

Parental Influence on Adolescent Covid-19 Vaccination Opinions

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Abstract

The heavy politicization of the Covid-19 pandemic has caused widespread Covid-19 vaccine skepticism and presents a major public health challenge. While previous studies have found that vaccine hesitancy for adults is correlated with many factors such as political affiliations, research on adolescent vaccination opinions and formation of their beliefs is comparatively limited. Though most states require parental consent for minor/adolescent vaccination, some areas of the country have begun allowing teenagers to autonomously receive vaccinations. Here, we investigate whether parental opinions of the Covid-19 vaccines have strong influence on teenagers' views. An anonymous online survey was given to students in 9th through 12th grade classes at Madison West High School in Madison, Wisconsin, USA. Data analysis of survey responses showed that parents are the major source of healthcare and vaccination information for adolescents. Additionally, parents/guardians can influence the beliefs of their children when trust and communication are present in the relationship. Collectively, our findings demonstrate the strong influence from parents in the formation of their adolescents' vaccine opinions and suggest the importance of positive communication in supporting influential interactions between parent and child.

Keywords

Covid-19, Vaccination, Parental Influence, Adolescent Opinions

1. Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has killed 1,088,854 people in the US and 6,700,519 deaths globally as of January 13, 2023 (World Health Organization, 2023). The Food and Drug Administration (FDA)

issued emergency use authorization for the Pfizer-BioNTech novel messenger RNA coronavirus diseases 2019 (Covid-19) vaccine on December 11, 2020, a year after the Covid-19 case in Wuhan, China (*The American Journal of Managed Care*, 2021; *US Food & Drug*, 2020). The successful development of Covid-19 vaccines offered substantial hope that, through strong public health vaccination initiatives, the pandemic could be overcome. Previous global vaccination initiatives, like the 2001 Measles Initiative, have prevented an estimated 4.3 million childhood measles deaths (*Schuchat*, 2011). Vaccination hesitancy for the new Covid-19 vaccines, however, became widespread and continues to be a major public health challenge in 2023.

Though many factors are linked to general vaccine hesitancy, including economics and public health messaging, the heavy politicization of the Covid-19 pandemic has added to the widespread mistrust of the Covid-19 vaccines (*Fridman et al.*, 2021; *Schuchat*, 2011; *Thompson et al.*, 2021; *Truong*, 2021). The United States' \$18 billion public-private effort to develop Covid-19 vaccines, for example, was named "Operation Warp Speed". The name suggested to the general public that speed was favored over safety, contributing to widespread skepticism of the new vaccines (*Bolsen & Palm*, 2022; *US Government Accountability Office*, 2021). Additionally, Operation Warp Speed coincided with the 2020 Presidential Election, leading to concerns that FDA approval would be timed for President Trump's political gain (*Bolsen & Palm*, 2022; *Cook & Choi*, 2020). Generally, those with right-leaning, conservative political beliefs tended to be more hesitant of the Covid-19 vaccines as opposed to those with left-leaning, liberal opinions (*Baumgaertner et al.*, 2018; *Fridman et al.*, 2021; *Sol Hart, Chinn, & Soroka*, 2020). This political divide is reflected in the Republican and Democrat Parties' vaccination rates. In June 2021, 52% of Republicans had either received their first dose of a Covid-19 vaccine or planned to be vaccinated, versus 88% of Democrats (*Bolsen & Palm*, 2022). Interestingly, a longitudinal study of adult Covid-19 vaccination opinions found that intention to vaccinate decreased among Republicans over the course of the pandemic while little change was observed among Democrats, suggesting that vaccination attitudes strongly correlate with political affiliation (*Fridman et al.*, 2021). Furthermore, a study in Ghana of adults showed that 77% of the sample population were "happy" for the Covid-19 vaccine availability and 67% believed in its potency. Interestingly only 29% of respondents were vaccinated, suggesting the prevalence of vaccine hesitancy due to rumors surrounding vaccines (*Baffoe & Korkor Leeyoo Watson Nortey*, 2021).

