

Effectiveness of WeChat Official Accounts in health communication: A comparative study of hospitals and centers for disease control and prevention on resident participation in Shenzhen

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Abstract

Background: As China transitions from a disease-centered to a people-centered healthcare model, hospitals are increasingly involved in health education. This study compares the effectiveness of WeChat Official Accounts (WOAs) operated by hospitals and Centers for Disease Control and Prevention (CDCs) in engaging residents and identifies strategies to enhance the dissemination and impact of hospital WOAs in digital health communication.

Methods: This observational study utilized WcplusPro to collect health education-related articles posted between July 2023 and June 2024 from WOAs of district-level CDCs and hospitals in eight administrative districts of Shenzhen, China, excluding administrative affairs-related content. The effects of different posting organizations on article reading and sharing were compared using chi-square tests and multivariable logistic regression in R.

Results: A total of 2270 health-related articles were selected for analysis. CDC WOAs accounted for 59.34% ($n = 1347$) of the posts, while hospital WOAs accounted for 40.66% ($n = 923$). Articles posted by hospitals showed a significant positive association with high reading levels ($OR = 14.69$, 95% $CI = 9.96–22.25$). For sharing levels, articles posted by hospitals showed a significant positive association with high sharing levels ($OR = 3.56$, 95% $CI = 2.71–4.72$). Articles were more likely to achieve higher resident engagement ($p < 0.05$) if they were published by accounts with larger follower bases ($OR = 59.01$), featured interrogative titles ($OR = 22.19$), avoided threatening tones ($OR = 4.98–15.44$), or were highlighted as headlines ($OR = 25.03$).

Conclusions: Hospital WOAs demonstrate higher effectiveness in promoting resident participation in health education. Hospitals should link health services to daily life and use emotionally resonant narratives. They should expand followings, refine headlines, and position. Encouraging healthcare professionals in health education can boost participation.

Keywords

Health education, health information, health communication, WeChat official account, social media

Received: 14 November 2024; accepted: 17 March 2025

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Introduction

Health education is a critical means of enhancing population health literacy, preventing disease, and improving quality of life.^{1,2} The widespread dissemination of professional health knowledge enables the public to better understand health risks, acquire essential disease prevention skills, and adopt positive health behaviors.³ Advances in internet technology,^{4–9} have transformed how the public accesses health information, particularly with the rise of social media platforms.^{10,11} Social media has become a crucial platform for health information dissemination, broadening its reach and enhancing public engagement and interaction.^{12–15} Studies demonstrate that active engagement on social media positively impacts health outcomes.^{16,17}

WeChat, China's most widely used social media platform, had over 1.3 billion monthly active users as of 2024.¹⁸ WeChat is not only a social networking tool but also a critical platform for health communication. WeChat integrates various functions, including payment services, mini-programs, official accounts, and video accounts. Operators of WeChat Official Accounts (WOAs) can post health education articles on the platform, which are automatically pushed to followers, enabling them to read, like, or share the content.^{19,20}

The Basic Healthcare and Health Promotion Law of the People's Republic of China explicitly mandates that "the state shall establish a health education system to safeguard citizens' right to health education and enhance their health literacy."²¹ In recent years, China has vigorously implemented the Healthy China 2030 strategy, enacting a series of policy initiatives to advance its goals.²² The Healthy China 2030 Planning Outline explicitly advocates for expanding the dissemination of health science knowledge, standardizing health information sources, and leveraging new media to broaden health education.²³ As core components of the healthcare system, both the Centers for Disease Control and Prevention (CDCs) and public hospitals must promote health literacy through digital means.

CDCs have been at the forefront of health education, actively disseminating information through WOAs. Ma et al.²⁴ analyzed the dissemination impact of health information released by the Guangzhou CDC through its WOA, demonstrating significant improvements in public health literacy. Yin et al.²⁵ examined the impact of article characteristics released by the Wuxi CDC's WOA on user engagement, revealing that concise, thematically clear content increased user reading and sharing. Sun et al.²⁶ studied the WOAs of 531 CDCs and found that using WOAs to promote health education is an effective, sustainable, and feasible strategy. Yin et al.²⁷ analyzed the effects of WOA article characteristics from CDCs across each province of China on user reading and sharing, finding that factors such as article content, format, and posting location had varying influences on user engagement across different epidemic phases.

