The Influence of Herbal Cigarette Misinformation on Tiktok on Health Risk Perception Among Generation Z

Olih Solihin[1], Safutra Rantona[1], Yuni Mogot[1], Julian Nugroho[2]

[1] Universitas Komputer Indonesia, Bandung, Indonesia
[2] IPB University, Bogor, Indonesia
olih.solihin@email.unikom.ac.id

Abstract. This research explores the impact of false information regarding herbal cigarettes on TikTok concerning the health risk perception of Generation Z in Indonesia. Misleading information about product safety conveyed by means of short video clips can lead to distortions of subjective risk perceptions of the younger generation towards such products. By means of an explanatory quantitative survey research design, data was collected using a Google form from 412 Generation Z participants. The instrument for data collection consisted of 32 items measuring the variables of herbal cigarette misinformation on TikTok (X) and health risk perception (Y) based on the Health Belief Model approach. Simple linear regression analysis was performed using IBM SPSS 26.0 software. Results show a significant negative relationship between misinformation and health risk perception ($b = -0.748$, sig. $= 0.000$, $R^2 = 0.464$).

Keywords: Health Misinformation, TikTok, Health Risk Perception, Generation Z, Herbal Cigarettes, Health Belief Model.

1 Introduction

The issue of health misinformation on social media cannot be overlooked any further by scholars, public health officials, and policy makers. While there are numerous options, TikTok is a platform where the health-related content experiences the fastest growth at the same time as becoming a medium for spreading false claims. The increasingly popular issue in the TikTok community is herbal cigarettes, products actively advertised as natural and healthier alternatives to the conventional tobacco-based cigarettes. These claims, not substantiated scientifically, are extensively promoted via short video clips that might have an effect on the way people perceive the health dangers linked with smoking.

Individuals who were born in 1997–2012 form Generation Z. It is the generation that uses TikTok to the greatest extent. As reported by We Are Social and Meltwater (2024), the number of active TikTok users in Indonesia was over 157 million accounts [1]. In the age category of 18-24 years, which comprises the vast majority of Gen Z members, the number of active TikTok users is the highest. It makes Gen Z extremely vulnerable to false statements presented in visual form.

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Based on the perspective of public health, the usage of herbal cigarettes is never a safe product. It has been stated by Indonesia's Ministry of Health [2] that the use of herbal cigarette products still produces tar, carbon monoxide, and other compounds which are detrimental to the human respiratory system in the same way as the regular cigarettes, despite the contrary statements commonly made by the manufacturers and social media influencers. When such false statements are continuously consumed by individuals lacking health literacy skills, their perception of the health risks may get greatly skewed.

There have been numerous studies investigating the effects of misinformation exposure on the perception of health risks; yet, the number of studies focusing specifically on the topic of herbal cigarettes on TikTok is still rather limited, especially considering the Indonesian context. According to Pennycook et al. (2020), repeated exposure to misinformation through social media reduces individual ability to recognize the risk associated with misleading information [3]. On the other hand, Zhao et al. (2022) have shown that emotionally appealing videos are more influential in affecting the risk perceptions than longer, informative articles [4]. Sukmawati & Prabowo (2023), in particular, conducted a study on the influence [5].

A theory that can help comprehend the above scenario is the Health Belief Model (HBM). This model was first formulated by Rosenstock (1974) and was later revised by Champion & Skinner (2008) [6, 7]. The theory asserts that an individual's health-related behavior depends on their level of perceived susceptibility and the level of perceived severity. Misinformation manipulates the two perceptions and when individuals believe that herbal cigarettes are not dangerous, they will have a low risk perception of the product.

Another theory that helps comprehend the above situation is the Third-Person Effect by Davison (1983) [8]. It states that people think that other individuals are easily persuaded by media communication compared to themselves. The Third-Person Effect might make individuals believe that misinformation about herbal cigarettes in TikTok has minimal influence on them.

This study is meant to examine the degree to which misinformation about herbal cigarettes being shared on TikTok affects the health risk perceptions of Generation Z in Indonesia. This study took place from January to March 2026 using a quantitative methodology that utilized an instrument based on Google Form survey. This research can make both theoretical and practical contributions to the field of digital health communication studies.