Compared to the studies on adults, factors influencing vaccination status and opinions amongst children and adolescents are less well-defined. Adolescents represent a unique group in vaccination opinions due to the increasing usage of online resources in the modern digitalized world. In the digital world, social media platforms such as TikTok and Instagram act as a source of information for susceptible youth who are more likely to believe the misinformation than adults (*Baum et al.*, 2020; *Fox*, 2021). This is manifested in one study showing 51.3% of 13-year-old are willing to receive the Covid-19 vaccine, compared to 69% of

adults (Fazel et al., 2021; Funk & Tyson, 2021), suggesting that social media acts as a source of vaccine misinformation and controversy for youth. Additionally, adolescent behavior surrounding Covid-19 was found to be largely influenced by the perceived opinions of peers and parents around them (Rogers et al., 2021), suggesting that peers and parents act as another important factor for adolescent vaccination beliefs. Compared to extensive studies describing the multifaceted factors such as social media, parents, and peers, little research is conducted on the relative importance of these three factors. As of January 4, 2023, 68% of American youth aged 12 - 17 received at least one vaccine, and 58% completed the two series vaccination (American Academy of Pediatrics, 2023). A major challenge in getting youth vaccinated is the requirement of parental consent for vaccination of minors below the age of 18 in 41 states in the US. In the remaining 9 states and the District of Columbia, requirement for consent is based on a certain age or perceived maturity, called the “mature minor doctrine” (Morgan et al., 2021). In some regions, such as the city of Philadelphia, children above age of 11 can consent for their own vaccination, including Covid-19 vaccines by a 2007 regulation (City of Philadelphia Department of Public Health, 2019). Additionally, parents’ willingness and positive attitudes towards the Covid-19 vaccine are factors that may increase acceptance of the Covid-19 vaccine for their children (Yilmaz & Sahin, 2021). This is consistent with previous research on vaccine opinions.

For adults, most points of contention with vaccines and vaccine mandates surround their perceived efficacy and safety and the battle between individual rights to bodily autonomy and societal responsibility to protect medically vulnerable groups from infectious disease (Meyer, 2015; Schuchat, 2011). Previous studies found that parents’ decisions to vaccinate their children depended upon guidance from primary care providers and their perception of vaccine safety, efficacy, and necessity (Blaisdell et al., 2016; Rosenthal et al., 1995; Zimet et al., 2005). Interestingly, one study also found that adolescents were influenced by their perception of their parents’ views on vaccine necessity. Additionally, parents also influenced the extent to which adolescents believed that the vaccine was a normal, routine preventative measure for all people (Rosenthal et al., 1995). Collectively, these published studies suggest that parent opinions are a major factor in determining their children’s views on vaccination safety and necessity. Furthermore, teenagers’ perception of social acceptance of specific vaccines as the norm also seems to influence their opinions.

As children mature into young adults, their behavior and opinions are influenced by their friends and surrounding environment, whether it be celebrity advertisements that encourage teenagers to perceive e-cigarettes as “cool” (Sapru et al., 2020) or peer participation in activities like drinking and smoking (Clark & Loheac, 2007). Neurobiologically, areas of the brain that control decision-making and problem-solving are immature in adolescents when compared to adults (Tottenham & Galvan, 2016). These neural pathways are prone to stress-based environmental influences such as parental neglect and trauma, with pathological changes observed in exposed individuals (Tottenham & Galvan, 2016). Importantly,

the impact of external influences on adolescent behavior is context dependent. Parental values, for example, are a predictor for students' academic behavior (Masten et al., 2009), while peer-related stimuli may dispose adolescents to participate in risky, but rewarding, behavior (Albert et al., 2013).

