

12-2017

Influential Factors in the Parental Decision-Making Process of Child Vaccinations

Amanda Boldy

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INFLUENTIAL FACTORS IN THE PARENTAL DECISION-MAKING PROCESS OF
CHILD VACCINATIONS

A Thesis

Submitted to the School of Graduate Studies and Research
in Partial Fulfillment of the
Requirements for the Degree
Master of Education

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December 2017

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The purpose of this study was to help establish the sources of information on where parents currently receive information regarding vaccination; whether from credible sources or social media sites. A survey was electronically dispersed to parents of children ages 0-12 years old through a social media site (Facebook) examining what their perceptions of vaccinations and what source of information they used to come to their decisions. The most significant finding after analysis of the survey was a significantly moderate negative correlation ($r = -.367$, $p = .01$) between parents who ranked using social media as their primary source of information indicated that they did not, or will not, vaccinate their child(ren). This showed that the parents who reported that they have or plan to vaccinate their child(ren) based on the recommended schedule, were less likely to use social media as a source of vaccination information.

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CHAPTER 1

INTRODUCTION

Background

Parents determine when and what vaccinations their children receive. It was established that parents rarely make these decisions on their own (Brunson, 2013). There are many factors that contribute to a parent's decision on whether or not to vaccinate their child. Research suggests that parents are strongly influenced by social networks and particularly people networks in the decision-making process (Brunson, 2013). With the popularity of social media continuing to increase, it is important to determine how this increased usage impacts their decision-making process on vaccinating their children.

The majority of the research explains that the most common source of vaccination information is from healthcare providers. However, evidence is growing that parents are getting information from a multitude of other sources (Jones, 2012). One study examined the parental attitudes and beliefs associated with internet use as a source of vaccination information finding that parents who received their information from the internet were less likely to agree with the vaccine science and children need or benefits of vaccines (Jones, 2012). The influence of social media as a source of information is becoming prominent through its appearance in the literature. Studies have been conducted that analyze social media sites posts about vaccinations attempting to document the source, tone, and medical accuracy (Love, 2013).

In order to assess the potential influences on the decision-making process, researchers need to understand they do not have control over (i) parental ability to access and verify medical information, and (ii) outside influences such as religion and culture. This study helped to

examine where parents currently receive information regarding vaccinations. These results can help health educators provide to parent's accurate information on vaccination and help parents understand what is inaccurately construed in the media by non-credible sources.

Research Question

This study examined where parents get their information when making the decision whether or not to vaccinate their children. Furthermore, this study will determine if these parents follow the recommended vaccination schedule, delay vaccinations, or not vaccinate their own children.

Hypotheses

1. A greater percentage of parents will report gaining information regarding vaccinations from a reliable source (i.e healthcare provider).
2. A small percentage of parents will report gaining information regarding vaccinations from social media sites.
3. Parents who report they gain information about vaccinations primarily from social media will have a more negative perception towards vaccinations.
4. Parents who report they gain their information from reliable sources will have a more positive perception towards vaccinations.

Assumptions

1. Parents have access to reliable sources of information regarding vaccinations.
2. Parents are exposed to information regarding vaccinations via social media sources.
3. Parents are aware of the recommended vaccination schedule provided by the Centers for Disease Control and Prevention (CDC).

Limitations

1. The researcher is only using one form of data collection.

Significance of the Study

Research suggests parents are strongly influenced by social networks and people networks in the decision-making process about their children (Brunson, 2013). With social media being such a prominent part of people's daily lives, it is important to recognize that there is an abundance of information displayed on these sites. Being able to recognize false information is important for this information may have the ability to sway a parent's opinion specifically related to vaccinations.

Knowing that there is an influence from non-reliable sources such as social media sites on parent's vaccination decisions, this study was novel in that it examined the influence that social media has on making health decisions. The purpose of this study is to help establish the sources of information on where parents currently receive information regarding vaccination whether from credible sources or social media sites.

Definition of Terms

Vaccination schedule- A schedule of recommended immunizations made by the Centers for Disease Control and Prevention (CDC) for parents of children ages 0-18 years old (CDC, 2017b)

Social Networks- (includes both people and source networks) the people one interacts with as well as the source of information they result (Brunson, 2013).

CHAPTER 2

REVIEW OF RELATED LITERATURE

Parents play a critical role in managing their children's health. Parents want to stay informed on the family health topics and there is an abundance of resources readily available to them (Harmsen, 2013). The Center for Disease Control and Prevention (CDC) has developed a recommended Immunization Schedule for children and adolescents ages 18 years and younger to follow (CDC, 2017b). The schedule goes through each age group and explains what vaccine is recommended. This list is provided to families by the child's pediatrician at the initial appointment soon after being born. Harmsen (2013) indicates that childhood vaccination is a health topic that is highly searched on the internet; that 79.6% of parents use two to six sources on average when searching for information. Therefore, it is important to understand where parents are receiving their information along with what sources are being used. It is equally important to understand the controversy around vaccinations and why this controversy has arisen.

