

Initial Mapping on JUUL Electronic Cigarette Usage and Perception among Youth Adult Users

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Abstract

JUULs are the type of e-cigarette with disposable pods. This has become so popular among young people due to its flavors and modern packaging components. Its vaping initiation is controversial because of the nicotine content found in the pods, public access and social engagement involved among its users. 81 college students were selected from the pilot study to determine the percentage of previous smokers that have switched to Juul pods, identify the reason behind of switching cigarettes to Juul pods and measure the difference on the perceived efficiency and number of recommendations by students who using it between Juul pods and conventional cigarette. Majority of the respondents have access to Juuls. It was reported they have completely stopped smoking and prefer using their Juuls. 40.5% of the respondents started smoking because of their friends, peer pressure and exposure to family members who smoke. Respondents also perceived JUUL through friends' recommendation as healthier alternative to smoking and other electronic nicotine delivery systems and its flavor as well. Initial results suggested that respondents have a greater acceptance of JUULs in their social circles.

Key Word: Juul, nicotine delivery, e-cigarette, vaping, smoking

Introduction

There are 17.3 million smokers in the Philippines aged 15 and older with over 13.8 million of them smoking every day. 71% of lung cancer deaths in the world can be attributed to tobacco (Philippine Daily Inquirer). The WHO estimates that one billion people will have succumbed to a smoking-related disease at the end of the century (WHO, 2008). The Philippines was the 15th largest consumer of tobacco in the world in 2002 and currently has one of the highest smoking rates in Asia. With these facts, it is clear that Filipinos have been exposed to smoking, and it's dangers, from an early age which affects the lives of millions of people daily. This is primarily due to the low price of, and the ease of access to, cigarettes. The Philippines was ranked as the second lowest tobacco product in Southeast Asia (Alechnowicz & Chapman, 2004).

A recent government initiative such as Executive Order 26: Tobacco Regulation Act "Providing for the Establishment of Smoke-Free Environments in Public and Enclosed Places," was issued by President Rodrigo Duterte last 16 May 2017. This banned smoking in public places with the exception of separate smoking rooms (Morallo, 2017). This executive order invoked the Clean Air Act of 1999 and the Tobacco Regulation Act of 2003 to impose a nationwide ban on smoking in all public places in the Philippines. The ban replicates, on a national level, an existing ordinance in Davao City that Duterte created as mayor in 2002. The order also covers existing bans on the sale, distribution and purchase of tobacco products to and from minors, or persons below 18 years old, as well as the restrictions on cigarette advertisements and promotions under the Tobacco Regulation Act.

As a result of Executive Order 26, alternatives to traditional smoking are now in demand. This trend resulted in the rise of the popularity of e-cigarettes, such as vaping mods, like Myle and Juul pods, which replaced the combustible cigarettes that people have used for decades. As an outcome of this development, a growing number of medical practitioners and civic organizations have started appealing for wider access to these electronic nicotine delivery systems, which are said to be 95 % less harmful than conventional cigarettes (Public Health England (Cox et al., 2018). Findings by Goniewicz (2014) stated that the vapor in e-cigarettes has a significantly decreased level (9 – 450 times reduction) of toxic substances compared to the conventional cigarette (Fadus, Smith, & Squeglia, 2019). A previous study assessed 900 individuals that sought support from the UK National Health Service for smoking cessation. After one year, 18 percent of e-cigarette users had successfully quit smoking compared to 9.9 percent of those using nicotine replacement therapy (Reyes, 2019). It was noted on the previous randomized clinical trials that the e-cigarette is efficient in assisting tobacco smokers to quit smoking (Nardone, St. Helen, Addo, Meighan, & Benowitz, 2019).

