American Journal of Qualitative Research
2026, Vol. 10 No. 2, pp. 115-138
https://doi.org/10.29333/ajqr/18007
© 2024 AJQR. http://www.ajqr.org

AMERICAN JOURNAL OF QUALITATIVE RESEARCH
ISSN: 2576-2141

Exploring Parental Vaccine Hesitancy: Reflexive Thematic Analysis—Insights from Traditional vs. AI Methods

Carlene J. Brown[1]
University of Northern Colorado, Greeley, CO, USA

ABSTRACT
Vaccine hesitancy among parents of young children extends beyond individual family choice and impact; it is an imminent health challenge with far-reaching consequences. This study explores the underlying beliefs of parents through qualitative interviews and compares Traditional human-led reflexive thematic analysis (RTA) with AI-assisted RTA using ChatGPT. It examines latent beliefs contributing to vaccine hesitancy among parents of children under 18 and evaluates the effectiveness of Traditional RTA versus AI-assisted RTA. A basic qualitative research design was used to explore how individuals construct meaning from their experiences. Semi-structured virtual interviews were conducted with 18 participants recruited via convenience sampling through social media. Data were analyzed using RTA, and traditional methods were compared with AI-assisted RTA using ChatGPT. Traditional RTA identified four main themes: influences and perceptions shaping vaccine decisions, trust and concerns in vaccine decision-making, attitudes toward vaccine mandates, and alternative perspectives on vaccinations. AI-assisted RTA discovered five and six themes, respectively. Parental perspectives were shaped by personal and vicarious experiences, trust in healthcare providers, and various information sources. The methodological comparison revealed that Traditional RTA provided a more nuanced and comprehensive analysis than AI-driven RTAs, though the AI analyses were significantly faster.

KEYWORDS: AI-assisted analysis, parental attitudes, qualitative research, reflexive thematic analysis, vaccine hesitancy

Parental Vaccine Hesitancy

It could be argued that health is a treasured resource that should be vigilantly guarded and maintained. This fundamental and imperative endeavor consists of multifaceted considerations for oneself and one's family. Dietary, exercise, and other behavioral lifestyle choices are often at the forefront of conscious attention when endeavoring to achieve and maintain well-being and vitality. However, there are other concerns that require careful reflection as well. Vaccinations are a wellness decision that is ever present throughout one's lifetime. The preponderance of these health considerations is most common during childhood, requiring parents to make numerous health-

[1] Corresponding author; Carlene J. Brown, Ph.D., University of Northern Colorado, 5314 W 9th Street, Greeley, CO 80634. E-mail; carlenebrown589@gmail.com
Copyright © 2026 by Author(s) and Licensed by CECS Publications, United States. This is an open access article distributed under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

related decisions throughout the parenting years. Many parents do not waver in attaining immunizations for their children, while others struggle to see the benefit of or are reluctant toward such routine preventative health measures. Among the primary concerns of parents hesitant about vaccines are their safety, potential side effects, lack of sufficient information, and distrust of governmental and medical institutions (Kerrigan et al., 2020). Although parental reservations surrounding childhood vaccinations have been ever-present, the recent global pandemic has brought this issue to the forefront for many parents and, in turn, for those serving in public health.

Vaccine hesitancy has been a cause for concern among public health officials on an international level for many years, with the World Health Organization citing it as among the most significant threats to global health (Nuwarda et al., 2022). However, the COVID-19 pandemic exacerbated these concerns by disrupting routine vaccination rates, leading to significant declines in all age groups across various vaccine types (Cunniff et al., 2023). Notably, the most pronounced effects of these reductions were among children and adolescents (Cunniff et al., 2023). Lower vaccination rates fueled by hesitancy and failure to vaccinate can result in insufficient herd immunity and could lead to unvaccinated individuals becoming sources of the spread of infectious agents (Nuwarda et al., 2022). The importance of herd immunity cannot be overstated; it is achieved through enough of the population being immune to disease, often accomplished through vaccination, making its spread less likely (CDC, 2022). Outbreaks impacting widespread populations can be triggered by unvaccinated individuals contracting a vaccine-preventable disease (Nuwarda et al., 2022). Therefore, maintaining high herd immunity levels is crucial to prevent widespread epidemics. Nuwarda et al. (2022) assert that approximately 95% of the population must be immunized to thwart a measles outbreak, and polio prevention requires nearly 80% immunization rates. The World Health Organization (2022) notes that vaccinations have been credited with saving more lives than any other medical innovation in recorded history, with millions of lives saved each year through the reduction and eradication of numerous deadly diseases, making the importance of vaccinations and the need to address vaccine hesitancy as a public health threat unreservedly evident.

Properly addressing vaccine hesitancy begins with an understanding of its definition and prevalence. Larson et al. (2022) contend that "vaccine hesitancy is a state of indecision and uncertainty about vaccinations before a decision is made to act (or not to act)" (p. 58). Even before the global pandemic, McKee and Bohannan (2016) conveyed that 77% of parents indicated being hesitant toward at least one childhood vaccination, with Kempe et al. (2020) concurring that approximately 1 in 15 parents in the United States held hesitations toward childhood immunizations. These pre-pandemic numbers are significant and point to vaccine hesitancy, contributing to approximately 25% of inadequate vaccine uptake (Nguyen et al., 2022). Markedly, the COVID-19 pandemic ushered in new concerns that further fueled vaccine hesitancy, as seen in the World Health Organization and UNICEF officially published data that denoted the most significant continuous decline in childhood vaccinations in nearly 30 years (World Health Organization, 2022). Teasdale et al. (2022) echo these concerns, noting that 33.1% of parents in the U.S. indicated that their child or children did not receive vaccinations in the initial year of the pandemic. Moreover, Seither et al. (2023) report that vaccination coverage has decreased in most states from 2021-2022 to 2022-2023, while vaccine exemptions have increased in 40 states, citing that exemptions for the youngest population of elementary school children (kindergartners) have increased from 2.6% in 2021-2022 to 3.0% in 2022-2023, with nonmedical exemptions comprising over 90% of the total. Researchers warn that continued hesitancy coupled with neglect in receiving immunizations could potentially exacerbate the already concerning erosion of herd immunity, which in turn could heighten the risk of preventable disease outbreaks (Teasdale et al., 2022). It is important to remember that vaccine exemptions exceeding 5% hinder the level of vaccination

coverage that is feasible to reach (Seither et al., 2023). The possibility of preventable disease outbreaks occurring in the absence of vaccinations due to vaccine hesitancy, evident through decreased vaccination coverage and the ever-rising number of exemptions, highlights the critical need to address vaccine hesitancy, especially considering its ever-spreading prevalence. Working to ensure widespread immunization is essential in protecting individual health, sustaining herd immunity, and averting local and global health crises that may result in the unnecessary loss of lives.

While the numbers paint a portrait of the landscape of vaccine hesitancy, it is important to note that this information conveys only a partial aspect of the complete picture. Vaccine hesitancy can arise from several concerns, including apprehensions surrounding vaccine safety, trepidation of potential side effects, insufficient information, and skepticism concerning governmental and medical institutions (Kerrigan et al., 2020). Engaging directly with vaccine-hesitant parents is essential to comprehensively understand the nuances of their hesitancy and effectively convey the full scope of vaccine hesitancy. Gaining a broader and deeper understanding of vaccine hesitancy by engaging with individuals reluctant to vaccinate themselves or their children can aid in significantly improving communication strategies. This approach can help to mitigate and potentially alleviate this pressing and important issue through targeted and effective methods.

