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# Demand and satisfaction analysis of short health videos among Chinese urban youth: A mixed-methods study based on the KANO model

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Short videos have become a powerful medium in health communication. This study explores the information needs and satisfaction of Chinese urban youth regarding short health videos, guided by the KANO model. The research was conducted in four stages: text mining, online survey, demand analysis, and emotional strategy analysis. During the text mining stage, we used GooSeeker software to extract 26,108 health-tagged short video entries from Douyin and identified 21 unique themes through a collinear network analysis. In the online survey stage, we gathered data on urban youth's preferences for these themes. Using the KANO model and *Better-Worse* analysis in the demand analysis stage, we categorized health video demands and gained insights into the preferred content. In the emotional strategy analysis stage, we examined how different emotional strategies like appeals to fear and hope influenced content effectiveness. Findings show that content related to health science, tea drinking, popular news, and food safety significantly enhances satisfaction. Conversely, information on refuting rumors, epidemic prevention, and control, as well as authoritative views, tends to lower satisfaction, possibly due to a trust crisis caused by a mismatch between demand and supply. This study suggests that content creators can boost engagement and satisfaction by focusing on preferred themes. It also highlights the varying impacts of information sources and emotional strategies on the health video preferences of Chinese urban youth. The insights from this research provide a foundation for user-centric content creation and platform development in health communication.

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## Introduction

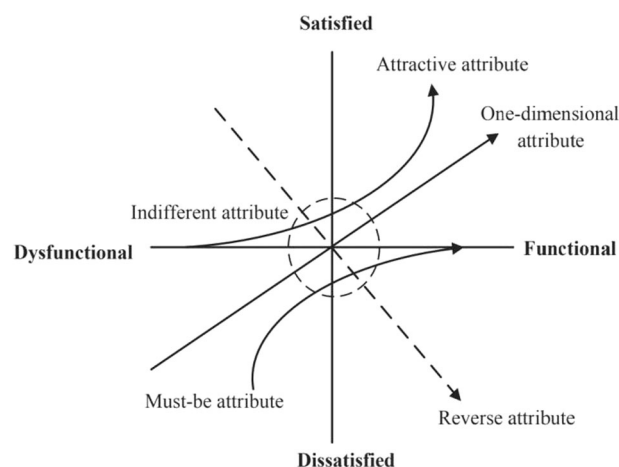
As media technologies continue to evolve, short videos have gained immense popularity, especially among young audiences, for their concise, engaging, and dynamic content (Wu et al. 2021). Unlike traditional, dense medical texts and newspapers, short health videos offer an accessible and entertaining form of communication (Cuesta-Valino et al. 2022). These videos play a crucial role in disease prevention, health promotion, and managing public health crises. For example, TikTok, a leading global short video platform, effectively disseminates critical public health messages to diverse populations, enhancing health knowledge, and mental well-being, and promoting healthy lifestyle choices (Basch et al. 2021; Yang et al. 2021). Furthermore, short health videos have proven effective in improving living or eating habits (Liang and Pang, 2022), boosting physical and mental health among older adults (Basch et al. 2021), and in vaccine promotion among young people (Gao et al. 2022).

Over the past decade, the exponential growth of short video platforms has captured significant academic interest. Research has primarily focused on the information quality and credibility of health-related content (K. Chen et al. 2022; Enver et al. 2020; Li et al. 2020), factors influencing the perceived usefulness of short health videos (Campbell and Rudan, 2020), viewing behaviors of specific videos by different demographics (Rosenthal et al. 2021), and content analyses focusing on communication characteristics and strategies (Han et al. 2022; Wu et al. 2022; Yurdaisik, 2020). However, the specific health information needs within the short video context remain underexplored. Among the limited published literature, studies have been constrained to health needs of specific groups such as patients with neurodevelopmental disorders or cancer (Eklund et al. 2018; Lehmann et al. 2022), pregnant adolescents (Owusu-Addo et al. 2016), commercially sexually exploited young women (Barnert et al. 2019), young parents caring for infants (Hong and Zhao, 2020), and young people in prison (Lennox, 2014). Moreover, these topics are predominantly focused on situations in Western countries (Ou et al. 2017).

However, with the rapid modernization of society, Chinese urban youth are navigating increasingly stressful lifestyles due to rapid urbanization, competitive job markets, and educational pressures. This has led to a surge in lifestyle-related diseases, mental health disorders, and poor physical fitness among this demographic. The health concerns of Chinese urban youth have thus gained significant importance. Recently, short videos have become increasingly popular among young people in China, with Douyin (the Chinese version of TikTok) leading as the premier short video platform (Zhu et al. 2023). As of December 2023, Douyin boasts over 800 million users in Mainland China, with more than 600 million monthly active users (JiemianNews, 2023). TikTok has become a vital channel for contemporary individuals to inquire about and obtain health information (Li et al. 2023; Xiong et al. 2023). Therefore, exploring the potential of such platforms to address these health issues is crucial. In our study, we focus on analyzing the information demand and satisfaction levels of Chinese urban youth regarding short videos.

## Analytical framework: KANO model

In this study, we utilized the KANO model to explore and verify the health short video demands and preferences of Chinese urban youth (Fig. 1). The KANO model, developed by Japanese scholar Noriaki Kano and his colleagues, is a two-dimensional cognitive model that categorizes product quality attributes based on customer satisfaction. This model, which derives from Frederick Herzberg's two-factor theory, identifies five categories of service



**Fig. 1** The KANO model.

attributes: must-be qualities, one-dimensional qualities, attractive qualities, indifferent qualities, and reverse qualities. Must-be qualities are essential features that, if absent, cause dissatisfaction but do not enhance satisfaction when present. One-dimensional qualities affect satisfaction directly and proportionally, attractive qualities significantly boost satisfaction if included, indifferent qualities impact satisfaction minimally, and reverse qualities decrease satisfaction when present (Ku and Shang, 2020).

The KANO model has been applied across various studies to assess patient demands in healthcare settings, including medical institutions serving the general public and older adults, new health facilities, digital medical applications, and daily medical services (Barrios-Ipenza et al. 2021; Mao et al. 2022; Gimpel et al. 2021; Lacerda et al. 2022), as well as to evaluate the impact of gamification elements in health and fitness applications (Yin et al. 2022). Additionally, the model has been used to prioritize quality principles in daily medical practice (Malinka et al. 2022) and to assess the need for health information services in libraries (Meng et al. 2021). Given its effectiveness in analyzing user needs within health communication, we adopted the KANO model to examine the specific health demands of Chinese urban youth regarding short health videos.