JUUL's features

JUULs are a type of vaporizer (or e-cigarette) with disposable pods containing propylene glycol, glycerin, flavorings, benzoic acid and nicotine. Considered as one of the smoking cessation tools in developed and developing countries, the pods come in different flavors to facilitate its use among adult consumers (Liu & Halpern-Felsher, 2018). The major components of the pods are “FDA approved” in the United States of America and contain similar ingredients found in food. These factors support the proclaimed advantages of using vape products over conventional cigarettes (Warner et al., 2019). However, based on studies by Chun (2017) and Sleiman (2016), the long-term usage of e-cigarettes, when heated, leads to the buildup of toxic chemicals (such as aldehydes). These findings contradict the statement that the health risk from long-term inhalation of vapor from current e-cigarettes models is unlikely to exceed 5% of the harm from smoking tobacco (Royal College of Physicians, 2016). In addition to the potential health benefits of JUULs, the flavoring from the pods are an additional feature that encourage non-smokers and young people to start consuming these goods (Burton, Dadich, & Soboleva, 2018). The JUUL was designed so that it would not appear like a standard e-cigarette. The device is small enough to fit in a closed fist and has a sleek, tech-inspired design that resembles a USB flash drive. It has been described as the “iPhone of e-cigarettes because of its user-friendly design and flavor pods with nicotine. It also utilizes protonated nicotine to provide more satisfying experience to prevent experiences of unpleasant taste, smell and throat irritation (Fadus et al., 2019). JUUL devices (and other vaporizers) work by heating up a cartridge that contains oils to make a vapor that can be inhaled (JUUL, 2019).

Between those two design elements, and the fact that the JUUL pods come in flavors like crème brulee, cool cucumber, and mango, these e-cigarettes have become popular among the youth (Morean, et al. 2019). The JUUL vaping device was invented by two Stanford graduates in 2007, and has since become the best-selling e-cigarette in the market, capturing 32 percent of the market share, according to Nielsen data (Robinson, 2017). Since then, the JUUL consumption increased its popularity among school youths due to tweets and social media (Leavens et al., 2019).

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JUUL's popularity

After two years in the e-cigarette market, JUUL has become so popular among the youth that it has already amassed nearly half of the e-cigarette market share (Craver, 2019). JUUL devices heat up a cartridge containing oils to create vapor, which quickly dissolves into the air. JUUL products do contain nicotine. In fact, a single JUUL cartridge is roughly equal to a pack of cigarettes, or 200 cigarette puffs. Each flavor pod (e-liquids) contains 5% nicotine by weight according to Juul Labs Inc (2009). The limited content of nicotine is now reflected on its label. But based from the analyses of Reilly (2018), 61.6 mg/mL of nicotine was measured. Though nicotine concentration varies among its flavors, JUUL e-liquids are reported to have one of the highest amounts of nicotine per pod in the U.S. market (Nardone et al., 2019).

Many young people, however, do not realize that they are inhaling nicotine when they use e-cigarettes. (Morean et al., 2019). The majority of youth e-cigarette users believe that they consumed only flavoring, not nicotine, according to the University of Michigan's 2016 Monitoring the Future study (Truth Initiative, 2019). Aside from its available flavors, it was also noted that the discreet aerosol feature of JUULs make it more appealing to the youth (Chen, 2017). The USB-like packaging makes the product more encouraging to the youth (Patel et al., 2019). Wide reaching campaigns through social media platforms such as Twitter, Instagram, Facebook and You Tube play a role in the JUUL's popularity (Allem, Dharmapuri, Unger, & Cruz, 2018; Burton et al., 2018; Chu et al., 2018). These are the ideal venue among the e-cigarette and JUUL users to engage, market and share news and feedback.

Controversies on Nicotine

The health risks attributed to nicotine are still the main concern, particularly among the youth. Nicotine is quite controversial due to its health effect to the smokers. Smokers are still looking on the effect of nicotine delivery without the harmful factors of tobacco smoke can prevent most of the harm from smoking (Royal College of Physicians, 2016). The tobacco cigarette remains the most dangerous of all nicotine delivery systems. Addiction is the common result of the regular use of nicotine. Dr. Harold Farber stated that 'electronic cigarettes are a path of nicotine addiction for youth' (Chen, 2017).

According to Professor Michael Russell, a psychiatrist in the United Kingdom, people smoke for the nicotine effect. Illness and premature mortality are attributed to the inhaled tar (a byproduct of combustible cigarette products). Tar is the main cause of tobacco-related diseases. Prof. Russell emphasized the reduction of tar production during the combustion of conventional cigarettes while maintaining its desired nicotine level in the body (Russell, 1976). Therefore, the introduction of electronic cigarettes, which only uses a specific temperature to prevent the conversion of tobacco leaves or liquids to tar and other toxic chemical compounds, in order to maintain the appropriate nicotine level, as its basis by the tobacco harm reduction advocates.