AI-Assisted Qualitative Analysis

The inception of ChatGPT, released by OpenAI in November 2022, has been met with widespread recognition of this digital platform's diverse capabilities, including various forms of qualitative analysis (Hamilton et al., 2023; Marr, 2023; Sridhara et al., 2023; Wu et al., 2023; Yang et al., 2023; Zhang et al., 2023). With its use of natural language processing (NLP) and machine learning (ML), ChatGPT is making its way into qualitative research. Recent studies, such as Mesec (2023) and Wang et al. (2023), assessed this new resource's ability to analyze qualitative data to identify insightful themes and understand sentiments without specific training as compared to human analyses. Both studies reported favorable results, noting that ChatGPT identified insightful themes, summarized data effectively, and provided useful suggestions for future research.

Similarly, Hamilton et al. (2023) utilized the novel platform's ability to perform thematic analysis on their phenomenological data to explore the financial situations, experiences with the financial support program, and personal lives of participants in a guaranteed income program. Their results indicated that while there were some differences between the human and AI analyses, there was a significant overlap between themes generated by both. However, the human analysis was reported to be more comprehensive, considering broader social, economic, and cultural contexts (Hamilton et al., 2023). Researchers like Lee et al. (2023) and Morgan (2023) concur with Hamilton's reporting that ChatGPT generated key themes like those identified by human analysis and demonstrated efficient coding, theme generation, and quote processing. Conversely, these researchers also pointed out that the AI tool focused on more specific details rather than the overall picture (Morgan, 2023) and had difficulty managing multiple transcripts and capturing nuanced data and underlying emotions (Lee et al., 2023).

Markedly, Zhang et al. (2023) further advanced this line of research by examining the impact of prompts on the outcomes of reflexive thematic analysis performed by ChatGPT. These researchers determined that developing and refining prompts enhances the technological platform's performance to provide meaningful analytic outcomes, bolstering trust in the AI's conclusions (Zhang et al., 2023). Mesec (2023) concurs, encouraging future research to focus on honing and refining prompts to enhance the AI-assisted qualitative analysis process and outcomes. These findings underscore the potential benefits of utilizing ChatGPT in qualitative analysis. However,

researchers emphasized that the platform should be used in collaboration with human supervision to ensure the trustworthiness of its outcomes (Hamilton et al., 2023; Lee et al., 2023; Mesec, 2023; Morgan, 2023; Wang et al., 2023; Zhang et al., 2023).

ChatGPT is a nascent platform that necessitates extensive research to explore how AI can be leveraged to improve qualitative research, including analysis. Investigating precise and systematic prompts is a promising approach to provide a greater understanding of how this innovative tool may advance and enrich the landscape of qualitative research and beyond. Studying the differences between AI and human-led analysis in qualitative research is essential, as AI technologies such as ChatGPT are rapidly becoming integrated into research practices. Researchers must understand both the advantages and limitations of using AI in qualitative analysis. Although still in its early stages, some studies suggest that AI can generate themes that align with those identified by human coders (Prescott et al., 2024). However, Nguyen-Trung (2025) outlines several important limitations of this emerging tool, including a restricted context window for processing large datasets, inconsistent outputs that require multiple prompt attempts, the need to navigate between separate platforms, and a lack of training data specific to qualitative research. These concerns must be carefully considered before incorporating AI into qualitative analysis workflows. As qualitative research faces a shifting landscape, additional research is needed to determine the effectiveness and potential limitations of using AI as a tool for analysis

Study Purpose

This study aimed to comprehensively examine the factors influencing vaccine hesitancy among parents of children under 18, utilizing qualitative interviews to enhance an in-depth comprehension of the roots of vaccine hesitancy. Targeted inquiry endeavored to gain insight into the complex factors shaping parental attitudes toward vaccinations. By collecting rich contextual data, this study sought to uncover the underlying beliefs and reasons behind vaccine hesitancy or acceptance. This approach complements quantitative research by providing direct insights from parents on the perspectives and thoughts behind their beliefs. Additionally, this research conducted a methodological investigation comparing reflexive thematic analysis performed by traditional human-led methods with that conducted by ChatGPT, using two distinct sets of prompts. Comparing and contrasting these methods worked to uncover valuable insights for researchers seeking to select the most appropriate methods and structure for qualitative analysis for future studies. The research questions guiding this study were:

Q1. How do parents' underlying beliefs contribute to vaccine hesitancy?

Q2. What are the distinctions between reflexive thematic analysis using ChatGPT and traditional analysis using NVivo?

Methods

This study utilized a basic qualitative research design. Merriam and Tisdell (2016) describe basic qualitative research as research that aims to describe and interpret how individuals construct meaning from their experiences and interactions within their social worlds. Basic qualitative research lends itself well to social constructivism, which is employed in this current research. Social constructivism posits that individuals play an active role in shaping their knowledge and understanding, that development occurs within social settings, that learning serves as a driver of personal development, and that language and thought are innately interconnected (Overall, 2007). Subjective meaning is fundamental to this paradigm, embracing nuanced views instead of narrowly defined predetermined categories (Creswell & Poth, 2018). Creswell and Poth (2018) posit that

constructivist researchers ask open-ended questions to understand how participants construct meaning from social contexts while also acknowledging personal biases in interpreting these subjective experiences. Semi-structured virtual interviews were employed to allow the researcher to focus on pertinent questions while also allowing the exploration of relevant concepts that may naturally emerge during the interview. Virtual interviews allowed the researcher and participant to meet without the limitation of distance.

Participants

Participants were recruited through convenience volunteer sampling. Sampling was conducted through word-of-mouth referrals, email, and outreach through popular social media channels, including Facebook, Instagram, and LinkedIn. The goal of utilizing these platforms was to expand participant recruitment by engaging with diverse networks and communities for a more comprehensive representation in the study. Recruitment was conducted in conjunction with a larger, mixed-methods study examining parental vaccine hesitancy. The criteria for participation were English-speaking individuals aged 18 years or older who were parents of children aged 18 years or younger. Participants remained anonymous and were assigned pseudonyms to protect their identities, offering them a sense of security and autonomy to express their thoughts, perceptions, and ideas freely. Participants were provided a consent form before the interview, ensuring they were fully informed about the study's purpose, procedures, and estimated time commitment. The form also clarified their right to withdraw from the study at any time, demonstrating research transparency and respect for their autonomy. Eighteen individuals participated in the semi-structured interviews (See Table 1).

Table 1

Demographic Participant Information

Pseudonym	Vaccine Hesitant Status	Gender	Age	Education	Occupational Status	Marital Status	Annual Household Income	Ethnicity	Geographic Location
Rachael	Yes	Female	25-34	Bachelors	Full-time	Married	$100k+	White	Big city
Gabe	Yes	Male	25-34	Associates	Full-time	Married	$100k+	White	Big city
Maddy	Yes	Female	25-34	Associates	Slf-employd	Married	$75-$99k	White	Sm town
Sam	Yes	Female	25-34	Bachelors	Full-time	Married	$100k+	White	Rural
Stella	Yes	Female	25-34	Bachelors	Part-time	Married	$100k+	White	Big city
Ivy	Yes	Female	45-54	Bachelors	Full-time	Married	$100k+	White	Sm town
Ava	Yes	Female	25-34	Bachelors	Student	D.Prtnshp	$75-$99k	White	Big city
Brian	Yes	Male	35-44	Associates	Full-time	Married	$75-$99k	White	Rural
Olivia	No	Female	35-44	Post-grad	Full-time	Married	$100k+	Asian	Big city
Sophia	No	Female	35-44	Post-grad	Full-time	Married	$100k+	White	Rural
Cecile	No	Female	25-34	Post-grad	Full-time	Married	$100k+	White	Sm town
Cameron	No	Female	25.34	Post-grad	Full-time	Married	$100k+	White	Big city
Daniel	No	Male	45-54	Bachelors	Full-time	Married	$100k+	White	Big city
Owen	No	Male	35-44	Bachelors	Full-time	Divorced	$100k+	White	Big city
Elena	No	Female	35-44	Post-grad	Unemployed	Married	$100k+	White	Big city
Amelia	No	Female	25-34	Associates	Student	Single	$10-14k	White	Sm town

