



# “If I could try it, I’d try it”: Qualitative study of the illegal vaping culture in Singapore

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## ABSTRACT

**Aims and background:** Singapore has one the world’s strictest e-cigarette (vaping) regulations, with bans on e-cigarette import, sale, purchase, use and possession. Nevertheless, Singapore is seeing a growing vaping trend. Beyond estimates of vaping prevalence, little is known about vaping in countries where it is banned or the features and drivers of such illegal vaping cultures. This qualitative study thus explored the characteristics of Singapore’s illegal vaping culture.

**Methods:** We held ten focus group discussions with 63 Singaporeans aged 21–40 years, exploring participants’ experiences and views related to vaping in Singapore. Transcripts of the discussions were coded using deductive and inductive coding methods.

**Results:** Despite its illegal status, vaping was perceived as appealing due to the novelty flavours, ease of use, and convenient access. Harm perceptions were mixed, with concerns over the adverse health impacts along with beliefs that vaping was innocuous when used in moderation. A conspicuous vaping culture among young people, along with perceptions of lax enforcement, drove beliefs that vaping is an entrenched social norm in Singapore. This belief was in turn associated with a sentiment that Singapore should introduce a regulated e-cigarette market to better control its use among the general population.

**Conclusions:** The reinforcement of vaping as a social norm appears to be driving an illegal vaping culture in Singapore. Measures that denormalise vaping could help to strengthen the effectiveness of the vaping ban.

## 1. Introduction

E-cigarette use (‘vaping’) is a public health concern due to its addictiveness, potentially harmful impact on lung and cardiovascular function, role in renormalising smoking, and high usage rate among youths driven by industry marketing (World Health Organization, 2021). Singapore, a high-income city-state in Southeast Asia with a predominantly Chinese (76 %), Malay (15 %) and Indian (8 %) population (National Population and Talent Division of the Prime Minister’s Office, 2023), has one of the world’s strictest vaping bans. Singapore’s ban was pre-emptive and completely bans all e-cigarette import, sale, distribution, purchase, possession and use (Attorney-General’s Chambers of Singapore, 2020). While other Southeast Asian countries (Brunei, Cambodia, Laos and Thailand) have also banned e-cigarette sales, vape markets in neighbouring Malaysia and Indonesia are thriving, with a strong industry presence and ubiquitous vape marketing via shops, industry-sponsored vape events, and popular ‘vapefluencers’ on social media (van der Eijk et al., 2022).

As vaping gained popularity globally and in these neighbouring countries, vaping in Singapore has also become increasingly common despite its illegal status, especially among youths (Ong, 2023). The number of offences for e-cigarette purchase, use or possession rose 58 % from 5,000 cases in 2022 to 7,900 cases in 2023, and the number of students reported for vaping offences rose from fewer than 50 in 2018 to 800 in 2022 (Tan, 2024). This prompted the government to strengthen its multi-agency efforts to disrupt e-cigarette supply, increase enforcement, and educate the public (Ministry of Health Singapore, 2022). However, it is unclear how such efforts will impact Singapore’s illegal vaping culture as the features of this culture have not been a subject of research, both in Singapore and in other countries where vaping is banned.

As at October 2023, 39 countries in Latin America, the Middle East, Asia, Africa, Europe and Oceania have banned e-cigarette sales (Global Center for Good Governance in Tobacco Control, 2023). Despite this, studies have reported vaping in some of these countries (Pettigrew et al., 2023), with higher usage rates among young people (Pettigrew et al.,

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2023; Phetphum et al., 2021; Zavala-Arciniega et al., 2018). In Thailand and India, where vaping in public is banned, studies reported that, despite these bans, people believed that vaping in public was legal or could be done with impunity (Pettigrew et al., 2023; Phetphum et al., 2021). These studies suggest that, where vaping bans exist, compliance may be low. Growth of an illegal vaping culture may, in turn, put pressure on governments to legalise vaping. While little is known on the features and drivers of these cultures in the context of vaping, a similar parallel is observed with cannabis, which has been legalised in various jurisdictions following industry pressure and the growth of illegal cannabis cultures (Dills et al., 2021; Rehm et al., 2019).

