health consequences of smoking/nicotine addiction ( $n=5$ , 19%) and such training serving as an excellent opportunity for students to quit smoking themselves ( $n=2$ , 2%). Conversely, of the 52 schools, 6 (12%) reported that tobacco cessation training was not needed in pharmacy education, and 19 (37%) were not sure of the necessity of introducing such a training programme. The reasons they cited for not implementing the training were that tobacco cessation training is not listed as an objective of the Model Core Curriculum ( $n=18$ , 35%), there is a lack of space for such training in the school curriculum ( $n=5$ , 9.6%), and such material could be learnt during their clerkships in the fifth year ( $n=2$ , 4%).

Although half of the pharmacy schools offered education for non-use of tobacco at the first-year students' orientation (55%), tobacco cessation programmes were not commonly offered to either students or staff (10% and 18%, respectively).

### Curricular coverage of learning topics for tobacco cessation training

Only one school conducted a comprehensive tobacco cessation training programme in an elective course in the fifth year ([table 1](#)). This school implemented 16 topics (eight basic knowledge aspects and eight skills, including health effects of new tobacco products) of the 19 total topics for a tobacco cessation training programme. The total number of tobacco cessation training topics covered in the curriculum did not differ by school type, location, campus tobacco control policies and tobacco education for institution members. Pharmacy schools that had a positive attitude to the introduction of a tobacco cessation training programme or a positive attitude towards a campus smoking ban covered more tobacco cessation training topics in their curriculum than other pharmacy schools, which did not have these. Curricular coverage of the nicotine pharmacology effect and principles of nicotine addiction, which were listed in the Model Core Curriculum, were not significantly different among subgroups of the perceived importance of tobacco cessation training in pharmacy education (online supplementary file 3). However, regarding the curricular coverage of topics not listed in the Model Core Curriculum, practical skills were almost absent.

[Table 2](#) shows curricular coverage, school years and the course of learning topics for tobacco cessation training in responding pharmacy schools in Japan. Regarding basic knowledge of tobacco cessation training listed in/related to the Model Core Curriculum, around 40%–60% of pharmacy schools reported coverage in core/elective classes in the median third year (IQR: second to fourth year). Curricular coverage of the nicotine pharmacology effect and principles of nicotine addiction were 65% and

**Table 1** Total of all tobacco cessation training topics covered by participating pharmacy schools

Characteristics	n (%)	Tobacco cessation training topics covered by schools mean (SD)	P value for difference
<b>Basic backgrounds (n=52)</b>			
School Type			
Public	9 (17)	4.1 (5.5)	0.36
Private	43 (83)	5.9 (5.3)	
School area			
Hokkaido or Tohoku	6 (12)	4.3 (3.7)	0.29
Kanto	16 (31)	4.5 (5.4)	
Hokuriku or Tokai	5 (10)	6.2 (5.1)	
Kinki	13 (25)	4.7 (5.2)	
Chugoku or Kyushu	12 (23)	8.5 (5.8)	
<b>School attitude to tobacco cessation training programme introduction (n=52)</b>			
School has a tobacco cessation training programme in a core/elective course			
Yes	1 (2)	16.0 (-)	<0.001
Under consideration	4 (8)	13.0 (4.7)	
No	47 (90)	4.8 (4.7)	
Tobacco cessation training programme should be introduced in pharmacy education			
Yes	27 (52)	7.8 (5.9)	0.007
No	6 (12)	2.7 (2.8)	
Not sure	19 (37)	3.5 (3.7)	
<b>School attitude to campus smoking ban (n=51)</b>			
Smoking ban on campus			
No exceptions	30 (59)	5.9 (5.3)	0.31
Indoor only	15 (29)	6.5 (5.5)	
With designated smoking area	6 (12)	2.7 (4.8)	
New tobacco products use indoor			
Available	14 (28)	5.7 (5.5)	0.99
Unavailable	37 (73)	5.7 (5.3)	
Campus smoking ban should be introduced in pharmacy schools			
Yes	38 (75)	6.6 (5.4)	0.02
No	1 (2)	12.0 (-)	
Not sure	12 (24)	2.3 (3.3)	
<b>Campus policies for tobacco control (n=50)</b>			
Smoke-free prohibition policies			
Yes	27 (54)	6.5 (5.3)	0.22
Under consideration	7 (14)	7.6 (5.4)	
No	16 (32)	4.0 (4.8)	
Tobacco cessation initiatives			
Yes	13 (26)	7.2 (5.4)	0.49
Under consideration	7 (14)	6.3 (3.3)	
No	30 (60)	5.1 (5.4)	
Secondhand smoke exposure policy			
Yes	14 (28)	7.6 (4.9)	0.13
Under consideration	8 (16)	8.0 (5.1)	
No	28 (56)	4.4 (5.1)	

