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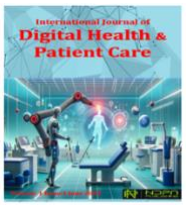

The Power of Digital Campaigns in Public Health: An Analysis of The Ministry of Health's Social Media Activities

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ABSTRACT

To assess whether health-themed social media posts by the Turkish Ministry of Health (MoH) are associated with short-term online information-seeking. Methods: We analyzed 25 MoH posts on X and Instagram (October 1, 2024–March 30, 2025). Engagement metrics (likes, comments, reposts, views) were compiled; Google Trends search volumes for matching topics were extracted. On X, one-way ANOVA tested time-of-day effects on engagement and views; Spearman correlations assessed associations between views and other metrics; Mann–Whitney U compared posts that did vs. did not coincide with a Google Trends spike (GT+ vs. GT–). Findings: Nine of 25 posts coincided with increased search volume. On X, engagement did not differ by posting time ($F(2,44)=2.16$, $p=.128$). View counts differed overall by time-of-day ($F(2,44)=3.87$, $p=.028$), but pairwise differences were non-significant (Games–Howell, all $p>.05$). Views correlated with likes ($\rho=.692$, $p<.001$), comments ($\rho=.550$, $p<.001$), and reposts ($\rho=.487$, $p=.001$). GT+ and GT– posts did not differ on X (likes: $p=.153$; reposts: $p=.106$; total engagement: $p=.293$; views: $p=.450$). On Instagram, GT+ posts had higher reposts ($U=21.00$, $p=.003$) and likes ($U=40.00$, $p=.049$); total engagement trended higher ($U=44.00$, $p=.080$). Conclusion: MoH digital campaigns are associated with short-term increases in public information-seeking, particularly on Instagram. Platform-specific strategies emphasizing compelling visuals, concise messages, and alignment with awareness days may enhance impact, whereas posting hour alone appears insufficient to boost engagement.

1. INTRODUCTION

In the communication era of the 21st century, digital platforms have evolved beyond mere channels for information sharing; they have become powerful tools that influence individuals' attitudes, behaviors, and health-related decisions. Social media plays a pivotal role in disseminating public health policies, guiding health information-seeking behaviors, and enhancing the success of community-based awareness campaigns [1, 2]. On the other hand, the literature also highlights areas where digital health communication remains weak or insufficiently effective. In a recent study, Kolca (2025) evaluated the limitations of digital interaction in healthcare services, emphasizing its restrictive effects on user engagement and access to information. Based on this foundation, the present study not only draws attention to such limitations but also aims to demonstrate how strategically designed digital public health campaigns can effectively influence public information-seeking behavior [3]. Surpassing the limitations of traditional media tools, social media offers time- and location-independent access, thereby transforming into a strategic communication asset for health authorities [4]. Moreover, the expanding role of immersive digital technologies in healthcare has been widely discussed in the recent literature. For instance, prior work highlights the transformative potential of metaverse and health technologies in shaping public engagement strategies [5]. Although our study does not directly involve immersive technologies, it builds upon the broader framework of digital transformation in public health communication through social media platforms.

Studies have shown that digital campaigns can significantly influence public access to health-related information. In particular, health-themed content has been found to have a notable impact on individuals' online information-seeking behaviors

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[6]. Digital data sources such as Google Trends provide an objective means to measure the extent to which public-facing digital content captures attention and which health topics dominate public discourse [7]. Accordingly, evaluating the impact of digital campaigns on public health requires a multi-layered analytical approach that integrates social media engagement metrics with collective information-seeking trends.

This study aims to examine the public engagement impact of health-related content shared by the Turkish Ministry of Health on X (formerly Twitter) and Instagram platforms and to assess the digital resonance of these communications. By correlating Google Trends search volume data with social media engagement metrics (likes, shares, comments, and views), the analysis explores not only quantitative differences but also the emotional appeal, timing strategies, and message repetition patterns of the content.

In this regard, the study provides a rare and original contribution to the understanding of the digitalization of public health campaigns in Türkiye. It adopts a holistic perspective that considers not only the reach of digital content but also its behavioral impact. The findings aim to offer concrete recommendations for public institutions regarding prioritization in digital content planning and strategic communication on social media platforms.