In contrast, as key healthcare providers, hospitals primarily use WOAs to share hospital-related content, including news updates and introductions to healthcare services. However, as China shifts from a disease-centered to a people-centered healthcare model,^{28,29} hospitals are increasingly engaging in health education. While existing studies have examined the effect of health information dissemination by CDCs on public engagement, less attention has been given to the use of WOAs by hospitals. Furthermore, these studies have predominantly evaluated health communication through single-institution analyses. Using CDCs as a reference point for traditional health education institutions and comparing them with hospitals allow for a more accurate assessment of hospitals' role in health communication. In the context of the Healthy China 2030 strategy, improving the health literacy of the entire population has become a key task. Therefore, this study compares the effectiveness of WOAs operated by hospitals and CDCs in engaging residents and explores strategies to improve the reach and impact of hospital WOAs in digital health communication.

Methods

Data source

As a designated national pilot zone for digital economy innovation, Shenzhen has led the development of valuable policies and practices in digital health, providing insights for the entire country. Its comprehensive health policy framework, especially the establishment of integrated health information platforms and primary care consortia, offers robust infrastructure and technological support for digital health communication. Additionally, Shenzhen residents exhibit a nationally high level of health literacy, making the city an optimal setting for studying digital health communication. Following Shenzhen's primary healthcare reform, district hospitals have been responsible for meeting residents' health needs within their districts. This study excluded WOAs not explicitly operated by CDCs and the corresponding WOAs of people's hospitals. Eight district-level CDCs and the corresponding WOAs of People's Hospitals in Shenzhen, China, were selected. To reduce the impact of confounding factors related to the Coronavirus Disease 2019 pandemic, we selected one year following the stabilization of external conditions. We used WcplusPro to collect a total of 3445 articles posted between July 1, 2023, and June 30, 2024. WcplusPro is a tool designed to extract data from WOAs, including article titles, publication time, reading volume, likes, and other relevant information (https://github.com/wonderfulsuccess/weixin_crawle). After excluding articles related to administrative affairs, 2270 health articles were retained.

Variables and characteristics

The independent variable was the type of posting organization, including CDC WOAs and hospital WOAs. The

covariates were selected based on previous studies to include article characteristics,^{24,25,27,30} including the number of followers of the posting organization, posting frequency, article topic, title length, posting time, title sentence structure, whether it creates a sense of threat, and whether it is a headline. These factors were selected based on prior research demonstrating their influence on reader engagement and sharing behavior. The number of followers represents the potential audience reach. Headlines, posting frequency, and posting time affect the visibility of articles. Article topic, title length, sentence structure, and sense of threat may influence reader interest.

According to the median number of followers of the posting organizations, the number of followers was categorized as low or high. Posting frequency was classified as <2, 2 to 4, and >4, based on the 25th and 75th percentiles. Article topics were classified into knowledge and theories, healthy lifestyles and behaviors, and basic skills, based on Chinese residents' health literacy. Posting times were categorized using the 24-h system as morning (00:00 to 11:59), afternoon (12:00 to 17:59), and evening (18:00 to 23:59). This classification is based on typical daily activity patterns in China. Title sentence structures were categorized as declarative, exclamatory, or interrogative. When titles did not clearly fit into a single category, we adopted a flexible approach, assessing their overall tone and primary function. If a title contained both exclamatory and interrogative elements, its classification was determined by the dominant feature influencing its purpose. For example, in the title "Is your child's academic performance always poor? Besides enrolling in a training class, perhaps... you need to do this check!" the question introduces the title, but the concluding emphatic statement holds greater weight, making it classified as an exclamatory sentence. Titles were evaluated for the presence of threatening words (e.g., caution, alert, high-risk, immediate),³¹ and the sense of threat was classified as either yes or no. Articles were categorized as "non-headline" or "headline" based on their publication position. The variables were independently categorized by two researchers (FFG and YZ) using standardized criteria. Double data entry and consistency checks were conducted to ensure accuracy. Discrepancies identified during classification were independently verified by a third researcher (LZ), and final categorizations were resolved through consensus discussions among all three researchers.

