

Socialization Agents and Vaping Behaviour Among Adolescents in Negeri Sembilan, Malaysia

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Abstract

Background: Adolescent e-cigarette use (vaping) has reached alarming proportions globally and nationally, creating a critical public health and sociocultural challenge under Malaysia's Smoke-Free 2030 agenda. **Research Problem:** Despite regulatory interventions, including the Control of Smoking Products for Public Health Act 2024 (Act 852), adolescent vaping continues to escalate. Existing Malaysian literature predominantly relies on quantitative prevalence surveys. Consequently, a critical gap remains in understanding the qualitative, sociological mechanisms by which diverse socialization agents drive initiation, sustain use, and normalize vaping subcultures in specific local contexts. This study explored the influence of socialization agents on adolescent vaping behavior and investigated the processes through which vaping becomes culturally normalized among high school youth in Negeri Sembilan, Malaysia. **Methodology:** An exploratory qualitative research design grounded in social constructivism was deployed. Primary data were gathered through semi-structured, in-depth interviews with four adolescent vape users (aged 13–17) and two commercial vape vendors in the Seremban district. Data triangulation was achieved via direct non-participant field observations and document analysis of legislative frameworks (Act 852). In addressing Research Questions 1 and 5, this study revealed that peer groups operate as the primary microsystem catalyst, exploiting adolescent curiosity, trend-seeking, and stress-coping needs. Simultaneously, macrosystem elements, including aggressive social media marketing, disguised device aesthetics (resembling stationery/USB drives), and non-compliant digital supply channels, weaken microsystem protections (family and school oversight). This multi-level interaction fosters a pervasive 'cultural normalization,' eroding the perceived health risks of nicotine and establishing vaping as a routinized digital lifestyle marker. **Theoretical Contribution and Implications:** The study extends Ecological Systems Theory by demonstrating how digital macrosystem forces circumvent traditional mesosystem boundaries, thereby neutralizing microsystem safeguards. Practically, it underscores the need for family-centered psychosocial interventions, strict digital supply chain auditing, and targeted school-based counter-messaging.

Keywords: Adolescent Vaping, Socialization Agents, Ecological Systems Theory, Qualitative Research, Cultural Normalization, Negeri Sembilan, Malaysia.

1. Introduction

Adolescent e-cigarette use, commonly termed vaping, has evolved from an emerging public health concern into a complex global sociocultural crisis. Internationally, the rapid adoption of Electronic Nicotine Delivery Systems (ENDS) and non-nicotine vaping devices among youth threatens decades of progress in tobacco control (World Health Organization [WHO], 2024). In Malaysia, national surveillance data reflect this alarming trajectory. The National Health and Morbidity Survey (NHMS, 2022) revealed that the prevalence of vaping among adolescents aged 13 to 17 rose sharply from 9.8% in 2017 to 14.9% in 2022. This shift signifies more than a transient habit; it marks a structural behavioral transition wherein digital nicotine devices have become embedded within contemporary adolescent youth cultures.

Regionally and nationally, this epidemic is exacerbated by rapid device innovation, enticing e-liquid flavor profiles, and evasive marketing strategies tailored to youth aesthetics. The pervasiveness of modern vaping directly confronts national health milestones, particularly Malaysia's vision of achieving a 'Smoke-Free Generation' and the strategic objectives of the Smoke-Free Malaysia 2030 agenda. Hence, to curb this trajectory, the Malaysian government enacted the Control of Smoking Products for Public Health Act 2024 (Act 852), establishing stringent prohibitions on sales, sponsorship, and digital promotion to minors. Nonetheless, enforcing top-down legislative measures encounters persistent grassroots anomalies. The operational reality of adolescent behavior often outpaces formal regulatory mechanisms, as youth continuously adapt their procurement and usage strategies to circumvent adult surveillance.