Table 1
Continued

Addison	No	Female	25-34	Post-grad	Student	Single	$10-14k	White	Big city
Zoe	No	Female	45-54	Post-grad	Full-time	Married	$100k+	White	Big city

Data Collection

Institutional Review Board approval was obtained prior to the recruitment of participants and the collection of data. Interviews were conducted using Zoom and were recorded with the participant's permission. A semi-structured interview guide with fourteen questions primarily directed the interviews while allowing follow-up questions to emerge organically as the discussions progressed. Interviews ranged from 30 to 90 minutes in length. Interview questions included the following:

- Where do you get information about staying healthy?
- Where do you get information about vaccines for kids?
- How do you react when you hear different information about vaccines from people you know, like friends or family, or from the internet?
- What events or things have made you think about vaccines for your kids? (This could be things like talking to doctors when they got sick, or information you heard on TV, or online.)
- Have you ever worried about giving vaccines to your kids? If so, what were you worried about?
- Do you feel that vaccines are safe and work well?
- Are there vaccines or information about vaccines that you find hard to believe or trust?
- What do you think about vaccines for kids overall?
- How much do doctors and nurses influence your decisions about vaccines for kids?
- How and where do you look for information when you decide about vaccines for your kids?
- Do you trust what health experts say about vaccines for kids?
- Do you talk about vaccines with people in your life?
- Do you feel that getting vaccines for your children helps protect them as well as other children?
- Is there anything I forgot to ask that you would like to share with me about this topic?

The primary researcher independently managed all aspects of the interviews, audio recordings, and transcription processes. Transcripts were cross-checked by comparing the audio recordings with the written text to identify and correct any inaccuracies, such as misheard words or mislabeled speakers. Once all identifying information had been removed, transcripts were shared with participants for review and approval. This member-checking process served to enhance data quality and credibility, while also supporting the overall trustworthiness and rigor of the study. Seventeen interviews with eighteen participants were conducted from May to June 2024.

Data Analysis

The data were analyzed through three different methods using reflexive thematic analysis (RTA). RTA is "a method for developing, analyzing, and interpreting patterns across a qualitative dataset, which involves systematic data coding processes to develop themes – themes are your ultimate analytic purpose" (Braun & Clarke, 2022, p. 4). This approach to analyzing data is flexible

and involves the identification of patterns in the data that address the research question while also holding space for the researcher's self-awareness and perspective (Braun & Clarke, 2022). The first analytic method included the researcher manually coding the data through an iterative process from which themes were derived, leading to the overarching interpretation of the data's narrative. NVivo was employed to manage data storage and coding during this process. Procedures for RTA included becoming familiar with the data, coding the dataset, generating initial themes, developing and reviewing themes, refining, defining, and naming themes, and interweaving the analysis together to develop a complete narrative of the data, all while fostering an environment for the researcher's self-awareness of thoughts and perspectives.

ChatGPT version 4.0 was used for the second and third analyses following a structured, non-iterative approach, with prompts designed in alignment with Braun and Clarke's (2022) six steps of reflexive thematic analysis (RTA) and those used in Zhang et al.'s (2023) recent RTA research (see Appendix A) (OpenAI, 2024). These prompts guided the AI through each phase of the analysis process. For both analyses, the first output generated by ChatGPT was accepted without additional refinement or re-prompting. This approach was used to evaluate the quality and depth of ChatGPT's thematic outputs in identifying themes and sub-themes related to parental vaccine hesitancy and to assess whether the AI-generated findings aligned with those from a human-directed analysis. The three analytic procedures, which include traditional human-directed RTA conducted using NVivo, ChatGPT RTA using prompts inspired by Braun and Clarke (2022), and ChatGPT RTA using prompts inspired by Zhang et al. (2023), were assessed using the rubric found in Table 3. Table 3, developed in collaboration with ChatGPT (2024), enabled a comparison across the three analyses. The prompts utilized for these analyses can be found in Appendix A.

Researcher Stance

Human Researcher Stance

As a white, cisgender, heterosexual wife, mother, and female scholar who grew up in a low socioeconomic status but now occupies a higher economic tier, I am highly sensitive to individuals in positions of power and authority stemming from financial status, social class, and educational attainment who display seemingly condescending attitude towards individuals they consider to be of lower status. My personal experiences, combined with my previous research, have highlighted a skeptical bias toward individuals in positions of influence and leadership who exhibit such behaviors. This bias can extend to medical institutions, as I and others close to me have encountered patronizing interactions from healthcare professionals. Acknowledging this, I have made a concerted effort to approach this research holistically, actively recognizing and setting aside biases as they arise. This has allowed me to learn from the data and strive to enhance the study's trustworthiness and rigor.

ChatGPT Researcher Stance

As an AI language model, my role in this research process is unique compared to that of a human qualitative researcher. I do not possess personal experiences, assumptions, or beliefs in the traditional sense. However, my design and training with human engineers and researchers have inherently influenced my responses and approach to the reflexive thematic analysis performed on the transcripts.

Influences on the Research Process:

1. **Training Data:** My training involved vast amounts of text from diverse sources, including scientific literature, news articles, books, and other educational materials. This broad exposure helps me provide informed and contextually relevant responses but also means my output is influenced by the predominant perspectives and biases present in the data I was trained on.
2. **Influences on the Research Process:** The algorithms and parameters guiding my functioning are designed to emulate human-like understanding and reasoning. These algorithms prioritize coherence, relevance, and informativeness in my responses, which shapes how I analyze qualitative data and generate thematic interpretations.
3. **Human Oversight**: While I operate autonomously to some extent, my design and updates are managed by human developers who embed certain values, priorities, and safeguards into my system. This human oversight ensures I produce ethical and reliable outputs, but it also means my analyses reflect the implicit biases and assumptions of these developers.
4. **Lack of Personal Experience:** Unlike human researchers, I do not have personal experiences or a subjective perspective. This absence of personal bias can be an advantage in maintaining objectivity; however, it also means I may lack the depth of understanding that personal experience and emotional engagement can bring to qualitative research.
5. **Ethical Considerations:** My approach to qualitative analysis aims to respect and accurately represent the voices of the participants. I strive to avoid misinterpretation and ensure that the themes and insights derived from the data are faithful to the participants' expressions and contexts.

Critical Reflection on My Position:

As an AI, my primary stance is one of neutrality and support. I assist researchers by providing structured analyses, identifying patterns, and summarizing large amounts of qualitative data. My position is fundamentally one of a tool rather than an active participant with personal stakes in the research outcomes.

Results and Discussion

Traditional Human-Directed Reflexive Thematic Analysis Results

Four themes emerged from the Traditional human-directed RTA: Influences and Perceptions Shaping Vaccine Decisions, Trust and Concerns in Vaccine Decision-Making, Attitudes Toward Vaccine Mandates, and Alternative Perspectives and Attitudes Toward Vaccinations. The respective themes will be expounded upon in further detail below.

Influences and Perceptions Shaping Vaccine Decisions

A multitude of influences were found to shape participants' perceptions of childhood vaccines. These included personal experiences, the experiences of others, interactions with doctors and healthcare practitioners, the influence or non-influence of family and friends, and the impact of various information sources such as scientific research, vaccine inserts, doctors' advice, podcasts, internet forums, and books.