Participation

Resident participation was defined as reactions to articles, such as reading, liking, sharing, commenting, and viewing. The number of likes and views was relatively low, and not all WOAs enabled the commenting function. Therefore, this study focused on two primary dependent variables: reading and sharing levels. Both variables followed a non-normal distribution. Reading and sharing levels were classified as

"high" or "low" based on the 75th percentile threshold, where "high" denotes values greater than the 75th percentile, and "low" denotes values less than or equal to it.²⁷

Statistical analysis

Data were analyzed in R (version 4.3.2). Categorical variables were analyzed descriptively using frequencies and proportions. A chi-square test was used for univariate screening of categorical variables. Variables that were statistically significant in the univariate analysis were further analyzed with multivariable logistic regression to assess the effect of the posting organization on resident participation. Model 1 was unadjusted for any covariates, model 2 was adjusted for the number of followers, and model 3 was adjusted for variables found to be statistically significant in the univariate analysis. Sharing levels were analyzed using model 3 as the fully adjusted model. Reading levels were analyzed using model 3, with non-significant covariates removed, and model 4 as the fully adjusted model. Further subgroup analyses were conducted using stratified logistic regression, and interaction effects were evaluated for statistical significance using the Wald test. Odds ratios (OR) and 95% confidence intervals (CI) were calculated. $p < 0.05$ was considered statistically significant.

Results

Characteristics of article features

During the study period, a total of 2270 health-related articles were posted. The descriptive analysis results are presented in Table 1. Most articles were posted by CDCs (59.34%, $n = 1347$), while 40.66% ($n = 923$) were from hospitals. More than half of the posts (57.80%, $n = 1312$) came from accounts with high follower counts, while 42.20% ($n = 958$) came from accounts with lower follower counts. Regarding posting frequency, 53.39% ($n = 1212$) of WOAs posted 2–4 times, 41.15% ($n = 934$) posted more than four times, and only 5.46% ($n = 124$) posted fewer than two times. Most posts focused on healthy lifestyles and behaviors (60.70%, $n = 1378$), followed by knowledge and concepts (35.68%, $n = 810$) and basic skills (3.61%, $n = 82$). Articles were most frequently posted in the afternoon (42.20%, $n = 958$), followed by the morning (35.77%, $n = 812$), and the evening (22.03%, $n = 500$). Regarding title structure, exclamatory titles were the most common (39.03%, $n = 886$), followed by interrogative (31.23%, $n = 709$) and declarative titles (29.74%, $n = 675$). 57.49% ($n = 1305$) of titles contained 16–25 characters, 33.70% ($n = 765$) had fewer than 16 characters, and 8.81% ($n = 200$) had more than 25 characters. 65.46% ($n = 1486$) of titles did not convey a sense of threat, while the remaining 34.54% ($n = 784$) did. Finally, 53.70% ($n = 1219$) of the articles were published as headlines, whereas 46.30% ($n = 1051$) were not.

Table 1. Descriptive analysis and chi-square test of reading and sharing levels ($n = 2270$).

	N (%)	Reading levels			Sharing levels		
		Low	High	<i>p</i>	Low	High	<i>p</i>
Posting organization				<.001			<.001
No (CDCs)	1347 (59.34)	1136	211		1085	262	
Yes (hospitals)	923 (40.66)	566	357		624	299	
Followers				<.001			<.001
Low	958 (42.20)	876	82		825	133	
High	1312 (57.80)	826	486		884	428	
Posting frequency				<.001			.34
< 2	124 (5.46)	108	16		100	24	
2–4	1212 (53.39)	879	333		912	300	
> 4	934 (41.15)	715	219		697	237	
Article topic				<.001			.15
Knowledge and concepts	810 (35.68)	637	173		628	182	
Healthy lifestyles and behaviors	1378 (60.70)	987	391		1018	360	
Basic skills	82 (3.61)	78	4		63	19	
Posting time				.90			.07
Morning (00:00 to 11:59)	812 (35.77)	613	199		594	218	
Afternoon (12:00 to 17:59)	958 (42.20)	714	244		744	214	
Evening (18:00 to 23:59)	500 (22.03)	375	125		371	129	
Title sentence structures				.85			<.001
Declarative sentences	675 (29.74)	541	134		558	117	
Exclamatory sentences	886 (39.03)	641	245		627	259	
Interrogative sentences	709 (31.23)	520	189		524	185	
Title length				<.001			.44
< 16	765 (33.70)	577	188		584	181	
16–25	1305 (57.49)	978	327		981	324	
> 25	200 (8.81)	147	53		144	56	
Cause a sense of threat				<.001			<.001
No	1486 (65.46)	1159	327		1154	332	

(continued)

Table 1. Continued.

