# Motivations and Themes of University Students' Health Information Needs During Public Health Emergencies: Postprint

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## Abstract

[Purpose/Significance] Investigating the motivations and themes underlying university students' health information needs during public health emergencies contributes to the refinement of information needs theory and the optimization of online health information services. [Method/Process] Using the early 2020 public health emergency as the contextual backdrop and self-reported health information needs from university students as the data source, this study employs content analysis, open coding, and association rule mining to examine the distribution, evolution, and interrelationships of information need motivations and themes. [Results/Conclusion] In public health emergencies, personal and social motivations for university students' health information needs are roughly balanced; themes concentrate on epidemic status and trends, disease prevention, etiology/pathology and diagnosis, government actions, and social phenomena, and as the public health emergency evolves, the focal themes exhibit both stability and change; the association between motivations and themes is significant, with social motivations playing a prominent role in driving needs related to epidemic status and trends, social phenomena, and government actions, while personal motivations primarily drive needs for disease prevention, etiology/pathology and diagnosis.

## Full Text

### Motivation and Topic of College Students' Health Information Needs in Public Health Emergencies

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**Abstract**

[**Purpose/Significance**] Exploring the motivations and topics of college students' health information needs during public health emergencies contributes to refining information needs theory and optimizing online health information services. [**Method/Process**] Taking the early 2020 public health emergency as the context and college students' self-reported health information needs as the object, this study combines content analysis, open coding, and association rule methods to analyze the distribution, evolution, and correlation of information need motivations and topics. [**Result/Conclusion**] The study finds that personal and social motivations for college students' health information needs during public health emergencies are roughly equal in proportion. Topics focus on epidemic status and trends, disease prevention, etiology/pathology and diagnosis, government actions, and social phenomena. As the public health emergency evolves, the focal topics remain stable yet shift. Motivations and topics are significantly correlated: social motivations prominently drive needs for epidemic status and trends, social phenomena, and government actions, while personal motivations primarily drive disease prevention, etiology/pathology, and diagnosis.

**Keywords:** public health emergency; motivation of health information needs; topic of health information needs

## 1. Introduction

With continuous medical advancement and improving public health literacy, people have significantly increased their attention to health information and awareness of obtaining it. According to the 2018 *Report on Chinese Netizens' Science Popularization Search Behavior* released by the China Research Institute for Science Popularization [1], health and medical topics are widely concerned by netizens, with health information search becoming a primary component of user information behavior, accounting for as much as 35.63% of searches. Health information needs are considered the starting point of users' health information behavior and the cause of their search behavior [2]. Motivation and topic represent important dimensions in health information needs research [3-4], and understanding user health information needs is a crucial step toward enhancing personalized search experiences.

Meanwhile, the China Internet Network Information Center's March 2020 report on netizen occupational structure shows [5] that students constitute the largest proportion. This makes research on student groups' health information needs essential. Emergencies refer to sudden occurrences that cause or may cause serious social harm and require emergency response measures [6], and public health emergencies have become the fastest-growing science popularization hotspot within health and medical topics [1]. Compared to users' daily health information search behavior, research on user health information search

behavior during public health emergencies has attracted researchers' interest due to its contextual differences [7-8]. Given this, this study collects college students' real-world health information search behavior data during public health emergencies through user experiments to analyze their health information need motivations and topics, thereby supplementing and improving existing information needs theory while providing reference for optimizing health information services.

## 2. Literature Review on Information Needs

Conceptual research on information needs has consistently been a hotspot in information behavior research as it forms the theoretical foundation. R.S. Taylor's [9] information needs hierarchy theory plays a foundational role. N.J. Belkin et al. [10] further proposed the concept of "anomalous state of knowledge" on this basis, explicitly defining information needs as problems users cannot accurately articulate. In recent years, increasing research has begun describing information needs during information retrieval [11] and information interaction [12] processes. Building on R.S. Taylor and N.J. Belkin's research, numerous scholars have analyzed query terms and their reformulations to identify information needs [11-12]. On this foundation, C. Cole [13] and E. Hoenkamp [14] considered both instinctive and conscious types, arguing that search results also belong to information needs. Zhou Xiaoying et al. [15] further studied the concept of information encountering, pointing out that content obtained through serendipitous discovery also constitutes information needs. Therefore, this study defines information needs as information that users expect to search for, meaning information that helps achieve goals or interests.