Controversy Around Vaccinations

Vaccinations have been a topic of controversy for decades now and it's not going away. When exploring the literature, there is a common set of positive and negative topics continuously discussed. According to ProCon.org, the subcategories that have the most publicity are safety, government credibility and involvement, and eradications and elimination.

Safety

Safety is a major concern that parents constantly watch regarding their children's health. There are multiple arguments being made around the topic of safety which relate to the adverse effects of vaccines along with the ingredients put inside them.

Adverse Effects

The first argument is around the notion “vaccines save children’s lives” (ProCon.org, 2017b). The American Academy of Pediatrics states that “most childhood vaccines are 90-99% effective in preventing diseases” (AAP, 2016). The opposite stance to this statement is that “vaccines can cause serious and sometimes fatal side effects” (procon.org/vaccine). The Center of Disease and Control Prevention (CDC) states that all vaccines carry a risk of anaphylaxis (e.g. allergic reaction) in about one in every million children (CDC, 2017a). This article also states that there may be an association with MMR (measles, mumps, and rubella) along with DTaP (diphtheria, tetanus, and pertussis) vaccines causing increased risk of long-term seizures, coma, lowered consciousness, and permanent brain damage (CDC, 2017a). It is important to note that the CDC also states that the rarity of this reaction makes it difficult to determine the causation (CDC, 2017a).

Ingredients

Continuing around the topic of safety, the next idea often debated is the ingredients in vaccines. The CDC states that the most common substances found in vaccines include aluminum, antibiotics, egg protein, formaldehyde, monosodium glutamate (MSG), and Thimerosal (CDC, 2011). Contradicting the notion that these ingredients are safe, the opposing side states that the ingredients found in vaccines are harmful (ProCon.org, 2017b). Several ingredients may pose risk for many types of complications including headaches, abdominal pain, nausea, diarrhea, fever, blood in urine or stool, pneumonia, and inflammation of stomach or intestines (CDC, 2017a). Though chemicals like mercury are included in several vaccinations, they are only linked to negative health effects at high doses. Carrillo-Marquex (2013) explain that the ingredient Thimerosal (which contain components of mercury, specifically methyl

mercury), is minimally dangerous at the small level that is included in the vaccine. An example of this methyl mercury exposure is when people consume fish, such as tuna and swordfish, at higher levels than what a vaccine may contain (Carrillo-Marquex, 2013).

Government Credibility and Involvement

Organizations including the CDC, Food and Drug Administration (FDA), American Medical Association (AMA), American Academy of Pediatrics (AAP), World Health Organization (WHO), and many others state that “Vaccines are very safe” (ProCon.org, 2017b). While the opposing argument emphasizes on the idea that “the pharmaceutical companies such as the FDA and CDC should not be trusted to make and regulate safe vaccines” (ProCon.org, 2017b). The idea of government involvement with personal medical choices (e.g. mandatory vaccines) is a topic of debate. This process is said to interfere with personal freedom as stated on the online article from vaccine.org. This statement was supported by former Senator Ron Paul’s article “Government Vaccines- Bad Policy, Bad Medicine” (Paul, 2011). Paul (2011) states that personal medical decisions should not be made by government for that would interfere with the most basic freedom of one’s physical person. Paul (2011) quotes, “If we let the government make medical decisions for us, we in essence accept that the state owns our bodies”. Along with personal freedoms, mandatory vaccines are also accused of overstepping the constitutionally protected religious freedoms. Certain religious beliefs are affected by the push for mandatory vaccines including beliefs from institutions such as certain Christians, Amish communities, and the Church of Illumination (ProCon.org, 2017b).

Eradication and Elimination

The final sub categorical vaccine argument involves eradications and elimination.

