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Adolescents trust physicians for vaccine information more than their parents or religious leaders

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Abstract

Although, evidence clearly supports vaccination as the most cost effective approach to controlling infectious diseases there are many individuals questioning, delaying and refusing vaccines. The main purpose of this study was to find out what source of information adolescents trust the most on vaccines. We conducted a cross-sectional survey of public high school students using a paper-based questionnaire in a region with a high rate of vaccine acceptance to assess sources they trusted most for vaccine information. Surveys were administered over a one-week period in the fall of 2017. We gave forms to 200 students to obtain parental consent and student assent and then distributed our questionnaire to the 125 students who completed these consent/assent forms. A total of 105 completed questionnaires were returned. The major finding was that students reported physicians as their most trusted source for vaccine information. Secondary analysis was performed looking at the perceptions teenagers have relative to risks and effectiveness of vaccines for the prevention of communicable diseases. Most teenagers (62%) reported their physician or other medical professional as the most trusted source and 24% cited parents/guardians. We found that physicians were the most trusted

source for information about vaccinations, above parents, in this group of high school students.

Keywords: Vaccines, Public health, Infectious disease, Sociology

1. Introduction

Vaccines are one of the most cost effective and successful approaches to protecting individuals from a wide range of diseases, and have resulted in the prevention of hundreds of thousands of deaths and millions of hospitalizations in the United States and worldwide [1, 2]. Increasing rates of exemptions from vaccination are threatening to allow and already resulting in the re-emergence of many vaccine preventable diseases (VPDs) [3, 4, 5, 6]. Over the last decade, vaccination of adolescents has received more attention, as high rates of some VPDs are found in this age group [7]. For example, 74% of new HPV infections occur among those aged 15–24 years. Pertussis incidence has increased in the past decade at a faster rate among 11–18 year-olds than any other age group, and 11–19 year-olds have the highest incidence of meningococcal disease outside of infancy [8, 9, 10]. Even though there is evidence that vaccination rates for certain vaccines such as Tdap are increasing for adolescents, others such as HPV are below the Healthy People 2020 goals of 80% [11]. Additionally, there is mounting evidence that adolescence is a critical time for establishing the foundations of future health decisions [12].

Prior research has focused on parents who are hesitant to vaccinate and whether interventions, such as education, can make them more likely to accept vaccines [13, 14]. Previous studies have also explored the impact parents have on their children's opinions on vaccination, and the interventions studied are aimed at the parents [15, 16]. These investigations have suggested that the impact of education may be complex or even contradictory with higher education of parents being associated with both higher as well as lower levels of vaccine acceptance. The authors suggest that many interventions hold promise for increasing adolescent vaccination but deserve further investigation. Researchers are investigating the potential impact of sending text messages to parents about vaccines and are finding questions such as, "Do you want to protect your daughter from cervical cancer?" increase parents' intent to vaccinate. There is increased attention on creating "patient-centered" educational material(s) but there is a lack of research on the impact of these newer educational modalities on adolescents [15]. Although many patient entered interventions show promise when targeting parents they have not been thoroughly tested when targeted at adolescents. Dempsey and Zimet (2015) also point out that there is still limited research on what sources of information adolescents are interested in listening to and willing to trust when formulating their beliefs about vaccinations.

Our study focused on the attitudes of adolescents with regard to the importance, safety and effectiveness of vaccination, and on their most trusted source for information about vaccines. We studied teenagers in a region of high vaccine acceptance. This region's vaccination rate in adolescents exceeds national averages (e.g., 91.1% of teens received the tetanus-diphtheria-acellular pertussis (Tdap) and 89.2% received the meningitis vaccine) [17]. We chose to do our investigation in an area with high vaccination rates and looked at attitudes and information sources in an area achieving success with adolescent vaccination to better understand adolescents' attitudes toward vaccines and trusted information sources.