	N (%)	Reading levels			Sharing levels		
		Low	High	<i>p</i>	Low	High	<i>p</i>
Yes	784 (34.54)	543	241		555	229	
Headline				<.001			<.001
No	1219 (53.70)	1005	214		999	220	
Yes	1051 (46.30)	697	354		710	341	

The relationship between posting organizations and participation

The chi-square test (Table 1) showed that the posting organization, follower count, posting frequency, article topic, title length, sense of threat, and headline position were significant predictors of reading levels ($p < 0.001$). The relationship between resident participation and posting organization is shown in Figure 1. All models showed a significant positive association between articles from hospitals and resident participation. For reading levels, model 4 indicated that articles from hospitals had 14.69 times higher odds of achieving high reading levels than articles from CDCs (OR = 14.69, 95% CI = 9.96–22.25) (Table S1). For sharing levels, model 3 showed that articles from hospitals were 3.56 times more likely to be highly shared than articles from CDCs (OR = 3.56, 95% CI = 2.71–4.72) (Table S2). This may be influenced by users' daily health management needs, leading to differences in interaction frequency and information relevance.

Subgroup analysis

The results of the subgroup analysis on the effects of posting organization on reading and sharing levels are presented in Table 2. For reading levels, a significant interaction effect was observed between the posting organization and factors including the number of followers, title sentence structure, sense of threat, and headline status ($p < 0.05$). However, there was no significant interaction between article topics and posting organization ($p > 0.05$). This suggests that hospital articles are more likely to achieve high reading levels if they are posted by accounts with a large follower base, feature interrogative titles, do not convey a sense of threat, or are presented as headlines. Regardless of whether the posting organization was a hospital or CDC, no significant differences were observed in reading levels among articles of different topics. For sharing levels, a significant interaction effect was observed between posting organization and sense of threat ($p < 0.05$), whereas no significant interaction was found with follower count, title structure, or headline

position ($p > 0.05$). This suggests that articles from hospitals are more likely to achieve high sharing levels when their titles do not convey a sense of threat. Overall, health information posted by hospitals was more likely to encourage resident participation than that posted by CDCs, particularly when the WOAs had a large follower base, used interrogative titles, did not convey a sense of threat, and were presented as headlines.

Discussion

To the best of our knowledge, this is the first study in China to compare the effects of different types of posting organizations on resident participation behavior. This study explored the different impacts of articles posted by hospital WOAs and CDC WOAs on residents' health promotion participation behaviors. We found that hospital-operated WOAs consistently received higher levels of participation in terms of reading and sharing compared to CDC-operated WOAs.

People are more likely to accept and engage with information when it originates from credible sources with professional expertise.^{32,33} WOAs serve as key platforms for information dissemination in China. Those managed by public health organizations, such as the CDCs and public hospitals, are widely trusted due to their professionalism and authority, making them effective channels for health communication. Although both CDCs and hospitals are professional organizations, this study identified significant differences in resident participation behaviors. This may be influenced by users' daily health management needs, leading to differences in interaction frequency and information relevance. The exposure effect suggests that people tend to prefer what they encounter repeatedly.³⁴ Hospital services (e.g., medical appointment booking, report access)³⁵ are closely linked to residents' daily health management needs. Through frequent offline interactions, residents establish a strong connection with hospitals. Public trust extends from offline to online health services,³⁶ which increases residents' willingness to engage with hospital WOAs. In contrast, CDCs primarily provide services such