Continued

Table 1 Continued

Characteristics	n (%)	Tobacco cessation training topics covered by schools mean (SD)	P value for difference
Tobacco education for institution members (n=51)			
School offers education for non-use of tobacco for students			
Yes	28 (55)	7.1 (4.9)	0.07
Previously offered	3 (6)	7.0 (0.6)	
No	20 (39)	3.6 (4.4)	
School offers smoking cessation programme for students			
Yes	5 (10)	6.8 (4.9)	0.06
Previously offered	4 (8)	11.5 (5.9)	
No	42 (82)	5.0 (4.8)	
School offers smoking cessation programme for staff			
Yes	9 (18)	6.4 (5.4)	0.90
Previously offered	3 (6)	6.0 (1.5)	
No	39 (77)	5.5 (5.3)	

52%, respectively. However, regarding practical skills for tobacco cessation training, around 10%–20% of pharmacy schools reported coverage in the median fourth year (IQR: third to fifth year). Seven (14%) schools reported covering both ‘forms of tobacco used in Japan’ and ‘health effects of new tobacco products, including heated tobacco products’ in the median third year. Both basic knowledge of and practical skills for tobacco cessation training were taught over multiple years.

We counted the total number of tobacco cessation training topics, which presented an overall picture of the school coverage of the tobacco cessation training programme. Overall, the mean coverage (SD) was 5.6 (5.3) topics in responding pharmacy schools, corresponding to 30% of the total tobacco cessation training topics.

#### Educators for tobacco cessation training

Various lecturers taught fragmented tobacco cessation training topics across multiple courses (table 3). Faculty members mainly taught both basic knowledge and practical skills (81% and 93% for each trainer, respectively). Pharmacists with clinical expertise were the main educators (33% for basic knowledge trainer and 43% for practical skills trainer). In addition, the use of tobacco cessation specialists, including external lecturers, was low (5% and 7%, respectively).

## DISCUSSION

We found that a comprehensive tobacco cessation training programme incorporating topics focusing on tobacco cessation in one course was introduced in only one pharmacy school in Japan. The topic of new tobacco and practical skills for tobacco cessation training, which were not listed in the Model Core Curriculum, were

covered by 10%–20% of the schools. Certified tobacco cessation specialists were used by 5%–7% of tobacco cessation training educators.

Basic knowledge topics for tobacco cessation listed in or related to the Model Core Curriculum were covered by 44%–65% of the schools, while practical skills were covered in less than 20% of responding schools. The Model Core Curriculum does not specifically address, define or require comprehensive tobacco cessation training; it requires education regarding tobacco-related diseases, including nicotine dependence, as well as disease state, for example, pathophysiology and symptoms. Pharmacy schools in Japan seem to be likely meeting the minimum requirements of the Model Core Curriculum. However, comprehensive tobacco cessation training would need to be a required coursework of pharmacy curricula in Japan to ensure that all pharmacy students possess evidence-based knowledge and skills to help patients quit tobacco use,<sup>11</sup> like most pharmacy colleges/schools in the USA (99%) and Malaysia (81%), which integrate tobacco cessation content into their coursework.<sup>8 12</sup> It would be preferable to introduce all topics on tobacco cessation in a short-term intensive course; however, it could be permissible for several faculty members to teach the material across multiple courses, if the curriculum is difficult to change or there is limited time.