Elimination means that the disease is not present in a region, while eradication means that the

disease does not exist anywhere globally (ProCon.org, 2017a). One side argues that vaccines have eradicated smallpox and have nearly eradicated several other diseases such as polio; so, vaccinations have shown positive worldwide benefits (ProCon.org, 2017b)). Hinman (2011) states that immunization had led to the elimination of several vaccine-preventable diseases in the United States which subsequently reduces the number of deaths, disabilities, and illnesses. The opposing side argues that disease prevented by vaccines are targeting have essentially disappeared and there is no reason to vaccinate against them anymore (ProCon.org, 2017a). A chart from the CDC shows that in 2013, there were no reported deaths from the vaccine-preventable diseases of Diphtheria and polio-paralytic (CDC, 2015). Along with the idea that these diseases are not a threat anymore, it is also mentioned that most diseases that vaccines target are relatively harmless in many cases, thus making them unnecessary (ProCon.org, 2017b). The CDC states that chickenpox is a very contagious disease that causes a blister-like rash, itching, tiredness, and fever (CDC, 2016b). The CDC also states that an at home treatment for Chickenpox includes the use of Calamine lotion and colloidal baths to help relieve the itching. The use of over-the-counter medications such as acetaminophen will help relieve the fever that is caused by chickenpox (CDC, 2016a). The facts provided by the CDC help stand by the notion that the diseases being vaccinated for are relatively harmless making the vaccine unnecessary.

Sources of Medical Information

With the controversy around vaccine having such a large impact on society, it is important to understand where parents are getting their information in regards to vaccinations. Brunson (2013) has introduced the idea that there are different networks that people rely on when getting information, particularly around vaccinations. These networks include social

networks; which include people as sources of information, and source networks; which include media and technological-communication (e.g. TV, internet, social media sites).

Social Networks

Brunson (2013) defines social networks in her article about parent's vaccination decisions broadly as a network of people they interact with as well as the sources of information they consult. Given the definition, two distinct categories emerge within a social network, including people and source networks. To acquire a better understanding of social network's role of influencing parent's vaccination decisions, it is important to note that both accurate and inaccurate information are available through a variety of sources (Davis, 2004).

People Networks

With the majority of children being vaccinated under the age of 5, parents play a key role in the acceptance or denial of a vaccine (Brunson, 2013). It is highly noted that these decisions are not made alone. There are a variety of different networks that impact a parent's decision-making process. In a study of 196 participants, 95% of conforming parents (parents who followed the child vaccination schedule) and 96% of nonconforming parents (parents who delay vaccination, partially vaccination, or do not vaccinate their children at all) reported using a people network to make their decision (Brunson, 2013). A people network is defined as a group of individuals that have an influence on another's decision-making process (Brunson, 2013). When asked to state their people networks, the most common source of vaccination information came from their child's healthcare provider (Jones, 2012).

Source Networks

According to a recently published study (Brunson, 2013), 59% of nonconforming parents reported to have received their vaccination information from source networks that recommend

something other than complete, on-time vaccination. Similarly, Jones (2012) found that among all respondents, 39.9% reported that they viewed the internet as a good or excellent source of vaccination information. Along with the internet as a source of information, multiple articles have stated the prevalence of vaccination information being available on social media sites, specifically Twitter (Love, 2013, Salathé, 2011).

Based on the information above, some may wonder if there is a correlation between where parents are receiving their information and their decision on whether or not to vaccinate. This reiterates the purpose of this study, which was to help establish the sources of information on where parents currently receive information regarding vaccination whether from credible sources or social media sites.

CHAPTER 3
METHODOLOGY

Introduction

This study examined the sources of information that parents rely on when making decisions on whether or not to vaccinate their children. Participants for this study were recruited through the social media site Facebook. A post was made to the public from the principal investigator and co-investigator's Facebook pages. This post contained study information including eligibility, contact information, and the link to the online survey. Once those interested in participating were recruited, they opened a link that directed them to an online survey system called Qualtrics. Once there, participants were asked to read over the study details and the eligibility criteria before agreeing to participate.

The survey was interested in answering the following research questions:

1. Where do parents get their information when making the decision about vaccinating their children?
2. What impact does social media play on whether or not parents decide to vaccinate, or delay vaccination, of their child(ren)?

Given the established research question, this study makes the following hypotheses:

1. A greater percentage of parents will report gaining information regarding vaccinations from a doctor/physician.
2. A small percentage of parents will report gaining information regarding vaccinations from social media sites.
3. Parents who report gaining the majority of their information about vaccinations primarily from social media will have a more negative perception towards vaccinations.

4. Parents who report they are gaining the majority of information from reliable sources will have a more positive perception towards vaccinations.

Study Sample

This study includes all parents who are at least 18 years old, have a child between the ages of 0-12 years, and are a resident of the United States. Both male and female parents were invited to participate in this study. The demographics that were collected included age, gender, state of residence, number of children in the household, age of child(ren), highest level of education, and household income. The recruitment process included contacting participants through Facebook.