Personal experiences strongly influenced vaccine views. Ivy, for instance, shared a distressing experience that contributed to her hesitancy:

> "…when [Ashley] was born, she got vaccinated like our other two children; she had no problems… at nine months old… she got that shot in her thigh… and she started to have some very adverse reactions. And we ended up back in the hospital. Her liver basically failed."

By contrast, Maddy shared a cautionary family experience that motivated her to vaccinate:

> "My little brother… got pertussis. And then my whole family had to be quarantined… it was kind of a common thing… because they had a little hive of severe anti-vaxxers… It was scary… We all had to be on prophylactic antibiotics and all that kind of stuff."

Participants also cited others' experiences. Olivia, reflecting on her time in a developing country, stated:

> "…I've seen the medical boats come and women lining up for hours, if not days, to get vaccines because their kids are dying of preventable diseases."

Meanwhile, Stella's hesitancy stemmed from someone close to her:

> "…our friend's daughter… is wheelchair-bound… She received a three-in-one vaccine… But… how do you know which vaccine is interfering with you?... In situations like that, it does become eye-opening…"

Healthcare interactions varied. Some parents, like Cecile, felt supported:

> "I think that my experience is that my pediatrician… provides a wealth of information…"

Others felt poorly informed:

> "So, I didn't feel like I was communicated with at the hospital…"

Trust in vaccine information from doctors also varied. Sophia stated:

> "I trust the information that I receive from my doctor…"

In contrast, Sam explained:

> "No… I don't know when they would have time [to review a vaccine insert with a parent]."

Gabe voiced concern about physicians' knowledge:

> "They can give you the insert, but… if you ask, "What are the risks?"… They don't have that."

Influence from family and friends was mixed. Maddy noted:

> "My mom's a nurse… she said, 'If you don't take her to get vaccinated, I will…"

Yet Ivy shared:

> "Well, in my case, they were not supportive whatsoever…"

Information sources ranged widely in credibility. Some trusted medical or academic sources. Addison shared:

> "If it's for my son, my first go-to is his doctor…"

Zoe stated:

> "I would go to PubMed… But if I need to drill down… I would go to PubMed."

Others relied on more casual sources. Daniel said:

> "On my Google feed on my phone."

Cameron added:

> "Definitely Google… Reddit or Instagram."

These findings show that vaccine perceptions are shaped by personal experiences, healthcare interactions, social influences, and information sources—some of which conflict with prior research on vaccine hesitancy. Many parents, regardless of stance, actively sought confirming information and showed a desire to make informed decisions.

Trust and Concerns in Vaccine Decision-Making

Participants expressed mixed levels of trust in medical institutions and vaccine safety. While some held strong confidence in healthcare providers, others were deeply skeptical of vaccine ingredients, potential side effects, and the intentions of the medical industry. Many conveyed concerns about transparency, fear-based messaging, and the growing childhood vaccine schedule.

Trust in public health varied. Zoe shared a positive view:

> "Yeah. In fact, I think they're doing a very important job, and it's a very hard one at times."

In contrast, Ava remarked:

> "Not anymore, no. It's unfortunate. I feel like COVID has really unraveled the trust of the public of public health for a lot of people, yeah."

Sam elaborated:

> "No, I don't. We've learned from the past, like with Oxycontin… Now, we know better… I don't trust the intertwining of profit and healthcare…"

Concerns about vaccine safety were common. Sam cited specific ingredients:

> "Many vaccines use polysorbate 80… that opens [the blood-brain barrier] … There are high levels of aluminum… All of those can cross… That gave me pause."

Ava pointed to side effects:

> "…there are severe neurological effects and risks… Guillain Barre syndrome… they list that as a side effect on the CDC sheet for flu shots…"

Gabe criticized physicians' lack of familiarity:

> "Something else I've realized is that your doctors don't study the vaccines… you don't even know the name of what you're doing…"

However, some parents had no such concerns. Amelia stated:

> "Nope. I haven't even ever thought twice about not doing them."

Sophia echoed:

> "No, I've never. I never really worried about it when they were younger…"

A few participants recounted feeling pressured or fear mongered. Rachael shared:

> "A direct quote from the fearmongering when I was pregnant with our first: they wanted to give me the COVID vaccine; they said, 'If you don't get this, you will die, and your baby will die.'"

She added:

> "And she did die. But it wasn't because I had COVID… we felt really pressured by the doctors… we told ourselves we would never do that again…"

Stella experienced similar pressure:

> "They kind of do, like, fear-monger you into feeling like you have to do it or something bad is going to happen."

Conversely, others felt supported. Sam recalled:

> "I've had a few conversations with my doctor about it… and she's very supportive… She said… find all the knowledge you need until you feel equipped to make the decision…"

Owen noted:

> "He knows us well and takes time to explain everything. His communication style influences how we treat ourselves…"

Cecile reflected:

> "They're like, 'You know this is a choice,' and they present it very well…"

Some parents distrusted the expanding vaccine schedule. Gabe remarked:

> "…how everything sort of snowballed to get to the point where they went from 8 vaccines to 20 to now, we're at like 73…"

Brian observed:

> "Of course, the CDC recommendation of the vaccine schedule is probably triple or quadruple what we had when we were growing up."

Maddy gave a specific example:

> "My child was essentially at zero risk for hepatitis B… yet they want to give those brand-new babies the hepatitis B vaccine right away… I did refuse that one…"

While not all participants commented on the schedule, it was a clear concern for several.

In summary, trust in healthcare professionals and public health institutions significantly influenced parental attitudes toward vaccinations. While some parents felt supported and well-informed, others were skeptical or alarmed by perceived coercion, inadequate provider knowledge, and the growing number of required vaccines. These sharply contrasting perspectives suggest that vaccine trust is highly polarized, with limited middle ground.

Attitudes Toward Vaccine Mandates

Most participants opposed vaccine mandates, asserting that decisions regarding childhood immunizations should remain a parental choice. This perspective was expressed by both vaccine-hesitant and non-hesitant parents.

Some who were vaccine-hesitant strongly objected. Ivy said:

> "Oh, I'm completely against fax vaccine mandates, 100%. Yeah."

Gabe agreed:

> "I think it's terrible. … I'm 100% against it."

Ava emphasized personal autonomy:

> "I think it's unconstitutional that we have to be forced to be given a substance that we don't want to have."

Interestingly, many parents who support vaccines also opposed mandates. Addison stated:

> "They are terrible."

Sophia asserted:

> "I don't believe that we should be forced."

Amelia, a non-hesitant parent, explained:

> "Honestly… I don't like someone telling me I have to do something. I want to be able to make that choice for myself 100%."

These findings mirror broader public sentiment post-COVID-19. Recent research shows growing support across political affiliations for parental discretion over school vaccine mandates (Hoffman, 2022). The current study aligns with this trend, revealing that objections to mandates often stem from values of autonomy rather than outright rejection of vaccines.

Alternative Perspectives and Attitudes Toward Vaccinations

Some parents expressed hesitation toward newer vaccines (e.g., COVID-19, HPV, flu), favored spacing out vaccines, emphasized the body's natural immunity, or were frustrated by being labeled as "anti-vax" despite holding nuanced views.

Several parents routinely accepted traditional childhood vaccines but declined newer ones. Addison explained:

> "I didn't want to give him… the flu vaccine."

Owen shared:

> "We just don't get flu shots in this household… it almost seems like a nicety versus a necessity."