Based on our survey, offering a tobacco cessation training programme around the third or fourth years would be reasonable; in this way, during their clerkships in the fifth year, pharmacy students could have an opportunity to advise patients to quit tobacco. Several schools expected that tobacco cessation training would be covered during their clerkships. However, pharmacy students are not likely to have enough opportunities to observe tobacco cessation interventions by pharmacists or

**Table 2** Curricular coverage, school years and the course of learning topics for tobacco cessation training in responding pharmacy schools in Japan

Topics	Model Core Curriculum	Year, M (IQR)	Respondents, n=52 (%)		
			Total	Core requisite	Elective (non-credit)
<b>Basic knowledge of tobacco cessation education</b>					
1 Population-based trends of tobacco use in Japan	Related	3 (2–3)	56	50	6
2 Health-related problems of tobacco use	Related 1)	3 (2–3)	60	54	6
3 Health-related problems of secondhand smoke	Related	3 (2–3)	56	48	8
4 Forms of tobacco used in Japan	None	3 (3–5)	14	8	4
5 Pharmacological effects of nicotine	Listed	3 (2–3)	65	62	4
6 Principles of nicotine addiction	Listed	3 (3–3)	52	50	2
7 Aids for cessation (dosing, side effects, etc)	Listed 2)	4 (3–4)	46	40	6
8 Drug interactions associated with smoking	Listed	3 (3–4)	44	42	2
9 Withdrawal effects and health benefits of tobacco cessation	None	4 (3–4)	39	35	4
<b>Practical skills for tobacco cessation education</b>					
1 The 5 As	None	4 (3–5)	15	12	2
2 The 5 Rs	None	4 (3–5)	15	12	2
3 The brief intervention model (ask, advise and refer)	None	5 (4–6)	10	6	2
4 Tobacco user's readiness to quit smoking	None	4 (3–5)	14	12	2
5 Cognitive and behavioural strategies for quitting	None	4 (2–5)	10	8	0
6 Motivation interview for quitting	None	4 (2–5)	10	8	0
7 Counsel patients on proper use of the aids for cessation	Related 3)	4 (3–4)	19	15	2
8 The daily costs of the aids for cessation compared with cigarette smoking	None	4 (2–6)	15	10	4
9 Tailored strategies to assist patients with quitting and following-up based on role-playing scenarios	None	5 (3–6)	10	6	2
10 Health effects of new tobacco products, including heated tobacco products	Related 4)	3 (1–5)	14	10	4

Model Core Curriculum category (number: title):

- 1) D-(2)–3: Lifestyle related Diseases and their prevention.
- 2) E2-(4): Drugs used for the treatment of Respiratory and digestive tract disorders.
- 3) E2-(9): Over-the-counter and behind-the-counter drugs and self-medication.
  - F2-(4): Professional attitudes and behaviours of practice, patient education and counselling.
  - F-(5)–3: Role of pharmacists in primary care and self-medication.
  - 4) F-(5)–2: Advancing pharmacy health literacy in the community.

**Table 3** Tobacco cessation training educators in participating pharmacy schools.

Educator's background	Total	Faculty member	External lecturer
	%	%	%
Basic knowledge of tobacco cessation training	n=86	n=70	n=16
Tobacco cessation specialist	5	4	6
Pharmacist with clinical expertise	33	33	31
Physician	17	19	13
Nurse	5	3	13
Others	41	41	38
Practical skills for tobacco cessation training	n=30	n=28	n=2
Tobacco cessation specialist	7	7	0
Pharmacist with clinical expertise	43	43	50
Physician	23	21	50
Nurse	0	0	0
Others	27	29	0

to learn about tobacco-related diseases during their clerkships in the fifth year.<sup>24</sup>

The topic of the various forms of tobacco—not listed in the Model Core Curriculum—was rarely covered by the surveyed pharmacy schools. Because heated tobacco products and electronic cigarettes have been gaining popularity,<sup>20</sup> future pharmacists will be required to provide counselling to users of these products, as well as users of traditional tobacco products. A recent study recommended that targeted training on how to counsel patients on e-cigarette cessation should be included in pharmacy curricula in the USA.<sup>25</sup> Also, in Japan, where heated tobacco products are the most prevalent, tobacco cessation training that includes information on new tobacco products should be introduced as needed.

Although academic clinical pharmacists were the main tobacco cessation training educators, almost none of them were certified tobacco cessation specialists. In the USA, the national train-the-trainer programme is conducted as a '14.5-hour, 3=day course' before the implementation of the tobacco cessation training programme in pharmacy schools,<sup>26</sup> and a '6 hour web-based Rx for Change train-the-trainer programme' for pharmacy faculty who wish to teach tobacco cessation is underway.<sup>12</sup> Introducing a similar 'train-the-trainer programme' should be useful for Japan as well as other countries where these educational systems have not yet prepared. In addition, the creation of board-certificated tobacco cessation specialists within the realm of tobacco cessation training would be ideal for teachers.