Thus more information on the features and drivers of illegal vaping cultures could provide important lessons for other countries that have banned vaping or that, in response to growing youth vaping trends, are seeking to tighten restrictions (Davey, 2023; Duboust, 2023). In this study, we aimed to explore the characteristics of Singapore's illegal vaping culture from the perspective of adult Singaporeans age 21–40 years.

## 2. Method

Our CONSolidated criteria for REporting Qualitative research (COREQ) checklist is provided in Supplement 1. From October 2022 to March 2023, we held ten focus group discussions (FGDs) with 63 participants who met the inclusion criteria: Singaporean (Citizen or Permanent Resident) and age 21–40 years. We recruited participants from a prior survey which collected information on sociodemographics and smoking and vaping history. These participants had been recruited in May 2022 from an online panel using convenience sampling (Ng et al., 2023). Of the 99 people we approached, 34 chose not to participate and two dropped out. We recruited a balanced sample in terms of age, gender, ethnicity, socioeconomic status, tobacco use and e-cigarette ever use. Initial recruitment was via email invitation, and subsequently via snowball sampling. We stratified focus groups by age, gender, and ethnicity (Table 1) to facilitate open discussion of age-, gender- or ethnicity-specific themes that might arise. We reached data saturation after eight FGDs, after which no new themes surfaced.

Participants had a mean age of 29 years (range: 21 to 40 years). 34 (54 %) were female, 34 (54 %) were of Chinese ethnicity, 44 (70 %) had monthly household incomes below \$10,000 Singapore Dollars, and 31 (49 %) had a university education. We recruited a mixture of vape ever and never users into each group. 45 (71 %) were never smokers, 12 (19 %) were current smokers, and 6 (10 %) were former smokers. The first author conducted all FGDs in the English language, the main language spoken in Singapore, online using Zoom conferencing. Only the FGD moderator and participants were present. Each FGD lasted 60–90 min. We used open-ended prompts to encourage participants to share their perceptions and views on vaping in Singapore (Table 2). Given the illegality of vaping in Singapore, we took several measures to protect participants' confidentiality: we included a mixture of vape ever and never users in each focus group, identified participants with pre-

assigned codes during FGDs, and asked them to turn off their cameras and remove any identifying profile pictures before joining the Zoom meeting. Turning off the cameras did not appear to adversely affect their participation in FGDs, as we observed a good level of engagement among all FGD participants. The FGDs were audio-recorded and transcribed verbatim by a professional transcription service. Transcripts were not sent to participants for amendment or feedback.

We used thematic analysis methods to code transcript data. The first and second authors developed an initial codebook *a priori* based on the discussion guide and independently coded all transcripts in NVivo. Codes were inductively modified, re-arranged and added throughout the coding process based on multiple readings of the transcripts. All three authors analysed the data and resolved discrepancies via discussion and consensus to generate the final codebook (Supplement 2).

At the time of data collection, the first author was a Research Associate (Masters), the second author an undergraduate student, and third author an Assistant Professor (PhD). The third author has expertise in tobacco control and the first author has worked with the first author on various tobacco control research projects. Both the first and third author have several years of experience in qualitative research methods while the second author, who is trained in psychology and life sciences, had completed initial training in qualitative methods before joining the study. None of the authors have a history of tobacco or e-cigarette use.

## 3. Results

### 3.1. General perceptions of vaping

#### 3.1.1. Appeal of vaping

Participants consistently described vaping as highly appealing, largely due to the wide variety of e-liquid flavours. According to participants, these acted as an ice breaker to start conversations with other e-cigarette users and triggered a curiosity to try vaping, even among never- or former- smokers:

Caramel popcorn. That's how I started and I tried [vaping]. – Focus Group (FG) 10.