Controversial healthcare topics such as vaccination are of critical importance to public health and the factors that influence public opinions on such issues must be understood to advance the wellbeing of communities. Past successful immunization efforts led to the global eradication of smallpox and control of malaria, measles, and polio (Schuchat, 2011). Although vaccination attitudes and parental influence on adolescents have been independently well studied, there is limited research combining these two major topics. As teenagers become young adults, their awareness and investment in social issues tend to deepen. Based on previous studies, we hypothesized that parental opinions strongly influence teenagers' views on Covid-19 vaccination. In this study, we gathered data through an anonymous online survey and analyzed the results to determine what correlations exist between the vaccination status and opinions of parents/guardians and that of their dependent minors.

2. Research Method

2.1. Survey Questionnaires

An anonymous Google Form survey was created with eight demographic questions, five vaccination questions, and sixteen questions about the respondent and respondent's parents' opinions surrounding Covid-19 vaccines. Fourteen opinion questions were designed to receive responses on a linear scale, where respondents were asked to choose, on a scale from zero to ten, the extent to which they felt statements were true or accurate to their opinions. Examples of questions that measured student opinions include: "If you could choose for yourself, how likely are you to get vaccinated?" and "I feel safe in asking my parents/guardian questions about controversial healthcare topics, like the Covid-19 vaccine." The linear scale for responses was "0 Not likely at all... 10 Extremely likely" and "0 Not true at all... 10 Very true", respectively. All questions had an option for "N/A" or "I don't know".

2.2. Data Analysis

All survey responses were collected anonymously, and students completed the survey voluntarily. A total of 79 responses were collected. Post-survey analysis of responses found two identical, duplicate responses (four responses total). These responses were discarded, and the remaining 75 responses were used for all data analysis. For sliding scale questions, a response between 7 and 10 was interpreted as a positive or affirmative answer. Responses between 0 and 3 were interpreted as a negative or dissenting answer. Responses between 4 and 6 were interpreted as neutral. Pearson's correlation coefficient for survey results was performed in GraphPad Prism version 9.0.0 for Windows, GraphPad Software, San Diego, California USA, (<https://www.graphpad.com/>). Additional mathe-

matical figures were also generated using GraphPad Prism software.

2.3. Figure Generation

Figures were compiled in Adobe® Illustrator® 2019. Text figures were created in Adobe® Illustrator® 2019.

2.4. Survey Development and Data Acquisition

The Google Survey was designed to evaluate respondents' demographics, vaccination status, parent/guardian vaccination status, and respondents' vaccination opinions. The study was performed during the 2022 Spring Semester at Madison West High School in the Madison Metropolitan School District (MMSD) in Madison, Wisconsin, USA. Of the 2164 students at Madison West High School, 47% are minority and 34% are Economically Disadvantaged (U.S. News & World Report, 2021). After receiving administrative approval and student consent (Figure 1), the study was conducted with three cohorts of students. The first cohort included 31 students enrolled in a 10th grade Health class. Based on feedback from this first cohort, Question 13 about adolescent vaccine autonomy laws was revised to specify that the example law in the question was passed in Philadelphia, and not in the entire state of Pennsylvania (Figure 2 Q13). The second cohort included 30 students who were also enrolled in a 10 grade Health class. Finally, the third cohort consisted of 16, 11th and 12th grade students in the same English class.

3. Results

3.1. Participant Demographic and Vaccination Overview

Respondents were mostly White/Caucasian (57.3%). 26.7% of the students identified as "Asian", 10.7% identified as "African American", 14.7% identified as "Hispanic/Latino", 1.33% identified as "First Nation/Indigenous". Of these respondents, 10.7% chose multiple races. Of the 75 respondents, 54.7% of the respondents identified as "Woman", 38.7% identified as "Man", 5.30% identified as "Non-binary/Non-conforming", and 1.30% preferred not to indicate a gender identity (Figure 3(a)). At the time of the survey, 72 of 75 student respondents had been vaccinated against Covid-19. Of the 72 vaccinated students, 58 received Pfizer, 2 received Moderna, 1 received Johnson & Johnson, and the other 11 students did not know which vaccine they received. Of the students who received Pfizer or Moderna, 24 students received 2 doses and 40 students received 3 doses (2 doses and booster). The student who received Johnson and Johnson received 2 doses (initial vaccine and booster) (Figure 3(b)). For parents and guardians, vaccination status and type were reported by the students. 94.67% of respondents had the same vaccination status as at least one parent or guardian. Of note, two of the three unvaccinated students in this study were not able to

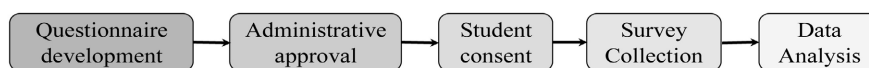


Figure 1. Overview of the methodology used in this study.

