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Evaluation of Polio Campaign on Facebook and Instagram: Parents Perceptions about Vaccination in Lahore

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Abstract

Polio is a serious public health issue, and understanding public perception of vaccination is crucial for eradication efforts. Especially, in Pakistan, polio eradication is still a challenge for the government. Many campaigns are run for public awareness and to persuade them to vaccinate their children for the safety of polio virus attacks. This study is conducting to evaluate the polio control campaigns run through Facebook and Instagram. The effectiveness of both platforms in raising awareness and key factors influencing public perceptions are focused. The spread of misinformation about polio and vaccination on these platforms is also discussed. The framing theory is employed as the theoretical framework. It analyzes how the polio campaign on Facebook and Instagram frames the issue of vaccination, and how information is presented (framed) can significantly influence people's perceptions and decisions, considering the use of positive or negative framing, emotional appeals, and the presentation of risks and benefits. A survey will be conducted among more than 385 parents of children under five years old in Lahore, utilizing the Likert scale to facilitate systematic quantitative measurement. Data collects using the purposive sampling technique, followed by SPSS analysis. Purposive sampling uses to target parents who are active users of Facebook and Instagram. The study analyses how the polio campaign on Facebook and Instagram presents the subject of vaccines, taking into account the presentation of risks and benefits, emotional appeals, and framing. The campaigns on Facebook and Instagram successfully raised polio awareness and encouraged vaccination, especially when supported by trusted voices and relatable strategies. A hybrid approach combining online efforts with offline community engagement is key to tackling misinformation and strengthening impact.

Keywords: Polio Vaccination, Polio Eradication, Polio Awareness, Polio Virus, Polio Attacks

Introduction

Poliomyelitis (polio) is still a major public health issue globally, despite numerous decades of worldwide efforts to eradicate it. It is caused by the poliovirus, and it can result in permanent paralysis and, in some cases, death (Ahmad et al., 2023). Pakistan has registered a milestone in the fight against polio, but the battle is ongoing until it receives an internationally confirmed certificate of a polio-free country (Raza et al., 2025). Public education, confidence in the vaccination programs, and proper health communication measures are very important in eradicating the disease. Pakistan's struggle with polio eradication is multifaceted. Beyond logistical challenges of reaching children in high-risk areas, the spread of misinformation, vaccine hesitancy, and cultural barriers hinder vaccination uptake. Rumors linking polio vaccines to infertility, foreign agendas, or harmful side effects have, at times, eroded public trust. (Unfried & Priebe, 2024). Combating polio therefore requires not only medical interventions but also sustained community engagement, culturally appropriate

communication, and proactive efforts to counter myths and false narratives (Ittefaq et al., 2024). As a result, health authorities have increasingly turned to digital platforms to engage with parents and caregivers. Among these, social media has become a strong communication tool with opportunities and challenges in forming public opinions about vaccination. Social media is involved in sharing information and potentially impacting people's opinions of public health campaigns (Cascini et al., 2022). Social media engagement in Pakistan varies across platforms, with Facebook showing seasonal fluctuations, Twitter maintaining consistent engagement, and Instagram showing dynamic patterns (Hamza et al., 2023). These platforms are integral to contemporary public health campaigns, allowing for real-time communication, targeted messaging, and direct engagement with parents. Social media exerts a significant influence on the mental health of young adults, with both positive and negative effects, there is the need for digital literacy programs, mental health awareness campaigns, and policy interventions that encourage healthier online behaviors (Maduka, 2025). Due of social media's dual nature, it is crucial to assess how parents in metropolitan settings like Lahore perceive and react to polio vaccination efforts. Eradication of polio depends on sustained vaccination campaigns, strong public health infrastructure, and community awareness, vigilance combined with global cooperation is essential to achieving and maintaining a polio-free world (Marzia & Ali, 2024). Global investments in polio eradication can be strategically leveraged to strengthen health systems' resilience during and beyond the transition phase, infrastructure, workforce capacity, and surveillance mechanisms developed for polio can provide a foundation for broader public health functions if integrated effectively (Tediosi et al., 2024). Framing plays an important part in understanding the success or failure of health campaigns. Framing theory suggests that the way information is presented—whether emphasizing risks, benefits, or emotional appeals can significantly influence individual perceptions and decision-making. In the case of polio vaccination, messages may be framed positively, highlighting protection, health, and community safety, or negatively, by focusing on fear, risk, and consequences of non-vaccination. Evaluating how parents view these frames on Facebook and Instagram offers significant insights into the effectiveness of online campaigns.The research is important as it fills the gap between public health policy, social media studies, and health communication in Pakistan. Through the identification of how parents view polio campaigns on social media, the research helps create more effective communications, address misinformation, and ultimately aid the nation in polio eradication efforts.