I am a non-smoker, but I ask[ed] my friend whether I can try or not, just a puff because I am just naturally curious. – FG 2

I used to be a smoker. I stopped smoking since I think 2013, 2014. Then, when... one of my cousins [was] vaping, I took it to try it out. – FG 9

It is an interesting icebreaker...when you meet somebody and they vape, and you're just like, "Have you tried this other flavour so and so?" Then you just bond over it. – FG 8

Participants elaborated on the easy appeal of vaping; how it had evolved into devices that were fun to use and easy to operate and disguise:

I once vaped out of my friend's that looked like a slurpee cup, a small bubble tea cup, sip through the straw. It taste like bubble tea flavour. The culture has evolved beyond just a battery, and a pack, and a cartridge. – FG 8

One participant compared the activity of vaping to badminton in the sense that badminton is a simple, everyday activity that everyone can do:

The ones that come in pods. Basically, pods were actually adapted to make it easier for consumers... like badminton, everybody can do it. – FG 10

Most participants likened the smell of vape aerosol to perfume, fruit and candy and described it as pleasant, with some even noting it triggered their curiosity:

I've actually walked past young people who was vaping around my area. Every time I walked past, I was like, "Actually the smell [is]

**Table 1**

Composition of the focus groups by size, gender, age, ethnicity and income/education level. Minority ethnicities included Malay, Indian, Eurasian and Arab.

FGD	Group size	Gender	Age	Ethnicity	Income/education level
1	10	Female	21–30	Minority	Mixed
2	6	Female	21–30	Chinese	Low
3	6	Female	21–30	Chinese	High
4	5	Female	31–40	Minority	Mixed
5	7	Female	31–40	Chinese	Mixed
6	7	Male	21–30	Minority	Mixed
7	5	Male	21–30	Chinese	Low
8	5	Male	21–30	Chinese	High
9	7	Male	31–40	Minority	Mixed
10	5	Male	31–40	Chinese	Mixed

**Table 2**

Focus group discussion guide.

1. What are your impressions about vaping in general, and how it compares to smoking? (Probe on trends observed, harm perception and social acceptability.)
2. Have you encountered vaping in Singapore? Please tell us about your experience. (Probe details of encounters and participants' responses to those encounters.)
3. In general, what are your thoughts about vaping and the regulations in Singapore? (Probe views on appropriateness and effectiveness of regulations.)

quite nice." Then I thought, "It smells like candy. If I could try it, I'd try it." – FG 5

Two focus groups compared vaping to shisha, stating that vaping was better as it was "softer on the throat" which compelled them to vape more (FG 9) and "cuter and easier to bring around" (FG 2). Vaping was also described as leaving a sense of mental relief, and also physical relief from the cooling sensation in the lungs left by menthol-flavours.

### 3.1.2. Harm perceptions

Harm perceptions were mixed. Some participants believed that vaping is more addictive and harmful than smoking cigarettes. As described by one participant who used both tobacco and vaping products:

Every morning when usually I wake up the first thing I do is check my phone but when I'm vaping, the number one is to vape. Even when I'm smoking, I'm not like that, so I think it's a lot more addictive. – FG 6

Participants raised concerns over the adverse health effects of vaping that were obscured in e-cigarette advertising, citing heart disease, lung injuries and the unknown risks of inhaling e-liquid chemicals. Some recalled cases of friends who had fallen ill from vaping, others observed that e-cigarette users are particular about the brand of e-liquid they use because they believe that products from established brands were safer. However, some participants appeared to hold misperceptions on the relative harms as they believed that cigarette filters had a protective effect:

It [vaping] is more harmful than the normal cigarette...[where] there's a filter, but for vaping, the filter is no longer there. You are just smoking directly the chemical inside to your body. – FG 5

Other participants perceived the harms of vaping as relatively innocuous when consumed in moderation, or as unclear and unsupported by sufficient scientific evidence. Other reasons for a reduced harm perception included a belief that e-liquids do not contain tar or nicotine and that users could take fewer puffs at a time instead of having to finish an entire cigarette stick:

The tendency of you being addicted to it is drastically reduced because there's no nicotine [in vape liquid]. – FG 4