For the following statements, rate how true they are for you:

1. "I wish that I had more control over decisions about my personal health."
2. "I am happy with the way my parents/guardians communicated with me about the COVID-19 vaccine."
3. "My parents/guardian and I see eye-to-eye about most healthcare decisions for me."
4. "I trust my parents/guardians to make healthcare decisions for me."
5. "I feel safe in asking my parents/guardian questions about controversial healthcare topics, like the COVID-19 vaccine."
6. "I have a trusted adult in my life to whom I can go to with any health-related question."
7. "I get most of my information about healthcare from my parents/guardian."
8. "I get most of my information about healthcare from my peers (friends, teammates, classmates)"
9. "I get most of my information about healthcare from social media."
10. "My personal opinions were heard/taken into account when my parents/guardians were deciding whether to get me the COVID-19 vaccine."

0 10

Not true at all Very true

11. "Regardless of your personal vaccination status, which of the following best reflects your opinion of the COVID 19 vaccine?"

0 10

Strongly opposed to the vaccine Strongly supportive of the vaccine

12. "If you could choose for yourself, how likely are you to get vaccinated?"

0 10

Not likely at all Very likely

13. "In cities like Philadelphia, the city government has passed laws that allow teens over the age of 11 to get vaccinated without parental consent. How would you describe your level of support for such a law in Madison? (*Madison currently does NOT have this law)"

0 10

Strongly oppose Strongly support

14. "How similar are your COVID-19 vaccine beliefs to those of your parent(s)/guardian(s)?"

0 10

Strongly different Strongly similar

For the following statements, indicate "Yes" if true, "No" if untrue:

15. Do your parents believe that the COVID-19 vaccine is effective in preventing severe illness from the SARS-CoV-2 (COVID-19) virus?
16. Do your parents believe that the COVID-19 vaccine is safe for teenagers to receive?

Figure 2. Summary of opinion focused survey questions.

provide a vaccination status for their parents or guardians. Of the 72 respondents who were vaccinated, 48 were able to indicate the type of vaccine that their parents/guardians received. 27/48 (56.25%) of these respondents received the same type of vaccine as their parents. However, the difference in the type of vaccine could be due to a difference in which vaccines were available to the child age group and other factors. For example, the White House announced that all people aged 16 and older were eligible for the Covid-19 vaccine on April 19, 2021 while the FDA approved vaccines for ages 12 - 15 starting May 10, 2021 (Assistant Secretary for Public Affairs (ASPA), 2022; The White House, 2021).

3.2. Parent Strong Influence on Student Opinions

After collecting the survey data, Pearson's correlation coefficients were used to