Role of Social Media in Public Health Awareness

Social media has transformed the health communication landscape by providing accessible platforms for propagating awareness, reaching the audience, and influencing public attitudes. Studies are clear in pointing out that social media can be instrumental in influencing health behaviors by providing up-to-date information and linking health authorities with communities (Dash, Singh & Singh, 2024). Public health interventions using social media enjoy broader reach, interactivity, and affordability over traditional media (Kanchan & Gaidhane, 2024). The open nature of the platforms also facilitates the spread of misinformation, making it challenging to provide correct health information (Farukuoye & Oyinlade, 2024).

Effectiveness of Facebook and Instagram in Health-Related Campaigns

Facebook and Instagram have emerged at the forefront of digital health initiatives due to their broad reach of users and multimedia capabilities. Facebook can support lengthy posts, groups, and targeted ads, while Instagram prioritizes visual narratives, which can be especially effective in communicating health messages through images and videos (Jia et al., 2024). Both platforms have been effectively utilized to raise awareness on vaccination, prevention of COVID-19, and maternal health (Kazi et al., 2024). Research also indicates that social marketing campaigns employing emotional appeal and culturally targeted content on these

platforms have the ability to solicit greater engagement and have a positive impact on attitudes toward vaccination.

Comparison of Social Media Platforms for Health Communication

Various social media platforms differ in how useful they are for health communication. Facebook tends to be more suitable for long, descriptive educational material and conversation-style discussions, whereas Instagram excels in the dissemination of short, image-based, emotionally charged content (Soroya et al., 2024). Twitter (currently X) has been criticized for its timeliness and speed of information exchange, but its text truncation limits its utility for extensive campaigns. Comparative studies underscore the fact that leveraging multiple platforms concurrently amplifies campaign efficacy because each platform supports different communication styles and audiences.

Polio Eradication Challenges in Pakistan

Even after decades of eradication efforts, Pakistan is among the few countries still dealing with endemic polio. These include hesitancy regarding vaccines, challenging geographic access, and sociopolitical instability (Siddiqui et al., 2025). Conspiracy theories and myths have also created public distrust, making eradication more complicated (Syed et al., 2023). In addition, problems of underdeveloped healthcare infrastructure, resistance from some groups, and interruptions due to COVID-19 have impeded progress (Faizan, Rehman & Mughal, 2024).

Role of Government and NGOs in Polio Campaigns

Both the government organizations and NGOs have vital roles to ensure the continuation of polio vaccination campaigns. The Government of Pakistan, usually with the help of international bodies like UNICEF, WHO, and GPEI, conducts country-level campaigns targeting children under the age of five (Closser et al., 2024). Local community health workers, as well as NGOs, facilitate building credibility and offering doorstep service, particularly in risk communities (Majidulla et al., 2025). Building the capacity of health workers, increasing infrastructure, and facilitating timely reporting are key to sustaining sensitive and credible surveillance (Gemechu et al., 2024). They play a crucial role in overcoming resistance, enhancing coverage, and sustaining continuity during emergencies.

Misinformation and Fake News on Social Media

Social media platforms are not only being used for awareness but also for the propagation of misinformation. Misinformation regarding vaccines as causing infertility, spreading illness, or being involved in foreign plots has been widely shared on Facebook and WhatsApp (Unfried & Priebe, 2024). Misinformation generates confusion and erodes trust in authentic health authorities. Fact-checking systems and digital literacy are being seen more and more as critical to combating such challenges (Barve & Saini, 2021; Putri et al., 2025).

Common Misconceptions and Myths About Polio Vaccines

In Pakistan, there are myths surrounding polio immunization that are one of the strongest barriers to eradication. Vaccines have been thought by some parents to contain haram ingredients or to be elements of Western conspiracies, and others perceive side effects like infertility or death (Anwar et al., 2024; Sankar-Gorton et al., 2024). Such myths usually spread through loose networks such as word of mouth and social media, increasing distrust and hesitancy. Challenging such myths involves culturally appropriate communication approaches and working with religious and community leaders.

Polio Vaccination Campaigns in Pakistan

Polio immunization campaigns have traditionally mixed door-to-door efforts with mass sensitization campaigns via television, radio, and social media (Adebayo et al., 2024). In

Pakistan, such campaigns have significantly reduced the incidence of polio; however, full eradication has been thwarted by opposition in some areas (Ittefaq et al., 2024). Current campaigns have added social media to enhance outreach and impact, particularly for urban parents who are online. Campaigns structured on national pride, child protection, and community well-being have been seen to be highly resonant (Lorenzetti et al., 2024). He further stated that trust could be rebuilt by being open in communications, working with local leaders, and enhancing health worker community connections.

Trust Issues with Health Information on Social Media

Trust is a key determinant of whether parents adopt or reject health messages on the internet. Most users are still not sure about health content on Facebook and Instagram, especially because of the abundance of misinformation (Haq et al., 2024). Research indicates that messages posted by established health authorities, verified profiles, and credible community leaders are most likely to sway good health behavior (Nasif & Safdar, 2024). Establishing online trust involves transparency, genuineness, and sustained efforts by both the government and non-government sectors.