Nicotine mimics the neurotransmitter acetylcholine which binds to nicotinic cholinergic receptors. Therefore, nicotine facilitates neurotransmitter release (like dopamine) and sympathetic neural stimulation which helps the individual to become active. Nicotine is perceived to be the leading cause of tobacco-related diseases. This is due primarily to addiction, cardiovascular disease, reproductive toxicity, cancer, impaired adolescent brain development and infectious disease risk. Nicotine is much less hazardous to cardiovascular health than smoking, but may contribute to acute cardiovascular events, especially if the smoker has a current cardiovascular disease (Benowitz, 2019). The speed of nicotine dose delivery to the brain is an important factor in determining addiction rates and this statistic varies among different e-cigarette products. There are positive and negative reinforcement models in nicotine dependence. For the positive reinforcement, smokers like nicotine due to the positive effects they experience. It helps in anxiety relief, improved alertness and cognitive functioning (Dudas and George, 2005); nicotine helps smokers to cope with daily tasks by managing arousal levels and smokers use nicotine to relieve neurocognitive deficits (Dawkins, 2019). Negative reinforcement includes the following: escape and avoidance of negative affect is one of the reason for using nicotine among smokers (Baker et al., 2004); smokers experience feelings of tiredness and stress when they are without nicotine thus nicotine manages cortical arousal and emotional tension (Parrott, 1999); and smoking directly causes stress and negative mood states therefore quitting is related to reduced stress (Cohen & Lichtenstein, 1990).

Significance of the study

The identification of the main factors that influence the switch from conventional cigarettes to e-cigarettes, like JUULs, is very important. This is necessary in order to determine the possible initiation and access of the youth to their most preferred nicotine delivery systems. Compared to the millions of Filipinos that still prefer tobacco products over e-cigarettes, the amount of people that have converted to e-cigarettes contribute greatly to lowering the risk of diseases and emphasizing the other beneficial factors attributed to e-cigarettes and other alternative nicotine

young respondents' access to JUULs outside the school. JUUL pod systems are not as affordable as regular cigarettes. Most Filipinos outside of the Enderun community are unable to benefit from the advantages of electronic nicotine delivery systems. Observation in an environment like Enderun community was applicable for this study setting.

Method of data gathering

The research employed a quantitative-qualitative data gathering method the use of an online survey. Responses were analyzed with quantitative methods by assigning numerical values to Likert-type scales. This was followed by qualitative data collection methods which used interviews, questionnaires with open-ended questions, focus group discussions, observation, game or role-playing, and case studies (Ritchie and Lewis, 2014).

Theories to apply

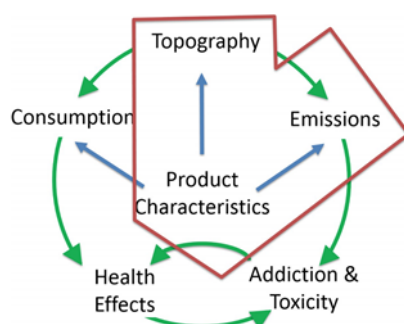


Fig. 1 Multi-path relationship between product characteristics, use behavior and emissions (Robinson et al., 2018)

Multi-path relationships from a single characteristic of product such as JUULs were measured throughout the respondents' consumption, usage behavior, possible addiction and its perceived benefit. (Robinson et al., 2018). JUUL's increase in popularity was accompanied by marketing on social media like Twitter, Instagram and YouTube by the youth. As of 2017, the JUUL advertisement highlighted on its "high tech features" and flavors (Keamy-Minor et al., 2019).

The pilot study was also patterned according to the assumption where college students are open to discussion and engagement from the Theory of Social Normative Behavior by Perkins (2002). It was stated that approval of a behavior is connected to behavioral engagement. Normative perceptions (such as the perceived benefit and efficiency of JUULs) augment to the targeted individual, campus and community. This paper begins to fill important gaps in the JUUL literature by mapping JUUL use patterns, reasons for use, and normative perceptions of JUUL among college students. (Leavens, Stevens, Brett, Leffingwell, et al., 2019).