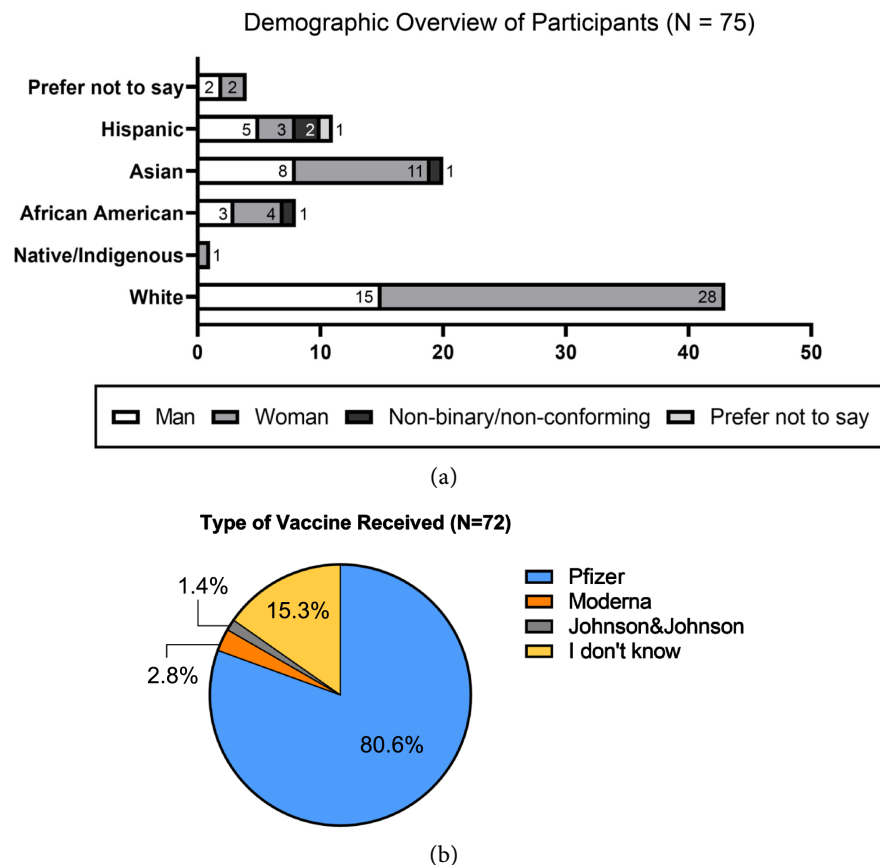


Figure 3. Demographic and vaccination summary of participants. (a) Demographic Overview of Participants (N = 75), (b) Type of Vaccine Received (N = 72).

assess the hypothesis that parental opinions strongly influence teenagers' views on Covid-19 vaccination. Views on adolescent healthcare decision autonomy were first evaluated to determine participants' perception of independence. Support for more personal control over health decisions, broadly, was evenly spread, with the average response being 4.77 out of 10, with 10 indicating the strongest support for greater health control. Specifically regarding Covid-19 vaccine decisions, however, the majority of respondents (50/75) indicated that they were "Very likely" to choose the vaccine for themselves (**Figure 4(d)**). Furthermore, there was a strong positive correlation ($r = 0.91$) between respondents' opinion of the Covid-19 vaccines and likelihood of choosing the vaccine for themselves, as well as a strong positive correlation ($r = 0.75$) between support for a minor vaccination autonomy law in Madison, WI and likelihood of choosing the vaccine for themselves (**Figure 5 Q12 and Q13**). Together, our results from the health decision autonomy questions suggest that teens who are pro-vaccination and feel confident in choosing the vaccine for themselves without parental consent would also support initiatives that empower other teens to access the vaccine by their own choice.

We then sought to determine whether the vaccination beliefs were a result of parent/guardian influence. Survey responses showed that 93.3% and 97.3% of