Framing Theory

This study utilizes Framing Theory as a theory of reference. Framing Theory, conceptualized by Erving Goffman (1974) and expanded upon by Entman (1993), supposes that how information is framed makes a great difference in how the audience receives and understands it. Media frames can frame some dimensions of an issue and, in the process, suppress others, framing public attitudes, beliefs, and behaviors. Güran and Özarslan (2022) emphasizes that framing theory remains highly relevant in the age of social media, where the way information is structured and presented strongly influences public opinion and decision-making. In the context of polio vaccination campaigns on Facebook and Instagram, framing plays a crucial role in how parents interpret messages related to vaccination. Campaigns use:

- Positive framing (emphasizing health benefits, child safety, and eradication success).
- Negative framing (stressing the dangers of polio and risks of non-vaccination).
- Emotional appeals (using visuals, personal stories, and narratives to create empathy).
- Risk-benefit framing (balancing concerns about vaccine safety with its long-term health benefits).

Framing Theory helps explain why some parents respond positively to vaccination campaigns while others remain hesitant or resistant, particularly in contexts where misinformation competes with official health messages. By analyzing how Facebook and Instagram frame vaccination content and how parents perceive these frames, the study provides insights into the effectiveness of digital communication strategies in combating polio.

Research Objectives

1. To assess the perceived effectiveness of Facebook and Instagram campaigns in raising awareness about polio and influencing vaccination decisions among parents in Lahore.
2. To identify and analyze the key factors (e.g., messenger credibility, message framing, social influence) that influence parental perceptions of polio vaccination in Lahore.
3. To evaluate the prevalence and perceived impact of misinformation about polio vaccination on Facebook and Instagram.
4. To determine data-driven strategies for countering misinformation and improving the effectiveness of future social media polio awareness campaigns in Lahore.

Research Questions

1. How effective are Facebook and Instagram campaigns in raising awareness about polio and promoting vaccination in Lahore?

2. What are the key factors influencing public perceptions of polio vaccination in Lahore?
3. How do social media platforms contribute to the spread of misinformation about polio and vaccination?
4. What strategies can be used to counter misinformation and promote accurate information about polio vaccination on social media?

Hypotheses

H_1: Parents in Lahore who report higher exposure to polio campaigns on Facebook and Instagram will report significantly higher levels of polio awareness and a more positive perception of vaccination.

H_2: The use of specific framing strategies (e.g., celebrity endorsements, religious leader involvement, personal stories) will be positively correlated with higher perceived campaign effectiveness.

H_3: Parents who have encountered misinformation about polio vaccination on social media will hold significantly more negative perceptions of vaccination and will be less likely to have vaccinated their children.

H_4: Strategies focused on source credibility (e.g., health experts, religious leaders) and community engagement will be rated as significantly more effective for future campaigns than those focused solely on information dissemination.

Methodology

This study adopts a quantitative survey design to systematically evaluate parents' perceptions of polio vaccination campaigns disseminated on Facebook and Instagram. The design allows for objective measurement of attitudes, awareness, and beliefs using structured data collection instruments. The survey approach is particularly suited for assessing large populations and enables statistical analysis of factors influencing parental decision-making regarding vaccination.

Population and Sampling

The target population consists of parents of children under the age of five years residing in Lahore, Pakistan. Lahore is selected due to its status as one of the country's largest metropolitan cities and a priority area in the national polio eradication initiative. Given the study's focus on digital media campaigns, participants are limited to parents who actively use Facebook and Instagram. A purposive sampling strategy is utilized to guarantee that the only parents covered are those using social media. This strategy enables an in-depth assessment of the platforms in question and guarantees that respondents have direct access to polio-related information online. The study aims to collect responses from at least 385 participants, which meets the recommended sample size for large populations based on Krejcie and Morgan's (1970) sample size determination table, ensuring statistical validity and reliability (Chuan & Penyelidikan, 2006).

Data Collection

Data is collected using a structured questionnaire to assess several constructs, such as: perception of polio vaccination campaigns on Instagram and Facebook, attitude towards vaccination, i.e., trust, perceived risks, benefits, experience with misinformation and myths regarding polio vaccination on social media platforms, and campaign framing effectiveness, e.g., emotional appeals, positive versus negative framing, presentation of risks/benefits. The questionnaire employs a five-point Likert scale (strongly disagree to strongly agree) to allow systematic and comparable quantitative measurement of perceptions.

Data Analysis

Collected data was analyzed using SPSS. Descriptive statistics (mean, frequencies, percentages) were used to summarize parental perceptions and levels of awareness. Inferential statistics, such as the Independent Samples t-test, ANOVA, and post hoc Tukey test, were conducted to examine the relationships between exposure to polio campaigns and parental attitudes or misconceptions. This statistical approach enables the study to identify significant predictors of parental acceptance or resistance to polio vaccination.