However, despite an expanding body of literature on youth vaping, significant empirical and sociological gaps remain. First, the vast majority of Malaysian studies have adopted quantitative designs focused primarily on

macro-level prevalence, clinical toxicity, or physiological harm (e.g., E-cigarette or Vaping Product Use-Associated Lung Injury [EVALI]). Although these epidemiological metrics are critical, they fail to elucidate the subtle, lived experiences and socio-relational mechanisms through which adolescents begin, maintain, and justify their vaping practices. Second, limited qualitative inquiry explores how primary and secondary socialization agents interact dynamically within local socio-geographical landscapes. The state of Negeri Sembilan presents a unique socio-demographic setting, straddling rapidly urbanizing hubs like Seremban and tightly-knit semi-rural communities. Nevertheless, localized qualitative data explaining youth subcultures in this region remain scarce.

To address these empirical omissions, this study focused specifically on two pivotal dimensions: identifying the primary socialization agents driving adolescent vaping initiation (Research Question 1) and analyzing how vaping ascends to a normalized cultural phenomenon within youth ecosystems (Research Question 5). Consequently, by isolating these two inquiries, the study moves away from broad descriptive overviews to present a cohesive, sociologically grounded argument. The primary objective of this study is to critically examine the interplay among socialization agents that drive adolescent vaping and to elucidate the structural processes that facilitate its cultural normalization in Negeri Sembilan.

2. Literature Review

2.1 Family and Peer Influences

Socialization is the fundamental process through which individuals internalize the values, beliefs, and behaviors appropriate to their social group. In adolescent risk behavior literature, family dynamics and peer relationships represent the two primary microsystem forces shaping behavioral outcomes. Historically, the family functions as a primary protective shield. However, contemporary empirical studies demonstrate that structural vulnerabilities within the home, such as permissive parenting, lack of emotional warmth, broken communication channels, or parental modeling of tobacco use, significantly elevate youth susceptibility to substance experimentation (Azmawaty Mohamad Nor, 2024; Ghani et al., 2024). Lax parental monitoring and active consumption of nicotine products by family members within shared domestic spaces diminish the perceived risk associated with vaping, effectively granting tacit approval (Arshat et al., 2002).

Conversely, as adolescents navigate developmental transitions, the locus of social influence shifts heavily toward peer networks. Peer influence operates through dual mechanisms: direct peer pressure and indirect normative conformity (Farah Atiqah Amran et al., 2023). Adolescents exhibit heightened sensitivity to social rejection and to identity validation within peer hierarchies (Steinberg, 2023). Vaping is frequently deployed as a tool for social entry, bonding, and status projection. Group rituals, such as sharing devices, trading e-liquid flavors, and performing trick clouds, consolidate group cohesion while marginalizing non-users.

2.2 School and Community Influences

Institutions of learning represent critical meso- and microsystem environments intended to enforce discipline and promote health literacy. Nevertheless, schools globally face an unprecedented challenge in curbing on-campus vaping (Lee Lam Thye, 2024). The rapid miniaturization of vape devices disguised as common school supplies such as highlighters, USB drives, or ballpoint pens has severely compromised institutional surveillance (Green et al., 2024). School restrooms, dormitories, and secluded campus corners have transformed into clandestine vaping zones, creating an environment where disciplinary enforcement is constantly bypassed.

At the broader community level, environmental accessibility and public indifference further entrench youth vaping. Studies highlight that the spatial density of physical vape kiosks, convenience stores, and informal vendors near residential and educational zones drastically increases youth exposure (Nizam Baharom, 2025). Furthermore, a pervasive sense of community 'social indifference', characterized by adult bystanders failing to intervene or reprimand underage youth vaping in public spaces, signals to adolescents that vaping is a socially tolerated behavior.

2.3 Digital Media and Commercial Networks

The 21st-century socialization landscape has been fundamentally reconfigured by digital space. In particular, social media platforms, most notably TikTok, Instagram, and Telegram, act as powerful, unregulated digital socialization agents (Nurul Hidayah Hamid, 2025). Through these platforms, algorithms deliver targeted content featuring lifestyle influencers, viral trick videos, and lifestyle aesthetics that portray vaping as glamorous, stress-relieving, and modern (Ramamurthi et al., 2023). Commercial entities exploit these digital avenues to bypass traditional advertising bans, utilizing subtle Peer-to-Peer (P2P) marketing and encrypted messaging channels to facilitate underage sales (Brown et al., 2025).