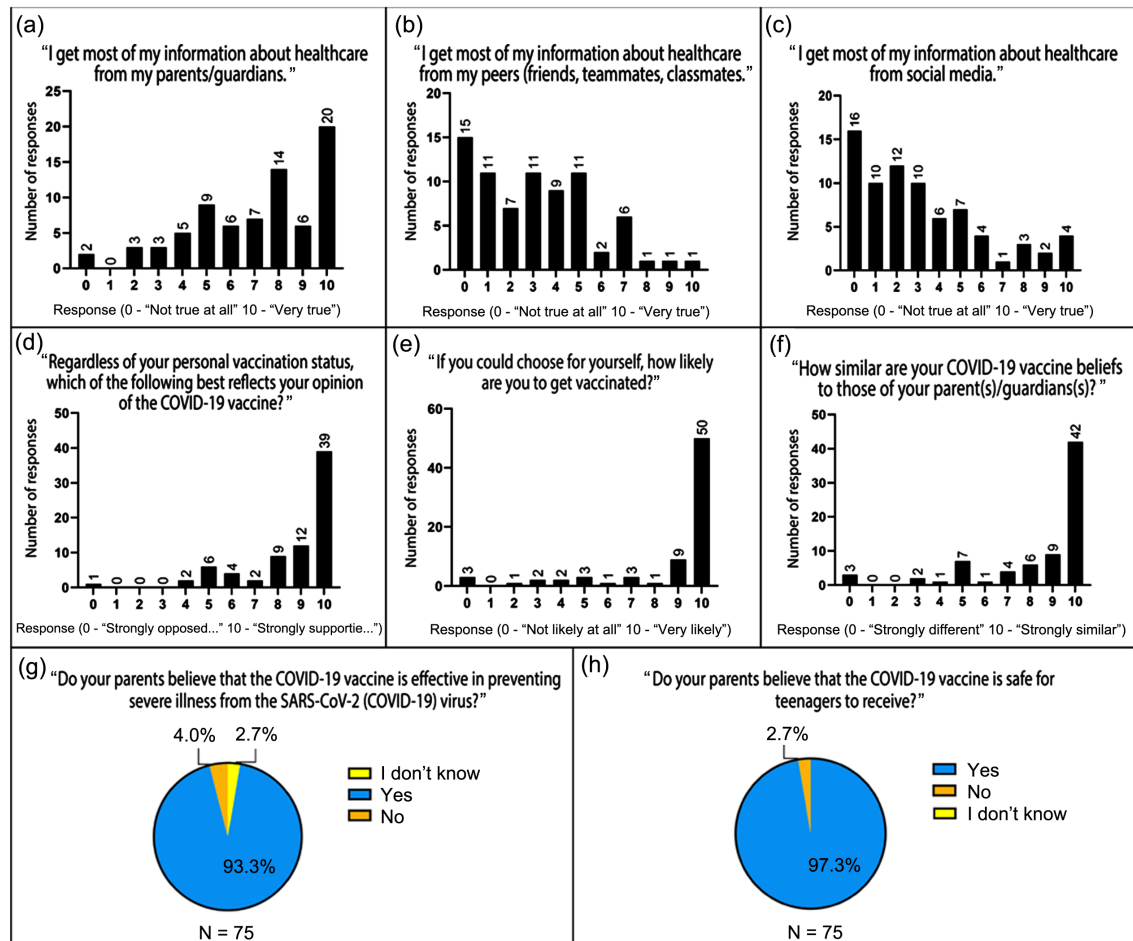


Figure 4. Response breakdown and frequency distributions for selected questions. N = 75 for all questions. (a) Q7, (b) Q8, (c) Q9, (d) Q11, (e) Q12, (f) Q14. Response breakdown by percentage for (g) Q15, (h) Q16.

respondents believe that their parents view the Covid-19 vaccines as effective and safe for teenagers to receive, respectively (**Figure 4(g)** and **Figure 4(h)**). When asked about similarities in Covid-19 vaccine opinions between parent and child, 81.3% (61/75) of respondents perceived vaccine beliefs as similar while 8.00% indicated dissimilarity in opinions. Notably, 56.0% (42/75) had strongly similar shared beliefs (10 on the scale) (**Figure 4(f)**). Interestingly, there was a strong positive correlation ($r = 0.82$) between Q11 and Q14, which asked about student opinions on the vaccines and parent-child opinion similarities, respectively, indicating that students with a favorable opinion of the Covid-19 vaccines held similar beliefs with their parents (**Figure 5**). These results suggested that the largely positive vaccine views of the respondents were related to the positive vaccine opinions of the parents/guardians. Finally, the majority of respondents, 65.3% (47/72), affirmed that their parents/guardians were their main source of health information, indicating a causal relationship between parent opinions and adolescent opinions (**Figure 4(a)**). Alternatively, 12.5% (9/72) and 13.9% (10/72) of respondents viewed their peers and social media as their main sources of health information, respectively (**Figure 4(b)** and **Figure 4(c)**). Together,