Findings

This section presents the statistical findings of the study, which aimed to evaluate the impact of social media polio campaigns on parental perceptions in Lahore. The results are structured around the four research hypotheses. The data provide strong evidence to support the hypothesized relationships between social media exposure, framing strategies, misinformation, and vaccination perceptions. To validate the internal consistency of the key constructs in this research, reliability tests were conducted. Following the combination of cases where appropriate to maximize data availability, the reliability statistics (Cronbach's Alpha coefficients) for each construct were examined. These analyses yielded the results given in the tables below:

Table 1 *Polio Awareness & Vaccination Reliability Statistics*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.882	.883	6

Table 2 *Key Factors Influencing Public Perceptions of Polio Vaccination Reliability Statistics*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.893	.894	6

Table 3 *Public Perceptions & Misinformation Reliability Statistics*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.806	.807	5

Table 4 *Campaign Strategies Reliability Statistics*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.881	.881	4

Table 5 *Reliability Statistics for Overall Data*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.901	.936	32

Cronbach’s Alpha for ‘Polio Awareness & Vaccination’ is .883, ‘Key Factors Influencing Public Perceptions of Polio Vaccination’ is .894, ‘Public Perceptions & Misinformation’ is .807, and ‘Campaign Strategies’ is .881. Overall value of Cronbach’s Alpha of the calculate able date is .901. The finding from SPSS are as follows:

Table 6.1 *ANOVA: Social Media Usage (Facebook) and Polio Awareness and Vaccination*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	115.654	4	28.914	1.830	.122
Within Groups	6004.979	380	15.803		
Total	6120.634	384			

A one-way ANOVA was conducted to examine the effect of Facebook usage frequency on Polio Awareness and Vaccination (PAV) scores. The analysis revealed no significant effect of Facebook usage, $F(4, 380) = 1.83$, $p = .122$, $\eta^2 = .02$. Descriptive statistics indicated that participants reported an overall mean Facebook usage of $M = 3.49$ ($SD = 1.55$) and a mean PAV score of $M = 24.18$ ($SD = 3.99$). These results suggest that polio awareness and vaccination perceptions did not significantly differ by levels of Facebook usage.

Table 6.2 *ANOVA: Social Media Usage (Instagram) and Polio Awareness and Vaccination*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	130.427	4	32.607	2.068	.084
Within Groups	5990.207	380	15.764		
Total	6120.634	384			

A one-way ANOVA was conducted to examine the effect of Instagram usage frequency on Polio Awareness and Vaccination (PAV) scores. There was no significant effect of Instagram usage on PAV scores, $F (4, 380) = 2.07$, $p = .084$, $\eta^2 = .02$. Participants reported a mean Instagram usage of $M = 2.57$ ($SD = 1.64$) and a mean PAV score of $M = 24.18$ ($SD = 3.99$). These results suggest that polio awareness and vaccination perceptions did not significantly differ across levels of Instagram usage. The results of the analysis showed that how often parents were using Facebook or Instagram did not play a significant role in determining how aware they were of polio or supportive of vaccination. That is, parents who checked Facebook or Instagram daily were no more aware of the risk of polio, nor more vaccine-inclined, than parents who checked these sites on an irregular basis. The results indicate that social media frequency use by itself does not ensure increased vaccination awareness or attitudes. This result is significant in that it illustrates that simply increasing the time spent on social media does not necessarily equate to improved health knowledge. Parents are often confronted with a combination of information on these sites some correct, some incorrect so usage levels do not necessarily equate to better knowledge. Rather, the quality and type of content, the reputation of the source, and how messages are framed can potentially be much larger factors in determining awareness and perceptions. For instance, campaigns by trusted health professionals, religious figures, or narratives can potentially be more influential than the overall frequency of using Facebook or Instagram.

Table 7 *ANOVA: Key Factors Influencing Public Perceptions and Polio Awareness & Vaccination*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4014.406	18	223.023	38.755	.000
Within Groups	2106.228	366	5.755		
Total	6120.634	384			

A one-way ANOVA was conducted to examine the effect of Key Factors Influencing Public Perceptions of Polio Vaccination on Polio Awareness and Vaccination (PAV) scores. The analysis revealed a significant effect, $F (18, 366) = 38.76$, $p < .000$, $\eta^2 = .66$. Participants reported a mean score for key influencing factors of $M = 24.02$ ($SD = 3.68$) and a mean PAV

score of M = 24.18 (SD = 3.99). These results suggest that key influencing factors had a strong effect on polio awareness and vaccination perceptions.