Information need motivation refers to the cause of information needs, representing the internal drive of information needs [16] and constituting important content in information needs research. Self-determination theory [17] categorizes motivations into intrinsic motivation, extrinsic motivation, and amotivation based on differences in autonomy levels, serving as the foundation for related research. Deng Shengli et al. [3] identified four main types of information need motivations for Q&A community users: curiosity, knowledge gaps, problem-solving, and decision-making. Subsequently, S.A. Paul et al. [18] explored Q&A community users' information need motivations from intrinsic and extrinsic perspectives. Zhu Yuanyue et al. [19] found that intrinsic motivations centered on learning dominated among domestic college students' information needs. S. Majid et al. [20] and A. Ramnah [21] demonstrated that foreign college students' information needs topics were clearly driven by learning-oriented intrinsic motivations. Li Fenglin et al. [22] further explored graduate students' information needs during knowledge internalization, with results showing that intrinsic motivations remained prominent during self-study processes.

Information need topics refer to the content types of information needs, representing the external manifestation of information needs. Topic identification is a prerequisite for information needs topic research, involving extracting use-

ful information from large amounts of user-generated data and summarizing it into topics [4]. Questionnaires, interviews, and log analysis are primary data collection methods, while manual coding and machine learning are important data analysis methods. Some researchers prefer using interviews or questionnaires to obtain data. For example, Zhou Yanmei et al. [23] investigated college students' information need topics under learning tasks using questionnaires. Wang Liangcheng et al. [24] surveyed college students' daily information need topics in network environments using questionnaires and interviews. Other researchers prefer using search logs to obtain large-scale, fine-grained data. For instance, Wu Dan et al. [25] explored college students' daily information need topics in APP interaction contexts by mining search results from mobile phone logs. Cao Shujin et al. [26] found that diabetic patients highly focused on diet and exercise based on diabetes-related questions from Q&A websites. A small number of researchers proposed supplementing log methods with questionnaires or interviews to obtain user information needs data, such as S. Sarkar et al. [27], who combined questionnaire surveys about search obstacles and assistance with log data analysis to comprehensively analyze information need topics. Overall, these methods have respective advantages and disadvantages: questionnaires and interviews can excavate deep-level information but have long time lags; log methods better guarantee data richness and accuracy but remain at the surface level; the questionnaire-log combination effectively improves upon single-method shortcomings but subjects are easily disturbed when obtaining subjective data during the search process.

Health information needs, as the fastest-growing public demand [1], have become a widespread concern among researchers, particularly regarding health information need motivations [28-32] and topics [4,24,26]. Regarding health information need motivations, researchers have found that in health information search contexts, information needs are driven by clear or relatively clear motivations [23-25]. H. Ming et al. [28] summarized motivations from cognitive, action, and emotional perspectives based on information search process models. R. Savolainen [29] explored health information need types among social Q&A community users, finding motivations concentrated on action aspects such as problem-solving and knowledge acquisition. Yuan Hong et al. [30] found that functionality (particularly understanding personal health status) was the main motivation for digital immigrants' health information needs, with health relevance positively affecting motivation intensity. Therefore, researchers have begun exploring health information need motivations from personal relevance perspectives, particularly from motivation autonomy angles, producing a series of research outcomes. For example, Shen Mo et al. [31] found that intrinsic motivations such as self-diagnosis and treatment were primary drivers when exploring college students' health information needs. Further, Yang Xiaoxi et al. [32] found that college students' mental health information needs were significantly triggered by intrinsic factors represented by self-efficacy.

Regarding health information need topics, analyzing information needs from topic and temporal perspectives is a research focus. Numerous scholars have

explored college students' health information need topic concerns based on the Internet and mobile terminals [31,33-35], finding that while topics are diverse, core themes such as healthcare and treatment remain prominent. Li Chongyang et al. [36] and Cao Shujin et al. [26] discussed temporal changes in online Q&A community users' health information need topics from a temporal perspective, finding that health information need topics tend to concentrate over time. It is evident that, on one hand, college students are primary users of network information search, particularly APP interaction search; on the other hand, social Q&A communities have developed rapidly, becoming important channels for meeting health information needs. Therefore, research has focused on college student groups with higher health information literacy or Q&A community users.