This study has several limitations. First, this paper included only self-reported outcomes by faculty members who were responsible for coordinating school courses. It would be preferable to ask them directly about the extent of the tobacco cessation training programme in their respective school's curriculum, because few pharmacy schools introduced those. Second, we did not look into the time spent on each topic, the resources used, or the outcomes, although we did note that few schools used tobacco cessation specialists as lecturers. Past studies have indicated a lack of consistency in healthcare professionals' tobacco/nicotine education<sup>27</sup>; therefore, further research should be conducted to take a more practical approach to train pharmacy students and pharmacists in Japan. Third, because this was a cross-sectional study, there is the possibility of potential bias: the extent to which research-funding institutions established by tobacco companies influenced faculty members to develop school curricula is unclear.<sup>28</sup> Despite these limitations, this study provides information about the need for more tobacco education in pharmacy training programmes in Japan.

Tobacco cessation counselling is an essential public health service provided by pharmacists worldwide. Because tobacco smoking and high blood pressure are the two major risk factors for adult mortality from non-communicable diseases in Japan, the provision of tobacco cessation and hypertension counselling by pharmacists would be beneficial. To deliver such services sustainably, incorporation into the pharmacy curriculum is advocated.<sup>29</sup> In countries where new tobacco products, including heated tobacco products, are spreading, pharmacy education should introduce tobacco cessation training programmes to counsel people on their risks, because it is untrue that IQOS use is unassociated with the adverse cardiovascular effects of smoking cigarettes.<sup>30</sup>

## CONCLUSIONS

This study revealed that pharmacy schools in Japan generally do not include comprehensive tobacco cessation training programmes. Most pharmacy schools do not introduce the topic of new tobacco products. With newer tobacco products continually being developed, there is a need for upgrading cessation education and adequately educating pharmacists. The Model Core Curriculum in pharmacy education should revise its standards to include tobacco–nicotine cessation training.

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**Contributors** HT and YT developed the survey questionnaires. HT completed the analysis of the survey data. HT drafted the manuscript. YT, KY and MS reviewed the manuscript. All authors conceived the study, participated in its design, and read and approved the final manuscript.