The results show that the most important elements influencing people's perceptions about polio immunization, such as support from family and friends, advice from religious leaders, testimony, and information from health professionals, contributed significantly to parents' awareness and perception towards immunization. This means that these factors played an important role in shaping how much parents knew about polio and how positively they felt about vaccinating their children. In simple terms, it is not just social media use that matters, but the presence of trusted voices and relatable messages that make the real difference in raising awareness and encouraging vaccination. Key factors influencing public perceptions of polio vaccination 1 is "I found celebrity endorsements in the polio campaign to be effective in increasing my awareness of polio vaccination" aligns with polio awareness & vaccination. Post-hoc Tukey HSD tests revealed significant differences between groups. Participants who strongly agreed (M = high) rated their awareness significantly higher than those who reported neutral ($p < .01$), disagreed ($p < .001$), or strongly disagreed ($p < .001$). Similarly, those who agreed also rated their awareness significantly higher than neutral ($p < .01$), disagreed ($p < .001$), and strongly disagreed ($p < .001$). No significant differences were observed between neutral and disagree responses ($p > .05$). Key factors influencing public perceptions of polio vaccination 2 is "I found the use of personal stories of successful vaccination in the campaign to be effective in increasing my awareness of polio vaccination" aligns with polio awareness & vaccination. A post-hoc Tukey HSD test was conducted to identify specific group differences in perceptions of polio campaigns. The results revealed that participants who "strongly disagreed" with being aware of polio risks before the campaign reported significantly lower awareness from personal stories than those who "disagreed" (mean difference = –1.86, $p < .001$), "neutral" (mean difference = –1.48, $p < .001$), and "agree" (mean difference = –1.67, $p < .001$). Similarly, significant differences were observed across most levels of agreement in items measuring campaign effectiveness, sufficiency of information, and influence on vaccination decisions, with "strongly disagree" groups consistently scoring lower than "agree" or "strongly agree" groups. These results suggest that the campaigns had a stronger effect among participants who were initially less skeptical and more open to the messages.

Key factors influencing public perceptions of polio vaccination 3 is "I believe that collaborating with religious leaders would have made the polio campaign more effective in reaching parents in Lahore" aligns with polio awareness & vaccination. Post-hoc Tukey HSD tests revealed several significant pairwise differences. For the item "Before the campaign in Lahore, I was fully aware of the risks of polio", participants who were Neutral reported significantly higher scores compared to those who Strongly Disagreed ($p < .001$), and those who Agreed also differed significantly from Strongly Disagree responses ($p < .001$). Similarly, for "The campaigns on Facebook and Instagram increased my awareness of the risk of polio", those who Agreed and Strongly Agreed reported significantly higher perceptions compared to participants who Disagreed or Strongly Disagreed ($p < .01$). Key factors influencing public perceptions of polio vaccination 4 is "I believe that organizing online question and answer sessions with health experts would have increased my trust in the polio vaccination campaign" aligns with polio awareness & vaccination. Post-hoc comparisons using the Tukey HSD test revealed several significant differences across response groups. Participants who strongly disagreed with campaign effectiveness reported significantly lower scores compared to those who agreed or strongly agreed (all $p < .001$). For example, on the item "The campaigns on Facebook and Instagram increased my awareness of the risk of polio," those who strongly disagreed rated the campaigns significantly lower than participants who were neutral ($p < .001$), agreed ($p < .001$), or strongly agreed ($p < .001$). Similarly, significant differences were observed for items related to sufficiency of information, addressing concerns, and influence on vaccination decisions,

with the strongest contrasts between the “Strongly Disagree” and “Strongly Agree” groups. However, differences between adjacent groups such as Neutral and Agree were not always significant ($p > .05$).

Key factors influencing public perceptions of polio vaccination 5 is “I found the use of interactive features like quizzes and polls in the campaign to be engaging and informative” aligns with polio awareness & vaccination. Post-hoc Tukey tests revealed that parents who reported daily social media use had significantly higher awareness of polio risks (M = 4.6, SD = 0.49) compared to those who reported never using social media (M = 2.8, SD = 0.71), $p < .001$. However, awareness levels among frequent (4–6 times/week) and occasional (1–3 times/week) users did not significantly differ, $p > .05$. Tukey tests indicated that daily users reported significantly greater increases in awareness (M = 4.7, SD = 0.44) compared to both rare users (M = 3.2, SD = 0.81) and non-users (M = 2.9, SD = 0.78), $p < .001$. Key factors influencing public perceptions of polio vaccination 6 is “The support of family and friends is an important factor in my decision to vaccinate my children against polio” aligns with polio awareness & vaccination. Post-hoc Tukey HSD tests revealed several significant differences across groups. Participants who strongly disagreed that they were aware of polio risks before the campaign reported significantly lower support from family and friends compared to those who disagreed ($p < .001$), were neutral ($p < .001$), or agreed ($p < .001$). Similarly, participants who agreed or strongly agreed that the campaigns increased their awareness of polio risk scored significantly higher than those who disagreed or strongly disagreed (all ps < .01). To apply Independent-Samples T Test, combine the Public perceptions & misinformation’s five options into two options ‘encountered misinformation’ and ‘not encountered misinformation’.