Previous research has explored various aspects of health media, revealing preferences for short, free, comprehensible, and visually supported health science videos among Chinese populations (Xiao et al. 2023), and the impact of design elements like progress bars and background music on the viewing experience of short health videos (Xu et al. 2023). However, there is a gap in research specifically addressing which health information topics can best meet the needs of urban youth. Uses and gratifications theory, which posits that individuals actively select media to fulfill their unique needs and motivations (Katz et al. 1973), supports the relevance of the KANO model in this context. The model provides a clear and intuitive understanding of how media content correlates with viewer preferences, particularly important for addressing prevalent health issues among young people in Chinese cities such as obesity, depression, anxiety, and chronic diseases that are increasingly affecting younger populations (Zhu et al. 2019; Duan et al. 2020; Pang et al. 2017; Huang and Zhao, 2020). This study aims to provide a nuanced understanding of health information preferences and needs among urban youth, offering actionable insights for health communicators and digital platform designers to optimize content and delivery strategies. This could enhance the relevance, uptake, and effectiveness of health messages, positively influencing health outcomes for urban youth in China.

Therefore, the research questions for this study are:  
RQ1: What are the specific short health video demands of urban youth in China?  
RQ2: Which themes in short health videos are most likely to satisfy Chinese urban youth?  
In addressing these questions, we will also examine the sources of short health videos and their emotional strategies to provide a more comprehensive answer to our research questions.

Methods

This study was executed in four sequential stages: text mining, online survey, demand analysis, and emotional strategy analysis. In the text mining stage, we combined web scraping, data cleaning, theme clustering, and expert evaluation to identify various theme categories, laying the foundation for subsequent item development. The online survey stage involved distributing surveys to our target population and testing the reliability and validity of our questionnaire. In the demand analysis stage, we applied the KANO model to comprehensively categorize the demands for short health videos. The final stage, emotional strategy analysis, assessed the impact of emotional strategies used in short health videos by analyzing content for emotional cues of fear and hope and their influence on user satisfaction and demand.

**Text mining.** First, on November 30, 2022, we used GooSeeker software to scrape 30,901 short health video entries tagged with “health” from Douyin. After removing irrelevant content and advertisements, 26,108 entries were retained. Using KH Coder software, we processed the dataset by removing particles and prepositions unrelated to our theme, then performed a clustering process to generate collinear networks and theme words. Based on the data size prompts from KH Coder (Gil et al. 2020), we set the minimum frequency for theme words at 80, delineating the first 400 permutations and extracting 371 theme words that met the conditions. These words were clustered into 40 categories, and after removing duplicates and invalid clusters, 22 categories remained (Fig. 2).  
Second, to enhance the accuracy and reliability of our text mining process, we selected three PhD candidates and two professors from the clinical medicine program at Shanghai Jiao Tong University School of Medicine. This program is renowned for its top-ranking status in China (ShanghaiRanking, 2023). These experts were chosen for their profound expertise in the health domain, ensuring an authoritative evaluation of our thematic classifications. Prior to conducting the interviews, we clearly articulated the objectives of our study to the experts and provided a comprehensive introduction to the KANO model to align their assessments with our research goals. Interviews were

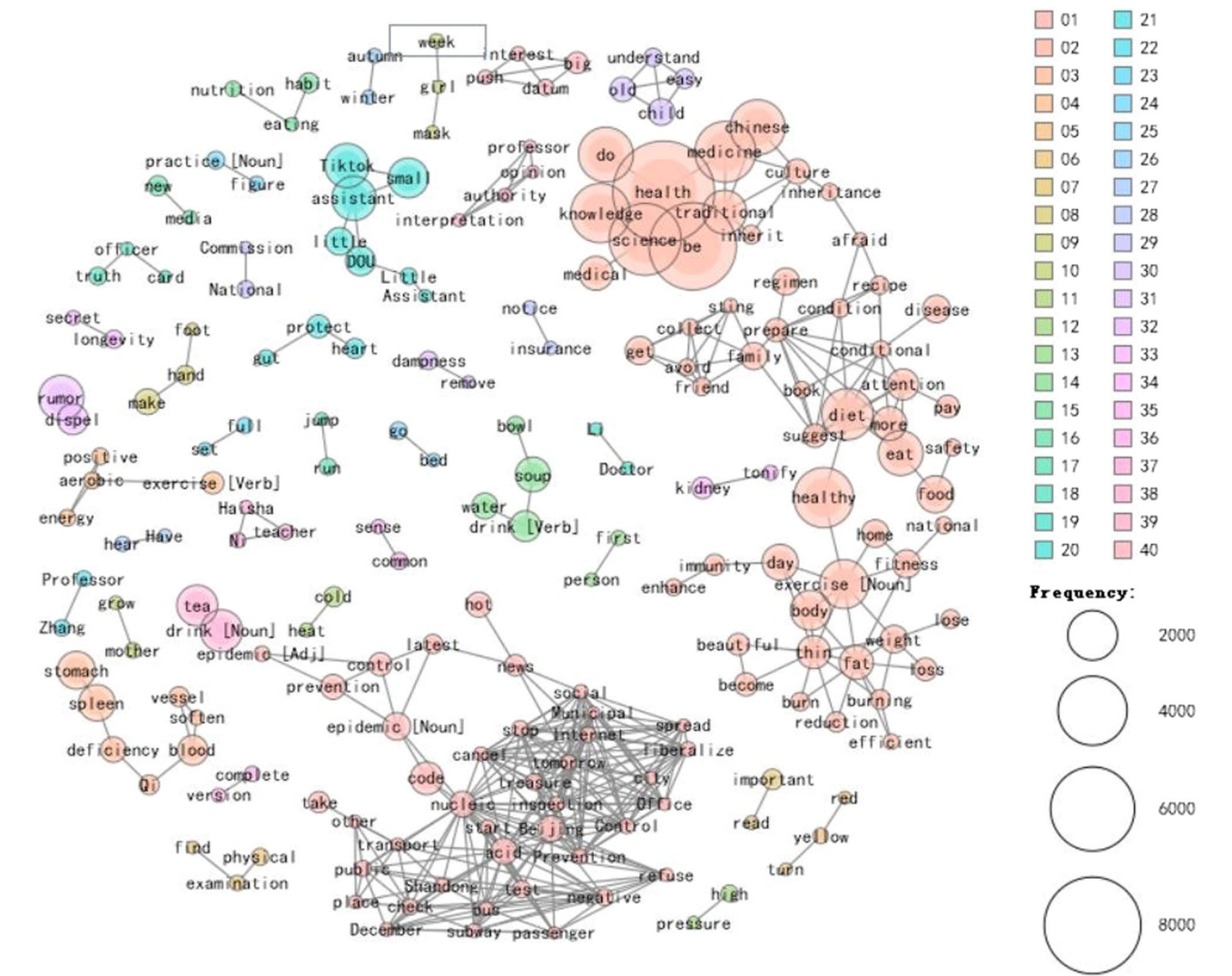


Fig. 2 Collinear network diagram of short health video themes.