### 3.1.3. Perceptions of vaping compared to smoking

Participants observed a trend of smokers switching to vaping for varying reasons, including to attempt to quit, to reduce harm by cutting down smoking, to save money, or in rebellion to the government's denormalisation of tobacco use. One participant, a current smoker, recalled being advised by a doctor to switch to vaping to manage his chronic coughs:

I've even met a doctor that told me that, "Hey, you keep coughing, keep seeing me for cough. Why don't you just switch out to a vape? I shouldn't be telling you this, but you can give it a try." – FG 4

Participants who were current smokers preferred cigarettes over vaping for a variety of reasons. Some were simply not into it while, for others, vaping did not provide the same 'kick' as smoking cigarettes. Others found the flavours or nicotine in e-liquids too overwhelming and preferred the flavour and sensation of traditional cigarettes:

The stuff that we get is mostly from Malaysia and that stuff is strong. It is to me, stronger than the regular cigarettes that I smoke. – FG 4  
The flavour is too concentrated...I don't know what fluid it is. It feels quite, I don't know. It's just quite gross. Then also it gives me cough and phlegm... As funny as this sounds, I think smoking feels cleaner. – FG 6

## 3.2. Views on the vaping culture in Singapore

### 3.2.1. Features of the vaping culture in Singapore

Participants described the vaping culture in Singapore as simultaneously discreet and open. They had observed people vaping in more discreet places such as toilets, homes and cars, and others as being very open and brazen by vaping conspicuously in public places such as public transport and malls. In general, they perceived vaping to be common in places where people are unlikely to get caught:

I was quite shocked when I walked around CBD [central business district] area and then people are just walking and vaping. – FG 2  
I think people are more careful now because they don't want to get fined. – FG 4

Just last year, during Chinese New Year, my husband's side, the friend came over for visiting, and they just vaped in my house openly. – FG 5

I know a particular club, for instance, where you can openly vape where you are. The whole club is literally vaping and the management is fine with it. – FG 9

Participants described being subjected to peer pressure to vape in their social circles:

I was in a social group setting where people were just passing around the vape...it does feel a bit pressurizing to see everyone else doing it except you. – FG 1

I have this group of friends, colleagues and all. They find me weird because I didn't vape. – FG 6

### 3.2.2. Association with particular segments

Participants associated Singapore's vaping culture with particular segments of the population, including adult smokers switching to vaping, youths wishing to be trendy, and rebellious youths, colloquially known as 'young punks'. Youths were generally described as vaping more overtly to get attention, show rebellion and normalise vaping as a trend:

...as we see more of such posts [youths vaping] on our feeds, we will kind of get used to it and in turn we may be thinking that, "Oh, okay, the younger people are doing this. Maybe this is something in the trend." – FG 10

I would say it's the YPs, the young punks. People aging from 14 to 17, 18, like that. This generation of kids, I don't know what the hell they're thinking. – FG 7

### 3.2.3. The vaping culture among youths

When asked on their perceptions of the vaping culture among youths, participants described it as a social norm, with vaping done in an open and conspicuous manner. As recalled by two participants:

Some of my cousins... got caught [vaping] by the school. Then, when I asked her why she did it...she says, "It's cool. Why can't I do it? If everyone's doing it, what's so wrong about me doing it?" – FG 1  
I'm pretty sure everyone sees a lot of people, especially the youngsters, and even it's their school time, they are doing vape openly in their uniforms and whatnot. Even outside in shopping malls. – FG 10

They also described vaping as being associated with a cool and rebellious image among the youths:

I actually saw somebody vaping for the first time, almost close to 10 years ago...in class...when I looked at that person, I was like wow, she really does fit the image of like cool girl. – FG 3

Youths were seen as more ready to initiate vaping compared to adults as they are more easily influenced by peers, the media, celebrities and other influencers, and less concerned about health issues than adults:

...young people today are influenced a lot more by what they see in the media, even if it's foreign media. It puts off a picture that, "Hey, this is actually quite common. Why are we so backward that we don't allow these things?" – FG 9

Health is not their priority because they're young. It's not that they don't care... They care a lot, but they care about different things, things that we cannot relate to anymore. – FG 5