2 Literature Review

2.1 Health Misinformation on Social Media

Misinformation related to health can be defined as information that is false, scientifically baseless, but presented in a way suggesting it has been founded based on well-accepted truths [9]. In the ever-evolving realm of social media, health misinformation has transformed into a systematic problem going far beyond mere mistakes in information dissemination. WHO has introduced infodemics in the context of an excessive

amount of information (valid and invalid) impeding the community from making evidence-based health-related decisions.

The authors Wardle & Derakhshan (2017) differentiate three types of problematic content in the digital information sphere, including misinformation (false information intentionally disseminated without the intention to mislead), disinformation (false information intentionally disseminated in order to mislead the public) and malinformation (information that is true but used for malicious purposes) [10]. In the case of herbal cigarettes being sold on TikTok, this type of content is classified as disinformation, as producers and their agents intentionally disseminate claims about the safety of products that are scientifically disproved.

According to an extensive literature review done by Suarez-Lledo & Alvarez-Galvez (2021), about 25%-40% of 65 million social media health messages studied contained some level of misleading content; this percentage was even higher in relation to tobacco product and substitute products' content [11]. This literature review further indicated that while misinformation was more engaging than evidence-based information due to the appealing nature of the message, misinformation is also associated with higher levels of engagement in terms of likes, comments, and shares.

2.2 TikTok as a Health Content Ecosystem

TikTok has developed from being a mere platform meant for fun and entertainment to one of the most popular sources of health information in the youth population worldwide. With the help of its algorithmic nature, known as the For You Page (FYP) of TikTok, it is able to provide content personalized by the history of interaction of the users, thereby forming an echo chamber whereby the users keep seeing the same type of content, including health misinformation, that they had interacted with before.

An analysis done by Basch et al. (2022) of health information on TikTok indicates that most of the viral health videos on this platform lacked verifiable scientific references, did not contain details regarding the qualifications of the content producers, and were very persuasive using emotions to attract the attention of the viewers [12]. In addition, content on this platform that had an entertaining nature was twice as likely to be viral than those that had an informative nature. Rahmawati & Kusuma (2023), in a survey conducted on Gen Z people in Indonesia, found that 67.4% of them admitted to having altered their health perspectives or made decisions based on what they saw on the TikTok platform without verifying [13].

2.3 Herbal Cigarettes: Claims versus Scientific Evidence

Herbal cigarettes can be defined as tobacco-based cigarette products that contain herbal plants like mint, lavender, cloves, and other botanicals, excluding tobacco leaves as their main ingredient. These cigarettes are marketed commercially on the basis of claims of having no nicotine, being non-addictive, and being healthier than regular cigarettes. Nonetheless, these claims have been proved to be wrong scientifically.

The World Health Organization (WHO, 2023) has confirmed that herbal cigarettes still contain tar and carbon monoxide, whic is not significantly less than tobacco cigarettes after burning [14]. Any organic material burned, irrespective of which plant it

may be, produces hundreds of chemicals including PAH (polycyclic aromatic hydrocarbons), which are cancer-causing substances. As far as safety is concerned, the Ministry of Health of Indonesia [2] has declared that no cigarette product is safe enough to consume, even herbal cigarettes.

Chaffee et al. (2021) observed from their research on people who used herbal cigarettes that perceptions about the safety of the product were positively associated with the frequency of exposure to digital advertisements that emphasized the benefits of the products [15]. In essence, people who are frequently exposed to content that convinces them of the safety of the herbal cigarettes are likely to underestimate the health risks.

2.4 Health Risk Perception

Risk perception in health involves an individual's subjective evaluation of the probability of harm or potential health losses associated with certain behaviors or exposures [16]. It does not necessarily represent the actual objectively quantifiable risks but is significantly impacted by a number of cognitive, social, and communication variables acting concurrently.