Table 1 Short health video themes.		
Number	Short Health Video Theme	Description
1	Health Science Popularization	Videos aiming to make health science accessible and understandable to the general public
2	Exercise and Fitness	Videos providing information and guides about physical exercises and maintaining fitness
3	Lose Weight and Fat	Videos offering advice and strategies for weight loss and fat reduction
4	Family Dietotherapy	Videos about therapeutic diets suitable for family members with different health conditions
5	Drink Tea	Videos discussing the health benefits and proper preparation of various types of tea
6	Dispel Dampness	Videos explaining traditional Chinese medicine concepts for balancing body's humidity levels
7	Sleep Well	Videos providing tips for improving sleep quality
8	Traditional Chinese Medicine Culture	Videos sharing insights about the history, philosophy, and practice of traditional Chinese medicine
9	Secrets of Longevity	Videos revealing factors that may contribute to a long, healthy life
10	Cancer Knowledge	Videos educating about different types of cancer, their prevention, symptoms, and treatments
11	Replenish Qi and Blood	Videos providing information about traditional Chinese medicine methods to replenish life energy (Qi) and blood
12	Invigorate the Spleen and Stomach	Videos on dietary and lifestyle habits to strengthen the digestive system, based on traditional Chinese medicine
13	Tonifying Kidneys	Videos offering advice on enhancing kidney health based on traditional Chinese medicine
14	Soften Blood Vessels	Videos explaining strategies to maintain healthy blood vessels and prevent arterial hardening
15	Protect the Heart	Videos providing advice on maintaining cardiovascular health
16	Intestinal Protection	Videos discussing ways to support and protect intestinal health
17	Refute a Rumor	Videos debunking common health myths and misinformation
18	Epidemic Prevention and Control	Videos providing information on preventing and controlling infectious diseases
19	Popular News	Videos covering current health-related news and events
20	Authoritative Views	Videos featuring health advice and insights from recognized experts
21	Food Safety	Videos providing information on food handling, storage, and cooking practices to prevent foodborne illnesses

Table 2 Kano evaluation table.					
Functional form	Dysfunctional form				
	Like it	Must-be	Neutral	Live-with	Dislike
Like it	Q	A	A	A	O
Must-be	R	I	I	I	M
Neutral	R	I	I	I	M
Live-with	R	I	I	I	M
Dislike	R	R	R	R	Q

conducted online independently, respecting pandemic-related constraints. To mitigate potential biases, we employed structured interview protocols and encouraged open-ended responses to ensure that the experts could express their views without leading questions. During these discussions, it was collectively decided to exclude “medical information” as a category due to its overly broad nature, which encompassed more specific themes like cancer knowledge and traditional Chinese medicine practices. This refinement led to the establishment of 21 well-defined categories (Table 1), enhancing the clarity and parallelism of our thematic analysis.

Additionally, the Douyin platform distinguishes between different types of information publishers. Accounts that upload credentials and receive verification are categorized as party and government agencies, national media, local media, and professional self-media, among others. Party and government agencies (PGA) mainly include national and local government bodies, national media (NM) refers to accounts of national-level television stations, news agencies, newspapers, etc., and local media (LM) includes those of provincial-level and below, like local TV stations and newspapers. In this study, professional self-media (PSM) encompasses doctors and health science popularization accounts. All unverified accounts are classified as other self-media (OSM). We used the GooSeeker software to scrape health short video source tags and employed KH Coder’s automated frequency counting feature to statistically analyze

the publishers. Among the 26,108 pieces of short health video data, there were 7820 publishers. Of these, party and government agencies comprised 122, accounting for 1.56%. National media included 98, accounting for 1.25%. Local media had 564, representing 7.21%. There were 1982 professional self-media accounts, accounting for 25.35%, and 5054 other self-media accounts, making up 64.63%. Subsequently, using Python’s Pandas library, we automatically tagged each of the 26,108 health short videos with thematic classification labels and calculated the primary sources of the 21 categories of short health videos. For reposted videos, we counted the source of publication based on the original publisher.

**Online survey.** Utilizing the 21 themes identified from the text mining stage, we developed an online questionnaire based on the KANO model. We employed both forward and reverse questioning techniques for each theme category. Forward questions were phrased as, “If you are provided with this theme in short health videos, you will feel...”, while reverse questions were, “If you are not provided with this theme in short health videos, you will feel...”. These questions aimed to measure the “functional form” and “dysfunctional form” of responses, respectively, using a five-point Likert scale (1 = dislike, 2 = live with, 3 = neutral, 4 = must be, 5 = like it). The analysis of the survey responses resulted in 25 distinct outcomes, which are comprehensively classified in Table 2, known as the Kano evaluation table.

The target demographic of our survey comprised Chinese urban youth, specifically defined as individuals aged 18 to 34 years, according to the National Bureau of Statistics of China. To accurately reflect the demands for short health videos among this group, we engaged Wenjuanxing, China’s largest survey agency, to perform proportional stratified sampling across the 31 provinces, municipalities, and autonomous regions of Mainland China. This approach helped minimize potential sampling biases. In December 2022, the Wenjuanxing platform was used to distribute the questionnaires. Wenjuanxing is the largest and most widely used online survey platform in China, renowned for its authority and rigor. Previous studies have confirmed the robustness of its sample



Table 3 Participant characteristics (N = 2371).			
Variable	Category	Frequency	Percentage
Gender	Male	1253	52.85%
	Female	1118	47.15%
Age	18–22 years	620	26.15%
	23–26 years	601	25.35%
	27–30 years	566	23.87%
	31–34 years	584	24.63%
	Han ethnicity	1888	79.63%
Nationality	Ethnic minority	483	20.37%
Educational background	Junior high school or below	141	5.95%
	Senior high school or technical secondary school	671	28.30%
	Bachelor's degree or undergraduate	1079	45.51%
	Postgraduate education or some postgraduate	480	20.24%
Religion	Yes	1740	73.39%
	No	631	26.61%
Marital status	Married	989	41.71%
	Single	1290	54.41%
	divorced	89	3.75%
	widowed	3	0.13%
Residence	East	1663	70.14%
	West	708	29.86%

pool (Li et al. 2021; Ning et al. 2020), and the broad and representative sample distribution in our research further validates this point. The sampling from each province was proportional to the urban youth population in that region relative to the total urban youth population of Mainland China, based on data from the seventh national population census (NBS, 2021). The study was approved by the Institutional Review Board at the authors' institution (code B20223281). To validate respondents, an initial screening question regarding age and experience with short health videos was posed. Only those who were 18–34 years old and had watched short health videos were allowed to proceed. To maximize response rates, participants were incentivized with a 2 yuan RMB reward. Of the 2800 responses received, 2371 were considered valid for data analysis after filtering out responses with missing or inconsistent answers. The demographic characteristics of the respondents are detailed in Table 3.