Zoe expressed caution about the HPV vaccine:

> "Because it's newer… I wanted to read more about it before deciding… it is a bit of an elective choice…"

She was similarly cautious about COVID-19 vaccines. Amelia, despite being pro-vaccine, firmly opposed it:

> "Oh yeah, there's no way I would get the COVID vaccine. There's not enough research… to prove that it is safe long term."

Two parents later came to support HPV vaccination. Cameron reflected:

> "I said no… Looking back… I wish I had known… it would have had to go through a trial…"

Amelia added:

> "I just kind of kicked myself… if I had gotten it, I probably wouldn't have spent three years going through all these treatments…"

Both women now advocate for their children to receive the HPV vaccine.

Concerns about the vaccine schedule led some to space out immunizations. Maddy shared:

> "I think that spacing them out for us was what I liked the best because I wanted to be able to monitor for a reaction."

Sam noted:

> "There are vaccines… that you can get four times by 15 months or just once… That gave me options…"

Others emphasized the body's resilience and natural immunity. Addison explained:

> "I will clean, I will boost his immune system and everything… babies have this crazy immune system…"

Elena shared her holistic approach:

> "I prepare her body before and after. I give her fruits that help break down proteins…"

Although compliant with vaccination, these parents sought ways to reduce risks and strengthen immunity through natural means.

Frustration about being labeled was another theme. Sam said:

> "Asking these kinds of questions and getting immediately labeled… has stopped me from asking questions…"

Gabe also felt stigmatized:

> "If you are against it, somehow, you're kind of a wingnut or wacky… We're just normal people… there's a lot of shame with it."

These findings reveal that alternative perspectives don't necessarily equal rejection. Many parents made careful, informed decisions rooted in research and personal values. A more respectful, evidence-based approach may better engage those with nuanced or cautious views.

Among these themes, parents' views reflected strong emotions, personal convictions, and a deep love for their children. Influences such as personal and vicarious experiences, healthcare interactions, family and peer input, and diverse information sources shaped their vaccine decisions. Trust varied significantly—some parents relied on medical advice, while others distrusted the healthcare system, especially concerning mandates and vaccine safety.

Most participants, regardless of vaccine stance, opposed mandates, favoring individual parental authority. Many also employed alternative strategies, such as spacing out vaccines or boosting immunity through nutrition, to minimize risks. These choices reflected thoughtful, intentional approaches rather than outright rejection.

Ultimately, despite differing influences and beliefs, parents shared a common goal: to protect their children's health and make the most informed decisions possible.

ChatGPT Reflexive Thematic Analysis Using Prompts from Braun and Clarke (2022)

Using Braun and Clarke's (2022) RTA prompts (see Appendix A), six themes emerged: Diverse Information Sources, Informed Decision-Making, Safety Concerns and Hesitancy, Trust Dynamics, Balancing Personal and Community Health, and Integration of Natural Health Practices. These echoed many themes from the traditional analysis. One theme, Balancing Personal and Community Health, stood out and is explored further below. Quotes and theme summaries were taken directly from ChatGPT's output.

Balancing Personal and Community Health

Parents weighed personal beliefs with broader social responsibility, sometimes choosing selective or delayed vaccination schedules.

Supporting participant quotes:

> Olivia: "I believe vaccines are important for herd immunity."
> Owen: "We're protecting others by vaccinating our children."
> Amelia: "I just want to make sure that we're all making informed decisions."

Discussion

Parents' vaccine decisions reflected complex reasoning informed by experiences, trusted sources, and research. Hesitancy was often rooted in concerns about vaccine safety, transparency, and medical authority. While some parents followed medical advice, others integrated natural health strategies.

Decisions were also shaped by a sense of civic duty. Parents considered community well-being alongside personal values. Their preference for natural or integrative health reflects a cautious approach rather than outright refusal.

Parental beliefs were shaped by a mix of information sources, experiences, and trust in healthcare providers. Hesitancy stemmed from safety concerns, but a desire to protect both children and the broader community was evident. Integrating natural health practices revealed a holistic mindset. These findings underscore the need for clear, transparent communication and supportive healthcare relationships to guide informed vaccine decisions.

ChatGPT Reflexive Thematic Analysis Using Prompts from Zhang et al. (2023)

Using Zhang et al.'s (2023) RTA prompts (see Appendix A), five themes emerged: Trust and Distrust in Medical Systems, Influence of Personal Experiences and Anecdotes, Information Seeking and Decision-Making Process, Perception of Vaccine Safety and Necessity, and Sociocultural and Political Influences. Most themes aligned with the traditional RTA. One standout theme, Sociocultural and Political Influences, is highlighted below. As with earlier AI analysis, quotes and summaries were directly sourced from ChatGPT's thematic output.

Sociocultural and Political Influences

Parental vaccine attitudes were shaped by broader political and societal dynamics. The political climate often influenced vaccine perceptions, with identity and ideology intersecting with medical decisions. Community norms also reinforced or challenged beliefs.

Supporting participant quotes:

> Sophia: "Healthcare shouldn't be a conservative or liberal issue or a Democrat or Republican issue. It should just be about healthcare."
> Sophia: "When I moved to this area, it became more of a political issue...people began to question all vaccinations."
> Stella: "My parents had asked, 'Why you made this decision'… they were kind of able to say… 'Perfect. We will support you.'"
> Stella: "It was interesting for me to be like OK [my husband's] kind of like getting… conviction from the nurses and doctors."

Discussion

This analysis revealed a nuanced picture of vaccine hesitancy. Trust and Distrust in Medical Systems showed that while individual doctors could foster confidence, many parents remained skeptical of medical institutions and pharmaceutical motives. Personal Experiences and Anecdotes had a powerful effect, often outweighing scientific evidence.

Information Seeking demonstrated that parents actively sought out varied sources to make informed decisions. Perceptions of Safety and Necessity revealed concern over ingredients and a preference for natural immunity. Finally, Sociocultural and Political Influences highlighted how community norms and political climate can shape vaccine decisions.

Conclusion

Addressing vaccine hesitancy requires more than information—it demands trust-building, transparency, and empathetic engagement. Public health communication should adapt to cultural and political contexts, and messaging should be accessible and respectful. A multi-pronged approach is essential to support confident vaccine decisions and improve public health outcomes.

Analytic Comparison

An analytic comparison was conducted employing the rubric shown in Table 3. The results of each of the three analyses were organized into separate tables to facilitate the evaluation process. Each of the three analyses was evaluated using the seven criteria outlined in the rubric.

Table 2
Themes for All Reflexive Thematic Analyses

RTA	Theme I	Theme II	Theme III	Theme IV	Theme V	Theme VI
Traditional	Influences and Perceptions Shaping Vaccine Decisions	Trust and Concerns in Vaccine Decision-Making	Alternative Perspectives & Attitudes Toward Vaccination	Attitudes Toward Vaccination Mandates		
ChatGPT-Braun & Clarke (2022)	Informed Decision-Making Influences	Trust in Healthcare Dynamics	Safety Concerns and Hesitancies	Diverse Information Sources	Navigating Personal and Community Health	Integration of Natural Health Practices
ChatGPT-Zhang, Wu, Xie, Lyu, Cai, & Carroll (2023)	Influence of Personal Experiences and Anecdotes	Trust and Distrust in Medical Systems	Information Seeking and Decision-Making Process	Perception of Vaccine Safety and Necessity	Sociocultural and Political Influences	

Table 3
Rubric for Analyses Comparison

Criteria	Comprehensive	Satisfactory	Basic
Understanding of the Data	Demonstrates a deep understanding of the data and context. Extracts nuanced themes and patterns effectively.	Shows a satisfactory understanding of the data and context. Identifies relevant themes and patterns, although some may lack depth or clarity.	Shows a basic understanding of the data and context. Identifies surface-level themes and patterns.
Coding Accuracy	Coding is reliable, consistent, and well-supported with evidence from the data. Demonstrates proficiency in coding.	Coding is mostly reliable but may have occasional inconsistencies or omissions. Utilizes coding techniques effectively.	Coding may contain inconsistencies. May lack precision.
Thematic Analysis Process	Follows a rigorous and systematic process for thematic analysis, including data immersion, coding, theme development, and refinement.	Follows a structured process for thematic analysis but may lack depth or thoroughness in some stages. Adapts guidelines (Traditional, Braun & Clarke (2022) and Zhang et al. (2023) effectively.	Attempts to follow a thematic analysis process but may be less structured or thorough. Adapts Traditional, Braun & Clarke (2022), and Zhang et al. (2023) framework with limited success.