2. Materials and methods

We created a 15-question paper questionnaire specifically for this study. Participation was open to students in grades 9–12 (ages 14–18) at a public school on Long Island, NY with a total enrollment of approximately 1500 students. Questions were constructed with multiple-choice answers or responses being selected from a five-point Likert psychometric scale. We initially handed out forms to 200 students requesting parental consent and student assent at a Long Island public high school. We distributed the questionnaire to the 125 students for whom signed consent from their parents and assent from the students was obtained. Of the 125 students that received the questionnaires 105 students answered all of the questions and handed them in. The 20 students who received but did not complete the questionnaires after receiving them, either handed in partially completed questionnaires or decided they were not interested in participating and did not return completed forms. Only the 105 completed questionnaires were included in our analysis. Enrollees completed these questionnaires during one week in the fall of 2017. Analysis was performed using Graphpad Prism version 7.0. Approval for the study was obtained from the Schreiber High School Institutional Review Board. A copy of the questionnaire used is included as supplemental material.

3. Results

The participants were 38% male and 62% female. All participants were between the ages of 14–18 and in grades 9–12. A majority of the participants had favorable views of vaccinations (Fig. 1A). Over half of the sample agreed strongly (58%) with the statement “I think it is important for everyone to get the recommended vaccines for themselves and their children” (Fig. 1A). Of those responding to the statement “If I ever have children, I will want them to get all the recommended vaccinations,” 62% strongly agreed (Fig. 1B).

Responses to the statement “I am concerned about serious adverse effects of vaccines” demonstrated approximately 1/3 of respondents agreeing, 1/3 not agreeing

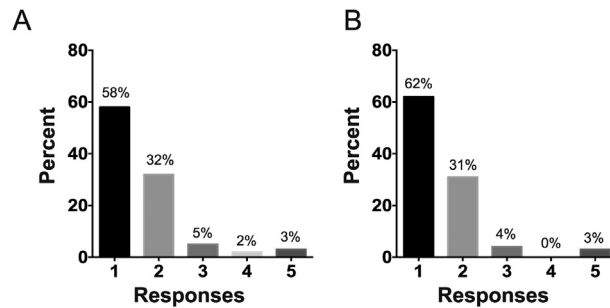


Fig. 1. Adolescents' opinions on the importance of receiving vaccines. (A) Responses to the statement, "I think it is important for everyone to get the recommended vaccines for themselves and their children" is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105) (B) Responses to the statement, "If I ever have children, I will want them to get all the recommended vaccinations" is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105).

and 1/3 of students neither agreeing or disagreeing, with students appearing to be equally divided on this issue (Fig. 2).

We found that half of adolescents disagreed with the statement that there were better ways to prevent disease than through vaccination strategies (Fig. 3A). A little less than two-thirds of participants disagreed or strongly disagreed with the statement "Rare diseases like measles, diphtheria, and polio are not common where I live, so those vaccines are not necessary" (Fig. 3B). The majority of adolescents reported that they shared the same beliefs about vaccines as their parents or guardians (Fig. 4A). In response to "I would make a different choice about vaccinating my own children than my parents have made for me", the majority disagreed (Fig. 4B).

Almost half (47%) of adolescents reported family physicians or other medical professionals as their primary source of vaccine information, followed by their parents/guardians (38%) (Fig. 5). The most trusted source of information was family

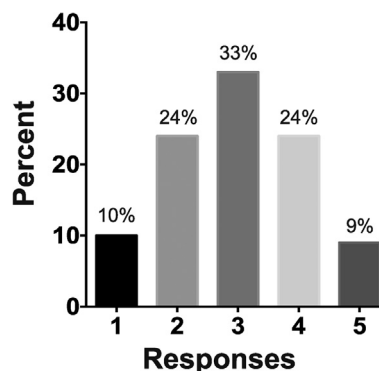


Fig. 2. Concerns about adverse effects of vaccines. Responses to the statement, "I am concerned about serious adverse effects of vaccines" is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105).