2. MATERIALS AND METHODS

This study was structured based on a mixed-methods approach to evaluate the impact of the Turkish Ministry of Health's social media strategies on public health information-seeking behavior. The study examines both the quantitative engagement metrics and the qualitative content characteristics of health-themed posts shared on the X (formerly Twitter) and Instagram platforms. This approach goes beyond measuring the numerical visibility of social media campaigns and allows for an in-depth understanding of which types of content generate digital resonance [8]. This methodological approach is consistent with strategies commonly utilized in healthcare marketing research, which emphasize the integration of diverse data sources and the assessment of target audience interaction [9].

1.1. Research Design and Data Set

The research was designed within the framework of an explanatory quantitative model, supplemented by a qualitative content analysis. The data set consists of 25 health-themed posts shared by the Turkish Ministry of Health between October 1, 2024, and March 30, 2025 on the X and Instagram platforms (Table 1). The analysis was limited to posts that could be directly associated with search volume data obtained from Google Trends. In cases where multiple posts were shared on the same day, the contents were merged based on thematic consistency, resulting in a total of 26 distinct observational units for analysis.

Table 1. Selected health themed posts

No	Keywords	No	Keywords
1	Cerebral Palsy	14	Heel Blood Test
2	Pregnancy Education Program	15	Vitamin K Administration
3	Baby-Friendly Hospital	16	Epilepsy
4	Arthritis	17	Childhood Cancers
5	Breast Health	18	Obesity
6	Stroke	19	Colorectal Cancer
7	Organ Donation	20	Tuberculosis (TB)
8	Pneumonia	21	Down Syndrome
9	Diabetes	22	Whooping Cough
10	Hypertension	23	Pulmonary Rehabilitation
11	HIV	24	Glaucoma
12	Zipper System	25	Sudden Hearing Loss
13	Productive Health		

Among the 25 social media posts analyzed within the scope of the study, 9 posts were identified as being associated with a notable increase in weekly search volume on Google Trends. A summary of these posts is presented in Table 2. The highest peaks in search interest were observed for posts addressing specific health topics such as *breast health*, *organ donation*, *heel blood test*, *vitamin K administration*, and *glaucoma*. Notably, the posts related to *organ donation* garnered significant attention, likely due to the involvement of well-known public figures, which was also reflected in the high levels of user engagement on Instagram.

As illustrated in the table, the majority of posts associated with increased search volume on

Google Trends also received high or very high engagement on Instagram. Thus, the table not only indicates which posts coincided with peaks in public information-seeking behavior but also qualitatively reflects the level of user interest in these topics on social media. In addition, a *delayed spike in search volume* was observed for the post related to *diabetes*, occurring after the initial week of publication. This finding is particularly noteworthy as it suggests that the impact of certain posts may extend over time, beyond their immediate visibility.

Table 2. Google Trends posts showing search volume increase and related topics

Topic (English)	Google Trends	Instagram Engagement
Breast Health	Highest peak during the week of the post	High
Organ Donation	Highest peak during the week of the post	Very high (with celebrity support)
Zipper System	Highest peak during the week of the post	Moderate
Heel Blood Test	Highest peak during the week of the post	High
Vitamin K Administration	Highest peak during the week of the post	Moderate
Obesity	Highest peak during the week of the post	Moderate
Down Syndrome	Highest peak during the week of the post	Moderate
Glaucoma	Highest peak during the week of the post	Moderate
Diabetes	Second highest peak during the week of the post	High (delayed impact)

2.2. Quantitative Data Analysis Process

Statistical analyses were conducted using SPSS v28. In the first stage, a one-way analysis of variance (ANOVA) was performed to examine differences in engagement levels across the timeframes (morning, afternoon, evening) in which posts were shared on the X platform. The normality of the data distribution was assessed using skewness and kurtosis values, which were found to fall within the acceptable range of ±1.5 [8].

The relationships among post engagement metrics (likes, reposts, and views) were tested using Spearman's rank-order correlation analysis. Differences between posts that were associated with increased search volume on Google Trends and those that were not were analyzed using the Mann–Whitney U test, due to the non-normal distribution of the data. For the Instagram platform, since timestamp data were unavailable, the analysis was limited to likes and shares, while comments were excluded due to the predominance of off-topic responses unrelated to the post content.