2.4 Theoretical Framing: Bronfenbrenner's Ecological Systems Theory

To address the limitations of treating socialization agents in isolation, Bronfenbrenner's (1979) Ecological Systems Theory provides an exceptionally rigorous analytical framework. Human development is shaped by nested, interacting environmental systems ranging from immediate face-to-face settings to overarching cultural and legislative structures. Therefore, by anchoring this study in Ecological Systems Theory, adolescent vaping is conceptualized not merely as a localized personal failing, but as the outcome of dynamic, cross-system interactions. These interactions occur across the Microsystem (family, peers, school), Mesosystem (school-family linkages), Exosystem (community supply networks, informal labor), Macrosystem (cultural norms, digital marketing, Act 852 legislation), and Chronosystem (temporal shifts in technology and policy).

3. Methodology

This study employed a qualitative exploratory research design grounded in the social constructivist paradigm (Creswell & Poth, 2018). Constructivism posits that reality is subjective, multiple, and socially constructed through individuals' lived experiences and interactions within specific historical and cultural contexts. Accordingly, applying a constructivist lens allowed the researcher to explore the subjective meanings, sociocultural interpretations, and underlying subcultures associated with vaping practices among adolescents and commercial vendors in Negeri Sembilan.

3.1 Participants and Sampling Strategy

Participants were recruited using a combination of purposive sampling strategies to access hard-to-reach youth demographics (Merriam, 2001). The sample comprised four adolescent users (aged 13–17) and two commercial vape vendors operating in the Seremban district, Negeri Sembilan.

Table 1: Profile and Characteristics of Study Participants

Participant Pseudonym	Category	Age / Demographics	Role / Status	Primary Data Contribution
Participant 1 (P1)	Adolescent User	16 / Male / High School	Active User	Peer group dynamics, curiosity, school device concealment
Participant 2 (P2)	Adolescent User	15 / Male / High School	Active User	Stress coping, digital media exposure, informal procurement
Participant 3 (P3)	Adolescent User	17 / Male / High School	Active User	Cultural normalization, family perception, trend validation
Participant 4 (P4)	Adolescent User	14 / Female / High School	Active User	E-liquid flavor attraction, group acceptance, discreet usage
Vendor 1 (PV1)	Commercial Vendor	Adult / Male	Physical Kiosk Owner	Retail dynamics, age-verification challenges, market trends
Vendor 2 (PV2)	Commercial Vendor	Adult / Male	Physical Kiosk Owner & Online / Informal Seller	Digital supply networks, P2P transactions, youth demand trends

3.2 Data Collection and Ethical Safeguards

Primary qualitative data were gathered through semi-structured in-depth interviews, direct non-participant field observations at youth hotspots, and document analysis of statutory frameworks (Act 852 and KPM circulars). Ethical approval was obtained from the Universiti Malaya Research Ethics Committee (UMREC). Informed written consent was obtained from legal parents/guardians, and written assent was obtained from adolescent participants. Strict anonymization protocols were applied, replacing real names with alphanumeric identifiers (P1–P4, PV1–PV2).

4. Results and Empirical Findings

4.1 Research Question 1: Socialization Agents Driving Engagement

Data analysis identified two main thematic categories governing adolescent vaping initiation: Pull Factors and Push Factors.

Theme 1.1: Pull Factors - Peer Influence, Curiosity, and Lifestyle Trends

Peer groups emerged as the most immediate agent of microsystem socialization. The desire to maintain group membership and participate in shared rituals creates continuous pressure to conform. P1 highlighted how peer group presence converted hesitation into active participation:

Verbatim Narrative: Peer Pressure & Harm Neutralization

"Sebab kawan-kawan ramai yang hisap. Bila kita lepak dengan depa, depa hulur peranti tu. Mula-mula tolak, tapi bila dah hari-hari tengok depa hembus asap wangi, rasa macam janggal kalau kita sorang tak hisap. Depa kata 'cuba sikit, tak ada apa pun, rasa buah bukannya rokok.' Dari situ terus lekat." (P1, 16 years old)

Translation: "Because many of my friends vape. When we hang out, they pass the device to me. At first I refused, but when you watch them blowing sweet-smelling vapor every day, you feel awkward being the only one left out. They said 'just try a little, it's nothing, it's fruit flavor, not a cigarette.' From that moment, I got hooked."