Information needs during public emergencies are products of specific contexts. Due to the suddenness, high uncertainty, and social impact of public emergencies, they have different characteristics from information needs in daily contexts. Additionally, research on information needs in emergency contexts has become a hotspot due to its significance for the public, society, and government [7-8,37-38]. For example, Kuang Yue et al. [37] used literature analysis to explore the generation process and topics of victims' information needs. Li Yuelin et al. [7] investigated public information need topics during the COVID-19 pandemic from an information disclosure perspective, finding topics concentrated on epidemic reporting, prevention and control updates, and health science popularization. On this basis, Li Yuelin et al. [38] further revealed characteristics of college students' high and low satisfaction information from a satisfaction perspective. Deng Shengli et al. [39] comparatively analyzed topic differences in health information needs between Baidu Knows and Zhihu users from a platform dimension, finding that health information need topics of users on different social Q&A websites had varying temporal sensitivities. Overall, most existing research has focused on distribution characteristics of information need topics during public health emergencies. However, public emergency lifecycle theory [40] points out that emergencies present different evolutionary patterns over time, making it necessary to explore information need evolution from a lifecycle perspective.

In summary, existing information needs research has primarily focused on motivation and topic identification, with daily contexts as the main research setting, lacking studies on the special yet practically significant context of public health emergencies. Furthermore, existing research has shown that exploring information need motivation and topic evolution from a lifecycle perspective is significant [40]. Therefore, this study uses college students' self-reported health information needs as analysis content to investigate Chinese college students' health information need motivations and topics during the early 2020 public health emergency, exploring their distribution, evolution, and correlation to supplement and improve information needs theory and provide theoretical support for online health information services.

## 3. Research Design

**3.1 Research Questions** Motivation and topic research on information needs constitutes an important dimension of information needs research: motivation reflects the internal drive of information needs, while topics represent the external manifestation. Different motivations drive different information need topics [41]. For example, daily tasks prompt users to generate entertainment-themed information needs, while academic tasks promote learning-oriented information behavior. Furthermore, comprehensively and three-dimensionally understanding information needs can be achieved through in-depth analysis of the distribution, evolution, and correlation of user information need motivations and topics. Therefore, this study takes public health emergencies as the background to explore the distribution and evolution characteristics of health information needs from both motivation and topic dimensions, analyzing the correlation between motivations and topics. The research framework is shown in Figure 1 [Figure 1: see original paper].

Accordingly, this study addresses the following three questions:

(1) What are the characteristics of college students' health information need motivations during public health emergencies? Specifically: What are the health information need motivations? What is the distribution pattern of health information need motivations? What is the evolution pattern of health information need motivations?

(2) What are the characteristics of college students' health information need topics during public health emergencies? Specifically: What are the health information need topics? What is the distribution pattern of health information need topics? What is the evolution pattern of health information need topics?

(3) What is the relationship between college students' health information need motivations and topics during public health emergencies?

**3.2 Data Collection** Mobile experience sampling method has become a new-generation user information behavior research method because it aligns with mobile internet era technology and characteristics and can simultaneously obtain dynamic and contextual behavioral data [25,42-43]. Critical incident technique is an indispensable method for obtaining critical and typical behavioral data [44]. Diary method ensures that subjects record their behaviors, thoughts, and feelings in natural contexts [45-46]. This study comprehensively employs mobile experience sampling, diary method, and critical incident technique to collect college students' health information search experiences during public health emergencies. To ensure timely diary recording, researchers sent messages via WeChat groups at 12:00, 16:00, and 20:00 daily during the experiment to remind subjects to record critical incidents. Therefore, this experiment not only obtains real information search behavior data but also guarantees data criticality and typicality.

During the experiment, once subjects triggered a critical incident, they immediately recorded oral diary responses to two questions: Please describe the cause of this health information need; Please describe the main content obtained from this health information search. This formed raw material for user health information need motivations and topics. To ensure consistency and completeness between the search process and oral diaries, researchers required subjects to first take screenshots of important interfaces during memorable critical health information searches, then complete oral recordings, and finally send both recordings and screenshots to researchers. Subjects' recordings were repeatedly reviewed and transcribed by two relevant professional researchers. The verified transcripts and search process screenshots were compiled into documents, forming a user health information search diary as a subsequent analysis sample. Diary samples were named using the format "Date-Subject ID-Search Time," such as 0207-D10-17:00 representing a health information search diary recorded by Subject 10 at 5:00 PM on February 7. Ultimately, this study obtained 380 diaries throughout the experimental period, with 5 excluded for being unrelated to health information topics, leaving 375 health information search diaries as final samples. Among them, 91.20% of diary samples were recorded by subjects in medium- and high-risk areas, further ensuring data contextualization.