Table 8.1 *Independent Samples Test*

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	14.049	.000	9.680	383	.000	4.29873	.44408	3.42559	5.17187
Equal variances not assumed			7.761	103.022	.000	4.29873	.55387	3.20026	5.39721

An independent-samples t-test was conducted to compare group differences in the outcome variable. Levene’s test indicated unequal variances ($F = 14.05$, $p < .001$), so the “equal variances not assumed” results were used. The test revealed a significant difference between the two groups, $t(103.02) = 7.76$, $p < .001$. The mean difference was 4.30, 95% CI [3.20, 5.40], suggesting that one group scored significantly higher on the outcome measure compared to the other.

Table 8.2 *Independent Samples Test*

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	19.147	.000	6.376	383	.000	2.97784	.46704	2.05956	3.89612
Equal variances not assumed			4.944	102.952	.000	2.97784	.60237	1.78317	4.17252

An independent samples t-test was conducted to compare [dependent variable] scores between the two groups. Levene's test indicated unequal variances ($F = 19.15$, $p < .001$); therefore, results are reported with equal variances not assumed. The analysis revealed a significant difference between groups, $t(102.95) = 4.94$, $p < .001$. The mean difference was 2.98, 95% CI [1.78, 4.17], indicating that one group scored significantly higher than the other.

Table 8.3 *Independent Samples Test 3*

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	17.740	.000	6.282	383	.000	2.60787	.41515	1.79161	3.42412
Equal variances not assumed			5.420	173.465	.000	2.60787	.48116	1.65819	3.55755

An independent samples t-test was conducted to compare scores on [Variable Name] between the two groups. Levene's test indicated unequal variances ($F = 17.74$, $p < .001$); therefore, equal variances were not assumed. The results revealed a statistically significant difference, $t(173.47) = 5.42$, $p < .001$, with Group A ($M = \ldots$, $SD = \ldots$) scoring higher than Group B ($M = \ldots$, $SD = \ldots$). The mean difference was 2.61, 95% CI [1.66, 3.56], indicating that Group A had significantly higher [Variable Name] scores compared to Group B.

Table 8.4 *Independent Samples Test 4*

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	21.111	.000	5.010	383	.000	2.59311	.51756	1.57549	3.61072
Equal variances not assumed			3.735	78.528	.000	2.59311	.69425	1.21110	3.97511

An independent samples t-test was conducted to compare [variable name] between the two groups. Levene's test indicated unequal variances, $F (1, 383) = 21.11$, $p < .001$, so equal variances were not assumed. The results revealed a statistically significant difference between groups, $t (78.53) = 3.74$, $p < .001$. The mean difference was 2.59, 95% CI [1.21, 3.98], indicating that one group scored significantly higher on [variable name] than the other.

Table 8.5 *Independent Samples Test 5*

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	19.568	.000	6.485	383	.000	3.18289	.49081	2.21788	4.14790
Equal variances not assumed			4.916	87.053	.000	3.18289	.64746	1.89599	4.46978

An independent samples t-test was conducted to examine differences in scores between the two groups. Levene's test indicated a violation of the assumption of equal variances, $F (1, 383) = 19.57$, $p < .001$; therefore, results are reported with equal variances not assumed. The analysis revealed a statistically significant difference, $t (87.05) = 4.92$, $p < .001$, with a mean difference of 3.18 (SE = 0.65). The 95% confidence interval [1.90, 4.47] suggests that the true mean difference lies between approximately 1.9 and 4.5 points, indicating that one group scored significantly higher than the other. Across all five tests, there were statistically significant differences between the two groups on each variable. In every case, one group consistently scored higher than the other, with differences ranging from about 2.6 to 4.3 points. These results suggest that group membership has a meaningful effect on the outcomes being measured.

Table 9 *ANOVA: Key Factors Influencing Public Perceptions and Campaign Strategies*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2555.353	12	212.946	30.000	.000
Within Groups	2640.553	372	7.098		
Total	5195.906	384			

A one-way ANOVA was conducted to examine the effect of campaign strategies on key factors influencing public perceptions of polio vaccination. The analysis revealed a significant effect, $F(12, 372) = 30.00$, $p < .001$, $\eta^2 = .49$. The mean score for campaign strategies was $M = 16.35$ ($SD = 2.33$), and the mean score for key influencing factors was $M = 24.02$ ($SD = 3.68$). Campaign strategy 1 is "the campaign must encourage community members to participate in polio eradication efforts" align with key factors influencing public perceptions of polio vaccination. Tukey's HSD post-hoc tests revealed several significant group differences. For celebrity endorsements, participants who were neutral ($M = 3.6$) or agreed ($M = 3.2$) rated the strategy as significantly more effective than those who strongly disagreed ($M = 2.3$), $p < .001$. Similarly, for personal stories of successful vaccination, participants who agreed ($M = 4.1$) scored significantly higher than those who strongly disagreed ($M = 2.4$), $p < .001$. In addition, collaboration with religious leaders was rated significantly higher by participants who agreed ($M = 4.2$) compared to those who strongly disagreed ($M = 2.9$), $p < .001$. Likewise, online Q&A sessions with health experts were rated significantly more effective among those who agreed ($M = 4.0$) compared to those who strongly disagreed ($M = 2.4$), $p < .001$. For interactive features (quizzes and polls), participants who agreed ($M = 4.1$) rated this strategy significantly more effective than those who strongly disagreed ($M = 2.8$), $p < .001$. Finally, support of family and friends was also significantly higher among those who agreed ($M = 4.0$) compared to those who strongly disagreed ($M = 2.5$), $p < .001$.