Participants also described how, for youths, vaping is relatively accessible as vaping products can easily be obtained through illicit channels without the need for identification, and were affordable as students can pay for vaping products in instalments:

I heard students can pay in instalments...disposable ones are cheaper. – FG 2

...would be price and the legality of it. Obviously, underage, they can't buy cigarettes. I would assume illegal methods like this they can...It seems easy for them to get it. – FG 10

### 3.2.4. Social acceptability

Participants shared mixed perceptions on the social acceptability of vaping. Most participants viewed vaping as a personal choice, although some noted that youths might not have developed the capacity to refrain from vaping. Some felt that vaping should not be done at the expense of the health of others, highlighting that the effects of inhaling secondhand vape aerosol are unknown. In general, they believed that vaping is considered less socially acceptable among the older generation and those who disapprove of anything that is illegal.

### 3.2.5. Other reasons why a vaping culture persists

Participants shared that the affordability of e-cigarettes was driving the vaping culture in Singapore as vaping products can be bought at a low price in neighbouring countries. As elaborated by one participant:

...the disposable kind that you can buy from JB [Johor Bahru] for like \$3 or \$2, it's damn cheap. It can last you like 700, 800 puffs. I know because I recently went to Malaysia with a friend... They were stocking up. – FG 3

Another important factor, according to participants, was the ease with which vaping products could be obtained. They described how vaping products can be ordered online and delivered to one's doorstep without detection, orders could be placed with friends who commute to work in Singapore from Malaysia, and how devices could be purchased from some local shopping centres. In the words of one participant:

They [vaping sellers] are super creative. Sometimes even the government cannot keep up. The internet is so huge, there'll be 1,001 ways for people to get access to all sorts of things. – FG 1

The convenience of vaping compared to smoking cigarettes was also a reason for its popularity. The relatively subtle scent of vape aerosol

allows people to avoid detection, even in public places such as the workplace, inside homes, and in public non-smoking areas:

If they [colleagues] have time for smoke break, usually they'll go outdoors to smoke cigarettes, but sometimes they don't have time, so they will use vape instead. – FG 2

A lot of my smoker friends converted to vape because it was more convenient...a lot of them they work from home they said it's very convenient. They don't need to leave the house. – FG 5

Non-smoking areas can also vape and easily escape...can be done so fast they don't get caught. – FG 9

## 3.3. Views on Singapore's vaping regulations

### 3.3.1. Illegal status of vaping

Some participants felt that the vaping ban was an effective deterrent, with some stating that it was the main reason they have not tried vaping:

I'm curious about the taste and the feeling. But because it's illegal, I don't think I would want to try it ever. – FG 4

Others considered a blanket ban to be inappropriate and called for a more nuanced to enable vaping as a cessation aid while improving control of its use. Some were of the view that, as vaping was already normalised in Singapore, it should be legalised:

...we have established vaping as a norm... legalise it and then, therefore, control it. – FG 9

Participants also widely held the sentiment that the sole reason for prohibiting vaping is that the government cannot reap tax revenues from it. As described by one participant:

... they [the government] can quantify the measurement of whatever content is in each of the parts of the cigarettes...It's easier and more trackable for the government to tax those cigarettes, as compared to vape. Because vape is like water content... It's hard for the government to tax that, and that's why they're illegalizing it. – FG 1

### 3.3.2. Penalties and enforcement

Participants had mixed views on Singapore's penalties and enforcement. Singapore's fine for e-cigarette possession or use, up to \$2,000, was described as "huge" while others believed it was "a friendly amount" for high earners (FG 3). Thus some participants felt that the fines are a strong deterrent whereas others believed that they are ineffective. Some also perceived a lack of enforcement and a lack of viable alternatives for smokers:

I know from my friends that this [fines] is probably brushed off because...their point of view is that there's not really any alternative and I don't want to go back to smoking anyway, so \$2000 fine, what else can I do? – FG 10

Some participants saw the current penalties as excessively harsh, especially when compared to possession of contraband cigarettes:

From what I know, if you get caught for contraband [cigarettes], one pack is \$500, if you get caught for two-pack, that's like \$600... so to fine someone \$2000 for vaping, it is really outrageous... – FG 10

Government attempts to deter vaping were viewed as largely ineffective, as evidenced by the salient vaping culture in Singapore. Participants attributed this to the significant challenges of policing online and cross-border sales, as well as the perception that enforcing the vaping regulations was a lower priority compared to other criminal issues in Singapore:

If they [the authorities] really want to clamp down, I'm sure they can do that. Seeing how people can get vapes easily, I think they are just closing one eye on this issue. – FG 10

### 3.3.3. Views on how regulations shape vaping culture

The ubiquity of vaping and the lack of reports on enforcement actions on e-cigarette users contributed to the perception that, in Singapore, people are not at a high risk of getting caught. Some participants compared vaping to jaywalking, which is illegal but rarely enforced in Singapore. There was also a prevailing sense of being safe from prosecution as long as the offense does not pertain to vaping supply or trade:

I find that people are vaping more in open now because they aren't as scared as in the past of getting caught. – FG 2

If you think about it, if you put it into context, jaywalking is technically illegal but everybody does it, because it is not enforced heavily. – FG 9

Suggestions for possible improvements to current regulations included a more selective ban, allowing milder e-cigarettes in the market for those who want to quit smoking, and stronger enforcement measures:

...just devote some resources, regulate this properly, get the stuff that's not so strong in, then maybe that will be helpful for people who are actually trying to quit. – FG 4

If you start reporting that you're catching 10,000 people every month, I'm sure nobody will be vaping outside. – FG 10

## 4. Discussion

### 4.1. Relevance of findings

Our study, which aimed to explore the characteristics of Singapore's illegal vaping culture, suggests that two distinct vaping cultures are being perpetuated: a discreet vaping culture among adult smokers and a more conspicuous vaping culture among younger people. Studies in countries where vaping is legal suggest that, similarly, adult smokers may vape discreetly to dissociate from negative vaping-related stereotypes (Kinouani et al., 2020; McCausland et al., 2020; Yule & Tinson, 2017) while younger people, such as those described as 'young punks' by our focus group participants, may vape more openly out of rebellion, novelty, or to reinforce a desired identity (Becker & Rice, 2022; Khoury et al., 2016; Tokle, 2020).

The more conspicuous youth vaping culture is a primary concern as it has the potential to normalise vaping, even if illegal. Our findings suggest that vaping is, to some extent, already becoming normalised in Singapore as the flavours, easy appeal, accessibility and affordability of vaping drove perceptions of vaping as 'normal', with some participants comparing it to everyday activities such as badminton. Even though vaping is still illegal and frowned upon in Singaporean mainstream society, some youth subgroups may perceive vaping as a social norm, similar to in countries where vaping is legal, if they are regularly exposed to it within their peer or social media networks (Chadi et al., 2019; Lee et al., 2020).

Participants perceived vaping as being *de facto* decriminalised in Singapore, and the government as better off legalising vaping in order to properly regulate it. The mainstreaming of this view could put Singapore's vaping policy on a similar trajectory as that of marijuana in other countries. For marijuana, the road to legalisation typically begins with decriminalisation on the grounds that prohibition was ineffective, then a push for medicalisation to reap the potential medical benefits, and eventually legalisation on the grounds that marijuana is innocuous with responsible adult use, to enable quality control and increasing of tax revenue (Dills et al., 2016; Marijuana Policy Project, n.d.; Rehm et al., 2019; Spetz et al., 2019). However, countries' experiences with marijuana and vaping legalisation suggest that legalisation would make the problem worse. Medicalisation and legalisation of marijuana are associated with more prevalent recreational marijuana use (Yu et al., 2020), lower risk perceptions (Chen et al., 2018; Wall et al., 2011), and

commercialisation by the industry which also drives the legalisation lobby (Kane, 2018; Rehm et al., 2019; Spetz et al., 2019). Similarly, countries that have introduced regulated e-cigarette markets on medical grounds, that is to support smokers' quit attempts, are now fighting epidemics of youth vaping, driven by the industry's marketing to youth (Dills et al., 2016; Huang et al., 2019; Kalayasiri & Boonthae, 2023; Rehm et al., 2019; Sabaghi, 2023; Yu et al., 2020). The push to legalise vaping is driven by a strong industry lobby, which has also sought to influence the media and academics in Singapore to challenge the vaping ban (van der Eijk & Tan, 2023). Put together, this suggests that having a legal e-cigarette market in Singapore would merely serve to deepen the normalisation of vaping in Singaporean society.