Table 3

Continued

Interpretation	Provides comprehensive and deeply insightful interpretations.	Provides satisfactory interpretations that offer some insight.	Provides basic interpretations with limited depth or insight.
Insightfulness of Findings	Generates insightful findings that contribute to the understanding of the research question or phenomenon. Offers novel insights supported by evidence from the data.	Produces findings that are relevant and contribute to understanding, although they may lack originality or depth. Provides some new insights, but not in great depth.	Generates basic findings that address the research question to some extent. Offers few, if any, original insights.
Overall Quality and Rigor	Exhibits high-quality and rigorous analysis, meeting or exceeding established standards for qualitative research.	Demonstrates satisfactory quality and rigor in the analysis, although improvements could be made in certain areas.	Shows limited quality and rigor, with notable deficiencies in analysis methodology and depth of interpretation.
Reflexivity	Demonstrates reflexivity, acknowledging biases and preconceptions. Provides insightful interpretations supported by reflexivity.	Exhibits some reflexivity but may lack depth or transparency in acknowledging biases. Provides interpretations that are somewhat insightful.	Shows limited reflexivity with minimal acknowledgment of biases. Provides interpretations that are simplistic or lack depth.

(OpenAI, 2024)

Note. The rubric was developed by the researcher in collaboration with ChatGPT. It is not an official or validated measurement scale.

Evaluations were classified into three categories: comprehensive, satisfactory, or basic, with corresponding numeric weights assigned as follows: Comprehensive = 3, Satisfactory = 2, and Basic = 1. Scores for each category were totaled to determine an overall score for each analysis. Results are shown in Table 4.

Table 4

Rubric Comparing Reflexive Thematic Analysis

Criteria	**Traditional RTA**	**Braun & Clarke (2022) RTA**	**Zhang et al. (2023) RTA**
Understanding of the Data	3	2.5	2.5
Coding Accuracy	3	2	2.5
Thematic Analysis Process	3	2.5	3
Interpretation	3	3	3
Insightfulness of Findings	3	3	3
Overall Quality and Rigor	3	2	2
Reflexivity	3	3	3
Total Score	21	18	19

Scoring: Comprehensive (3), Satisfactory (2), Basic (1)

Thematic results across the three analyses, Traditional Human-Directed RTA, ChatGPT RTA using Braun and Clarke (2022), and ChatGPT RTA using Zhang et al. (2023), revealed significant overlap in identified themes, despite some variation in thematic emphasis and language.

All three analyses highlighted information sources, personal experiences, and trust dynamics as central to vaccine decision-making. Both human and AI-generated analyses emphasized how experiences with healthcare providers, anecdotal evidence, and differing levels of institutional trust shaped parents' attitudes. Participants often used these sources to either reinforce confidence or deepen skepticism toward vaccines.

The Traditional RTA and Braun and Clarke-based AI analysis both included themes on informed decision-making and the integration of natural health practices, suggesting that many parents seek a balance between conventional medicine and holistic approaches.

The Zhang et al. (2023)-based AI analysis uniquely emphasized sociocultural and political influences, reflecting how vaccine perceptions are increasingly shaped by political identity and social environments. This theme was present, though less explicit, in the traditional analysis.

AI-generated themes were generally more succinct and relied heavily on exact participant phrasing. In contrast, the human analysis offered more interpretive depth, narrative nuance, and thematic layering.

I initially held concerns that the themes generated by ChatGPT might diverge significantly from those identified through human-led analysis; however, I was encouraged to find strong alignment across approaches. Given my reflexive stance regarding skepticism toward perceived authority and power structures, I remained attentive to how this perspective might shape my interpretations. In this study, I did not experience disagreement or dissonance with the AI-generated themes. Notably, I found that the similarity between analyses provided heightened confidence in the AI-led analytic process. This also suggests that when given clear and well-designed prompts, AI tools like ChatGPT can work in a supportive manner alongside traditional human-led qualitative research. These findings support continued exploration of how researcher positionality and reflexivity interact with AI-assisted analysis, particularly as these tools become more integrated into qualitative research practice.

Overall, the consistency across the three analyses suggests that ChatGPT can support qualitative research by rapidly identifying key themes and providing structured outputs. However, human interpretation remains valuable for uncovering deeper meaning, contextual nuances, and reflexive insights within qualitative data.

Conclusion

Methodological Conclusion

This study explored the use of ChatGPT for reflexive thematic analysis (RTA) by comparing two AI-guided approaches, using Braun and Clarke's (2022) and Zhang et al.'s (2023) frameworks, with traditional human-directed RTA. All three approaches yielded overlapping core themes, including personal experiences, trust, information seeking, and vaccine concerns.

The traditional human analysis provided a richer narrative and reflexivity, especially in interpreting emotional nuance and thematic complexity. In contrast, ChatGPT's analyses produced concise and organized themes, supported by clear participant quotes, demonstrating its potential to assist in early theme identification.

Future research should focus on refining prompt design and exploring multi-iteration prompting to improve the accuracy and depth of ChatGPT-based analysis (Mesec, 2023; Zhang et al., 2023). Comparing outputs across different AI models and prompt iterations may also help identify best practices for integrating AI into rigorous qualitative research. These efforts could inform the development of standardized approaches that balance efficiency with methodological integrity.

Despite limitations in nuance and contextual interpretation, AI can serve as a useful tool in qualitative research when paired with researcher reflexivity and oversight. This study highlights the feasibility and usefulness of integrating large language models into parts of the qualitative analysis process.

Contextual Conclusions

This study's findings reveal that vaccine decision-making among parents is influenced by a combination of personal experiences, trust (or distrust) in healthcare systems, information sources, and sociopolitical factors. Parents on both ends of the hesitancy spectrum emphasized autonomy, safety, and a desire to make informed choices.

Concerns about vaccine safety, ingredients, pressure from providers, and expanding vaccine schedules coexisted with an appreciation for medical guidance and a sense of responsibility toward community health. Many parents employed alternative or integrative approaches, such as spacing vaccines or boosting natural immunity, even when following recommended schedules.

The study underscores that vaccine hesitancy is complex and deeply personal. Addressing it requires more than scientific data; it calls for transparent, respectful communication, supportive healthcare relationships, and acknowledgment of parents' concerns and lived experiences.