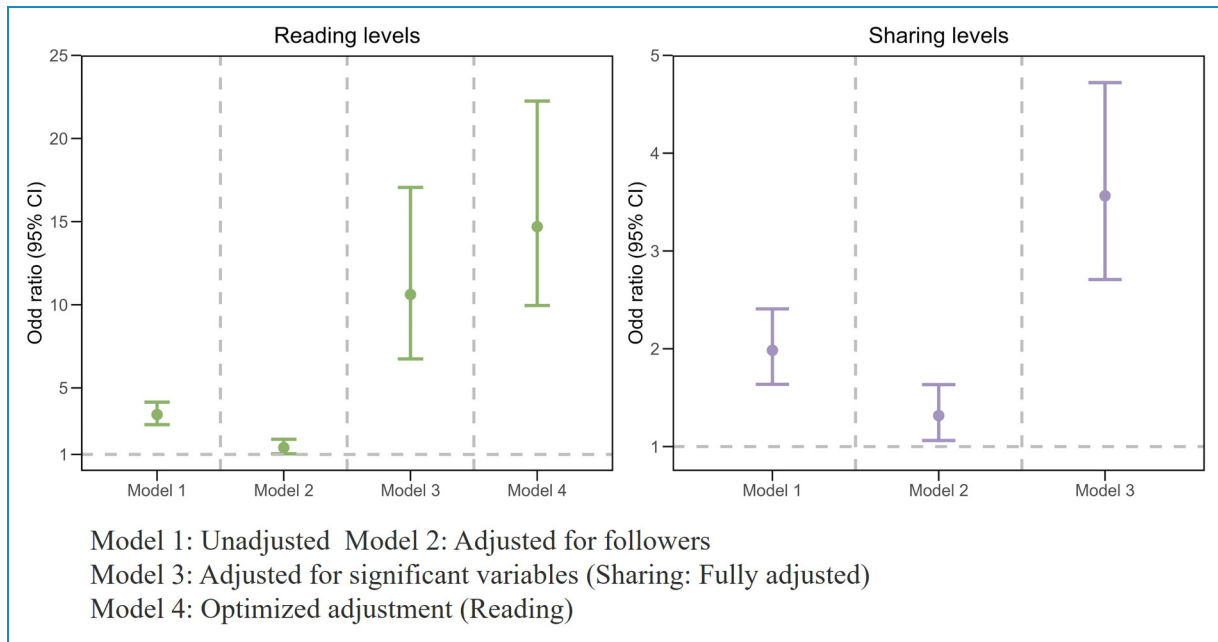


Figure 1. Odds ratios (95% CI) for reading and sharing levels based on posting organization (0 = CDCs, 1 = hospitals).

as vaccinations and infectious disease surveillance.³⁷ Although these services are valuable for public health, they have a weaker connection to individuals' daily health management needs. The lack of frequent offline interactions diminishes users' reliance on CDC WOAs, further reducing their willingness to engage online. We propose that posting organizations should integrate high-frequency services into daily life. Hospitals could enhance health management functions by incorporating medication reminders and intelligent follow-up appointment recommendations. By integrating seasonal disease trends with user health data, hospitals could automatically generate personalized health advice, enhancing passive user engagement. CDCs can integrate public services into personal health routines by providing vaccination reminders, infectious disease risk maps, and personalized self-assessment tools.

Moreover, perceived value significantly influences individual engagement with online health information,^{38–40} further explaining the differences in engagement behavior. The study found that health content more relevant to individuals leads to higher engagement.⁴¹ Hospitals' health communication content is primarily authored by clinical medical staff, focusing on prevalent and frequently occurring diseases among patients in their respective regions. Consequently, their information may be more directly relevant to users' immediate health concerns, thereby enhancing perceived value. In contrast, a large proportion of articles from CDCs are related to infectious diseases, which are less relevant to the general users' health needs.²⁶ Hospitals could strengthen personalized health communication. Analyzing subscribed users' basic information from

the WOA backend to help hospitals better identify their target audience, publish accurate and personalized health information. By using first-person narration and patient experiences, the content can become more relevant and emotionally engaging. Examples from articles in this study include "Every time I cleaned his wounds, I got dizzy from the stench" or "After five years, I finally went from crooked to straight!"

Further research found that the effect of posting by hospitals was more pronounced, especially in the case of high follower counts. This is largely attributable to platform algorithms, which prioritize content from accounts with a large follower base, providing them with greater initial exposure and increased visibility. A larger follower base not only expands organic reach but also enhances secondary dissemination.⁴² Hospitals can utilize their strengths to enhance offline and online interactions during patient visits. Hospitals can enhance offline Quick Response Code promotion by displaying them on registration slips, medication packaging, medical examination reports, electronic screens, and other strategic locations. Implementing user incentive mechanisms, such as offering rewards for subscriptions, interactive lotteries, and other engagement strategies, can effectively encourage patients to subscribe to WOA.