Studies have linked vaping to serious cardiovascular and respiratory diseases (Cherian et al., 2020; Peruzzi et al., 2020; Tsai et al., 2020) and cancer (Bracken-Clarke et al., 2021). This, together with the history with marijuana and e-cigarette markets in other countries, suggests that countries such as Singapore, that have banned e-cigarettes, should not cave in to pressure to legalise. Rather, our findings indicate that addressing misperceptions of vaping as a social norm may be more effective. Beyond restricting exposure to vaping on social media and in public places, counter-marketing campaigns could be used to associate a vape-free lifestyle with youth subcultures and values (Fallin et al., 2015; McQuoid et al., 2022; Moran et al., 2017). Education on the harms of breathing in secondhand aerosols could help to reduce the social acceptability of vaping (Islam et al., 2022; Palmisani et al., 2019). Industry denormalisation, another successful strategy in tobacco control (Malone et al., 2012), could expose the industry's targeting of youth (Rahmandar & Gribben, 2022; Struik et al., 2020; Truth Initiative, 2022) and detrimental environmental impact (Beutel et al., 2021), as having more positive views of the industry is associated with lower harm perceptions and vaping in youth (Alcalá & Shimoga, 2019; Cuccia et al., 2022).

Some participants held the view that Singapore should permit vaping as a smoking cessation aid, and we identified harm misperceptions that could undermine Singapore's vaping ban. Evidence on the efficacy of e-cigarettes as a quit smoking aid compared to nicotine replacement therapy currently does not support the use of e-cigarettes as a quit smoking aid, with reviews reporting modest overall increases in quit rates (Grabovac et al., 2021; Hartmann-Boyce et al., 2021; Malas et al., 2016) or similar quit rates (Pound et al., 2021), with a low quality of evidence. In addition, many smokers who switch to vaping become dual users (World Health Organization, 2021). Thus a vaping ban should be accompanied with proper education on current smoking cessation options, the potential harms of vaping, such as its respiratory effects and the chemicals inside e-liquids, targeting priority groups such as youths and smokers as well as the broader community (Rohde et al., 2020).

### 4.2. Limitations

This was a qualitative study, thus findings are not generalisable. As we included a mixture of vape ever and never users in each focus group to protect participants' confidentiality, it was not possible to identify differences in the responses of vape ever versus never users in this study. However, the May 2022 survey from which most participants were recruited found that vape ever use was associated with more positive perceptions of vaping (Ng et al., 2023). Despite steps to protect participants' confidentiality, some may still have been reluctant to discuss their personal experiences with vaping, given the illegal status of vaping in Singapore.

### 4.3. Conclusions

Reinforcement of the perception that vaping is a social norm, despite Singapore's vaping ban, appears to be an important driving force behind Singapore's illegal vaping culture. For e-cigarette bans to remain effective, they need to be accompanied with measures that denormalise



vaping.

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## Ethics Approval

This study was approved by the university's Institutional Review Board. Prior to taking part in the study, participants were informed of the study procedures and risks and gave their written consent.

GPPT: investigation, formal analysis, writing. XZT: formal analysis. YV: conceptualization, funding acquisition, methodology, supervision, formal analysis, writing. All authors approved the final draft before submission.

## CRediT authorship contribution statement

**Grace Ping Ping Tan:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **Xian Zhen Tan:** Writing – review & editing, Formal analysis. **Yvette van der Eijk:** Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

We cannot share raw data due to ethics reasons. We have included the codebook as a supplementary file.

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