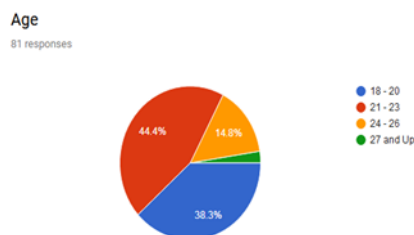
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Descriptive Findings

Based on the findings of the pilot survey created with a total of 81 respondents, the following results were gathered by the researchers:

1. Respondents

Majority of the respondents that replied were between the ages of 21-23. The age bracket of 18-20 comes second and the bracket with the least respondents was the aged 27 and above bracket. This shows that most Juul users in the Enderun community are in their early 20's (44.4%).

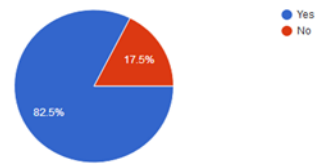


2. Smoking habit

The respondents were predominantly smokers, coming in at 82.5% while the succeeding 17.5% were non-smokers, meaning they have completely stopped smoking and prefer using their JUULs in its place.

Are you a smoker?

80 responses

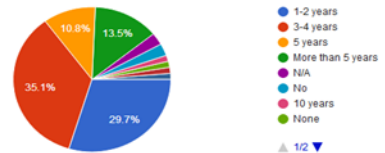


3. Duration of Smoking

Majority of the respondents (35.1%) have been smoking for 3-4 years. Coming in close at 29.7% was 1-2 years. There was a low amount of respondents that have been smoking for 5 years (10.8 %) and more than 5 years (13.5 %). The rest of the respondents had very varying answers

How long have you been smoking?

74 responses

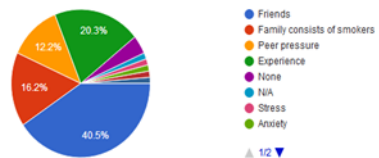


4. Smoking initiation

The 40.5% of respondents from the pilot survey stated that they started smoking because of their friends. This was followed by the group of people whose smoking habits came from raw experience (20.3%). It was observed that peer pressure and exposure to family members who smoke have contributed to smoking initiation compared to other options such as stress, anxiety.

What is or are the reasons why you started to smoke?

74 responses

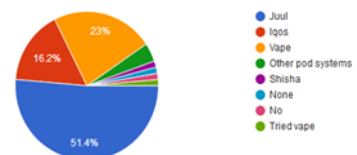


5. Alternative to conventional cigarette

Since this was a targeted survey, 51.4% of respondents have tried JUUL as an alternative to smoking. 23% chose another form of electronic nicotine delivery systems which is vaping.

Have you ever heard or tried anything alternative to cigarettes?

74 responses

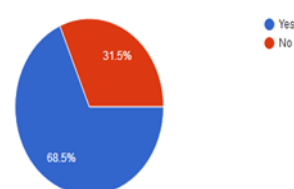


6. Access to JUUL

It was stated that most of them have used the Juul as an alternative. But only 68.5% of respondents actually own a JUUL. It is hypothesized that the respondents get access to JUUL through their friends or classmates.

Do you own a JUUL? (If not a JUUL owner, stop here)

73 responses

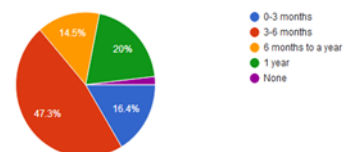


7. Duration of usage to JUUL

Most respondents have been loyal to their JUUL for 3 months to half a year (47.3%) while others have only been trying it out for up to 3 months (16.4%). A few respondents were able to say that they've been JUUL users for a year (20%).

How long have you been using your JUUL?

55 responses

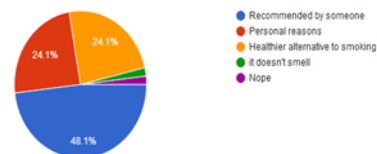


8. Reason for switching to JUUL

48.1% of respondents began their experience with the JUUL through the recommendation of a friend or colleague (48.1%). 24.1% were able to say that they tried it on their own or because it was a healthier alternative to smoking tobacco products.

Why did you switch to JUUL?