2.3. Qualitative Data Analysis Process

To enrich the interpretation of the quantitative findings, thematic content analysis was applied to the 9 posts that showed a noticeable increase in Google Trends search volume. During the coding process, the following thematic categories were identified:

- Topics with emotional resonance (e.g., infant health, donation appeals),
- Timed alignment with health awareness days (e.g., Organ Donation Day),
- Repeated messaging on the same theme (e.g., multi-post campaign series),
- Support from public figures (e.g., shares or endorsements by celebrities).

This analysis aimed to uncover the structural and strategic features of the content that contributed to heightened public attention and to develop theoretical links between message intensity, format, and online search behavior.

Ethics and Permissions

This study is based entirely on open-access data publicly available through the official social media accounts of the Turkish Ministry of Health and the Google Trends platform. As the study did not involve human subjects and did not collect any personal or identifiable data, formal ethical approval was not required.

3. RESULTS

The analysis revealed that 9 out of the 25 social media posts examined were associated with a significant increase in Google Trends search volume during the week they were published. A substantial portion of these posts also demonstrated notable levels of user engagement, particularly on the Instagram platform, where high numbers of likes and shares were observed.

Table 3. X interaction normal distribution values

Descriptives				
Timeframe			**Statistic**	**Std. Error**
X Interaction	**Morning**	**Skewness**	0,425	0,564
		Kurtosis	1,120	1,091
	Afternoon	**Skewness**	0,888	0,564
		Kurtosis	1,034	1,091
	Evening	**Skewness**	0,998	0,580
		Kurtosis	-0,160	1,121

Prior to comparing the engagement levels of posts shared on the X platform across different timeframes, the normality of the data distribution was assessed. For this purpose, skewness and kurtosis values were calculated for each time interval (Table 3). According to the ±1.5 threshold suggested by Tabachnick and Fidell (2013), all obtained values were within acceptable limits, indicating that the assumption of normal distribution was satisfied.

For instance, posts shared in the morning had a skewness value of 0.425 and a kurtosis value of –1.120, suggesting a symmetric distribution with minimal influence from outliers. For afternoon posts, the skewness was 0.888 and the kurtosis 1.034, indicating a moderately right-skewed and peaked distribution, but still within acceptable limits. For evening posts, the skewness was 0.998 and the kurtosis-0.160, reflecting a roughly symmetric and moderately platykurtic distribution.

Given that the normality assumption was met for all three timeframes, parametric statistical methods, specifically one-way analysis of variance (ANOVA), were deemed appropriate for subsequent analyses.

Table 4. X One-Way analysis of variance results of interaction levels and number of views by time period

Interaction levels by time period X	**Source of Variance**	**Sum of Squares**	**df**	**Mean Square**	**F**	**p**
	Between Groups	332.120,24	2	166.060,12	2,16	,128
	Within Groups	3.388.417,98	44	77.009,50		
X Number of Views by Time Zone	Between Groups	52.301.015.336,88	2	26.150.507.668,44	3,87	,028
	Within Groups	297.175.920.833,33	44	6.753.998.200,76		
	Total	349.476.936.170,21	46			

In order to evaluate the impact of post timing on user engagement on the X platform, differences in engagement levels across posts shared in the morning, afternoon, and evening were analyzed. For this purpose, a one-way analysis of variance (ANOVA) was conducted, and the results are summarized in Table 4.

According to the analysis, the time of day when posts were published did not lead to a statistically significant difference in user engagement levels ($F(2, 44) = 2.156$, $p = .128$). The between-group sum of squares was calculated as 332,120.24, while the within-group error variance was 3,388,417.98. Although the average engagement levels appeared to be relatively higher for morning posts, these differences did not reach statistical significance.

This finding suggests that the specific time of day when a post is shared is not a decisive factor in determining engagement levels on social media. In other words, users' likelihood of interacting with a post does not appear to be directly related to the posting time. This outcome aligns with the algorithm-driven content delivery mechanisms of social media platforms, which often display content to users at varied times independent of the original publication hour (Table 4).