The concept of risk perception within the Health Belief Model framework consists of two key dimensions: perceived susceptibility (how likely an individual believes oneself to be at risk from a health threat) and perceived severity (how serious an individual believes the threat to be). Champion & Skinner (2008) argue that both elements work as main determinants for the decision-making process on engaging in preventive behaviors or ignoring health threats [7].

According to Rimal & Juon (2010), individuals possessing low levels of media literacy become more vulnerable to having their risk perception impacted by persuasive and emotionally compelling messages, especially when they come via online media [17]. This is important in view of Gen Z because although they are digital natives, they are not always skilled enough in evaluating the validity of information about health risks that they receive online.

2.5 Generation Z and Digital Health Literacy

Generation Z is a demographic generation born and brought up in a digital era. They are frequent users of various social media platforms such as Tiktok, Instagram, and YouTube and are information sources of diverse information, including health. However, proficiency in the technological sense does not guarantee critical ability to assess the authenticity of health information [18].

Ningrum & Fadilah (2024) discovered in their research involving Indonesian university students that levels of trust towards health information posted on Tiktok were alarming with 58.3% of the respondents reporting to believe in health claims found on the platform without any verification [19]. Such a level points to a critical lack of critical literacy skills despite the high level of frequency of consuming digital content among Indonesian Gen Z.

In general, the research done by Vrieze et al. (2022) established that exposure to misinformation through short videos leads to developing the belief perseverance phenomenon when individuals continue to hold incorrect beliefs despite being informed

about the truth. Such cognitive process partially clarifies why counter-misinformation campaigns do not work effectively [20].

2.6 Theoretical Framework

The research is based on the following two key theoretical paradigms. The first one is the Health Belief Model (HBM) introduced by Rosenstock (1974) and improved by Champion & Skinner (2008) [6, 7]. It is applied as the theoretical underpinning for the health risk perception variable. The choice of the HBM is dictated by its potential to describe how people perceive health threats and how this information affects their behavior.

The second theoretical framework which is used to analyze how people perceive information from social media is Information Processing Theory introduced by McGuire (1989) [21]. It states that the impact of the message on the person is determined by many aspects, including the credibility of the source, the attractiveness of the message, and emotional engagement of the recipient, all of which are strong characteristics of TikTok posts (see figure 1).

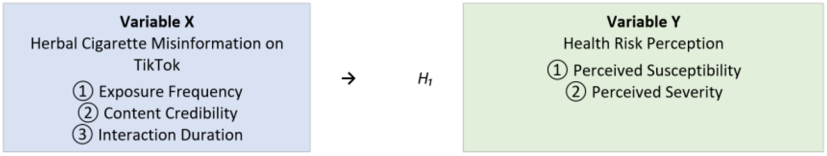

Fig. 1. Research model.

3 Methodology

3.1 Research Approach and Design

The research adopts a quantitative research approach using an explanatory survey design. The reason for the adoption of the quantitative approach is that the major focus of the research is to measure and examine the causal relationship between the misinformation about the health risks associated with herbal cigarettes on TikTok as the independent variable (X) and health risks perception among Generation Z as the dependent variable (Y). The use of explanatory design is due to the fact that the main focus of the research is not only to describe but also to explain the pattern of relationships and the degree of influence among the variables.

The theoretical framework of the research is positivism that perceives social reality as an object that can be quantitatively measured and statistically analyzed. In other words, inter-variable relationships are viewed from a perspective of causality that can be tested through hypothesis testing.

3.2 Research Timeline

The research process was carried out for three months, between January and March 2026. In the first phase of January 2026, the study involved development of instruments, validity and reliability test and distribution of the questionnaires. In February 2026, the study involved the collection of the data using online questionnaires. In March 2026, the process involved tabulation of data, analysis, and writing of the research report.

3.3 Population and Sample

The sample population of this study consists of all those who belong to Generation Z, i.e., people who were born between 1997 and 2012 and use TikTok and have been exposed to the concept of herbal cigarettes through the application within the past three months. With the help of information from APJII (2024), it is estimated that there are more than 74 million active internet users in Indonesia who fall into the age group of Generation Z, thus making the population infinity [22].