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## REFERENCES

- Ng M, Freeman MK, Fleming TD, *et al*. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA* 2014;311:183-92.
- Beaglehole R, Bonita R, Horton R, *et al*. Priority actions for the non-communicable disease crisis. *Lancet* 2011;377:1438-47.
- GBD 2015 Tobacco Collaborators. Smoking prevalence and attributable disease burden in 195 countries and territories, 1990-2015: a systematic analysis from the Global Burden of Disease Study 2015. *Lancet* 2017;389:1885-906.
- Ministry of Health, Labour and Welfare. The national health and nutrition survey 2017 (in Japanese). 2018 <https://www.mhlw.go.jp/content/10904750/000351576.pdf>.
- Drope J, Schluger NW. The tobacco atlas sixth edition (fact sheet of Japan). 2018 [ta6.org/country/japan](http://ta6.org/country/japan) (Accessed 1 Mar 2019).
- Ikeda N, Inoue M, Iso H, *et al*. Adult mortality attributable to preventable risk factors for non-communicable diseases and injuries in Japan: a comparative risk assessment. *PLoS Med* 2012;9:e1001160.
- Carson KV, Verbiest ME, Crone MR, *et al*. Training health professionals in smoking cessation. *Cochrane Database Syst Rev* 2012:CD000214.
- Simansalam S, Brewster JM, Mohamed MHN. Smoking cessation in Malaysian pharmacy curricula: findings from environmental surveys. *Pharm Educ* 2015;15:254-60.
- Saba M, Bittoun R, Saini B. A workshop on smoking cessation for pharmacy students. *Am J Pharm Educ* 2013;77:198.
- McBane SE, Corelli RL, Albano CB, *et al*. The role of academic pharmacy in tobacco cessation and control. *Am J Pharm Educ* 2013;77:93.
- University of California, San Francisco, Schools of Pharmacy and Medicine. Rx for Change: clinician-assisted tobacco cessation. <http://rxforchange.ucsf.edu> (Accessed 1 Mar 2019).
- Lang W, Elkhadragey N, Hudmon KS. Getting to zero: the role of academic and professional pharmacy in tobacco cessation. *Academic Pharmacy Now* 2016;9.
- World Health Organization. Tobacco free initiative. Code of practice on tobacco control for health professional organizations. 2011 <https://www.who.int/tobacco/wntd/2005/codeofpractice/en/> (Accessed 1 Mar 2019).
- Ministry of Education, Culture, Sports, Science and Technology. List of pharmacy schools in Japan 2018 [in Japanese].
- The Pharmaceutical Society of Japan and Council for Fostering Human Resources in Pharmacy Education, MEXT Japan Model core curriculum for pharmacy education—2015 version, 2018. [https://www.pharm.or.jp/kyoiku/pdf/corecurri\\_eng180426.pdf](https://www.pharm.or.jp/kyoiku/pdf/corecurri_eng180426.pdf). (Accessed 1 Mar 2019).
- The Pharmaceutical Society of Japan. Pharmaceutical education. <https://www.pharm.or.jp/eng/curriculum.html> (Accessed 1 Mar 2019).
- Uranaka T. Health News. Japan Tobacco ratchets up smokeless war with new products | Reuters. 2019 <https://uk.reuters.com/article/us-japan-tobacco-products/japan-tobacco-ratchets-up-smokeless-war-with-new-products-idUKKCN1PB090> (Accessed 1 Mar 2019).
- World Health Organization. Heated tobacco products (HTPs) market monitoring information sheet. 2018 [https://www.who.int/tobacco/publications/prod\\_regulation/https-marketing-monitoring/en/](https://www.who.int/tobacco/publications/prod_regulation/https-marketing-monitoring/en/) (Accessed 1 Mar 2019).
- World Health Organization. Heated tobacco products (HTPs) information sheet. 2018 [https://www.who.int/tobacco/publications/prod\\_regulation/heated-tobacco-products/en/](https://www.who.int/tobacco/publications/prod_regulation/heated-tobacco-products/en/) (Accessed 1 Mar 2019).
- Kunugita N, Bekki K, Shigehisa U, *et al*. Public health concerns regarding novel tobacco products including smokeless tobacco and e-cigarettes. *J Natl Inst Public Heal* 2015;64:501-10.
- World Health Organization. Tobacco free initiative. Health systems and professionals. 2013 [https://www.who.int/tobacco/control/health\\_professionals/en/index3.html](https://www.who.int/tobacco/control/health_professionals/en/index3.html) (Accessed 1 Mar 2019).
- Hyland A, Barnoya J, Corral JE. Smoke-free air policies: past, present and future. *Tob Control* 2012;21:154-61.
- Sasaki J, Kitazawa K, Nakayama T. Status of evidence-based medicine education in undergraduate pharmacy curricula [in Japanese]. *Yakugaku Zasshi* 2018;138:631-5.
- Tobari H, Aizawa M, Ito M, *et al*. Prevalence of smoking cessation training and practices for student pharmacists in hospital and community pharmacy clerkships [in Japanese]. *Japanese Journal of Tobacco Control* 2017;12:92-8.
- Nduaguba SO, Ford KH, Bamgbade B, *et al*. Comparison of pharmacy students' knowledge and self-efficacy to provide cessation counseling for hookah and cigarette use. *Curr Pharm Teach Learn* 2017;9:37-42.
- Elkhadragey N, Corelli RL, Russ AL, *et al*. Faculty perceptions of a tobacco cessation train-the-trainer workshop and experiences with implementation: A qualitative follow-up study. *Res Social Adm Pharm* 2019. doi.org/10.1016/j.sapharm.2019.01.005.
- Ye L, Goldie C, Sharma T, *et al*. Tobacco-nicotine education and training for health-care professional students and practitioners: a systematic review. *Nicotine Tob Res* 2018;20:531-42.
- Iida K, Proctor RN. 'The industry must be inconspicuous': Japan Tobacco's corruption of science and health policy via the Smoking Research Foundation. *Tob Control* 2018;27:e3-e11.
- El Hajj MS, Awaisu A, Kheir N, *et al*. Evaluation of an intensive education program on the treatment of tobacco-use disorder for pharmacists: a study protocol for a randomized controlled trial. *Trials* 2019;20:25.
- Nabavizadeh P, Liu J, Havel CM, *et al*. Vascular endothelial function is impaired by aerosol from a single IQOS HeatStick to the same extent as by cigarette smoke. *Tob Control* 2018;27:s13-s19.