For sampling convenience and subject characteristic consistency, this study recruited 30 current students from the School of Information Management at Central China Normal University and Wuhan University, majoring in information science or related fields. All had received information search training, possessed rich health search experience, and were proficient in search tool usage. The research period was selected as February 7, 2020, to March 10, 2020. A preliminary questionnaire survey of the 30 subjects' demographic characteristics revealed an average age of 23.6 years and education level of undergraduate or above. The 30 subjects were labeled as Di (i=1,2,...30). Subject basic information statistics are shown in Table 1 .

**3.3 Data Analysis** Classification of health information need motivations forms the foundation of this study. Using the foundational motivation research—self-determination theory [17]—as the content analysis framework, this study summarizes health information need motivations during public health emergencies. Protection motivation theory [47] posits that in health domains closely related to individuals, motivations certainly exist, meaning users will definitely search for health information for protective purposes. Therefore, motivations in this study have two types: intrinsic motivation and extrinsic motivation. In public health emergencies, intrinsic motivation manifests as personal motivation, while extrinsic motivation manifests as social motivation. To further integrate theory with reality, this study renames intrinsic motivation as personal motivation and extrinsic motivation as social motivation, ultimately establishing the health information need motivation framework for this study, shown in Table 2 .

This study uses the health information need motivation framework shown in Table 2 and employs content analysis [48] to code users' self-reported questions. Simultaneously, A. Strauss's open coding [49] is used to analyze users' self-reported health information search results, with identified topic results shown in Table 3 . Both content analysis and open coding processes were independently completed by two researchers, followed by comparison and discussion. Cases without consensus were determined by consulting a domain expert. Coding reliability for both researchers exceeded 90%. Notably, during this experiment, users' health information concerns included all epidemic-related information, encompassing both narrowly defined disease-related information and other information that might bring epidemic development changes. Therefore, this paper includes government actions, social phenomena, and public events within the information analysis scope.

The public health emergency lifecycle refers to the entire process from birth to demise of a public health event [50]. Existing research has focused on dividing public emergency lifecycles from perspectives such as event stage manifestations, crisis management, epidemic development scope and degree, and disaster impact and consequences [51-54]. To avoid assigning different lifecycle stages to the same phase, this study uses the main manifestations of each emergency stage as the division criterion, supplemented by news reports of key time nodes. Since this user experiment began on February 7, 2020, the incubation period of the public health emergency (12.1-1.23) and part of the outbreak period (1.23-2.7) were not considered in this study. Ultimately, the public health emergency lifecycle division in this study is shown in Table 4 .

Association rules [55] are commonly used methods to represent implicit correlation relationships within data, with lift being the most classic objective measurement indicator. Lift greater than 1 indicates a positive correlation rule, specifically manifested in this study as health information need motivations driving corresponding topics. Lift less than 1 is called a negative correlation rule, indicating that motivation occurrence reduces topic occurrence probability. This study primarily examines topic promotion by information need motivations within stages, thus focusing on positive correlation rules while ignoring negative correlation rules. Confidence [55] is a commonly used statistic measuring the probability of subsequent events occurring under the condition of antecedent events, typically set at a threshold of 0.1. Confidence in this study represents the topic distribution probability driven by health information need motivations, i.e., the probability of information need topics occurring under the condition of certain information need motivations.

## 4. Experimental Results

**4.1 Distribution Patterns of Health Information Needs** After establishing the analysis framework for health information need motivations during public health emergencies and identifying health information need motivations, this study conducts quantitative analysis to examine distribution characteristics

and precisely understand cognitive differences among college students in public health emergency contexts. Information searches driven by personal motivations totaled 200 samples (52.08%), while social motivation-related samples numbered 184 (47.92%). This indicates that college students' health information needs in emergency contexts are influenced by both personal and social motivations, with balanced impact. Whether for personal purposes of increasing health knowledge or social purposes of obtaining information to serve society, users actively search or browse relevant information. This also indicates that some samples were simultaneously driven by both personal and social motivations.