54 responses



9. Perceived benefits of switching to JUUL instead of continuing regular cigarettes

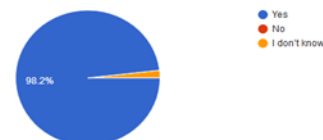
Collectively, the respondents switched to JUUL pods because *'it doesn't smell like regular cigarettes'*. Some have said they find it healthier than tobacco products and that the smell of smoke doesn't stick to their hands. It also showed in the results that convenience plays a part in choosing JUUL pods since they are not as restricted when it comes to the places they can smoke. A few respondents have also reported that it has significantly improved their health after switching to JUULs.

10. Observed recommendation by the users on the usage of JUUL

Based on the survey, respondents would recommend a JUUL product to their friends who are smokers. 98.2% of respondents said switching over to JUULs is more beneficial while the rest are a bit uncertain.

Would you recommend to others that switching to JUUL is overall better?

55 responses



Discussion

Few studies have mapped the attitudes, beliefs and perceptions of the youth on the use of electronic cigarettes like JUUL. This pilot local study provided brief insights on the common perceptions such as positive attitude on flavors and as an alternative to combustible cigarette smoking. It was noted that exposure to family members who smoke is one of the contributing factors in the initiation of JUUL. This is related to the study conducted by Olds (2005) and Pedersen (2013) on the positive associations between acceptance by their family and initiation of cigarette use (Alexander et al., 2019). Some respondents stated that recommendation from friends or colleagues initiated their use of JUUL. This has shown the study that peers' approval will contribute to JUUL usage particularly among the closest friends based on the theory of social normative behavior. Higher perceived approval of a behavior is associated with increased engagement in the behavior like in the case of JUUL (Leavens et al., 2019). This is also related in the study that friends' use and approval was correlated to frequency of usage of e-cigarette (Vogel et al., 2018).

The trademark of flavors due to its sweet and fruity flavor play a role in youth's acceptance of JUULs. This is related to the study by Kavuluru (2018) which has shown that Mint was the most repeatedly mentioned flavor. But the same study revealed only limited respondents acknowledged that flavor was a primary reason on the JUUL usage (Leavens et al., 2019).

Users believe that JUUL is an effective smoking cessation tool. However, it was also noted that due to its marketing strategy, this encourages on its potential approach of the interest of young people who are likely to be exposed to the risks of e-cigarettes (Burton et al., 2018). JUULs are now building its social dynamics that encouraged the youth to engage for its usage. The manufacturer contends that the intention of JUUL is for adult smokers who want to quit smoking. Another study reported that JUUL was already familiar to adolescents and young adults (Liu & Halpern-Felsher, 2018). Switching to JUUL from the conventional cigarette was a key to smoking alternatives. This was established on the study through the validation of classification and regression tree (CART) model where respondents were successfully switched to JUUL (Prakash, et al., 2019).

Based on the pilot survey, more than half of the respondents already carry JUULs. Respondents came from the Enderun community who belong to higher income brackets. Consistent with prior study by Dai and Hao (2016), who reported that alternative tobacco products such as JUUL are more likely to be sold in higher income commu-

nities (Simon et al., 2018). Adaptation of technology (like the use of electronic cigarette) was a hype among the youth. Packaging also contributes to its popularity among its users.

Access to JUUL is also a factor on the increased frequency of its usage. It was noted in the initial survey that there is no restriction to acquiring JUUL products since it is available in different stores. This is related to the previous literature by Hughes (2015) where young users who have previous experience to purchase e-cigarette are more like to access e-cigarette (Stroup & Branstetter, 2018).

Limitation and future directions

This study has a number of notable limitations. First, the number and patterns of puffs were not included in the survey. This will establish the link between the behavior and actual frequency of usage. Second, the perceived knowledge on the equivalent nicotine content were not fully understood. Based from the previous literature, the majority of the youth did not focus on the actual nicotine present in every pods' liquid. This is to measure the dependence to nicotine based on the number of puffs. Lastly, the generalization of result may be limited because of small and non-representative sample in this pilot survey. A larger, representative sample is needed to draw definite conclusions.

Conclusion

This pilot study was among the first to examine the factors on the usage of JUUL. Overall, initial results suggest that respondents have a greater acceptance of electronic cigarette particularly JUULs in their social circles. This was based on their assumption that JUUL posed lesser health risk as compared to conventional tobacco products.

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