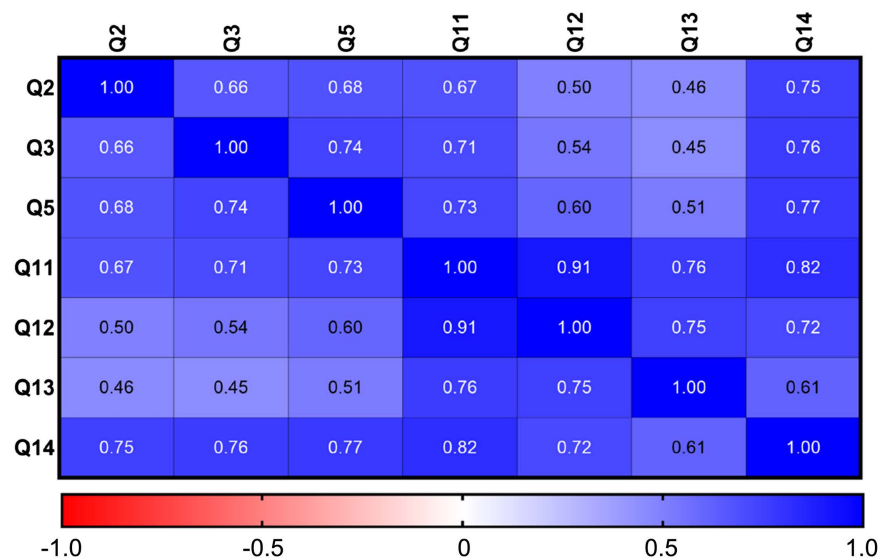


Figure 5. Heat map showing Pearson's correlation coefficient for selected questions. (Q2) "I am happy with the way my parents/guardians communicated with me about the Covid-19 vaccine." (Q3) "My parents/guardians and I see eye-to-eye about most healthcare decisions for me." (Q5) "I feel safe in asking my parents/guardians questions about controversial healthcare topics, like the Covid-19 vaccine." (Q11) "Regardless of your personal vaccination status, which of the following best reflects your opinion of the COVID-19 vaccine?" (Q12) "If you could choose for yourself, how likely are you to get vaccinated?" (Q13) "In cities like Philadelphia, the city government has passed laws that allow teens over the age of 11 to get vaccinated without parental consent. How would you describe your level of support for such a law in Madison? (*Madison currently does NOT have this law)" (Q14) "How similar are your Covid-19 vaccine beliefs to those of your parents/guardians?".

these findings support our hypothesis that parents are a strong influence on their teenagers' Covid-19 vaccine opinions.

Having established that parents/guardians are a strong influence on their teenagers' vaccine opinions, we wanted to further study whether this parental influence is dependent upon trust and communication with their children. With parents being the main source of health information for most respondents, we found a strong positive correlation ($r = 0.75$) between feeling satisfied with how parents/guardians communicated Covid-19 vaccine decisions and having similar Covid-19 vaccine opinions with parents/guardians (Figure 5 Q2 and Q14.). This suggests that similarity in parent-teen vaccine opinions may be positively influenced by effective parent-teen communication. Furthermore, the strong positive correlation ($r = 0.74$) between feeling safe in asking parents about controversial health topics and seeing eye-to-eye with parents on general health decisions suggests that more open and positive communication between parents and their children surrounding difficult topics is associated with a greater level of consensus in broader health contexts (Figure 5 Q3 and Q5). These findings support the idea that parents/guardians can influence the beliefs of their children when trust and communication are present in the relationship.

4. Discussion

The multifaceted causes of vaccine hesitancy are especially important to study as the world transitions out of the Covid-19 pandemic. While adult vaccination attitudes have been correlated to political opinion, healthcare worker recommendation, and perception of safety, adolescent opinions are comparatively understudied (Blaisdell et al., 2016; Fridman et al., 2021; Meyer, 2015; Rosenthal et al., 1995; Schuchat, 2011; Zimet et al., 2005). Given the controversial nature of the Covid-19 pandemic and vaccines, it is important to understand the impact of parents/guardians on the formation of adolescent opinions for the advancement of public health immunization initiatives. Our study found that parents are a strong influence on adolescent opinions, and that this influence is related to the level of trust and open communication in the parent-child relationship.