Since the population was infinite, the method used for sampling was purposive sampling along with snowball sampling method. The following criteria were adopted for sampling: (1) age between 13 and 28 years at the time of filling out the questionnaire; (2) owning an active TikTok account which is used at least thrice a week; (3) being exposed to herbal cigarettes in the past three months on TikTok; and (4) willingness to fill out the questionnaire completely and voluntarily.

3.4 Sample Size

The minimum sample size was calculated using the formula for an infinite population: $n = Z^2\alpha/2 \times p \times (1-p) / d^2$. For a 95% confidence level ($Z = 1.96$), proportion ($p = 0.50$), and margin of error of 5% ($d = 0.05$), the minimum number of people that needed to be sampled was 385. With the introduction of a 10% cushion to cater for possible losses, the number was increased to 425. In all, 412 people responded to the questionnaire.

3.5 Variables and Operational Definitions

Independent Variable (X): Inaccurate Information about Herbal Cigarettes in TikTok. This variable can be described as the level of exposure of respondents to inaccurate information on TikTok about the safety, advantages, and disadvantages of herbal cigarettes. It will be operationalized via the following three sub-dimensions: (1) frequency of exposure; (2) credibility of information; and (3) time of interaction.

Dependent Variable (Y): Perceived Health Risks. This variable will represent the subjective evaluation of the health risks of consuming herbal cigarettes by respondents. It will be operationalized in line with the HBM theory through the following two sub-dimensions: (1) perceived susceptibility; and (2) perceived severity.

3.6 Research Instrument

The data collection tool was a well-structured questionnaire delivered through Google Form, divided into three parts: (1) the demographics of respondents; (2) 18 questions pertaining to Variable X; and (3) 14 questions pertaining to Variable Y. The total number of substantive questions was 32, based on a five-point Likert scale (Strongly Disagree = 1 to Strongly Agree = 5).

Piloting of the questionnaire on 30 respondents showed that all the 32 questions were valid (r-values from 0.412 to 0.781). Reliability test results were as follows: Cronbach's Alpha value for Variable X was 0.874 and for Variable Y it was 0.891, both higher than the cut-off point of 0.70 [23].

3.7 Data Analysis Techniques

The collected data were analyzed using IBM SPSS Statistics Version 26.0 through four successive steps: (1) descriptive statistics analysis, which was used to profile respondents and describe variables' distributions; (2) classical assumptions analysis, comprising testing for normality (Kolmogorov-Smirnov test) and testing for linearity; (3) Pearson Product Moment correlation analysis; and (4) simple linear regression analysis, where the impact of X on Y was tested along with calculating R^2.

3.8 Research Hypotheses

H_0: There is no significant effect of herbal cigarette misinformation on TikTok on the health risk perception of Generation Z.

H_1: There is a significant effect of herbal cigarette misinformation on TikTok on the health risk perception of Generation Z.

Sub-hypotheses:

(i). H_1a: Exposure frequency significantly influences perceived susceptibility.
(ii). H_1b: Content credibility significantly influences perceived severity.
(iii). H_1c: Interaction duration significantly influences overall health risk perception.

4 Results

4.1 Respondent Profile

The study was able to gather data from 412 respondents that fit the inclusion criteria set. In the aspect of gender, out of the respondents, 231 were females (56.1%) while 181 were males (43.9%). As for the age category, the highest age category was the 18-22 year-old (61.7%) followed by the age category 23-28 years old (24.5%) and 13-17 years old (13.8%). For the frequency of Tiktok use, 38.3% of respondents used Tiktok for more than 4 hours each day.

Table 1. Respondent demographic profile (n = 412).