**4.2 Evolution Patterns of Health Information Needs** Analysis of college students' health information need topics during public health emergencies (Table 5 ) shows that health information needs for epidemic status and trends, disease prevention, and etiology/pathology and diagnosis are prominent, each exceeding 10% of searches, with proportions of 18.53%, 14.74%, and 13.15% respectively. Epidemic-related topics constitute users' primary health information needs, with disease-related information being the focus of college student users' health information needs. Additionally, college students' high demand for epidemic status and trend information indicates that their health information needs have timeliness characteristics. Furthermore, the prominence of disease prevention and disease transmission reflects that information needs are practice-service-oriented.

Social phenomena and government actions are also focal points of college students' health information needs, with search proportions of 11.75% and 9.96% respectively. This reflects that epidemic information at the social level is also a focus for college students. Moreover, beyond epidemic information, college student groups are also attracted to personal health-related daily health information: daily healthcare and physical condition topics account for 6.18% and 4.58% respectively.

In this experiment, the public health emergency lifecycle was divided into three stages: outbreak period, spread period, and decline period. Based on the motivation framework shown in Table 2, information need motivations across lifecycle stages were summarized, with results shown in Table 6 . The proportions of personal and social motivations fluctuated across lifecycle stages but remained around 50%. As the event developed, college students' health information needs were consistently influenced by balanced personal and social motivations, further validating the distribution pattern of health information need motivations.

Using the health information need topic framework shown in Table 3, topics across lifecycle stages were classified and their proportions calculated, with results shown in Table 7 . Hot health information topics varied across public health emergency stages: during the outbreak period, disease prevention (16.47%) ranked first, followed by epidemic status and trends (15.61%) and etiology/pathology and diagnosis (14.45%). During the spread and decline periods, epidemic status and trends were the most prominent concerns, ac-

counting for 22.80% and 30.95% respectively, while secondary concerns differed slightly between periods: social phenomena (15.80%) and government actions (12.28%) during the spread period, and etiology/pathology and diagnosis (16.67%) and government actions (14.29%) during the decline period. Common and prominent concerns across periods included epidemic status and trends, etiology/pathology and diagnosis, and government actions, indicating that epidemic information—particularly disease-related and social-level health information—remains the focus of college student users' health information needs, further validating the topic distribution pattern.

Notably, health information need topics show certain evolutionary trends during public health emergencies: across all stages, attention to epidemic status and trends consistently ranked high and continued rising, reflecting college student groups' sustained attention to real-time public health emergency information. Disease prevention, most concerned during the initial period (16.47%, 11.40%, 9.52%), continuously declined as the event developed. Similar trends were observed for disease transmission (10.69%, 6.14%, 2.38%) and disease treatment (9.25%, 6.14%, 2.38%). N.J. Belkin et al.'s "anomalous state of knowledge" theory [10] may explain this phenomenon: as knowledge about diseases became popularized on social media, users' basic understanding became sufficient to address current issues, thus reducing information needs.

Simultaneously, personal health-related information was also in demand across public health emergency stages, such as daily healthcare (5.78%, 7.89%, 4.76%) and physical condition (4.05%, 6.14%, 4.76%), which fluctuated but remained around 5%. This reflects that during public health emergencies, college students' health information needs are diverse. Beyond focusing on epidemic information, college student groups also generate personal health-related information needs. This study conducted correlation analysis between health information need motivations and topics with lifecycle stages, finding no significant relationship. Additionally, within the same lifecycle stage, no significant differences existed in the distribution of different health information need motivations or topics. Due to uneven gender distribution among subjects, no detailed analysis was conducted.

**4.3 Correlation Between Health Information Need Motivations and Topics** Association rules [55] are commonly used methods to explore correlations between factors. This study employs association rules to investigate the correlation between motivations and topics, with results shown in Table 8 . Table 8 shows confidence distributions between motivations and topics with lift greater than 1 and confidence greater than 0.1, where "_" indicates lift less than 1.

During public health emergencies, college students' health information need motivations and topics are highly correlated. From the lift distribution between motivations and topics in Table 8, only disease prevention, etiology/pathology and diagnosis, daily healthcare, disease treatment, and disease transmission have lift

greater than 1 with personal motivation, with confidences of 0.23, 0.165, 0.14, 0.12, and 0.11 respectively, indicating that personal motivation prominently drives disease prevention needs. In contrast, only epidemic status and trends, social phenomena, and government actions have positive correlation with social motivation, with confidences of 0.315, 0.234, and 0.185 respectively, indicating that social motivation significantly drives epidemic status and trend topic needs. Different types of health information need topics have different driving factors: when users have different information need motivations, the health information topics they search for differ. Meanwhile, social motivation drives relatively concentrated information need topics, while personal motivation drives relatively dispersed topics.