We conducted an anonymous Google survey to collect data from high school students about their Covid-19 vaccine status and opinions and that of their parents or guardians. Based on survey responses, we determined that parents are the main source of health information for 65.3% of our respondents. These results are consistent with findings from a larger 2014 survey of 1156 U.S. teenagers 13 - 18 years old, which found that 55% of respondents got most health information from their parents. Furthermore, 57% of respondents believed themselves to be “very” satisfied with parents as their source of information (Center on Media and Human Development School of Communication Northwestern University, 2015). Specifically, we found that similarities in parent-child vaccination opinions were correlated to having trust and communication in their relationship. Of note, all participants were students and responses about parent opinions were based on their children’s perceptions of their beliefs. We found significant correlation ($r = 0.75$) between trust and communication in a parent-child relationship and parental influence on child opinions. We also found that parent-child consensus in general health decisions was strongly correlated to respondents feeling safe in asking parents questions about controversial topics ($r = 0.74$). These results are consistent with a larger study of 4746 teenagers in Minnesota, USA, which found that in parent-child relationships where adolescents valued parent opinions for serious decisions and felt comfortable talking to parents about problems, adolescents were associated with improved behavioral and emotional health. Furthermore, the study concluded that family connectedness acted as an indicator of behavioral and emotional health, with adolescents in positive and trusting relationships turning to parents for information and guidance (Ackard et al., 2006). Our findings are also supported by a study which found that, for adolescents, one predictor for positive vaccination attitudes is the perception that their parents felt the vaccine was important (Rogers et al., 2021; Rosenthal et al., 1995).

One limitation to our research is the limited sample population. While our study included grades 9 - 12, most of our respondents were in the 10th grade. Additionally, the study was conducted in an area of Madison, Wisconsin, USA,

with a relatively high socioeconomic profile and the majority of our sample population was vaccinated and pro-Covid-19 vaccine (U.S. News & World Report, 2021). A previous study found that students who were vaccine hesitant, based on their decisions to opt out or remain undecided on receiving the Covid-19 vaccine, were associated with schools in areas of greater socioeconomic deprivation (Fazel et al., 2021). Accordingly, the 96% two-dose vaccine rate in our sample population of students is much higher than the national average of 58% for minors aged 12 - 17 (American Academy of Pediatrics, 2023). It would be interesting to evaluate whether our findings hold true for a more representative sample population with more varied vaccine opinions, statuses, and family dynamics.

Our study contributes to furthering the understanding of how teenagers form opinions on complex topics with a specific focus on parental influence. Our results are consistent with other research studies, indicating how parent-teen relationships are an area of active study with many critical applications. Our findings highlight the need for more research of the teenage demographic especially on topics that are of consequence for communities. While focus on public education has revolved around developing well-informed critical thinkers, our findings demonstrate that it is equally as important to study the significance of parents' influence on adolescent opinion development. This is especially true for public health measures such as vaccination, where most states have requirements of parental approval. Furthermore, it would be interesting to study the other aspect of influence, namely adolescent influence on parents. If so, this bidirectional influence could be a novel topic to pursue further research. Additionally, this research is significant in learning how vaccination information was conveyed during the Covid-19 pandemic. It is important to learn from such research to continue to develop our vaccine informative measures in order to prepare for future pandemics and prevent misinformation, politicization, and hesitancy toward vaccination.

5. Conclusion

Controversy over the Covid-19 vaccines has been attributed to multiple factors including vaccine efficacy, safety, and political beliefs. Our results suggest that parents are the major source of information for teenagers and have a stronger influence in the presence of positive communication and trust. These findings have further implications for studying how teenagers form opinions and how public health measures can be developed to ensure a well-informed teenage population in future pandemics.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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