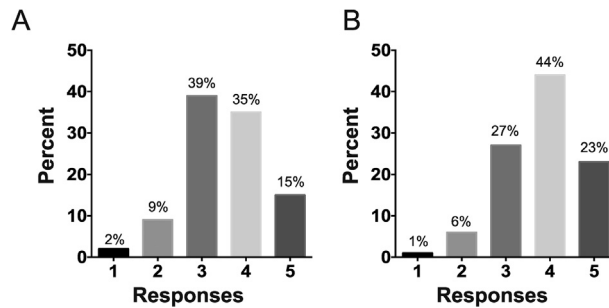


Fig. 3. Views on relative effectiveness of vaccinations. (A) Responses to the statement, “I believe that there are other (better) ways to prevent diseases which can currently be prevented by a vaccine” is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105). (B) Responses to the statement, “Rare diseases like measles, diphtheria, and polio are not common where I live, so those vaccines are not necessary” is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105).

physician or other medical profession (Fig. 6) while the least trusted source for information about vaccines was social media (Fig. 7). A little over half (56%) of participants reported that they felt sufficiently informed about vaccines and their safety (Fig. 8). We did not specifically test the adolescents in our study regarding their actual level of knowledge about vaccines.

Secondary statistical analysis was performed, including testing for the influence of gender, but the relationships were not found to be statistically significant nor were these pre-specified end points based on the anticipated power of this study. We reported the results in the order of questions on the questionnaire.

4. Discussion

Improving vaccination rates of adolescents before they enter adulthood is vital because it is a time of development during which effective preventative care

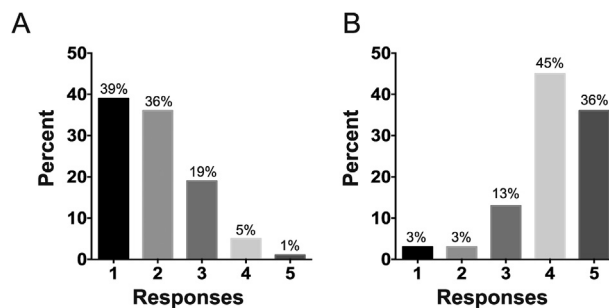


Fig. 4. Teenager beliefs about vaccines compared to their parents. (A) Responses to the statement, “I share the same beliefs about vaccines as my parents/guardians.” is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105). (B) Responses to the statement, “I would make a different choice about vaccinating my own children than my parents have made for me” is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105).

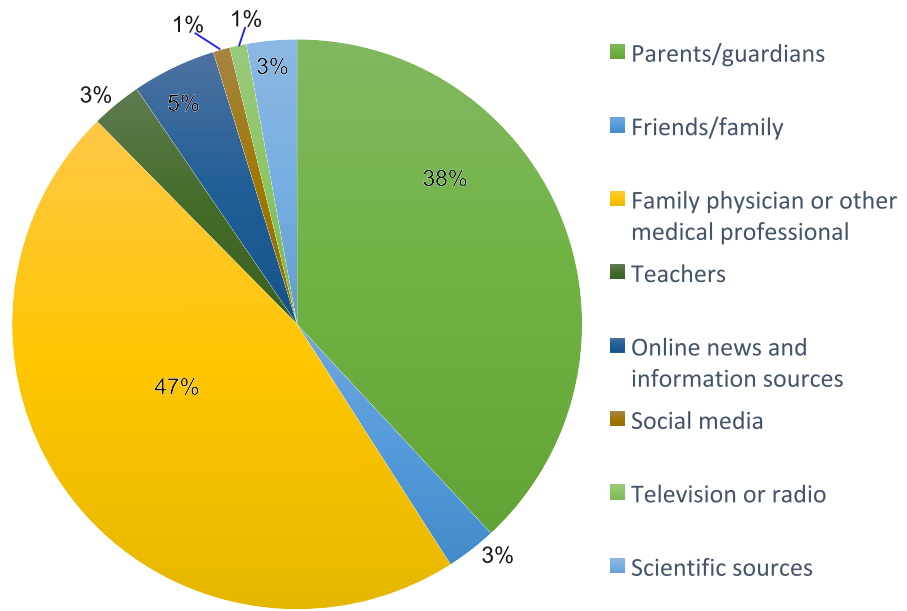


Fig. 5. Sources adolescents report receiving the most vaccine information from. (n = 105).

measures, such as timely vaccinations, could establish lifelong healthy behaviors [5, 18]. Currently, as adolescents enter adulthood, vaccination rates may drop below established targets [11, 19]. If parents establish regular vaccination habits and adolescents are educated about the importance of vaccination, they may continue to see the value in routine vaccinations across their lifespan. Recently, several new vaccines have been recommended specifically for adolescents, including the human papillomavirus (HPV), tetanus-diphtheria-acellular pertussis (Tdap), and meningococcal