Data Collection

Data was collected using a survey software program called Qualtrics. All the information about the study was summarized into a brief information Facebook post (Appendix A). This post outlined the nature of the study, the participants role in the study, instructions and consent procedures. The participants were asked to complete the survey through Qualtrics (Appendix B). Subjects who agreed to participate opened the link through the Facebook post and the link took them directly to the survey on the Qualtrics website. From there, participants had to agree to participate and indicate that they met the eligibility criteria.

Instrument

The demographic information gathered included the current age of the parent and child(ren), the state of residence, the number of child(ren) in the household, household income, parents highest level of education, and other variables. The *Parents Perceptions of Vaccinations* (Brunson, 2013) instrument was used to measure the parent's opinions of vaccinations. This

measurement was built on a Likert scale, asking the parents to strongly agree versus strongly disagree with different statements about vaccinations.

The survey instrument (Appendix C) being utilized for this study includes demographic items, as well as, the *Parents Perceptions of Vaccinations* developed by Emily Brunson (2013), and funded by the National Science Foundation. The purpose of this survey instrument was to see the relationship between where parents are getting their information regarding vaccinations and whether or not they decide to vaccinate their child(ren). For instance, one item asked parents rate their agreeance on if vaccination is generally safe.

The final portion of the survey was directed to addressing the concept of where parents are receiving their information around vaccinations. This was broken down into three categories, including (1) social media sources, (2) people sources, and (3) other sources. Participants were asked to select which sources they used in each category, as well as rank each of these categories of sources from most often used to least often.

Data Analysis

The survey was administered electronically using Qualtrics, an online survey software program that allows researchers to develop and administer web-based surveys (Phillips, Guss, & McGarry, 2011). The program generated a private link to the questionnaire that participants accessed through their Facebook accounts.

Participants were allowed to complete the survey within the available time allotted, which was monitored through the Qualtrix software. The survey results were analyzed using SPSS (Statistical Package for the Social Sciences) software (Levesque, 2007).

To answer the established research questions for this study, three tests were conducted. These tests included descriptive statistics, independent t-tests, and Spearman Rho. Descriptive statistics were calculated to describe the demographic information. Independent t-tests were used to determine the relationship between where parents get their vaccination information and whether or not they vaccinate their children. Spearman Rho was used to show the correlation between parent's decision to vaccinate and what source of information they use.

CHAPTER 4

RESULTS

Using the SPSS software, the researcher was able to take the survey responses and answer the specific questions outlined in this project. Furthermore, the demographic information of the participants was analyzed as variables when examining the different motivations measured in this study.

Demographics

The data from this study was collected from parents who are at least 18 years old, have a child between the ages of 0-12 years, and are residents of the United States. The participants were both male and female. The survey was sent out electronically through a Facebook post using Qualtrics. The electronic survey was posted once a week for two weeks.

A total of 50 participants completed the survey. 1 participant from the study withdrew during the first question because they did not meet the participant qualifications. The other 49 participants met the qualifications of the survey and completed it entirely. Of the 49 participants, 41 were female and 9 were male. Table 1 also displays the age of each participant. Of the 50 participants, 45 of those were Pennsylvania residents making up the majority at 90%. The other 5 participants were from Maryland (n = 2), Louisiana (n = 1), Oklahoma (n = 1), and some chose not to answer (n = 2). The majority (48%) of participants were in the 31-35 age group. The second largest (36%) group of participants were in the 35+ age group.

Table 1

Gender, Age, and Residence

		Frequency	Percentage
Gender	Male	9	18.0%
	Female	41	82.0%
Age	18-25 years	1	2.0%
	26-30 years	7	14.0%
	31-35 years	24	48.0%
	35+ years	18	36.0%
State of Residence	Pennsylvania	45	90.0%
	Maryland	2	4.0%
	Oklahoma	1	2.0%
	Louisiana	1	2.0%
Areas of Residence	Urban	5	10.0%
	Suburban	31	62.0%
	Rural	14	28.0%

Table 2 displays the number of children in each household as well as the age of these children. As reported below, the majority (42%) of the households reported having two children, followed by 32% having only one child.

When tracking the age of the children, parents could select multiple ranges based on the ages of each child in their family. It was determined that the majority (48%) of families had children between the ages of 2-3 years old. Furthermore, only eight (16%) of the parents reported having children between the ages of 10-12.

Table 2

Number of Children in Household and Age of Children

		Frequency	Percentage
Number of children in household	1 child	16	32.0%
	2 children	21	42.0%
	3 children	9	18.0%
	4+ children	8	8.0%
Age of child(ren)	0-1 years	19	38.0%
	2-3 years	24	48.0%
	4-5 years	12	24.0%
	6-7 years	10	20.0%
	8-9 years	9	18.0%
	10-12 years	8	16.0%

Table 3 displays the parent's highest education level and their household income. The table shows that half (50%) of the participants have an Associates/ Bachelor degree as their highest level of education. The second most frequent level of education reported (32%) was a graduate degree or higher.