This narrative demonstrates that peer socialization relies heavily on sensory allure and the reduction of perceived harm ('it's fruit flavor, not a cigarette'). Direct peer modeling triggers innate adolescent curiosity (*ingin tahu*). Notably, P2 described how curiosity interacted with peer encouragement:

Verbatim Narrative: Curiosity & Sensory Allure

"Memang rasa nak tahu sangat perasa dia tu betul ke sedap. Kawan saya guna perasa mangga susu. Bau dia wangi sangat dari jauh. Jadi saya tanya dia, 'boleh aku rasa sekali?' Bila dah sedut, rasa manis kat tekak, lepas tu nampak asap banyak, rasa seronok pulak. Perasaan ingin tahu tu yang buat saya terus beli peranti sendiri." (P2, 15 years old)

Translation: "I was really curious to know if the flavor was actually good. My friend was using mango milk flavor. It smelled so sweet from afar. So I asked him, 'can I try once?' When I inhaled, it felt sweet in my throat, and seeing the thick cloud was fun. That curiosity drove me to buy my own device."

Furthermore, content algorithms on TikTok and Instagram demonstrate sleek device aesthetics that appeal directly to youth identity expression. P4 noted how stealth designs allow seamless integration into school settings:

Verbatim Narrative: Digital Aesthetics & Stealth Designs

"Kat TikTok selalu lalu video budak-budak buat 'trick' asap. Nampak gempak dan 'cool'. Tambah pulak bentuk vape sekarang comel-comel, ada yang macam pemadam, ada macam pen highlight. Bila bawa pergi sekolah, kawan-kawan ingat alat tulis, padahal vape. Kita rasa stail bila pegang peranti yang trend terkini." (P4, 14 years old)

Translation: "On TikTok, videos of kids doing smoke tricks always pop up. It looks awesome and cool. Plus, current vape designs are cute; some look like erasers, some like highlighters. When we bring them to school, friends think it's stationery, but it's a vape. You feel stylish holding a trending device."

Theme 1.2: Push Factors - Boredom and Academic Distress

Push factors refer to internal psychosocial pressures that propel adolescents to seek escape or relief through vaping. Adolescents frequently experience structural strain within school and home environments, including heavy academic loads, exam pressure, and unstructured leisure time. P3 recounted:

Verbatim Narrative: Stress Coping & Emotional Regulation

"Bila stress dengan periksa, dengan cikgu asik tekan suruh skor, kepala jadi serabut. Bila lepak dengan kawan lepas sekolah, hembus vape tu rasa legakan sikit fikiran. Dia macam bagi rasa 'relax'. Kalau bosan kat rumah tak tahu nak buat apa, sambil main game sambil sedut vape, rasa terisi sikit masa bosan tu." (P3, 17 years old)

Translation: "When I'm stressed with exams and teachers constantly pressure us to score, my head feels overloaded. When hanging out with friends after school, puffing the vape gives a bit of mental relief. It feels like a 'relaxing' sensation. When bored at home with nothing to do, vaping while gaming fills the empty boredom."

4.2 Research Question 5: Cultural Normalization of Vaping

The empirical findings for Research Question 5 address how vaping has transitioned from a fringe risk behavior into an accepted lifestyle norm within youth communities in Negeri Sembilan. Normalization is structured across three perceptual pillars, comprising Adolescent Perceptions, Parental Perceptions, and Broader Social or Community Perceptions.

Theme 5.1: Adolescent Perceptions – Low-Risk Perception and Harm Neutralization

Adolescents hold distorted beliefs regarding the health risks of vaping relative to conventional smoking. Non-nicotine and flavored e-liquids are widely perceived as harmless water vapor. Specifically, P2 highlighted this cognitive bias:

Verbatim Narrative: Cognitive Neutralization of Health Risks

"Vape ni bukannya rokok betul. Rokok tar hitam tu yang bahaya kena kanser. Vape cuma wap air perisa buah sahaja. Tak ada busuk bau tembakau. Kawan-kawan semua kata vape selamat, takkan lah benda wangi macam ni boleh rosakkan paru-paru. Jadi tak rasa bersalah pun hisap hari-hari." (P2, 15 years old)

Translation: "Vape isn't a real cigarette. It's the black tar in cigarettes that causes cancer. Vape is just fruit-flavored water vapor. It doesn't have that foul tobacco smell. All my friends say vape is safe; how could something that smells this sweet damage your lungs? So I feel no guilt vaping daily."