Characteristic	Category	n	Percentage (%)
Gender	Female	231	56.1%
	Male	181	43.9%
Age Group	13–17 years	57	13.8%
	18–22 years	254	61.7%
	23–28 years	101	24.5%
Education	Senior High School	76	18.4%
	Undergraduate Student	277	67.2%
	Graduate/Employed	59	14.4%
TikTok Usage/Day	< 2 hours	111	27.0%
	2–4 hours	143	34.7%
	> 4 hours	158	38.3%

4.2 Descriptive Statistics

Variable X (misinformation on herbal cigarettes on TikTok) was subjected to descriptive analysis, which revealed an average score of 3.87 (SD = 0.612). The results reveal that respondents tend to be in the high exposure and engagement group when it comes to misinformation on herbal cigarettes on TikTok. With regard to the exposure frequency aspect, a score of 4.02 (SD = 0.589) was recorded, and 78.4% of the respondents reported having seen information about herbal cigarettes on TikTok more than three times per week. For the content credibility aspect, the average score was 3.74 (SD = 0.701), where 62.1% of the respondents agreed that herbal cigarettes are better and safer than regular cigarettes.

Variable Y (health risk perception) produced the average score of 2.43 (SD = 0.784). The respondents were categorized into the low level of health risk perception associated with herbal cigarettes. Perceived Susceptibility scored an average score of 2.31 (SD = 0.812), where 69.4 percent of the sample population did not perceive themselves susceptible to the risks of herbal cigarettes. However, the perceived severity had a marginally high score of 2.56 (SD = 0.751), indicating that the respondents were aware of the risks involved; although without any personal touch due to optimistic bias.

Table 2. Descriptive statistics of variables X and Y by dimension.

Variable	Dimension	Mean	SD	n	Category
X (Misinfo)	Exposure Frequency	4.02	0.589	412	High
	Content Credibility	3.74	0.701	412	High
	Interaction Duration	3.84	0.648	412	High
	Overall (X)	**3.87**	0.612	412	**High**
Y (Risk Percep.)	Perceived Susceptibility	2.31	0.812	412	Low
	Perceived Severity	2.56	0.751	412	Low
	Overall (Y)	**2.43**	0.784	412	**Low**

4.3 Classical Assumption Tests

The result of normality test using One-Sample Kolmogorov-Smirnov Test resulted in Asymp. Sig. values of 0.127 for Variable X and 0.094 for Variable Y, which is greater than the $\alpha = 0.05$, hence proving that the data follows the normal distribution. The test of linearity by Test for Linearity gave an F-value of 47.382 (sig. = 0.000) under the Linearity table and a significance value of 0.312 under Deviation from Linearity table.

4.4 Correlation Analysis

According to Pearson Product Moment correlation analysis, the result of the study shows a correlation coefficient (r) of −0.681 with a significance value of 0.000. The minus symbol shows that there is an inverse relationship between exposure to misinformation in TikTok and health risk perception of participants; hence, the greater the exposure, the lesser the health risk perception of the participants. The strength value of 0.681 is considered a strong relationship according to the criteria set by Sugiyono (2019) [24].

4.5 Simple Linear Regression Analysis

The coefficient of determination (R^2) calculated through the regression analysis was 0.464. This suggests that the 46.4% of variance in health risk perception of Generation Z can be attributed to misinformation about herbal cigarettes on TikTok. The value of F-calculated was F = 354.217 (P-value = 0.000), which shows that the regression model is statistically significant. The equation is:

$$\hat{Y} = 5.312 - 0.748X$$

Value of constant (a) = 5.312 suggests that in the total absence of misinformation, the health risk perception of Gen Z will be estimated at 5.312 units. Value of regression coefficient (b) = −0.748 suggests that when there is an increase in one unit of the misinformation, health risk perception of Gen Z will reduce by 0.748 units. T-value = −18.821 (sig. = 0.000) suggests that regression coefficient (b) is statistically significant, and therefore hypothesis (H_1) will be accepted and hypothesis (H_0) will be rejected.

Table 3. Summary of simple linear regression analysis.

Statistic	Value	Interpretation
Correlation Coefficient (r)	−0.681	Strong negative relationship
Coefficient of Determination (R^2)	0.464	46.4% of Y variance explained by X
Constant (a)	5.312	Baseline risk perception
Regression Coefficient (b)	−0.748	Significant negative effect
t-value	−18.821	Sig. = 0.000
F-value	354.217	Sig. = 0.000

Table 4. Summary of hypothesis testing results.