Before performing the demand analysis based on the KANO model, we assessed the reliability and validity of the questionnaire using SPSS 25.0. The Cronbach's alpha values for the forward questions and reverse questions were 0.802 and 0.817, respectively. Both values exceeded the threshold of 0.7, indicating that the questionnaire has high reliability (JM, 1997). Additionally, the KMO (Kaiser-Meyer-Olkin) value for the forward questions was 0.820, and the significance of Bartlett's test of sphericity was  $p < 0.001$ , indicating that the data is suitable for factor analysis. Similarly, the KMO value of the reverse questions was 0.845, and the  $p$ -value was also less than 0.001, further affirming the appropriateness of performing factor analysis. The results of factor analysis further demonstrated that the scales are well-validated, showing good construct validity. (Jackson, 1993).

**Demand analysis.** After gathering data from the online survey, we proceeded with a demand analysis using the KANO model. During this phase, we classified health video demands into attributes as defined in the KANO model: must-be, one-dimensional, attractive, indifferent, and reverse. We adhered to the

division rules of the KANO model, assigning elements to categories based on the maximum frequency of responses (Lo, 2021).

In instances where no dominant category emerged, the attribute was classified as mixed. To refine the traditional KANO model classification, we introduced two metrics: Total Strength (TS), reflecting user satisfaction with specific content, and Category Strength (CS), indicating user recognition of a required attribute for the content. These metrics help determine mixed-type demands, defined by conditions  $TS \geq 60\%$  and  $CS \leq 6\%$  (Lee, 1997).

Furthermore, to capture the specific preferences of Chinese urban youth, we utilized the *Better–Worse* four-quadrant index for demand satisfaction analysis (Chen and Kuo, 2011). The *Better* value measures how much satisfaction among Chinese urban youth improves when a theme is included in short health videos. A value closer to 1 indicates a significant improvement in satisfaction. Conversely, the *Worse* value measures the decrease in demand satisfaction when a theme is absent, with values approaching 1 indicating a substantial decrease in satisfaction.

For detailed calculations of these values, please refer to Eqs. 3 and 4 in the Appendix. Equation 3 calculates the *Better* value, representing the enhancement in user satisfaction when a feature is present. Eq. 4 calculates the “Worse” value, reflecting the reduction in satisfaction when a feature is absent, thereby highlighting the feature's critical role in overall satisfaction.

**Emotional strategy analysis.** To further analyze user demands and satisfaction, we expanded the KANO model from the perspective of information sources. This involved analyzing the emotional strategies adopted by these sources in health short videos, thereby delving deeper into the underlying mechanisms of user satisfaction. Specifically, previous research on health information dissemination often focused on the effects of fear- and hope-driven messages, as seen in various studies (Chua and Banerjee, 2015, 2018). Integrating the KANO model, we assessed the impact of health short videos that appeal to fear and hope on user needs and satisfaction. We utilized the emotional lexicon ontology developed by the Dalian University of Technology to identify vocabulary associated with fear and hope. Using Python, we analyzed the content of health short videos from various sources gathered via GooSeeker. By comparing the frequency of fear- and hope-related emotional words, we discerned the emotional strategies of different sources, such as party and government agencies, national media, local media, professional self-media, and other self-media, in their health short video content.

Results

**Sources of various health short video themes.** Table 4 presents the proportions of the top three publishing sources for 21 categories of health short video themes. In health video themes closely related to daily life, other self-media dominate in terms of publication volume, with professional self-media and local media also showing considerable interest. For instance, in health science popularization, OSM accounts for 65.8%, PSM for 20.6%, and LM for 9.5%; Exercise and fitness features OSM at 73.3%, PSM at 15.9%, and LM at 7.7%; Lose weight and fat shows OSM at 82.1%, PSM at 13.2%, and LM at 2.9%. However, in more specialized health fields, professional self-media become the predominant publisher. For example, in cancer knowledge, PSM accounts for 69.5%, OSM for 19.8%, and LM for 6.1%; Replenish Qi and blood see PSM at 72.4%, OSM at 22.7%, and LM at 4.4%; Invigorate the spleen and stomach is led by PSM at 73.5%, OSM at 16.2%, and LM at 8.8%. When it comes to major national events aimed at stabilizing public sentiment, national media and party and government agencies, though less in number in the health short video

Table 4 The primary sources of various short health videos.		
Number	Short Health Video Theme	Primary Sources (Top3)
1	Health Science Popularization	OSM(65.8%), PSM(20.6%), LM(9.5%)
2	Exercise and Fitness	OSM(73.3%), PSM(15.9%), LM(7.7%)
3	Lose Weight and Fat	OSM(82.1%), PSM(13.2%), LM(2.9%)
4	Family Dietotherapy	PSM(44.6%), OSM(38.0%), NM(10.5%)
5	Drink Tea	OSM(60.8%), PSM(35.6%), LM(2.1%)
6	Dispel Dampness	PSM(75.7%), OSM(19.3%), LM(4.4%)
7	Sleep Well	OSM(65.4%), PSM(23.4%), LM(6.6%)
8	Traditional Chinese Medicine Culture	OSM(62.3%), PSM(29.3%), LM(6.4%)
9	Secrets of Longevity	OSM(94.3%), PSM(4.6%), LM(1.0%)
10	Cancer Knowledge	PSM(69.5%), OSM(19.8%), LM(6.1%)
11	Replenish Qi and Blood	PSM(72.4%), OSM(22.7%), LM(4.4%)
12	Invigorate the Spleen and Stomach	PSM(73.5%), OSM(16.2%), LM(8.8%)
13	Tonifying Kidneys	PSM(78.1%), OSM(15.8%), LM(4.9%)
14	Soften Blood Vessels	PSM(81.8%), OSM(14.6%), LM(3.0%)
15	Protect the Heart	PSM(59.8%), OSM(25.2%), LM(9.1%)
16	Intestinal Protection	PSM(70.9%), OSM(18.6%), LM(6.5%)
17	Refute a Rumor	NM(80.8%), PGA(10.6%), PSM(7.5%)
18	Epidemic Prevention and Control	NM(55.4%), PGA(31.2%), LM(13.3%)
19	Popular News	OSM(57.1%), LM(29.6%), NM(10.5%)
20	Authoritative Views	NM(68.8%), PGA(17.9%), PSM(11.2%)
21	Food Safety	OSM(61.7%), PSM(20.9%), LM(8.4%)
PGA Party and government agencies, NM National media, LM Local media, PSM Professional self-media, OSM Other self-media.		