Theme 5.2: Parental Perceptions – Minimal Awareness and Shifted Tolerance

A lack of technical knowledge regarding modern vape aesthetics severely hinders parental capacity to intervene. Devices designed as stationery easily evade domestic detection. P1 admitted:

Verbatim Narrative: Domestic Stealth & Parental Blindspots

"Mak ayah saya tak tahu pun saya ada vape. Saya letak peranti tu atas meja bilik sebelah pensel warna. Mak masuk kemas bilik ingat itu 'highlighter' atau USB drive untuk sekolah. Sebab tak ada bau busuk rokok melekat kat baju, mak ayah memang langsung tak syak apa-apa." (P1, 16 years old)

Translation: "My parents don't even know I own a vape. I leave the device on my bedroom desk next to colored pencils. When my mother cleans the room, she thinks it's a highlighter or a USB drive for school. Because there is no foul cigarette stench on my clothes, my parents never suspect a thing."

In households where parents discover vape devices, responses often reflect resignation rather than strict prohibition, particularly if parents compare vaping favorably against illicit drug use or conventional smoking. PV1 (Vendor) observed:

Verbatim Narrative: Shifted Parental Tolerance

"Ada sekali dua ibu bapa datang kedai saya bawa anak depa. Depa kata daripada anak depa mencuri atau hisap dadah/rokok kat luar, depa izinkan hisap vape perasa buah kat rumah. Ada mak ayah yang tolong belikan pod sebab tak nak anak depa beli cecair haram merapu. Depa anggap vape ni 'lesser evil'." (PV1, Commercial

Vendor)

Translation: "I've had parents come to my shop with their kids once or twice. They say that rather than their kid stealing or doing drugs/cigarettes outside, they allow them to vape fruit flavors at home. Some parents even help buy pods so their kids don't buy shady, illegal liquids. They view vape as the 'lesser evil'."

Theme 5.3: Community Apathy and Digital Supply Networks

A decline in public community oversight reinforces the social normalization of adolescent vaping. Public spaces in Seremban reflect widespread community indifference. P4 shared:

Verbatim Narrative: Public Community Apathy

"Hisap vape dekat perhentian bas ke, kedai makan ke, orang awam lalu lalang tengok je. Tak ada siapa nak tegur atau marah macam orang hisap rokok dulu. Orang tengok asap wangi, depa wat tak tahu je. Bila masyarakat sekeliling pun tak kesah, kita rasa benda ni biasa je lah." (P4, 14 years old)

Translation: "Whether you vape at a bus stop or an eatery, the passing public just looks. Nobody reprimands or scolds you as they used to with smoking. People see sweet-smelling vapor and ignore it. When the surrounding community doesn't care, we feel this is completely normal."

Simultaneously, commercial vendors detailed how digital supply chains bypass statutory age restrictions, rendering statutory legal frameworks like Act 852 difficult to enforce at the grassroots level. PV2 (Informal Vendor) described the P2P ecosystem:

Verbatim Narrative: Unchecked Digital Supply Chains

"Budak-budak sekarang tak payah masuk kedai fizikal pun. Depa order terus melalui Telegram atau TikTok Shop. Bayar guna e-wallet, barang sampai guna kargo rider runner terus depan rumah atau drop point. Rider pun tak periksa IC/umur. Pasaran digital ni yang buka seluas-luasnya akses budak bawah umur." (PV2, Informal Online Vendor)

Translation: "Kids nowadays don't even need to step into physical shops. They order directly via Telegram or TikTok Shop. They pay using e-wallets, and items are delivered by courier riders straight to their doorstep or drop points. Riders don't verify IDs or age. This digital market opens underage access wide open."

5. Discussion

The primary findings of this investigation demonstrate that an interconnected array of socialization agents drives adolescent vaping in Negeri Sembilan. Initiation is rarely an isolated decision. Rather, it is a sociocultural process propelled by microsystem influences (peers, stress-coping) and accelerated by macrosystem structures (digital algorithms, stealth device design, e-commerce supply chains).