Additionally, the study analyzed whether the time of day at which posts were shared affected the number of views on the X platform. A one-way ANOVA was again employed for this purpose, and the findings are presented in Table 5. The results indicated a statistically significant difference in view counts across different time intervals ($F(2, 44) = 3.87$, $p = .028$). The between-group variance was calculated as 52,301,015,336.88, and the within-group error variance as 297,175,920,833.33. When comparing the mean square values, it was observed that the view counts varied depending on whether the post was shared in the morning, afternoon, or evening.

However, results from the Levene's test revealed that the assumption of homogeneity of variances was violated. As a result, the Games-Howell post-hoc test was applied. Despite the overall model reaching statistical significance, no statistically significant pairwise differences were detected between the time intervals ($p > .05$), likely due to the limited sample size and large variance discrepancies among the groups.

Therefore, although the overall analysis suggests that timing may influence post visibility (in terms of view count), it remains unclear which specific time frame contributes most significantly to increased exposure. This finding highlights the need for future studies with larger sample sizes to more clearly identify optimal posting strategies based on timing.

Table 5: Games-Howell Post-Hoc test results

Groups	Mean Difference	Std. Error	*p*	95% CI Lower Bound	95% CI Upper Bound
Morning – Afternoon	-562,50	9.513,63	,998	-24.306,30	23.181,30
Morning – Evening	-71.841,67	36.535,60	,156	-167.093,99	23.410,66
Afternoon – Evening	-71.279,17	37.135,27	,167	-167.448,13	24.889,80

Note: No statistically significant differences were found between any of the pairwise comparisons (p > .05).

Following the identification of a statistically significant difference in view counts across different time intervals through the one-way analysis of variance (ANOVA), a Games-Howell post-hoc test was conducted to determine which specific groups differed from one another. This test was selected based on the results of Levene's test, which indicated a violation of the assumption of homogeneity of variances. The findings are summarized in Table 5.

According to the analysis, none of the pairwise comparisons morning vs. afternoon ($p = .998$), morning vs. evening ($p = .156$), and afternoon vs. evening ($p = .167$) revealed statistically significant differences. Although the mean difference in view counts between morning and evening posts was as high as 71,841.67, this difference did not reach statistical significance. Similarly, the other group comparisons fell within confidence intervals that did not indicate meaningful distinctions.

These results suggest that while the overall ANOVA model indicated a significant difference, the pairwise comparisons lacked statistical power, likely due to the limited sample size and substantial variance heterogeneity between groups. This underscores the need for larger-scale studies to more precisely identify time-based effects. Moreover, the variation in engagement levels across different timeframes should be interpreted in conjunction with other contextual variables, such as content type, weekday versus weekend distribution, and campaign objectives, rather than time alone.

Tablo 6. Spearman correlations between view counts and likes, comments, and reposts

Variables	r (rho)	p (2-tailed)	n
Likes – Views	.692**	< .001	47
Comments – Views	.550**	< .001	47
Reposts – Views	.487**	.001	47

To examine the relationship between the number of views and other engagement indicators for posts shared on the X platform, a Spearman correlation analysis was conducted. Due to the non-normal distribution of the data, this non-parametric statistical method was selected. As summarized in Table 6, a strong positive and statistically significant correlation was found between views and likes ($r = .692$, $p < .001$). A moderate correlation was observed between views and comments ($r = .550$, $p < .001$), while a weaker but still significant relationship was detected between views and reposts ($r = .487$, $p = .001$).

These findings suggest that posts reaching a wider audience tend to elicit a higher number of likes, indicating that visibility is strongly associated with passive engagement behaviors. Given that a large portion of comments were unrelated to the actual content often consisting of complaints or personal requests it can be inferred that the correlation between views and comments may not fully reflect information-driven interaction, but rather a broader measure of overall visibility.

Table 7. Mann–Whitney U test results for X and Instagram platforms

	Variable	*U*	*Z*	*p* (Asymptotic)
X Platform	**Likes**	50.00	-1.43	.153
	Reposts	46.50	-1.62	.106
	Total Engagement	57.00	-1.05	.293
	Views	62.50	-0.76	.450
Instagram Platform	**Reposts**	21.00	-2.99	.003
	Likes	40.00	-1.97	.049
	Total Engagement	44.00	-1.75	.080

Note: Mann–Whitney U tests were used due to violations of normality assumptions. Significant differences were observed in Instagram repost and like counts ($p < .05$)

To determine whether the presence of increased search volume on Google Trends was associated with the engagement levels of content shared on the X platform, a Mann–Whitney U test was conducted. This non-parametric test was chosen due to violations of parametric assumptions, particularly the assumption of normality. The results are summarized in Table 7.