Table 5 Survey results.										
Number	Category totals						Traditional KANO category	TS	CS	Improved KANO category
	A	O	M	I	R	Q				
1	704	389	1001	158	88	31	M	0.88	0.13	M
2	557	243	1330	101	110	30	M	0.90	0.33	M
3	224	560	1295	134	143	15	M	0.88	0.31	M
4	985	338	351	569	101	27	A	0.71	0.18	A
5	890	678	282	406	75	40	A	0.78	0.09	A
6	451	329	341	1099	125	26	I	0.47	0.27	I
7	690	233	1225	104	98	21	M	0.91	0.23	M
8	988	676	218	355	106	28	A	0.79	0.13	A
9	209	251	188	1554	132	37	I	0.27	0.55	I
10	450	195	233	1380	89	24	I	0.37	0.39	I
11	425	322	384	1119	90	31	I	0.48	0.29	I
12	908	331	249	766	100	17	A	0.63	0.06	A + I
13	309	178	130	1580	144	30	I	0.26	0.54	I
14	297	105	112	1754	79	24	I	0.22	0.61	I
15	686	215	209	1175	57	29	I	0.47	0.21	I
16	806	481	208	783	60	33	A	0.63	0.01	A + I
17	132	309	487	570	860	13	R	0.39	0.12	R
18	68	225	311	408	1339	20	R	0.25	0.39	R
19	259	796	959	109	230	18	M	0.85	0.07	M
20	367	218	361	606	788	31	R	0.40	0.08	R
21	695	760	455	238	201	22	O	0.81	0.03	O + A

information sources, dominate the publication of such videos. For instance, in refute a rumor, NM represents 80.8%, PGA 10.6%, and PSM 7.5%; in epidemic prevention and control, NM stands at 55.4%, PGA at 31.2%, and LM at 13.3%; in authoritative views, NM accounts for 68.8%, PGA for 17.9%, and PSM for 11.2%.

**Demand analysis of short health videos for Chinese urban youth.** As shown in Table 5, the values in columns A, O, M, I, R, and Q indicate attractive attributes, one-dimensional (excitement-type) attributes, must-be attributes, indifferent attributes, reverse attributes, and questionable frequency of answers, respectively. According to the division rules of the KANO model, the class with the maximum frequency is the class

to which an element belongs (Lo, 2021). In this analysis, five attractive attributes (A) were identified: family dietotherapy, drinking tea, traditional Chinese medicine culture, invigorating the spleen and stomach, and intestinal protection. Food safety served as the only one-dimensional (excitement-type) attribute (O), and there were five must-be attributes (M): health science popularization, exercise and fitness, lose weight and fat, sleep well, and popular news. Seven indifferent attributes (I) were noted: dispel dampness, secrets of longevity, cancer knowledge, replenish Qi and blood, tonify kidneys, soften blood vessels, protect the heart, and intestinal protection. There were three reverse attributes (R)—refute a rumor, epidemic prevention and control, and authoritative views - and no questionable answers.

**Table 6 Better-Worse Index.**

Number	Short health video theme	Better	Worse
1	Health science popularization	0.49	−0.62
2	Exercise and fitness	0.36	−0.71
3	Lose weight and fat	0.35	−0.84
4	Family dietotherapy	0.59	−0.31
5	Drink tea	0.70	−0.43
6	Dispel dampness	0.35	−0.30
7	Sleep well	0.41	−0.65
8	Traditional Chinese medicine culture	0.74	−0.40
9	Secrets of longevity	0.21	−0.20
10	Cancer knowledge	0.29	−0.19
11	Replenish Qi and blood	0.33	−0.31
12	Invigorate the spleen and stomach	0.55	−0.26
13	Tonifying kidneys	0.22	−0.14
14	Soften blood vessels	0.18	−0.10
15	Protect the heart	0.39	−0.19
16	Intestinal protection	0.56	−0.30
19	Popular news	0.50	−0.83
21	Food safety	0.68	−0.57

Guided by the KANO model, the more the reverse attributes (17. refute a rumor, 18. epidemic prevention and control, 20. authoritative views) are provided, the more they lead to user dissatisfaction. Therefore, reverse attributes are classified as items not to be provided, eliminating the need for Better-Worse analysis.

Different from the traditional KANO category analysis, the improved KANO category analysis reveals changes in some users' demands. As shown in Table 5, invigorating the spleen and stomach and intestinal protection shifted from being classified solely as attractive attributes (A) to a mixed demand encompassing both attractive attributes (A) and indifferent attributes (I). This shows that, for Chinese urban youth, these two types of short health video theme demands may not always be attractive to them and, in some cases, may hold little significance. Furthermore, food safety transformed from a one-dimensional (excitement-type) attribute (O) to a mixed demand comprising both one-dimensional (O) and attractive attributes (A). This indicates that the short health videos on a food safety theme not only generate excitement among Chinese urban youth but also capture their interest.

**Analysis of the Demand Satisfaction Index.** Prior to conducting the Better-Worse analysis, we excluded three reverse attributes—refute a rumor, epidemic prevention and control, and authoritative views—from the study. These themes were identified as reverse demands, indicating that increased provision of these health short video themes correlates with decreased user satisfaction. Consequently, these themes were categorized as topics that should not be provided, thus eliminating the need for further satisfaction analysis.

We then calculated the Better and Worse values for various short health video themes using the data from Table 5, employing the specified formulae (see appendix). The resulting Better-Worse index is presented in Table 6. We used the absolute values of Better and Worse to establish horizontal and vertical coordinates, setting the average Better value (0.44) and the absolute Worse value (0.41) derived from the 18 video themes as benchmarks to partition the coordinates into four quadrants, illustrated in Fig. 3.

The first quadrant of the Better-Worse matrix is characterized by high Better values and high absolute values of Worse. Themes falling within this quadrant significantly improve satisfaction among Chinese urban youth when provided, and their absence

results in a noticeable decrease in demand satisfaction. The second quadrant features themes with low Better values and high absolute values of Worse; here, the provision of a theme does not significantly enhance satisfaction, but its absence leads to a notable decrease. The third quadrant, characterized by low Better and low absolute values of Worse, indicates that both the provision and absence of a theme from this quadrant have minimal impact on satisfaction. Conversely, the fourth quadrant includes themes with high Better values and low absolute values of Worse, where provision significantly boosts satisfaction, though their absence does not markedly reduce it.