Several researchers have identified title sentence structure as a factor that influences public engagement.^{27,43} This study found that articles posted by hospital WOAs were more likely to achieve high reading levels when titles used interrogative sentences. Interrogative sentences can capture attention, prompt readers to think, stimulate curiosity, and encourage active engagement, making readers more likely to click on

Table 2. Effects of posting organization on reading and sharing levels across subgroups.

	OR	Lower_95%CI	Upper_95%CI	p for interaction
<i>Reading levels</i>				
Followers				<.001
Low	4.55	2.44	8.48	
High	59.01	23.69	147.00	
Article topic				.44
Knowledge and concepts	14.93	7.71	28.91	
Healthy lifestyles and behaviors	15.12	9.02	25.33	
Basic skills	3.82	0.13	114.09	
Title sentence structures				<.05
Declarative sentences	7.88	3.33	18.62	
Exclamatory sentences	13.45	7.28	24.87	
Interrogative sentences	22.19	10.66	46.20	
Cause a sense of threat				<.05
No	15.44	9.52	25.03	
Yes	15.07	6.86	33.14	
Headline				<.05
No	8.02	4.38	14.67	
Yes	25.03	14.62	42.85	
<i>Sharing levels</i>				
Followers				.45
Low	3.95	2.32	6.70	
High	3.34	2.39	4.65	
Title sentence structures				.30
Declarative sentences	2.93	1.47	5.81	
Exclamatory sentences	2.79	1.85	4.19	
Rhetorical questions	4.85	2.94	8.01	
Cause a sense of threat				<.05
No	4.98	3.46	7.16	
Yes	1.86	1.18	2.94	

(continued)

Table 2. Continued.

	OR	Lower_95%CI	Upper_95%CI	p for interaction
Headline				.86
No	3.64	2.35	5.64	
Yes	3.45	2.39	4.99	

and read the article. Titles could include questions that are closely related to readers' daily lives, or that are new, controversial, or easily overlooked. Examples from articles in this study that attracted over 30,000 reads include "Do people really shower every day in winter?" and "Can men also experience sexual indifference?" Additionally, this study found that hospital-posted article titles, whether or not they conveyed a sense of threat, received more resident engagement than those from CDCs, and this effect was more pronounced for titles that did not have a sense of threat. Negative titles often capture residents' attention.^{35,44} However, if the urgency suggested in the title is not adequately supported by the content, it can come across as a "bluff." Such titles may entice readers to click due to a "fear of missing out" mentality,⁴⁵ but if they find the content less threatening or serious than expected, engagement behaviors may suffer.⁴⁶ This approach is unlikely to foster lasting user loyalty or trust and may even erode residents' trust in hospital WOAs over time.⁴⁷ Hospital WOAs can employ attention-grabbing but non-exaggerated titles, balancing attractiveness with authenticity,⁴⁸ avoiding bluffing, and ensuring readers feel genuinely benefited after reading the content. This approach can increase reading and sharing levels, helping to build a loyal user base.

Ma et al.²⁴ analyzed articles posted by the Guangzhou CDC WOA, and Yin et al.²⁵ analyzed articles posted by the Wuxi CDC WOA, and both found that headlines promote public participation. Yin et al.²⁷ also analyzed articles posted by China's provincial CDC WOAs and found that headlines, whether during a COVID-19 pandemic or otherwise, were more likely to promote resident participation than non-headlines. This study found that hospital WOAs had a better effect on resident participation when the articles were posted as headline articles. This is likely because the probability of residents being exposed to the information increases significantly when WOAs are set as headline articles. Given the impact of headline articles, priority should be given to placing essential health-related information in the headline position. This includes residents' primary health concerns, responses to public health emergencies, and content addressing health-related misinformation. Placing this key content in the headline position ensures residents' access to important health information first, enabling them to make timely health decisions.