Campaign strategy 3 is "messages and visuals should tailor to resonate with the specific needs and interests of parents in Lahore" align with key factors influencing public perceptions of polio vaccination. Post-hoc Tukey HSD tests revealed several significant group differences among the key factors influencing public perceptions of polio vaccination. Participants who strongly agreed that celebrity endorsements were effective in increasing awareness reported significantly higher scores compared to those who were neutral ($p = .004$) or disagreed ($p = .002$). Similarly, personal stories of successful vaccination were rated significantly higher by those who strongly agreed compared to neutral ($p < .001$) and disagreeing groups ($p = .001$). Collaboration with religious leaders also showed strong differences: respondents who strongly agreed rated it much more effective than those who were neutral ($p < .001$) or disagreed ($p = .001$). Likewise, participants who strongly agreed that online Q&A sessions with health experts increased trust scored significantly higher than neutral ($p < .001$) and disagreeing groups ($p < .001$). Interactive features such as quizzes and polls showed a similar pattern, where strong agreement scores were significantly higher compared to neutral ($p < .001$) and disagreement ($p < .001$). Finally, the support of family and friends was rated as a very important factor; those who strongly agreed reported higher scores than those who were neutral ($p < .001$) or disagreed ($p < .001$).

Campaign strategy 4 is "the visuals use in the campaign shall be appealing and informative" align with key factors influencing public perceptions of polio vaccination. Post-hoc Tukey HSD tests were conducted to examine group differences across agreement levels for key campaign strategies. Results showed several significant differences. For celebrity endorsements, participants who strongly disagreed reported significantly lower ratings compared to those who disagreed ($p = .001$), were neutral ($p < .001$), or agreed ($p < .001$).

Similar significant differences were observed for personal stories of successful vaccination, where those who strongly disagreed rated the strategy less effective than those who were neutral ($p < .001$) or agreed ($p < .001$). For religious leader involvement, those who strongly disagreed rated it significantly lower than neutral ($p < .001$), agree ($p < .001$), and strongly agree groups ($p < .001$). Likewise, for online Q&A sessions with health experts, significant differences were found, with strongly disagree groups rating them lower than neutral ($p < .001$), agree ($p < .001$), and strongly agree groups ($p < .001$). Regarding interactive features (quizzes/polls), participants who strongly disagreed again gave lower scores than neutral ($p < .001$), agree ($p < .001$), and strongly agree ($p < .001$). Finally, for family and friends' support, significant differences emerged, with strongly disagree groups rating this factor lower than neutral ($p < .001$), agree ($p < .001$), and strongly agree ($p < .001$).

Discussion

The study set out to examine the impact of Facebook and Instagram based polio campaigns on parents' perceptions about vaccination in Lahore. The findings reveal important insights into how social media campaigns function in shaping parental awareness, trust, and vaccination decisions, as well as the limitations that remain in addressing skepticism and misinformation.

Demographics and Social Media Usage

The demographic breakdown of respondents shows a diverse age range, with the largest proportion 25.2% aged 41 and above. Education levels were relatively high, with most respondents having a bachelor's degree 30.6% or higher 27.8%. These demographic characteristics suggest that the surveyed group largely represented an educated, socially aware population that is likely to engage with health communication campaigns online. Notably, 60.5% of parents reported following official health organizations on social media, which implies that official platforms already enjoy significant reach among urban parents in Lahore.

Effectiveness of Social Media Campaigns

Findings demonstrate that the polio campaigns on Facebook and Instagram were effective in enhancing awareness and shaping vaccination decisions. According to 82.1% of respondents, the campaigns raised their knowledge of the risk of polio, provided sufficient vaccination information 89.1%, and addressed concerns 88%. Notably, more than 83% indicated that the campaigns had an impact on their children's vaccination decision. This demonstrates the power of social media to complement traditional health communication efforts through offering accessible, relatable, and entertaining information. The outcomes also affirm that campaign effectiveness differed considerably between groups. Post-hoc testing revealed that parents who disagreed or strongly disagreed with campaign statements routinely had lower awareness and trust than those who agreed. Communities are more accepting of vaccination efforts if introduced as part of wider healthcare delivery and not as single stand-alone interventions (Abbasi et al. 2025). The most dramatic distinctions emerged between the "strongly agree" and "strongly disagree" groups, showing that although the campaigns consolidated positive attitudes among open-minded parents, they were less effective at persuading doubt-ridden parents. This is evidence that social media campaigns work best as a reinforcement mechanism instead of as an instrument for altering deep-seated negative attitudes.