To analyze the evolutionary characteristics of the correlation between college students' health information need motivations and topics during public health emergencies, this study calculated the correlation between motivations and topics across lifecycle stages. Confidence distributions between motivations and topics with lift greater than 1 and confidence greater than 0.1 are shown in Table 9 .

The correlation between college students' health information need motivations and topics during public health emergencies shows the following evolutionary characteristics:

First, information need topics driven by social motivation remain stable across lifecycle stages, manifested as lift greater than 1 between social motivation and epidemic status and trends, government actions, and social phenomena at all stages. Notably, confidence between social motivation and epidemic status and trends consistently ranked highest as the epidemic developed, highlighting that under social motivation, college student users maintain high demand for epidemic status and trend topics.

Second, information need topics driven by personal motivation show stability with changes as the epidemic develops. Specifically, personal motivation consistently shows positive correlation with etiology/pathology and diagnosis, disease prevention, and daily healthcare across all periods. However, personal motivation also drives different topics in different periods. For example, during the outbreak period, college student users also focused on disease transmission and disease treatment; during the spread period, they added attention to physical condition, with personal motivation driving up to six topics during this stage. Attention to physical condition continued into the decline period. As the epidemic gradually stabilized, college student users' personal focus shifted from public health disease-related information to personal daily health information, while knowledge saturation about disease treatment reduced its attention.

Additionally, as the epidemic developed, social motivation's driving effect on epidemic status and trends gradually strengthened, particularly during the decline period, where confidence reached 0.471. This not only indicates that college student groups consistently maintained high attention to social information related

to epidemic development during public health emergencies but also shows that as work resumption and school reopening approached, college students' desire to search for epidemic status and trend information became more urgent to better help family and friends prepare for work resumption and school reopening. Multiple subjects mentioned that as the time node for work resumption and school reopening approached, they more urgently wanted to know the current epidemic development status and trends.

## 5. Discussion and Conclusion

Analysis of research results reveals the following characteristics of college student groups' health information needs during public health emergencies:

(1) **Balanced influence of health information need motivations.** During public health emergencies, health information need motivations manifest as personal and social, with balanced influence on health information needs. From the motivation distribution pattern, personal and social motivations account for 52.08% and 47.92% respectively. From the motivation evolution pattern, although proportions fluctuate as the epidemic develops, they remain around 50%. This differs significantly from college students' health information need motivation distribution in conventional daily contexts, where personal motivations are prominent [31-32]. However, this study finds that in the unconventional context of public health emergencies, college students' health information needs are influenced by balanced personal and social motivations because the connection between society and individuals is close in emergency contexts, enhancing social motivation's driving effect. This also shows that changes in social context break college students' conventional health information concepts, breaking the personal motivation-dominated model and forming a college student health information need motivation influence pattern adapted to public health emergency contexts.

(2) **Focused distribution of health information need topics.** From the topic distribution, the top five searched topics—epidemic status and trends, disease prevention, etiology/pathology and diagnosis, social phenomena, and government actions—account for 68.13% of total searches, reflecting that college student users highly focus on epidemic current affairs information, particularly disease-related and social-level information. Compared with other related research, these findings show similarity, indicating that core needs are common across groups—whether college students or users on different platforms—generally focusing on epidemic status and trends, disease transmission routes, and prevention knowledge [7-8,38-39], reflecting high similarity in health information needs across different groups during public health emergencies. However, in conventional daily contexts, core health information need topics differ across groups due to group differences and health status differences. For example, social Q&A community users' topics concentrate on disease symptoms and

treatment [26,36], while college students' core health information needs are healthy lifestyles and emergency self-rescue and mutual rescue [33,35]. Clearly, core need topic distribution patterns differ significantly between the two contexts, reflecting the particularity of public health emergency contexts.