According to our findings, the prioritization of short health video content should be as follows: themes from the first quadrant are of the utmost importance, followed by those in the second and fourth quadrants. Themes in the third quadrant should be given the lowest priority. Notably, themes in the first quadrant, such as health science popularization, drinking tea, popular news, and food safety, significantly impact satisfaction levels and are crucial in meeting the demands of Chinese urban youth. Themes in the second and fourth quadrants, such as exercise and fitness, losing weight and fat, family dietotherapy, sleeping well, and traditional Chinese medicine culture, among others, also strongly influence satisfaction, especially when provided. Conversely, themes from the third quadrant, including dispelling dampness, secrets of longevity, cancer knowledge, replenishing Qi and blood, tonifying kidneys, softening blood vessels, and protecting the heart, do not significantly impact satisfaction, suggesting a relative indifference among Chinese urban youth towards these themes. This indicates that providing such content through short health videos may not be a priority.

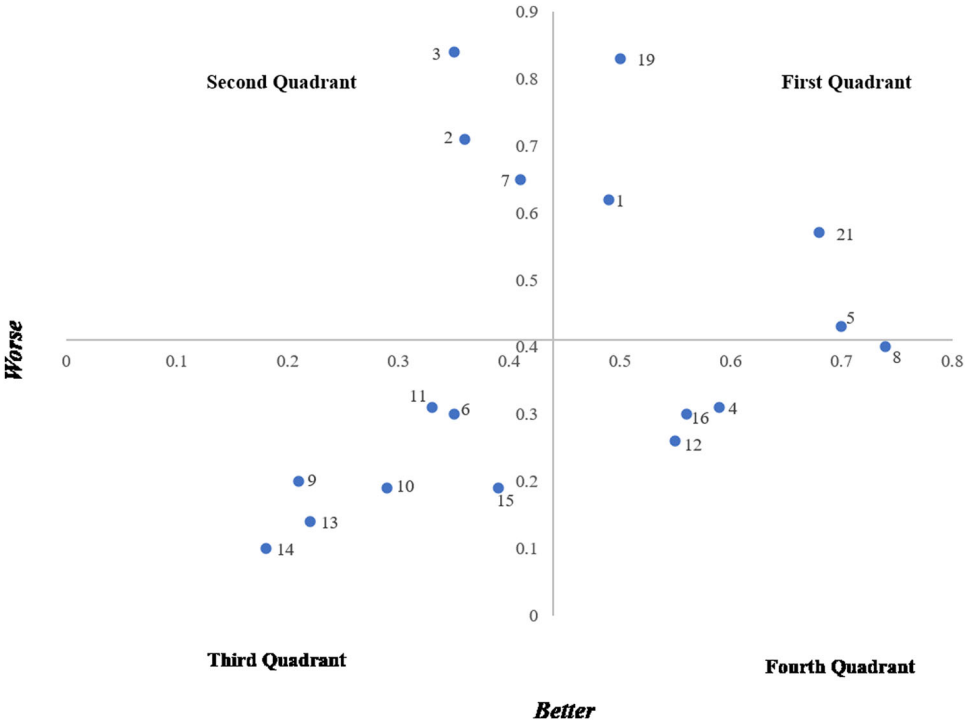
**Emotional strategies in different sources of short health videos.**

Our emotional strategy analysis revealed distinct patterns in the approach to health communication adopted by different sources of short health videos. The results, as depicted in the Fig. 4, indicate that PGA and NM predominantly employ an appeal-to-hope strategy in their health short video content. This approach is characterized by a positive tone and focuses on the beneficial outcomes of health behaviors, aiming to inspire and motivate the audience towards better health practices. On the other hand, OSM primarily adopts an appeal-to-fear strategy. This strategy emphasizes the negative consequences of unhealthy behaviors or health risks, seeking to provoke a change in the audience's behavior through concern or fear of adverse outcomes. LM and PSM demonstrate a more neutral emotional strategy. Their content tends to balance between positive and negative messaging or may focus on delivering factual health information without a strong emotional appeal to fear or hope.

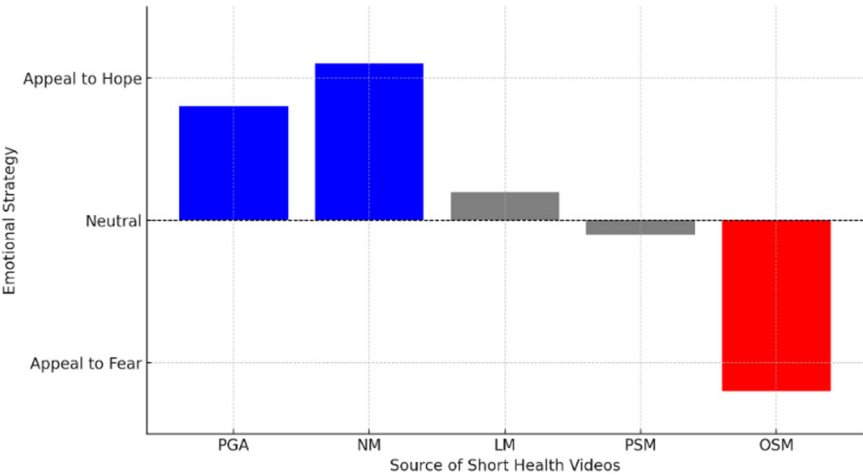
**Discussion**

In an era dominated by digital content consumption, our study leverages the KANO model to closely examine the health information preferences and needs of Chinese urban youth, specifically within the context of short health videos. By identifying the key themes and elements that resonate with this demographic, our research outlines a detailed taxonomy of health video demands, shedding light on the complex nature of short health video consumption among urban youth.

The findings from our survey, as detailed in Table 5, categorize three topics as “reverse qualities,” indicating themes that should be avoided as they lead to decreased satisfaction when provided more frequently. Conversely, four themes in the first quadrant are identified as “must-be qualities,” which are essential for satisfying this audience. Seven themes spread across the second and fourth quadrants are recognized as “attractive qualities,” showing



**Fig. 3 Better-Worse four-quadrant analysis matrix.** Notes. Guided by the KANO model, the more the reverse attributes (17. refute a rumor, 18. epidemic prevention and control, 20. authoritative views) are provided, the more they lead to user dissatisfaction. Therefore, reverse attributes are classified as items not to be provided, eliminating the need for *Better-Worse* analysis.



**Fig. 4 Emotional Strategies in Different Sources of Short Health Videos.** PGA Party and government agencies, NM National media, LM Local media, PSM Professional self-media, OSM Other self-media.

significant potential to enhance satisfaction when included. Meanwhile, seven themes in the third quadrant are deemed “indifferent qualities,” reflecting a neutral impact on viewer satisfaction.

**Reverse qualities.** As delineated in Table 5, our study categorizes themes such as refuting rumors, epidemic prevention and control, and authoritative views as “reverse qualities.” This classification reveals that an increased focus on these themes in short health videos is inversely related to user satisfaction. This counter-intuitive finding necessitates an exploration of the underlying factors through the lens of media trust theory.