The table below also shows that the income range of \$75,000- \$100,000 per year was the most frequently (34%) reported. Whereas, the smallest percentage (8%) of participants reported having an income to be less than \$50,000 per year.

Table 3

Parent's Education Level and Income

		Frequency	Percentage
Highest level of education	High school diploma	6	12.0%
	Associates/bachelor degree	25	50.0%
	Current graduate work	3	6.0%
	Graduate degree or higher	16	32.0%
Household income (per year)	Less than \$50,000	4	8.0%
	\$50,000 - \$75,000	12	24.0%
	\$75,000 - \$100,000	17	34.0%
	\$100,000 - \$150,000	11	22.0%
	\$150,000 +	5	10.0%

Table 4 shows the correlations between where the families live and the parent's decision on whether or not to vaccinate their child(ren). In the survey, parents selected the areas in which they lived choosing from urban, suburban, or rural. It was found that there was a low but significant negative correlation ($r = -.436$, $p = .002$) between parents who chose to vaccinate their children and families who live in urban areas. This shows that parents who lived in urban areas were more likely to follow the recommended vaccination schedule.

Table 4

Location and Decision-Making Correlation

	Will follow Vaccination Schedule	
	Spearman's rho	P
Families that live in urban areas	-.436	.002

To further these findings, it was also determined that there was a correlation between where the families lived and what social media source the parents used most often. Table 5 shows that there was a significantly moderate positive correlation ($r = .294$, $p = .043$) between parents who chose social networks as their primary source of information and parents who lived in urban areas.

Table 5

Location and Source of Information Correlation

	Use Social Networks as Primary Source of Information	
	Spearman's rho	P
Parents live in urban areas	.294	.043

Parent's Decisions about Child Vaccinations

Table 6 displays the decision on whether or not parents chose to vaccinate their children based on the federally recommended schedule. Parents had the option to select one of the following statements; a) Yes, I did/ plan on having my child(ren) vaccinated based on the recommended schedule, b) Somewhat, I did/ plan on partially vaccinating and/ or delaying the age my child is vaccinated or c) No, I didn't/ do not plan to vaccinate my child at all. It was reported that nearly half (48%) of parents indicated that did not, or do not, plan on vaccinating their children at all. Furthermore, six participants (12%) indicating that they did, or plan to, partially vaccinate their child. This resulted in only 20 (40%) participants stating that they did or will vaccinate their child(ren) based on the federally recommended schedule.

Table 6

Vaccination Decisions

		Frequency	Percentage
Vaccination agreeance statement	“Yes, I did/ plan on having my child(ren) vaccinated based on the recommended schedule.”	20	40.0%
	“Somewhat, I did/ plan on partially vaccinating and/ or delaying the age my child(ren) is vaccinated.”	6	12.0%
	“No, I didn't/ do not plan to vaccinate my child(ren) at all.”	24	48.0%

Parent's Perceptions about Child Vaccinations

Parents were asked to complete the *Parents Perceptions of Vaccinations* (Brunson, 2013) which looked at how parents view vaccinations. Table 7 displays the parent's perceptions around vaccinations. This data were based on a 5-item Likert scale ranking from strongly agree to strongly disagree. 48 participants completed this section of the survey, with 2 participants who chose not to answer this section.

As shown in table 7, it was determined that the majority of participants have negative perceptions towards vaccinations. For instance, 35 (70%) of the participants either agreed or strongly agreed with the statement 'vaccines contain substances that are harmful'. Furthermore, 38 Participants (76%) also agreed or strongly agreed with the statement 'children get more vaccines than are good for them'. Perhaps one of the most interesting results found that 30 (60%) participants either agreed or strongly agreed with the statement 'vaccinations may cause autism'.