In recent years, China has issued a series of policy documents encouraging hospitals and healthcare professionals to

provide health education services.^{49,50} Our study confirms that hospital WOAs posting health information can more effectively encourage residents to engage in health. Greater attention should be paid to the health promotion role of hospital WOAs. However, in practice, there are challenges with health information dissemination in hospital WOAs. Hospital WOAs serve various functions, while CDCs primarily focus on population health education. Many pages in hospital WOAs are occupied by affairs-related content intended for organizational promotion.³⁵ Healthcare workers have not been effectively motivated to provide health education services.⁵¹ Qin et al.⁵² investigated preferences for health education services among healthcare workers in secondary and tertiary hospitals in Beijing, China, and found that departmental work environment and performance bonuses were the attributes most valued by participants. We suggest optimizing the structure of the WOA by increasing the proportion of health education. Establishing a dedicated health education section can ensure the visibility of health information within the WOA. Additionally, cultivating a motivating work environment through measures such as funding, professional titles, and promotions can encourage healthcare professionals to take the initiative in health education. Strengthening interactions between hospitals and patients can build trust. Meeting the population's health needs and establishing targeted platforms for different groups can ensure broader reach.

Strength and limitations


This study focuses on the role of hospital WOAs in health information dissemination, which is relatively scarce in the existing literature. It provides a new perspective on public health communication research by comparing the impact of hospital and CDC WOAs. In addition, our dataset is more focused on health education and health promotion content, excluding hospital affairs articles, reducing the interference of other irrelevant information. The results of the analysis more accurately reflect the effectiveness of health information dissemination in hospital WOAs, free from the confounding influence of affairs content such as hospital announcements and service reminders. This focus greatly enhances the reliability and relevance of the study findings.


However, we selected only district-level CDC and hospital WOAs in Shenzhen, focusing on the impact on district residents. Given Shenzhen's relatively young population and the higher proportion of younger followers on its WOAs, the findings may not be fully applicable to regions with an aging population or to other levels of healthcare organizations, where digital engagement patterns may differ. Additionally, factors such as reward incentives embedded in articles and external influences, such as social hotspots, may affect engagement levels, potentially confounding the results. The effect of the article topic on reading levels did not differ significantly between articles posted by hospitals and CDCs. This may be attributed to the broad appeal of these topics to both hospital and CDC audiences or the limited number of articles in the basic skills category. Future research could further refine topic segmentation. Moreover, this study primarily uses reading and sharing levels to measure public engagement. However, these indicators do not directly translate into changes in health behaviors. Future research could employ quantitative methods to determine engagement thresholds. For instance, studies could investigate the level of article exposure or interaction required to produce measurable improvements in health knowledge, attitudes, and behaviors among residents.

Conclusions

The study compared the impact of health information posted by the hospitals and CDC WOAs on resident participation, finding that articles posted by hospital WOAs generated higher levels of resident participation, highlighting the role of hospitals as key health communication organizations. To enhance public engagement, hospitals should integrate high-frequency health services into daily life and employ emotionally resonant storytelling to elevate the perceived value of information. Additionally, offline promotions and user incentive mechanisms can help expand follower bases, while engaging yet credible question-based headlines and strategic headline placement enhance the delivery of key health messages. Furthermore, financial incentives, professional title recognition, and career development opportunities can motivate healthcare professionals to engage more actively in health communication. By systematically comparing the effectiveness of hospital and CDC WOAs in engaging the public, this study offers empirical evidence to inform hospitals' optimization of digital health communication strategies. These findings contribute to improving public health literacy and advancing the strategic goals of Healthy China 2030.

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Statements and declarations

Author contributions/CRediT

Fangfang Gong contributed to conceptualization, formal analysis, data curation, software, validation, writing—original draft, and writing—review and editing. Li Zeng contributed to methodology, validation, visualization, writing—original draft, and writing—review and editing. Yi Li contributed to data curation and writing—review and editing. Jingang Shi contributed to software, validation and writing—review and editing. Ke Huang contributed to investigation and writing—review and editing. Ying Zhou contributed to conceptualization, supervision, data curation, writing—original draft, and writing—review and editing. All authors have read and agreed to the published version of the manuscript.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the National Natural Science Foundation of China (grant number: 72374214).

Conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Supplemental material

Supplemental material for this article is available online.

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