5.1 Comparative Synthesis with Prior Literature

Table 2 provides a comparative synthesis contrasting international findings, prior Malaysian quantitative studies, and the empirical discoveries of this investigation.

Table 2: Comparative Synthesis Across Literature and Current Study Findings

Dimension	International Literature	Previous Malaysian Studies	Present Study Findings (Negeri Sembilan)
Primary Initiation Driver	Peer modeling, curiosity, targeted social media aesthetics (Ramamurthi et al., 2023).	General peer pressure, stress relief, curiosity (Siti Hajar, 2018; Mohd Razimi, 2020).	Synergistic pull between peer rituals and viral TikTok aesthetics; stress relief acts as a secondary push factor.
Procurement Channels	Online platforms, third-party adult buyers, retail non-compliance (Green et al., 2024).	Physical convenience stores, informal peer sharing (Najihah et al., 2018).	Encrypted P2P networks (Telegram), e-wallet payments, and unverified courier delivery bypassing physical retail filters.
Device Concealment	Stealth per-device designs (smartwatches, USBs) evading campus rules (Smith & Jones, 2023).	Acknowledged small form factors; limited focus on aesthetic disguises.	Disguised stationery devices (highlighters/erasers) deliberately neutralizing parental and school oversight.
Perception of Risk	Perception of vaping as a low-risk, tech-lifestyle choice over smoking (WHO, 2024).	General lack of health risk awareness despite statistical knowledge (Mohd Hairi et al., 2022).	Complete cognitive harm neutralization ('just water vapor'); community apathy and shifted parental tolerance ('lesser evil').
Theoretical Framing	Applied Ecological Systems and Behavioral Models to youth substance use (Parks, 2023).	Predominantly descriptive quantitative surveys; limited theoretical framing.	Anchored in Ecological Systems Theory, demonstrating how digital macrosystem forces bypass mesosystem barriers.

6. Theoretical Contribution

This study offers three significant theoretical refinements to Bronfenbrenner's Ecological Systems Theory when applied to contemporary youth risk behaviors:

1. **Digital Macrosystem Penetration:** Traditional ecological theory conceptualizes influence as moving sequentially through nested layers. This study demonstrates that in the digital age, macrosystem forces (e.g., global social media trends, viral marketing) directly penetrate the adolescent microsystem, bypassing traditional mesosystem intermediaries (parents and schools).
2. **Stealth Normalization Framework:** The study introduces the concept of Stealth Normalization, wherein commercial device design (disguising vaping devices as everyday items) intentionally exploits information gaps across microsystems. Thus, by concealing the physical indicators of risk behavior, the product prevents parents and teachers from recognizing active usage.
3. **Shifted Mesosystem Asymmetry:** The findings demonstrate an asymmetric mesosystem relationship. Although schools increase physical surveillance, families often remain unaware or adopt a permissive stance due to targeted 'harm reduction' narrative framing.