Table 7

Parent's Perceptions of Vaccinations

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
Vaccination is necessary to prevent disease.	13 (26.0%)	5 (10.0)	4 (8.0)	3 (9.0)	23 (46.0)
Immunity from having a disease is better than immunity from having a vaccination.	29 (58.0)	9 (8.0)	1 (2.0)	4 (8.0)	5 (10.0)
Vaccinations is foolproof, once vaccinated children cannot get the disease they were vaccinated against.	0 (0.0)	8 (16.0)	3 (6.0)	2 (4.0)	35 (70.0)
Without a vaccination, a child may get a disease and consequently cause others to get a disease.	15 (30.0)	9 (18.0)	8 (16.0)	6 (12.0)	10 (20.0)
The body can protect itself from the disease children are currently vaccinated against.	19 (38.0)	17 (34.0)	4 (8.0)	3 (6.0)	4 (8.0)
Vaccines are given to prevent diseases that children are not likely to get.	12 (24.0)	8 (16.0)	10 (20.0)	8 (16.0)	10 (20.0)
Vaccination is generally safe for children.	12 (24.0)	4 (8.0)	0 (0.0)	6 (12.0)	26 (52.0)
Vaccines contain substances that are harmful.	32 (64.0)	3 (6.0)	4 (8.0)	6 (12.0)	3 (6.0)
Children get more vaccines than are good for them.	34 (68.0)	4 (8.0)	3 (6.0)	3 (6.0)	4 (8.0)
Vaccinations may cause autism.	22 (44.0)	8 (16.0)	5 (10.0)	3 (6.0)	10 (20.0)
Children are more likely to be harmed by disease than by vaccines.	11 (22.0)	6 (12.0)	1 (2.0)	12 (24.0)	18 (36.0)

Parent's Vaccination Information Sources

The first research question looks specifically at where parents are getting their information when making decisions about vaccinating their child(ren). Participants were asked to state which sources they used within each category (e.g. social media sources, people sources, and other sources). Table 8 displays the results of this ranking process. The highest ranked source of information (48%) was for the “other sources” (i.e. internet, TV programs, etc.). The lowest ranked source (14%) was Social Media sources. Indicating that participants rely most on sources such as the internet and TV programming for health-related information.

Table 8

Information Sources Used: Ranked

		Frequency	Percentage
Information Sources Ranked (most often to least often)	Social Media Sources	7	14.0%
	People Networks	17	34.0%
	Other Sources	24	48.0%

This study was also interested in finding out what specific sources that parents used within the three established categories. Table 9 displays the variety of ‘social media’ sources that parents reported using as sources of information. Of all the social media cites, Facebook was the highest rated social media source being that 100% of the participants stated using it. The next two most frequently used social media source were Pinterest (54%), followed by Instagram (52%).

Table 9

Sources of Information: Social Media

		Frequency	Percentage
Social Media Sources of Information	Twitter	11	22.0%
	Facebook	50	100.0%
	Instagram	26	52.0%
	Pinterest	27	54.0%
	Other	5	10.0%

Table 10 displays the different ‘people networks’ participants reported to use when making vaccination decisions. The participants were asked to select all the different networks that they used within this category. As reported below, the most commonly used ‘people network’ was family members and friends (90%) while healthcare provider/ Doctor was listed closely (78%) behind.

Table 10

Sources of Information: People Networks

		Frequency	Percentage
People Networks as Sources of Information	Spouse	35	70.0%
	Healthcare Provider/Doctor	39	78.0%
	Family Members and Friends	45	90.0%
	Parents	35	70.0%
	None	2	4.0%

Table 11 shows the ‘other sources’ of information that parents report using to gather vaccination information. The most commonly reported ‘other source’ was the internet, with 100% of participants stating they use it. The second most frequently (48%) used source of information was TV programs. This section in the survey also had a “write in” option for the

participants. An example of some commonly written sources of information that participants wrote in included books (n=4) and radio/podcasts (n=2).

Table 11

Sources of Information: Other

		Frequency	Percentage
Other Sources of Information	Internet	50	100.0%
	Magazine articles	20	40.0%
	TV programs	24	48.0%
	Other	18	36.0%

Social Media's Impact of Vaccination Decisions

The second research question directly addressed what social media's impact is on whether or not parents decide to vaccinate, or delay vaccination, of their child(ren). Table 12 displays the correlations found between parent's decision to vaccinate and what source of information they use. This study found that parents who reported that they have, or plan to, vaccinate their child(ren) based on the recommended schedule, were less likely to use social media as a source of vaccination information. Specifically, there was a significantly moderate negative correlation ($r = -.367, p = .01$) between parents who ranked using social media as their primary source of information indicated that they did not, or will not, vaccinate their child(ren). In addition, there was a significantly moderate positive correlation ($r = .507, p = .001$) between parents who ranked using people networks (i.e. doctor, friends, family, etc...) as their primary source of information indicated that they did, or will, vaccinate their child(ren) based on the recommended schedule.

Table 12

Vaccination Information Source and Decision Correlation

	Will follow Vaccination Schedule	
	Spearman's rho	<i>P</i>
People Networks as Primary Source	.507	.001
Social Media as Primary Source	-.367	.01

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was conducted to answer two specific research questions concerning the decision-making process of parents around their child(ren)'s vaccinations. When conducting this study, the questions that specifically were examined included;

1. Where do parents get their information when making the decision about vaccinating their children?
2. What impact does social media play on whether or not parents decide to vaccinate, or delay vaccination, of their child(ren)?