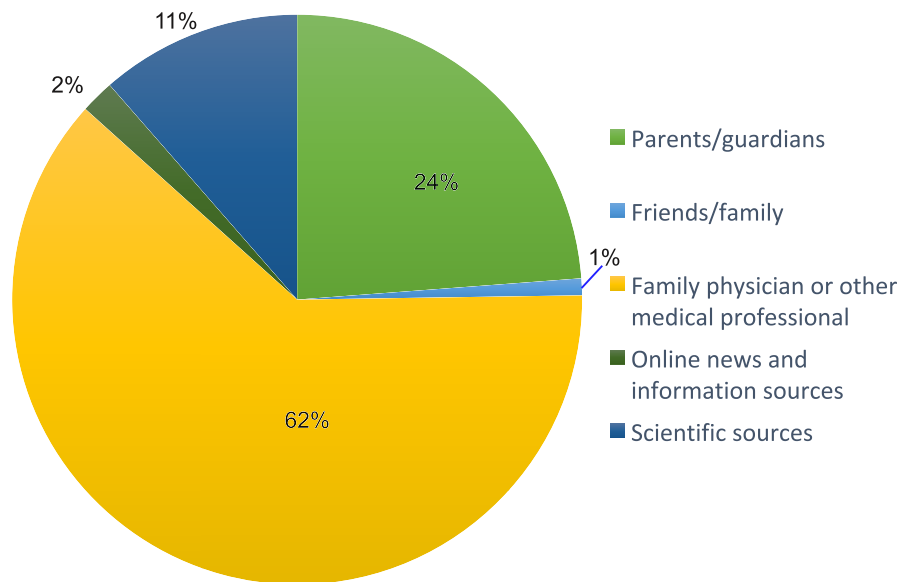


Fig. 6. Trusted sources for vaccine information. (n = 105).

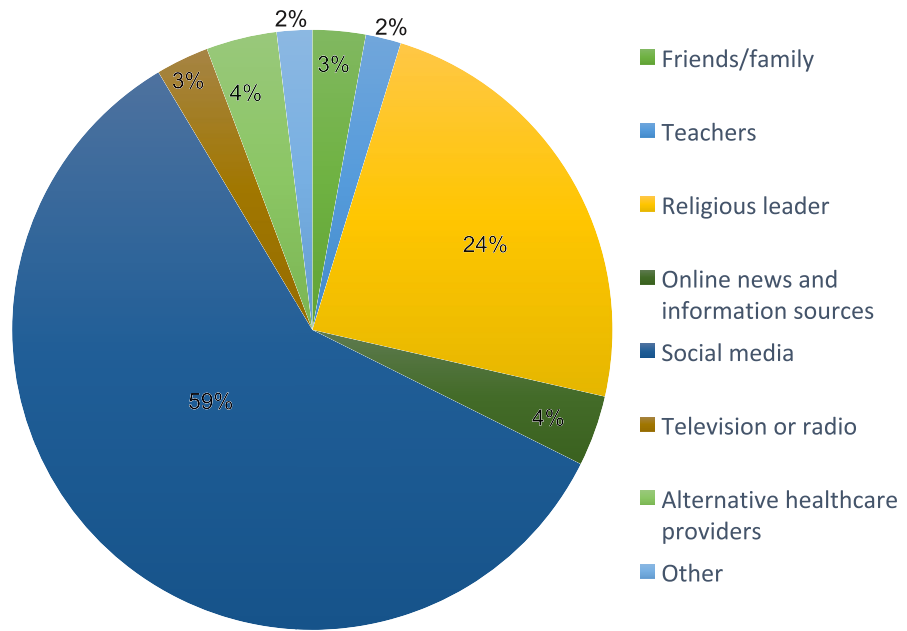


Fig. 7. Least trusted sources for vaccine information. (n = 105).

conjugate (MCV4) vaccines, making vaccination a major component of adolescent primary health care [20].