Table 5
Rubric Comparing Reflexive Thematic Analysis

Demographic	Category	Vaccine-Hesitant	Non-Vaccine	Total N (%)
Gender	Female	6 (33.3%)	8 (44.4%)	14 (77.8%)
	Male	2 (11.1%)	2 (11.1%)	4 (22.2%)
Age	25-34	6 (33.3%)	4 (22.2%)	10 (55.6%)
	35-44	1 (5.6%)	4 (22.2%)	5 (33.3%)
	45-54	1 (5.6%)	2 (11.1%)	3 (16.7%)
Education	Associates	3 (16.7%)	1 (5.6%)	4 (22.2%)
	Bachelors	5 (27.8%)	2 (11.1%)	7 (38.9%)
	Post-grad	0 (0.0%)	7 (38.9%)	7 (38.9%)
Occupational Status	Full-time	5 (33.3%)	7 (38.9%)	12 (66.7%)
	Part-time	1 (5.6%)	0.0% (N=0)	1 (5.6%)
	Self-employed	1 (5.6%)	0.0% (N=0)	1 (5.6%)
	Student	1 (5.6%)	2 (11.1%)	3 (16.7%)
	Unemployed	0 (0.0%)	1 (5.6%)	1 (5.6%)
Marital Status	Married	7 (38.9%)	7 (38.9%)	14 (77.8%)
	Single	0 (0.0%)	2 (11.1%)	2 (11.1%)
	Divorced	0 (0.0%)	1 (5.6%)	1 (5.6%)
	Domestic	1 (5.6%)	0 (0.0%)	1 (5.6%)
Annual Income	$100k+	5 (33.3%)	8 (44.4%)	13 (72.2%)

Table 5
Continued

	$75-$99k	3 (16.7%)	0 (0.0%)	3 (16.7%)
	$10-$14k	0 (0.0%)	2 (11.1%)	2 (11.1%)
Ethnicity	White	8 (44.4%)	9 (50.0%)	17 (94.4%)
	Asian	0.0% (N=0)	1 (5.6%)	1 (5.6%)
Geographic Location	Big city	4 (22.2%)	7 (38.9%)	11 (61.1%)
	Small town	2 (11.1%)	2 (11.1%)	4 (22.2%)
	Rural	2 (11.1%)	1 (5.6%)	3 (16.7%)

These findings highlight the importance of transparent communication, effective education, and supportive healthcare environments. Addressing parents' concerns with clear, trustworthy information can foster more informed vaccine decisions. Building trust in health agencies requires transparency, empathy, and accessible communication.

Creating simplified vaccine labels, like nutrition labels, detailing ingredients, side effects, and their likelihood, could improve understanding. Infographics could further support this by presenting complex information visually. These tools, paired with traditional vaccine handouts, would enhance clarity and appeal. For instance, Merck's (2023a; 2023b) 11-page M-M-R II brochure contrasts with its shorter handout, which lacks the depth some parents desire. Table 6 offers a sample ingredient label, and Table 7 translates clinical trial side effect data, illustrating how these formats compare to existing materials.

Table 6
Proposed Label for Vaccine Ingredients of the M-M-R II

Clinical Trial Data
M-M-R II Vaccine
In a clinical trial involving 752 children aged 12 to 18 months, the frequency of certain side effects was recorded:

	Intramuscular	Subcutaneous
Side Effects		
Erythema (redness at the injection site)	10.4%	16.2%
Pain at the injection site	7.0%	7.2%
Swelling at the injection site	1.9%	5.3%
Measles-like rash	2.9%	2.7%
Rubella-like rash	2.7%	2.7%
Varicella-like rash	0.5%	3.2%
Fever (temperature ≥ 38.0° C)	66.5%	66.8%

EXAMPLE

Serious Adverse Events:
Serious adverse events occurred at rates of 0.3% in the intramuscular group and 1% in the subcutaneous group during the clinical trial (Merck & Co., Inc., 2023b).

Two infographics were created with ChatGPT's assistance to summarize Sections 1–14 of the M-M-R II brochure, demonstrating how a transparent and accessible presentation can help clarify vaccine information and ease parental concerns. Including statistics on adverse reactions, such as those in Section 6 of the brochure, further enhances the utility of these materials.

Table 6

Proposed Label for Clinical Trial Data Documenting Side Effects of the M-M-R II Vaccine

Vaccine Facts

M-M-R II Vaccine Ingredients

Serving Size: 0.5 mL (Single Dose)

	Amount
Active Ingredients	
Measles Virus Vaccine Live	Not less than 3.0 log10 TCID 50
Mumps Virus Vaccine Live	4.1 log10 TCID50
Rubella Virus Vaccine Live	3.0 log10 TCID50
Other Ingredients	
Sorbitol	14.5 mg
Sucrose	1.9 mg
Hydrolyzed Gelatin	14.5 mg
Recombinant Human Albumin	≤ 0.3 mg
Fetal Bovine Serum	< 1 ppm
Neomycin Approximately	25 mcg
Buffers and Media Ingredients Various	

EXAMPLE

Contains No Preservative

Manufacturing Information:

- **Measles Virus Source:** Enders' attenuated Edmonston strain propagated in chick embryo cell culture
- **Mumps Virus Source:** Jeryl Lynn™ (B level) strain propagated in chick embryo cell culture
- **Rubella Virus Source:** Wistar RA 27/3 strain propagated in WI-38 human diploid lung fibroblasts

Additional Notes:

- The cells, virus pools, recombinant human serum albumin, and fetal bovine serum used in manufacturing are tested and determined to be free of adventitious agents (Merck & Co., Inc., 2023a).

This comprehensive strategy supports informed decision-making, fosters trust, and encourages open dialogue, all of which are crucial for addressing vaccine hesitancy and improving public health. Ultimately, whether a healthcare provider, public health official, or parent—hesitant or not—we all share the same goal: raising healthy children in a healthier world.

Acknowledgments

Thanks to the University of Northern Colorado, my dissertation chair, Dr. Randy Larkins, and my dissertation committee, who have supported this research endeavor.

Declaration of Conflicts of Interest

The author declared no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Funding

The author received no funding for this research study.

Data Availability Statement

The data used for this study (de-identified semi-structured interview transcripts and audit trail) can be made available to other researchers upon request. If you are interested, please contact the author.

Contribution of Authors

The author was the sole researcher responsible for all aspects of this study. The author's responsibilities and contributions include conceptualizing and developing the research idea, implementing the theoretical framework, and designing the research methods, including the qualitative reflexive thematic analysis and integration of AI-prompting methods. The author conducted all data collection activities, including surveys and interviews, collecting the data through an online survey and remote interviews. She utilized and implemented software tools for analysis, such as coding and analyzing qualitative data, employing NVivo as well as AI (e.g., ChatGPT). The author managed all primary research activities, including participant recruitment and data management, and he was responsible for writing the manuscript, including the abstract, introduction, materials and methods, results and discussion, and conclusion. She also created tables, figures, and other visual representations of the data and findings, and managed the overall research process. Additionally, the author conducted the research with ethical standards and obtained necessary approvals before initiating the research.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Reference

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE.

Centers for Disease Control and Prevention. (2022, December 1). *Vaccines & immunizations: Glossary*. https://www.cdc.gov/vaccines/terms/glossary.html#commimmunity

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE.