A survey was sent over the social media site Facebook in hopes of recruiting participants to determine if there was a significant correlation between where parents are getting their information around vaccinations and their decision on whether or not to vaccinate their child(ren).

In Chapter 1, there is a broad outline that stated the purpose of the study. Chapter 2 gave an extensive review of literature around this topic. This review included some issues such as safety, government credibility and involvement, and eradications and elimination. Chapter 3 outlines the procedures of this study. Chapter 3 explains the areas of the study including the purpose, setting, study sample, data collection, instruments used and data analysis. Chapter 4 outlines the data and analysis for this study. Discussion about significant findings and graphs can be found in Chapter 4. Chapter 5 will summarize the results and make recommendations for

further research being done on influential factors in the parental decision-making process of child vaccinations.

Conclusions

This research study focuses on 2 research questions that relate to different sources of information and their impact on parent's decisions on whether or not to vaccinate their children. In completing this survey, participants reported different sources that they receive vaccination information from as well as their perceptions of vaccinations. The impact that social media sources have on a parent's vaccination decision is the main focus in this study and is further explained in detail under Research Question 2.

Research Question 1.

The first research question studies where parents get their information when making the decision about vaccinating their child(ren). A series of questions related specifically to different sources of information were asked during the survey. These questions asked the participants to state which sources they used within each category (social media sources, people sources, and other sources) as well as rank these sources from used most often to least often. When separating these questions from the rest of the study, people sources ranked highest among all the information sources.

Other studies have shown that people sources (or networks) are the highest known source of information that parents base their vaccination decisions on (Brunson, 2013). Along with people sources, studies such as Jones (2012) explain that the internet is viewed as a good or excellent source of vaccination information, which this study helps reiterate. A high percentage; 48%, of participants ranked "other sources" which included internet as their most often used source of information.

Research Question 2.

The second research question asked what impact does social media have on whether parents decide to vaccinate, or delay vaccination, of their child(ren). This question is answered by using a Spearman rho correlation between what the parent's overall vaccination decision was and what their most common information source was. This study found that parents who reported that they have or plan to vaccinate their child(ren) based on the recommended schedule, were less likely to use social media as a source of vaccination information. There was a significantly moderate negative correlation ($r = -.367, p = .01$) reported with this. Another correlation that was found was a moderate positive ($r = .385, p = .01$) that the older the parents were, the less likely they were to vaccinate their children.

There is minimal research comparing social media sources having an impact on vaccination decisions. Several studies have shown that there is a prevalence of vaccination information available on social media sites such as Twitter (Love, 2013, Salathe, 2011), but they do not specifically compare the different types of social media. For instance, Love (2013), explained that over Twitter, a variety of posts about vaccinations are being shared. He found through his content analysis that two-thirds of the shared medical content around vaccinations were substantiated, prove the truth of (Love, 2013). This study adds to the literature by comparing the decision a parent makes on whether to vaccinate their child or not and where they most commonly go for information about this decision.

Recommendations

Parents have the freedom to choose whether or not to vaccinate their child(ren). These decisions are influenced by the people and media around them. Parents reported that other sources (i.e. internet and TV) influence their decision the most (48%). This study helps health

professionals see what the best sources of information would be when exposing parents to accurate information around vaccines. If public health professionals reached out to parents about vaccination information through these sources, it could go a long way in improving the rate of children getting the recommended vaccines.

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Appendix A

Facebook Post

Invitation to Complete Survey on Child Vaccinations

This voluntary study looks to determine where parents get information regarding vaccinations. Furthermore, we are interested in seeing how many parents vaccinate, delay vaccination, or do not have their child vaccinated. This project uses a simple online survey that will take approximately 10 minutes of your time to complete. Only parents who are 18 years old, have a child between the ages of 0-12 years, and are a resident of the United States are eligible to participate.

If you are interested in sharing your position on childhood vaccinations, please click the link below to learn more details about this study. This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the protection of human subjects (Phone 724.357.7730).

Do to privacy concerns, we are not permitted to respond to ANY comments or questions posted on Facebook post. Please direct any questions or comments to the principle investigator Amanda Boldy at mwpt@iup.edu or co-investigator Dr. Wachob at dzxk@iup.edu directly.

Appendix B

Qualtrics Study link Consent Form

Thank you for the interest in this project! If after reading the information below, you agree to participate, simply click YES at the bottom of the screen. If you do not wish to participate, click NO, or simply close this browser. Questions or comments regarding this study can be directed to the researchers using the information provided below.