High school students trust their family physician or another medical professional over any other source for information on vaccines. These results underscore the importance of health care provider-based interventions targeted at adolescents and the need to develop strategies for addressing vaccine hesitancy to help raise immunization rates among adolescents. Adolescent-centered education from physicians has the potential to influence vaccination acceptance.

The adolescents in this study reported that they felt sufficiently informed about vaccines, although previous research shows that teenagers exhibit limited knowledge

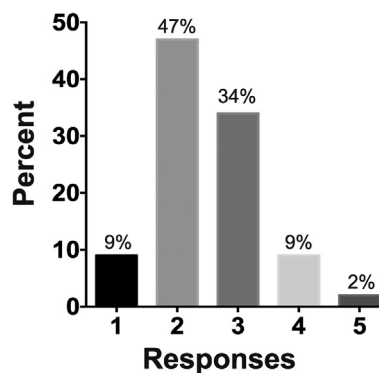


Fig. 8. Adolescents' feelings about their level of vaccine knowledge. Responses to the statement, "I feel sufficiently informed about vaccines and their safety" is seen for choices; 1-strongly agree, 2-agree, 3-neither agree or disagree, 4-disagree, 5-strongly disagree. (n = 105).

and experience of both vaccine-preventable diseases and vaccines themselves [21]. When adolescents believe they are informed, though in actuality they know little about the issue, there is concern that an educational deficit may leave them vulnerable to misinformation [22, 23].

Our results revealed adolescents were divided on the issue of vaccine safety, which may suggest that concern over the possible side effects of vaccines is a potential driver of vaccine hesitancy among a subset of adolescents. Strategies to address vaccine safety and hesitancy that focus on educating teenagers about the relative safety of vaccines might benefit the adolescent population. Additional research is needed to determine and understand how adolescents perceive of and concerns around vaccine safety. We also noted that just under half of respondents either do not feel adequately informed about vaccine safety, or do not have an opinion. It is unclear if this is because we studied a population with high vaccine acceptance or if educational efforts have not focused on the distinct but perhaps critical issue of vaccine safety. Future studies would be needed to explore this important issue. Seeing so many adolescents willing to embrace vaccination as an approach to prevent diseases despite their being equally divided with regard to safety concerns may suggest that focus on accentuating potential benefits would be even more persuasive than attempts to minimize perceptions of risk. Only further investigation will clarify these critical questions.

There are a number of limitations of our study. One limitation is that we had a small sample size. We also only obtained parental consent and student assent from a subset of students given the forms and not all of these students successfully completed the questionnaire. It is possible and likely that there was selection bias with regard to which students took consent forms to their parents, which parents agreed to allow their child to participate in a study on vaccination, and which students took the time to return a completed questionnaire. We anticipated a low participation rate, therefore, decided not to collect much demographic data such as specific age, specific grade, and whether the respondents were up to date on their own vaccines.

Another limitation of our study is that we only conducted our study at one school in a region of high vaccine acceptance. Future studies at other schools with high vaccine acceptance as well as schools in regions with lower vaccination rates would potentially have different findings. With regard to students' reports that they felt sufficiently informed about vaccines, our study did not provide any verification of the level of knowledge that these students actually had regarding vaccines and only assessed students' perception of their level of knowledge.

5. Conclusion

Adolescents identified physicians as their primary and most trusted source of information about vaccines. This finding suggests that there is an opportunity for physicians to

provide more vaccine education to adolescents. Also, in this study adolescents were divided with regard to vaccine safety, which suggests this topic might be important for physicians to address in their education efforts of adolescents. Future studies assessing the impact of increased engagement with adolescents and physician education of adolescents about vaccines are warranted and may help expand our understanding of barriers to adolescent vaccination [24]. Additional studies looking at the education of adolescents regarding the importance, safety and effectiveness of vaccines will allow us to better understand the most efficacious approach to engaging with this targeted population and improving the vaccination rates during their adolescent years as well as influencing the decisions they will make when they move into the role of parents.

Declarations

Author contribution statement

Daisy S. Griffin: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

George Muhlbauer: Conceived and designed the experiments, Contributed reagents, materials, analysis tools or data, Wrote the paper.

Daniel O. Griffin: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

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