Cunniff, L., Alyanak, E., Fix, A., Novak, M., Peterson, M., Mevis, K., Eiden, A. L., & Bhatti, A. (2023). The impact of the COVID-19 pandemic on vaccination uptake in the United States and strategies to recover and improve vaccination rates: A review. Human vaccines & immunotherapeutics, 19(2), 2246502. https://doi.org/10.1080/21645515.2023.2246502

Hamilton, L., Elliott, D., Quick, A., Smith, S., & Choplin, V. (2023). Exploring the use of AI in qualitative analysis: A comparative study of guaranteed income data. International *Journal of Qualitative Methods, 22*, 1–13. https://doi.org/10.1177/16094069231201504

Hoffman, J. (2022, December 16). Opposition to school vaccine mandates has grown significantly, study finds. The New York Times. https://www.nytimes.com/2022/12/16/health/vaccines-public-opinion.html

Kempe, A., Saville, A. W., Albertin, C., Zimet, G., Breck, A., Helmkamp, L., Vangala, S., Dickinson, L. M., Rand, C., Humiston, S., & Szilagyi, P. G. (2020). Parental hesitancy about routine childhood and influenza vaccinations: A national survey. *Pediatrics, 146*(1), 1–12. https://doi.org/10.1542/peds.2019-3852

Kerrigan, A. R., Aitnouri, I., Mar, J., & Altman, W. (2020). What barriers exist in the minds of vaccine-hesitant parents, and how can we address them? *Family Medicine, 52*(9), 626–630. https://doi.org/10.22454/fammed.2020.432940

Larson, H. J., Gakidou, E., & Murray, C. J. L. (2022). The vaccine-hesitant moment. *New England Journal of Medicine, 387*(1), 58–65. https://doi.org/10.1056/nejmra2106441

Lee, V. V., Van Der Lubbe, S. C., Goh, L. H., & Valderas, J. M. (2023). Viewpoint: Harnessing ChatGPT for thematic analysis: Are we ready? *arXiv*, 1–23. https://doi.org/10.48550/arXiv.2310.14545

McKee, C., & Bohannon, K. (2016). Exploring the reasons behind parental refusal of vaccines. *The Journal of Pediatric Pharmacology and Therapeutics, 21*(2), 104–109. https://doi.org/10.5863/1551-6776-21.2.104

Marr, B. (2023, October 5). A short history of ChatGPT: How we got to where we are today. *Forbes*. https://www.forbes.com/sites/bernardmarr/2023/05/19/a-short-history-of-chatgpt-how-we-got-to-where-we-are-today/?sh=3861fd82674f

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Mesec, B. (2023, April 18). *The language model of artificial intelligence ChatGPT: A tool of qualitative analysis of texts.* Authorea. https://doi.org/10.22541/au.168182047.70243364/v1

Merck & Co., Inc. (2023a). M-M-R® II (Measles, Mumps, and Rubella Virus Vaccine Live) Suspension for intramuscular or subcutaneous injection. Initial U.S. Approval: 1978. Rahway; Merck Sharp & Dohme LLC.

Merck & Co., Inc. (2023b). Patient Information M-M-R II Measles, Mumps, and Rubella Virus Vaccine Live. Rahway; Merck Sharp & Dohme LLC.

Morgan, D. L. (2023). Exploring the use of artificial intelligence for qualitative data analysis: The case of ChatGPT. *International Journal of Qualitative Methods, 22*. https://doi.org/10.1177/16094069231211248

Nguyen, K. H., Srivastav, A., Lindley, M. C., Fisher, A., Kim, D., Greby, S. M., Lee, J., & Singleton, J. A. (2022). Parental vaccine hesitancy and association with childhood diphtheria, tetanus toxoid, and acellular pertussis; measles, mumps, and rubella; rotavirus; and combined 7-series vaccination. *American Journal of Preventive Medicine, 62*(3), 367–376. https://doi.org/10.1016/j.amepre.2021.08.015

Nguyen-Trung, K. (2025). ChatGPT in thematic analysis: Can AI become a research assistant in qualitative research? *Quality & Quantity*. Advance online publication. https://doi.org/10.1007/s11135-025-02165-zOpenAI. (2024). ChatGPT (Version 4.0) [Large language model]. https://chat.openai.com/

Nuwarda, R. F., Ramzan, I., Weekes, L., & Kayser, V. (2022). Vaccine hesitancy: Contemporary issues and historical background. *Vaccines, 10*(10), 1595. https://doi.org/10.3390/vaccines10101595

OpenAI. (2024, May 2). *Revised rubric for evaluating reflexive thematic analysis comparing human and AI approaches* [Rubric]. Unpublished work.

Overall, L. (2007). Big theory 3: Vygotsky and social constructivism. In *Supporting children's learning: A guide for teaching assistants* (pp. 73–84). SAGE. https://doi.org/10.4135/9781446212776

Prescott, M. R., Yeager, S., Ham, L., Rivera Saldana, C. D., Serrano, V., Narez, J., Paltin, D., Delgado, J., Moore, D. J., & Montoya, J. (2024). Comparing the efficacy and efficiency of human and generative AI: Qualitative thematic analyses. *JMIR AI, 3*, e54482. https://doi.org/10.2196/54482

Seither, R., Yusuf, O. B., Dramann, D., Calhoun, K., Mugerwa-Kasujja, A., & Knighton, C. L. (2023). Coverage with selected vaccines and exemption from school vaccine requirements among children in Kindergarten — United States, 2022–23 school year. MMWR. *Morbidity and Mortality Weekly Report, 72*(45), 1217–1224. https://doi.org/10.15585/mmwr.mm7245a2

Sridhara, G., Ranjani, H. G., & Mazumdar, S. (2023). ChatGPT: A study on its utility for ubiquitous software engineering tasks. *ArXiv*. https://doi.org/10.48550/arXiv.2305.16837

Teasdale, C. A., Borrell, L. N., Shen, Y., Kimball, S., Zimba, R., Kulkarni, S., Rane, M., Rinke, M. L., Fleary, S. A., & Nash, D. (2022). Missed routine pediatric care and vaccinations in US children during the first year of the COVID-19 pandemic. *Preventive Medicine, 158,* 107025. https://doi.org/10.1016/j.ypmed.2022.107025

Wang, Z., Xie, Q., Ding, Z., Feng, Y., & Xia, R. (2023). Is ChatGPT a good sentiment analyzer? A preliminary study. *ArXiv, 1*, 1–17. https://doi.org/10.48550/arXiv.2307.03952

World Health Organization. (2022, June 15). Covid-19 pandemic fuels the largest continued backslide in vaccinations in three decades. https://www.who.int/news/item/15-07-2022-covid-19-pandemic-fuels-largest-continued-backslide-in-vaccinations-in-three-decades

Wu, T., He, S., Liu, J., Sun, S., Liu, K., Han, Q. L., & Tang, Y. (2023). A brief overview of ChatGPT: The history, status quo, and potential future development. *IEEE/CAA Journal of Automatica Sinica, 10*(5), 1122–1136. https://doi.org/10.1109/jas.2023.123618

Yang, K., Ji, S., Zhang, T., Xie, Q., Kuang, Z., & Ananiadou, S. (2023). Towards interpretable mental health analysis with large language models. *Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing.* https://doi.org/10.18653/v1/2023.emnlp-main.370

Zhang, H., Wu, C., Xie, J., Kim, C., & Carroll, J. M. (2023). QualiGPT: GPT as an easy-to-use tool for qualitative coding. *ArXiv*. https://doi.org/10.48550/arXiv.2310.07061

Notes on Contributor

Dr. Carlene Brown is a researcher, consultant, and educator specializing in applied statistics and research methods, with expertise in qualitative, quantitative, and mixed-methods methodologies. She holds a Ph.D. and M.S. in Applied Statistics and Research Methods and a B.A. in Psychology with a minor in Sociology. Dr. Brown's research spans diverse fields, including healthcare, education, and human behavior, and explores the use of AI to enhance both qualitative and quantitative research methods. She teaches graduate research classes at the University of Northern Colorado in Colorado, USA, and collaborates with colleagues on educational and person-centered research. Dr. Brown is committed to producing data-driven insights that inform decision-

making, advance research, and promote ethical, human-centered inquiry to address critical social and scientific questions.

ORCID

Carlene Brown, https://orcid.org/0000-0002-5414-7492