The findings indicated no statistically significant differences between posts that triggered a Google Trends spike and those that did not in terms of likes ($U = 50.00$, $Z = -1.43$, $p = .153$), reposts ($U = 46.50$, $p = .106$), total engagement ($U = 57.00$, $p = .293$), or views ($U = 62.50$, $p = .450$). These results suggest that the engagement levels of content shared on the X platform are not directly associated with changes in public information-seeking behavior as measured by Google Trends. In other words, a post receiving high engagement on X does not necessarily translate into increased online health information-seeking. This finding highlights the complex interplay of factors—such as algorithmic visibility, user behavior, and content type—that influence digital information-seeking behavior.

For the Instagram platform, the relationship between Google Trends search volume increases and social media engagement was also examined using the Mann–Whitney U test, due to the same lack of normal distribution. The results, also summarized in Table 7, indicated that posts associated with a Google Trends spike received significantly higher repost counts than those that did not ($U = 21.00$, $Z = -2.99$, $p = .003$). Similarly, like counts were also significantly higher in the same group ($U = 40.00$, $Z = -1.97$, $p = .049$). The difference in total engagement was marginally significant, approaching the threshold for statistical significance ($U = 44.00$, $p = .080$).

These findings suggest that content with high user engagement on Instagram may also be more effective in stimulating online health information-seeking behavior. In particular, active forms of interaction, such as reposting, not only increase the visibility of content but may also serve as catalysts for users to seek additional information. Considering Instagram's visual-centric design, its support for narrative content, and its strong mobile user base, the platform may act as a critical medium for facilitating behavioral transformation in digital public health campaigns.

Table 8: Differences in engagement between posts with and without Google Trends search volume increases

Platform	Variable	Z Value	p Value	Interpretation
X	**Likes**	-1.428	0.153	No significant difference
	Reposts	-1.617	0.106	No significant difference
	Total Engagement	-1.051	0.293	No significant difference
	Views	-0.755	0.450	No significant difference
Instagram	**Likes**	-1.967	0.049	Significant difference (borderline)
	Reposts	-2.991	0.003	Significant difference
	Total Engagement	-1.752	0.080	No significant difference (borderline)

Note: Mann–Whitney U test results. Significance assessed at $p < .05$ level.

In order to determine whether there were statistically significant differences in social media engagement levels between posts that did and did not generate increased search volume on Google Trends, Mann–Whitney U tests were conducted separately for each platform. The findings are summarized in Table 8.

For the X platform, no statistically significant differences were found in likes ($Z = -1.428$, $p = .153$), reposts ($Z = -1.617$, $p = .106$), total engagement ($Z = -1.051$, $p = .293$), or views ($Z = -0.755$, $p = .450$). These results suggest that the level of user engagement with content on the X platform may not directly reflect the content's impact on public search behavior. Factors such as posting time,

algorithmic visibility, and user interaction patterns may play a role in mediating this relationship.

In contrast, the findings for the Instagram platform were more notable. A statistically significant difference was observed in repost counts (Z = -2.991, p = .003), indicating that posts associated with Google Trends spikes were more frequently shared by users. Similarly, a marginally significant difference was identified in like counts (Z = -1.967, p = .049). Although total engagement did not reach the conventional threshold for significance, it approached that level (Z = -1.752, p = .080).

These results suggest that highly engaging content on Instagram may have a stronger capacity to stimulate online public information-seeking behavior. In particular, reposts—representing active user participation—may enhance both content visibility and the likelihood of further search activity. These findings underscore Instagram's potential as a strategic platform in public health communication**.**

4. DISCUSSION

This study aimed to holistically evaluate the impact of digital health communication by examining both social media engagement and user information-seeking behavior. The findings revealed that a number of health-related posts shared by the Turkish Ministry of Health on Instagram and X (formerly Twitter) were associated with simultaneous spikes in Google Trends search volumes. In particular, posts with high engagement on the Instagram platform were found to significantly influence public online health information-seeking behavior. This suggests that social media content serves not only to enhance visibility but also to stimulate active search behaviors among the public [6, 11].