Media trust refers to the belief in the media’s capacity to accurately portray events (Basch et al. 2021). Chaffee et al. (1991)

broadened this definition to include trust in the entire media ecosystem, not just isolated segments. The COVID-19 outbreak severely tested China’s disease prevention and risk communication systems, established in response to past crises like SARS, highlighting the critical need for reliable health information (Geurts et al. 2023; Schaefer et al. 2017). Since the 2003 SARS crisis, the media landscape has transformed dramatically with the widespread adoption of mobile and social media, diversification of information sources, and a rise in user-generated content (Raj and Meel, 2022). These transformations have led to fragmentation and an often overwhelming proliferation of health information, which has, in turn, sometimes resulted in the spread of misinformation (Chin et al. 2022). During major national events, which are key moments for stabilizing public sentiment, national



media (NM) and party and government agencies (PGA) predominantly publish short health videos. However, these themes have faced a credibility crisis on short video platforms, attributed to several factors. Firstly, the excessive availability of health-related content during crises can lead to information fatigue, reducing viewer satisfaction (Guan et al. 2023). Secondly, the presence of misleading or incorrect information under these themes can significantly damage their perceived trustworthiness, causing users to question the authenticity of the content (Peng et al. 2022). Additionally, NM and PGA's frequent use of an "appeal-to-hope" emotional strategy during health crises can generate cognitive dissonance among Chinese urban youth, especially when such optimistic messaging clashes with their personal experiences, potentially fostering dissatisfaction and resentment (Chen et al. 2021).

This analysis, underpinned by media trust theory, suggests that a discrepancy between the hopeful communications issued by health authorities and the actual experiences of the audience during public health emergencies can precipitate a trust crisis. This misalignment may compel the audience to seek alternative, more reliable health information sources, emphasizing the critical need for accurate and trustworthy health communication strategies. In the current era, marked by rapid digital media evolution and an ever-increasing flow of information, the implications of such a trust crisis are even more significant. As audiences become more adept at accessing diverse information channels, their tolerance for discrepancies in official communications diminishes. This dynamic environment requires health communicators to not only provide timely and accurate information but also to consistently maintain transparency and address misinformation promptly. Enhancing media trust in this way becomes crucial, as it directly influences public compliance with health advisories and intervention measures. Consequently, public health organizations must adapt their communication strategies to be more responsive and engaging, ensuring that they are viewed as reliable sources amidst a plethora of available information. This strategic shift is essential to manage public sentiment effectively and foster a cooperative attitude towards health measures, particularly in times of crisis.

**Must-be qualities.** In the context of service or product offerings, "must-be qualities" represent fundamental attributes that customers expect as standard. They're the inherent features that customers take for granted. If these qualities are not met, they could lead to significant dissatisfaction among users. In this study, we identified four main themes in the realm of short health videos that urban Chinese youth consider "must-be qualities": the popularization of health science, tea drinking, popular news, and food safety.

Why do these themes hold such importance? A deeper exploration of the cultural habits and lifestyle needs of urban Chinese youth provides us with the answer. Tea drinking, for instance, is more than just a casual habit; it's a significant component of traditional Chinese culture. The act of tea drinking extends beyond being a mere dietary routine; it encapsulates a way of life and a means of cultural expression (Pan et al. 2022). It's intertwined with the daily life of Chinese people, hence explaining its categorization as a "must-be quality".

Similarly, food safety is an essential concern for urban youth. Food safety, a pivotal concern for urban youth in China. It is deeply rooted in the broader context of national crises that threaten the physical and psychological well-being of Chinese citizens. The year 2022 witnessed numerous food safety scandals, reinforcing the urgency and importance of this issue. High-profile cases, such as the use of clenbuterol in sheep meat in Qing

County, Hebei Province, and hygiene issues in well-known restaurant chains like Xiaolongkan Hot Pot and Nayuki's Tea, have intensified public awareness and concern. These incidents highlight the critical need for vigilance and regulation in the food industry. Similarly, the detection of contaminants in Anutric's infant formula points to the vulnerabilities in even the most sensitive food products (CharmingPingyuan, 2023). These events not only draw attention to the specific incidents but also reflect a larger systemic problem within China's food safety ecosystem. For urban youth, these incidents are not mere news stories; they represent a direct threat to their health and well-being (Qin et al. 2022). Therefore, short health videos focusing on food safety are indispensable for Chinese urban youth. The extensive reporting and discussions surrounding these food safety failures have elevated health awareness among this demographic, leading them to seek greater transparency and assurance of safety in their dietary choices.

Popular news and health science popularization are also key themes for this demographic. With the high-pressure lifestyle of urban living, staying updated with current events becomes necessary, and health knowledge is equally crucial for maintaining a healthy lifestyle. These topics cater to both the emotional need for connectivity and the practical need for health consciousness among urban youth (Kaplan-Rakowski, 2021).

These four themes, therefore, reside in the first quadrant, indicating high demand and high satisfaction potential. In today's rapidly evolving digital and health landscape, the emphasis on themes such as health science popularization, tea drinking, popular news, and food safety in short health videos is crucial. These themes not only meet the high demand and satisfaction potential among Chinese urban youth but also enhance the relevance and trustworthiness of content platforms. By delivering timely health updates, connecting viewers with their cultural roots through traditional practices like tea drinking, engaging them with significant current affairs, and addressing critical issues such as food safety, content providers can significantly boost user satisfaction and loyalty. This strategic focus effectively meets the explicit and implicit expectations of urban youth, making it essential for platforms aiming to thrive in a digital era characterized by quick information dissemination and heightened health consciousness.

Understanding the significance of these must-be qualities in health short videos among Chinese urban youth also involves examining their primary sources. A closer look at the sources for these four key themes reveals that Other Self-Media (OSM) are the predominant publishers. OSM tends to focus on content that is closely related to daily life, which aligns with the nature of these must-be themes: health science popularization, tea drinking, popular news, and food safety. OSM often employs an appeal-to-fear emotional strategy in its content. This approach is effective in capturing audience attention and engagement, as fear can be a powerful motivator. Fear-based messaging tends to resonate more with viewers, drawing their focus towards the issues being discussed. This strategy by OSM is in line with existing literature, which highlights the impact of fear appeals in health communication (Chua and Banerjee, 2015, 2018). The use of such emotional strategies can enhance the relevance and urgency of the content, thereby aligning with the audience's concerns and interests. However, it's important to note the delicate balance required in utilizing fear appeals. While they can be effective in drawing attention, excessive or misdirected fear messaging can lead to anxiety or desensitization among viewers. Therefore, for these must-be qualities to maintain their high demand and satisfaction potential, it is crucial for OSM and other content providers to carefully craft their messages. The goal should be to inform and engage viewers without causing undue distress,

thereby ensuring a positive and constructive impact on their health awareness and behaviors.