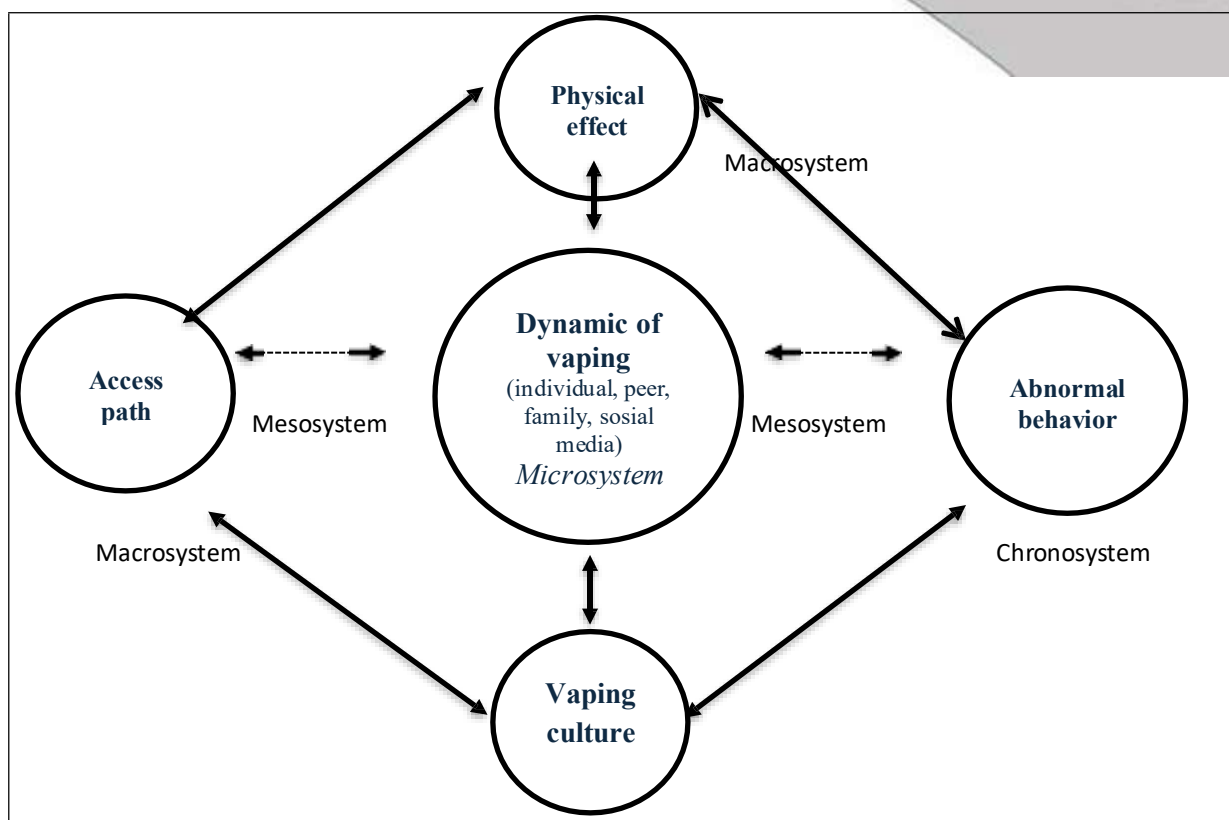


Figure 1: Vaping Dynamics Among Adolescents

7. Practical Implications

7.1 For Policy Makers (Ministry of Health Malaysia - MOH)

Enforcement under Act 852 must expand beyond physical brick-and-mortar retail audits to also target encrypted digital supply networks (e.g., Telegram, TikTok Shop, P2P networks). MOH should establish digital enforcement units to conduct sting operations on logistics networks, e-wallet transaction routes, and courier delivery channels to stop underage access.

7.2 For Educational Authorities (Ministry of Education - MOE)

MOE should update school administrative guidance (expanding on Surat Siaran Bil. 17/2015) to train teachers, school counselors, and disciplinary officers on identifying stealth vape devices disguised as stationery or flash drives. Moreover, school disciplinary policies should evolve from purely punitive models toward evidence-based psychosocial intervention programs.

7.3 For Families and Community Organizations (PIBG & NGOs)

The development of educational toolkits for Parent-Teacher Associations (PTA) is essential to help parents spot subtle behavioral signs of nicotine dependence and identify concealed devices. Community associations should launch public education initiatives to counter apathy among adults in the community.

8. Limitations and Future Research

This study focused on the Seremban district in Negeri Sembilan with a qualitative sample of four adolescent users and two commercial vendors. Although qualitative saturation was achieved, future research should conduct longitudinal qualitative studies tracking adolescent vaping trajectories across diverse state jurisdictions in

Malaysia. Additionally, dedicated digital anthropological investigations exploring algorithm-driven youth marketing on encrypted platforms are recommended.

9. Conclusion

Overall, this qualitative study demonstrates that adolescent vaping in Negeri Sembilan is a complex sociological phenomenon driven by dynamic interactions among multiple socialization agents. Peer groups act as the primary microsystem catalyst for initiation, accelerated by macrosystem digital marketing, stealth device designs, and unverified e-commerce supply chains. Therefore, effectively curbing adolescent vaping under the Smoke-Free Malaysia 2030 agenda requires combining digital supply chain enforcement under Act 852 with family-centered psychosocial support, updated educational monitoring, and targeted public health messaging.

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