(3) **Dynamic evolution of health information need topics.** Frequency analysis of college student users' health information need topics across public health emergency lifecycle stages reveals obvious dynamic characteristics: college student groups' focus on health information need topics remains stable yet changes across public health emergency stages. The "stability" is reflected in common concerns across periods—for example, epidemic status and trends consistently remain a user focus, with demand gradually strengthening as work resumption and school reopening unfold. Additionally, focal topics are similar during spread and decline periods, with users focusing on epidemic status and trends, government actions, and social phenomena. The "change" manifests in two aspects: First, focal topics differ across stages. Specifically, during the outbreak period, users focus on disease-related information (disease prevention, etiology/pathology and diagnosis); during the spread period, social information (social phenomena, government actions) becomes the focal topic; during the decline period, while focusing on disease information (etiology/pathology and diagnosis), users also highly focus on social information (government actions, social phenomena), with attention to disease treatment continuously weakening due to knowledge saturation. Second, focal topics shift from dispersed to concentrated. Focal topic proportions were around 15% during the outbreak period with small gaps; as the epidemic developed, focal topic proportions continuously increased, with epidemic status and trends even exceeding 30%. This is similar to the concentration trend of user health information need topics over time in daily contexts [26]. The discovery of dynamic evolution characteristics of health information needs has practical guiding significance for online health information resource organization and management. For example, during public health emergencies, software operators should consider not only diverse information 推送 but also different information 推送 in different periods.

(4) **High correlation between health information need motivations and topics.** During public health emergencies, college students' health information need motivations and topics are highly correlated. Personal motivation only shows positive correlation with disease prevention, etiology/pathology and diagnosis, daily healthcare, disease treatment, and disease transmission, while social motivation shows positive correlation only with epidemic status and trends, social phenomena, and government actions. This reflects that in emergency contexts, college student users' health information need motivations and topics are highly correlated, with personal motivation driving relatively dispersed topics and social motiva-

tion driving relatively concentrated topics. Some college students stated during self-reports that they obtained epidemic status and trend and government action information to enhance social understanding and for personal health safety, focusing on disease prevention information. From their answers to question (causes of health information needs), the high correlation between motivations and topics is evident.

**Example 1:** "The cause of this health information need is that this information doesn't directly affect my prevention or other epidemic developments; it's just attention to hot events. The content searched this time is about prevention measures in Jingzhou residential areas and situations like panic buying or crowding in supermarkets. (0208-D7-18:20-Motivation: Social motivation, Topics: Government actions and social phenomena)"

**Example 2:** "The cause of this health information need is that this is frequently needed in our recent lives. The content searched this time is how to disinfect after going out and returning home, and how to dilute 95% alcohol to 75%. (0208-D17-15:30-Motivation: Personal motivation, Topic: Disease prevention)"

In the first example, the college student user's need arose from attention to social hot events rather than personal needs, with health information need topics being government actions and social phenomena. In the second example, the college student user's disease prevention information need arose from personal prevention needs. Both demonstrate high correlation between motivations and topics. Additionally, from the confidence perspective, social motivation prominently drives epidemic status and trends, while personal motivation effectively drives public health literacy-related topics such as disease prevention and etiology/pathology and diagnosis.

This study examines health information search behavior through the lens of information needs, using college students as the research group and collecting real-context user health information search data through user experiments. Based on content analysis and open coding of user self-reported health information need data from experiments, this study explores the distribution, evolution, and correlation of college students' health information need motivations and topics in public health emergency contexts. Findings reveal: During public health emergencies, health information needs are influenced by both personal and social motivations, with balanced influence; College students' health information need topics have focused characteristics, with demand for public emergency-related information—particularly disease-related and social-level information—higher than other health information; College students' health information need topics have dynamic evolution characteristics, manifested as stable yet changing focal topics across event lifecycle stages; College students' health information need motivations and topics are highly correlated, with obvious differences in topics driven by different motivations, and this correlation remains relatively stable as the epidemic develops.

This study contributes to comprehensive understanding of college students'

health information needs during public health emergencies, thereby supplementing and improving information needs theory and providing theoretical basis for optimizing health knowledge services. However, this study has limitations. For example, although this study used mobile experience sampling, diary method, and critical incident technique to investigate college students' health information needs with a relatively long research period, certain investigation depth, and effective identification of motivations and topics, it cannot statistically explain the correlation between non-core needs (physical condition and mental health) and motivation types. Furthermore, subjects were 30 college students in medium- and high-risk areas, with relatively homogeneous subjects and limited universality. Future research will increase subjects with different characteristics or use web crawler technology to obtain large-scale data to further verify conclusions. Additionally, exploring the correlation between college students' health information needs and intentions is the next research focus. Moreover, examining the relationship between health information needs and health information search behavior, as well as search pattern distribution under different health information needs, is also necessary.

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*Note: Figure translations are in progress. See original paper for figures.*