The study specifically found that reposts and likes on Instagram were significantly associated with increased search volume on Google Trends. This finding indicates that emotionally charged content, especially on visual-oriented platforms, encourages greater user participation, which may in turn translate into higher levels of information-seeking behavior. Consistent with prior studies, emotionally resonant messages, personal narratives, and content linked to symbolic awareness days have been shown to generate greater public awareness in health campaigns [7, 12].

On the other hand, no significant association was found between engagement metrics and Google Trends search volume on the X platform. This may be due to differing platform dynamics. Existing literature suggests that X functions more as a news-oriented and message-dissemination platform, whereas Instagram offers a more suitable environment for emotional and visual engagement [1, 13]. Therefore, the effect of health-related content on user behavior is not solely a function of content type, but also of the functional structure of the platform itself [2].

Regarding timing, the analysis revealed that the time of day at which posts were shared on X had no significant effect on engagement. This result aligns with the algorithm-driven nature of social media platforms, where content visibility is not necessarily determined by the original posting time [2]. While there was a statistically significant difference in view counts across timeframes, post-hoc analyses revealed that pairwise differences were not statistically significant. This indicates that further, larger-scale analyses are needed to clarify the role of timing strategies in optimizing content visibility.

Correlation analyses showed a strong relationship between views and likes, suggesting that visibility directly influences passive forms of engagement. However, reposts and comments which require more active user involvement were less affected by view counts. This finding implies that different dynamics operate at various stages of user interaction, ranging from passive exposure to active engagement [14].

In conclusion, this study addresses a critical gap in the literature by analyzing the effectiveness of digital public health campaigns from both behavioral and content-based perspectives. Nonetheless, future research should examine in greater detail the roles of algorithmic visibility, content format, platform-specific dynamics, and audience segmentation in shaping user responses and campaign outcomes.

5. Conclusion and Recommendations

This study provides critical insights into the engagement levels of digital public health campaigns carried out by the Turkish Ministry of Health on social media platforms and evaluates their impact on public health information-seeking behavior. The findings indicate that content with high engagement on Instagram is often associated with notable increases in Google Trends search volumes related to health topics. In contrast, no statistically significant relationship was found on the X platform, suggesting that platform-specific user dynamics and algorithmic structures play a decisive role in determining content effectiveness.

Another key finding of the study is the strong correlation between views and likes, indicating that increased visibility is more likely to elicit passive forms of engagement such as likes. However, active engagement behaviors, such as comments and reposts, occurred less frequently and appear to be influenced by different factors. While content shared at different times of day showed some variation in visibility, the direction and strength of this effect remain inconclusive.

Based on these findings, the following recommendations are proposed:

1. Develop targeted content strategies. Content that evokes emotional responses, aligns with symbolic awareness days, or involves repeated messaging tends to stimulate higher levels of information-seeking. Health authorities should strategically integrate such content into their digital communication calendars.

2. Design platform-specific communication plans. Visual and mobile-focused platforms like Instagram offer greater potential for public health outreach. Therefore, content should be adapted to suit the functional and audience-specific features of each platform.

3. Disaggregate performance metrics by interaction type. Different types of engagement likes, comments, and shares reflect different levels of user intent. Campaign evaluations should therefore analyze engagement patterns separately to better understand user response dynamics.

4. Promote data-driven campaign management. Health institutions should incorporate open data sources (e.g., Google Trends, platform analytics) into real-time monitoring systems, enabling the dynamic optimization of content effectiveness.

5. Monitor long-term impact and behavioral change. This study focuses on short-term information-seeking behavior. However, future research should include longitudinal analyses, user experience studies, and cross-platform comparisons to evaluate the lasting effects of digital public health interventions.

Author Contributions

GSA.: Study design, Data collection, Statistical analysis, Results interpretation, Critical revision. CB.: Literature review, Methodology design, Article writing, English editing, Final approval. All authors have read and approved the final version of the manuscript.

Conflict of Interest

No conflict of interest is declared by tehe authors. In addition, no financial support was received.

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