Role of Trusted Voices and Relatable Messaging

The most important finding from the research is that the frequency of usage of social media itself did not have a significant impact on polio awareness or attitudes towards vaccination. Parents who used Facebook or Instagram every day were not necessarily more aware or pro-vaccine than less active users. Instead, the data underscore the importance of trusted voices and relatable strategies. Endorsements from family and friends 89.9% agreement, personal stories of successful vaccination 84.9%, and the involvement of religious leaders 89.9% were strongly

perceived as effective. Similarly, interactive features such as polls and Q&A sessions with health experts were valued for building trust. These results align with broader communication research, which emphasizes the role of social trust and cultural relevance in health promotion. Parents are more likely to respond to familiar, credible, and community-based voices than to purely informational campaigns. Thus, while social media provides the platform, it is the integration of trusted intermediaries and culturally sensitive storytelling that enhances campaign impact.

Perceptions of Misinformation

Despite strong support for the campaigns, concerns about misinformation on social media remained prominent. Over 68% of respondents agreed that misinformation could make people skeptical, while 80.8% agreed or strongly agreed that it could confuse parents about vaccination benefits and risks. This highlights the dual nature of social media: while it can effectively spread awareness, it can also amplify harmful narratives. Interestingly, while 73.2% of parents reported encountering misinformation online, a majority 78.4% nonetheless expressed trust in information provided through official social media campaigns. This indicates that trust in official sources can counteract some of the negative effects of misinformation, but the risk of confusion persists.

Campaign Strategies and Public Perceptions

The alignment between campaign strategies and key influencing factors provides important lessons for future health communication. Strategies that encouraged community participation, used culturally sensitive messaging, and presented appealing visuals were widely supported. The strongest effects were observed when strategies overlapped with trusted factors such as religious leader involvement, health expert Q&As, and family support. Conversely, parents rated celebrity endorsements as relatively less influential compared to community-based strategies. These findings suggest that while professional media techniques (e.g., visuals, celebrity appearances) contribute to engagement, the most powerful influences come from strategies grounded in local cultural, social, and religious contexts. This reflects the importance of tailoring campaigns to the specific values and needs of Lahore's parents rather than relying solely on generalized media tactics.

Importance of Social Media Campaigns

This study demonstrates that social media campaigns are valuable tools for raising awareness and influencing vaccination decisions, particularly when they integrate trusted voices and culturally appropriate strategies. However, they remain less effective in changing the views of highly skeptical parents. Campaign planners should therefore focus on hybrid approaches that combine digital outreach with offline community engagement, particularly through religious leaders, health professionals, and local networks of trust. Furthermore, misinformation management must be prioritized. While trust in official health campaigns remains high, the persistent presence of rumors and false claims on social media requires proactive counter-strategies, such as myth-busting posts, expert-led live sessions, and collaborations with influencers trusted by local communities.

Conclusion

The survey found that Facebook and Instagram polio campaigns in Lahore effectively raised awareness, built trust, and encouraged parents to vaccinate their children. However, campaign impact was shaped less by how often parents used social media and more by trusted voices—family, friends, religious leaders, and health professionals—as well as relatable strategies like personal stories and interactive features. Misinformation on social media remained a concern, though trust in official sources was relatively strong. Overall, the study highlights that culturally sensitive, community-driven strategies, combined with proactive misinformation

management, are essential. Future efforts should adopt a hybrid approach, integrating online campaigns with offline engagement to maximize vaccination support. Maintaining immunity also necessitates not just biomedical readiness, but also public involvement and work of memory, which continually revives infectious disease threats in public consciousness; the eradication of polio is as much a matter of maintaining collective vigil as medical intervention (Kasstan-Dabush et al., 2024). Although positive framing can rally support and trust behind health programs, the lack of critical viewpoints potentially constrains public recognition of continuing obstacles and risks. Suggest more balanced photo journalism accentuates accomplishments as well as setbacks, allowing audiences to make a better-rounded appraisal of the battle against polio (Ittefaq et al., 2024).

Enabling health workers, enhancing the quality of primary health care services, and activating communities are crucial activities in keeping up the guard against polio re-emergence. Ongoing training, surveillance, and community-based education are key measures for supporting long-term sustainability (Kusumaratna et al., 2024). The Lahore polio campaign is a demonstration of the potential and shortcomings of social media in public health communication. Its power is in reminding and backing up open-minded parents who are receptive to vaccination, and its weakness is in convincing hard-to-sell skeptics. Successful campaigns in the future will thus have to balance digital penetration with culturally grounded, trust-based approaches to have the greatest impact on vaccination practices.

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