Hypothesis	r / Coeff.	Sig.	Decision
H_1: Misinformation → Health Risk Perception (overall)	b = −0.748	0.000	Accepted
H_1a: Exposure Frequency → Perceived Susceptibility	r = −0.647	0.000	Accepted
H_1b: Content Credibility → Perceived Severity	r = −0.712	0.000	Accepted
H_1c: Interaction Duration → Risk Perception (total)	r = −0.623	0.000	Accepted

The main contribution of this research, which is the negative influence of misinformation about herbal cigarettes on the health risk perception of Generation Z with a coefficient of determination of 46.4%, gives a scientific proof of those theories developed within the health communication studies for a long time. This finding is consistent with the results obtained by Zhao et al. (2022), who have shown that emotions-oriented short videos have an enormous capacity to impact risk perception because younger generations cannot critically analyze health information due to insufficient health experience [4]. Also, this finding is in line with the work done by Swire-Thompson and Lazer (2020) [18].

The relatively high average on the exposure frequency aspect (average = 4.02) supports the claim by Basch et al. (2022) that the algorithm used by TikTok is engagement-maximizing, not accuracy-maximizing, meaning that even inaccurate content, as long as it is attractive enough to engage people, ends up getting distributed widely [12]. Thus, the process can be described as algorithmic amplification of misinformation, an endless loop which perpetuates the dissemination of inaccurate content on a wider audience base, considering that one-third of Gen Z users use TikTok for health-related information, leading to health problems.

The low average of Variable Y of just 2.43, considering its five-point scale, is a very alarming figure, especially from the perspective of public health. Referring to the Health Belief Model (HBM) [8, 7], people with low perceptions of the susceptibility of a disease or problem and the severity associated with it do not take any action towards prevention—and in this case, they are more inclined towards experimenting with or even recommending the use of herbal cigarettes. This low level of risk perception corresponds to results in e-cigarette studies, where social media usage (even TikTok), through which a lower degree of harm is perceived about the products, is promoted. Content credibility being the highest predictor (r = -0.712) is another finding that is in accordance with Pennycook et al.'s (2020) claim that high-quality analytical reasoning is the most crucial factor for resisting misinformation, based on Information Processing Theory [21], since source credibility and emotionality increase persuasion through videos [3].

5 Conclusion and Recommendation

From the analysis of the data gathered from 412 Generation Z participants in Indonesia, this study provides five major findings. First, there is an impact of misinformation about herbal cigarettes on TikTok on the health risk perception of Generation Z, characterized by the regression coefficient of −0.748 (sig. = 0.000) which leads to the acceptance of

H_1. Second, the impact of misinformation on the health risk perception is 46.4% (R^2 = 0.464), which constitutes a relatively large percentage in the context of research in digital health communication. Third, all sub-hypotheses (H_1a, H_1b, and H_1c) were accepted, while the content credibility factor had the strongest determinant impact (r = −0.712). Fourth, respondent profiling showed that 62.1% of Gen Z respondents believed the safety claims about herbal cigarettes on TikTok without verifying them, which constitutes a critical literacy deficiency. Fifth, these findings confirm the relevancy of the Health Belief Model in the context of digital health communication and provide a new aspect regarding the influence of algorithmic architecture as a misinformation amplifier.

Universities & Secondary Schools: There should be a need to incorporate health-related digital media literacy courses as part of formal university and secondary school curriculum as soon as possible. This should entail training in verification of health information and knowledge of social media algorithms through peer-to-peer learning methods since they have been found to be more effective among Generation Z.

Government (Ministry of Health and Ministry of Communication and Information Technology): Policy should be put in place immediately which will make it mandatory for social media websites to have automatic labeling mechanisms for all unverified health related information. Ministry of health should also improve its digital presence on TikTok through creative packaging of health education information suitable for Gen Z.

Tiktok Platform: The algorithm for the FYP should be altered to prevent aggressive sharing of information on unverified health information. The Tiktok platform should collaborate with official health institutions in the expansion of health information partnership programs.

Future Research: It is recommended for subsequent research studies to adopt longitudinal method in order to measure risk perception change over time as well as extend the model by incorporating moderating variables such as level of digital literacy, family influence, and exposure to

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