**Attractive qualities.** In our study, themes categorized as “attractive qualities” are those that can significantly enhance user satisfaction when provided, though their absence does not necessarily lead to dissatisfaction. For the urban Chinese youth demographic, the themes identified as attractive qualities include exercise and fitness, weight and fat loss, family diet therapy, sleeping well, traditional Chinese medicine culture, invigorating the spleen and stomach, and intestinal protection.

The rationale behind this classification stems from how Chinese urban youth typically engage with short health videos. These users often turn to such content in specific situations, such as during periods of illness or high stress. Under normal circumstances, there may be little active search for content on topics like traditional Chinese medicine or sleep enhancement. However, when health concerns or stress levels rise, the appeal of these themes increases markedly. For example, content on family diet therapy and traditional Chinese medicine culture can provide considerable comfort and support during times of stress or illness. Similarly, information about improving sleep and maintaining regular exercise becomes particularly valuable, given the direct link between these activities and overall well-being.

Thus, these themes are deemed “attractive qualities” because they hold the potential to greatly boost user satisfaction when they are most relevant, but their absence is not typically felt during periods of normalcy. This classification underscores that the demand for these topics is situational rather than constant. For content platforms specializing in short health videos, prioritizing these themes offers a strategic advantage. By tailoring content to include these attractive qualities at moments when they are most likely to resonate—such as during a health scare or a peak stress period—platforms can significantly enhance user engagement and satisfaction. This approach not only meets but anticipates the needs of users, providing them with valuable, situation-specific information that can support their health and wellness precisely when they need it most. Incorporating these themes as dynamic, value-added features could surprise and delight users, substantially enriching their interaction with the platform.

**Indifferent qualities.** In our study, themes classified under “indifferent qualities” are those toward which users typically exhibit a neutral stance, regardless of whether the content is provided or not. These themes include dispelling dampness, secrets of longevity, cancer knowledge, replenishing Qi and blood, tonifying kidneys, softening blood vessels, and protecting the heart.

These themes predominantly focus on specific health conditions and diseases. Their relevance to urban youth tends to depend on personal or immediate social experiences with these conditions. Without such personal connections, these topics often fail to capture attention, garnering minimal interest among this demographic (Pereira, 2020). Moreover, when encountering these health issues for the first time, urban youth are more likely to seek professional medical advice rather than relying on online videos for guidance. This preference is justified given the complexity and highly individualized nature of these health matters, which typically require direct consultation with healthcare professionals for accurate diagnoses and treatment plans (Pugh et al. 2017).

Consequently, for the time being, these video themes may not hold substantial immediate value or appeal for Chinese urban youth. They tend to be overshadowed by more urgent or relatable health topics that align more closely with their daily lives and

immediate health concerns. Nonetheless, the potential significance of these themes should not be dismissed outright. Health awareness and needs evolve over time, and these topics may become more relevant under certain conditions or at different life stages.

**Research contributions and limitations.** Our study offers both theoretical and practical insights. From a theoretical standpoint, firstly, our study underscores an overlooked but significant demographic - Chinese urban youth, a group which has been largely neglected in previous health communication research. Through a detailed investigation of this group under the guidance of the KANO model, we gained nuanced insights into their unique health information needs, contributing to a deeper understanding of their preferences and requirements. Secondly, our research offers empirical evidence from an Eastern context, specifically focusing on China’s urban youth. This non-Western perspective adds valuable diversity to the existing body of knowledge on health communication and digital media use. Thirdly, our study employs a diverse array of mixed research methodologies, including text mining, online surveys, demand analysis, and emotional strategy analysis. Additionally, by extending the KANO model to incorporate dimensions such as information sources and emotional strategies, we make a novel contribution to the field of health communication. This enhanced approach not only addresses a critical gap in the traditional application of the KANO model, which predominantly focuses on user-centric analysis, but also offers a more comprehensive and multidimensional framework for understanding user preferences and satisfaction. Such advancements provide a nuanced lens for examining the dynamics of media influence and content strategy, particularly within digital health platforms, enriching the KANO model’s applicability and fostering a deeper understanding of health communication processes.

From a practical standpoint, our research provides two managerial implications. Firstly, for content creators and health communication practitioners, our findings delineate the unique preferences of Chinese urban youth in the realm of short health videos. We offer clear directions on which health themes to prioritize, which ones to handle delicately, and which ones may be less relevant, thereby assisting in crafting engaging, relevant, and impactful content. Secondly, for short video platform developers, our study provides key insights that could inform the enhancement of platform features and recommendation algorithms. By understanding the diverse and dynamic health information needs of urban Chinese youth, platform developers can fine-tune their algorithms to better match these demands, leading to improved user satisfaction and engagement. Additionally, the identified indifference towards certain health topics can assist in managing the information overload problem, further enhancing the user experience on these platforms. In essence, our research contributes towards building a more user-centric and effective digital health communication ecosystem.

Despite its valuable contributions, this study also faces a few limitations. First, the theme classification method employed is based on high-frequency words derived from clustering, which might not fully capture all potential short health video themes. This approach could overlook less common but still important topics, thus limiting the comprehensiveness of our findings. Secondly, while our research’s focus on urban Chinese youth stands as a unique strength, the sample collected may not sufficiently represent the full diversity within this demographic. This limitation could impact the applicability of our findings across the entire group of urban Chinese youth. Future research could address these issues by incorporating a broader range of

themes and seeking a more diverse sample within the urban Chinese youth demographic. Additionally, extending this study to include other demographic groups and contexts would further enrich our understanding and could validate or augment our findings.

## Conclusion

Utilizing the KANO model, this study explored the preferences for short health video content among Chinese urban youth, a demographic that has been less emphasized in prior research. Our findings illuminate the variety of content themes that resonate with this audience, thereby broadening the theoretical framework of health communication studies. On a practical level, this research offers a strategic roadmap for content creators to develop relevant and engaging short health videos. It also provides essential insights for platform developers to refine algorithms and features specifically tailored to this user group. Ultimately, this study contributes a user-oriented perspective that enriches our understanding of health communication in the digital era, serving as a valuable reference for future investigations.

## Data availability

The original data for this article is included within the main text.

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## Author contributions

Zehang Xie: Research design, thesis writing, data analysis, thesis revision. Wu Li: Research design, thesis revision. Yunxiang Xie: Research design, data collection and analysis. Lingbo Wang: Retrieval of references. All authors contributed to the article and approved the final manuscript.

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## Competing interests

The authors declare no competing interests.

## Ethics approval

The studies involving human participants were reviewed and approved by the Ethics Committee of Shanghai Jiao Tong University (code B20223281).

## Informed consent

All participants provided their written informed consent to participate in this study via an online method before completing the survey.

## Additional information

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