The purpose of this study is to help establish where parents receive information regarding information about vaccinations. Furthermore, we are interested in seeing how many parents vaccinate, delay vaccination, or do not have their child vaccinated.

Your participation is strictly on a voluntary basis and you may decide to withdrawal at any point by simply closing your browser. If you choose to participate, all information will be collected anonymously, and your responses will only be considered in combination with those from other participants. The information obtained in the study may be published in educational journals or presented at conferences in its entirety. This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the protection of human subjects (Phone 724.357.7730).

In order to be eligible to complete the brief survey, participants must be;

1. A citizen of the United States. If you are not a U.S. resident, do not complete the survey.
2. At least 18 years of age or older.
3. A parent of at least one child ages birth to twelve years old (0-12).

By clicking YES below, you are agreeing that you are willing to participate and that you meet the listed criteria.

Thank you very much for your time and consideration.

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*****Clicking YES will take participants to the survey. Clicking 'NO' will take individuals to the end of the survey.**

Appendix C

Parents Perceptions on Vaccinations Survey Questionnaire

Table 1: Demographics	
Statistics- rank	
Current age?	<input type="checkbox"/> 18-25 years <input type="checkbox"/> 26-30 years <input type="checkbox"/> 31-35 years <input type="checkbox"/> 35+ years
Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Number of children in household?	<input type="checkbox"/> 1 child <input type="checkbox"/> 2 children <input type="checkbox"/> 3 children <input type="checkbox"/> 4+ children
Age of child(ren)? (Check all that apply)	<input type="checkbox"/> 0-1 years <input type="checkbox"/> 2-3 years <input type="checkbox"/> 4-5 years <input type="checkbox"/> 6-7 years <input type="checkbox"/> 8-9 years <input type="checkbox"/> 10-12 years
Highest Level of Education?	<input type="checkbox"/> No high school diploma <input type="checkbox"/> High school diploma <input type="checkbox"/> Bachelor degree <input type="checkbox"/> Current graduate work <input type="checkbox"/> Graduate degree
Household income? (per year)	<input type="checkbox"/> <\$50,000 <input type="checkbox"/> \$50,000 - \$75,000 <input type="checkbox"/> \$75,000 - \$100,000 <input type="checkbox"/> \$100,000 - \$150,000 <input type="checkbox"/> \$150,000+
Locations/residence?	<input type="checkbox"/> Urban/city <input type="checkbox"/> Suburban <input type="checkbox"/> Rural
State of residents?	<input type="checkbox"/> All US states listed

Table 2: Sources of Information	
Where do you get information regarding your decision about vaccinating your children?	
Which social media sources do you use? Check all that apply.	<input type="checkbox"/> Twitter <input type="checkbox"/> Facebook <input type="checkbox"/> Instagram <input type="checkbox"/> Pinterest <input type="checkbox"/> Other _____
What other sources do you get information from? Check all that apply.	<input type="checkbox"/> Internet <input type="checkbox"/> Magazine articles <input type="checkbox"/> TV programs <input type="checkbox"/> None of the above
What people source do you use? Check all that apply?	<input type="checkbox"/> Spouse <input type="checkbox"/> Healthcare Provider/ Doctor <input type="checkbox"/> Family members and friends <input type="checkbox"/> Parents <input type="checkbox"/> None
Out of the 2 sources listed (social media, people, and other) which do you base your decision on most?	<input type="checkbox"/> Social media sources <input type="checkbox"/> People sources <input type="checkbox"/> Other sources
Please select the statement you agree most with regarding vaccinating your child.	<input type="checkbox"/> Yes, I did/ plan on having my children vaccinated based on the recommended schedule <input type="checkbox"/> Somewhat, I did/ plan on partially vaccinating and/or delaying the age my child is vaccinated. <input type="checkbox"/> No, I didn't/ do not plan to vaccinate my child at all.

Table 3: Parents Perceptions of Vaccination	
Likert Scale Questions (strongly agree to strongly disagree)	
1	Vaccination is necessary to prevent disease.
2	Immunity from having a disease is better than immunity from having a vaccination.
3	Vaccination is foolproof, once vaccinated children cannot get the disease they were vaccinated against.
4	Without a vaccination, a child may get a disease and consequently cause others to get a disease
5	The body can protect itself from the disease children are currently vaccinated against.
6	Vaccines are given to prevent diseases that children are not likely to get.
7	Vaccination is generally safe for children.
8	Vaccines contain substances that are harmful.
9	Children get more vaccines than are good for them.
10	Vaccinations may cause autism.
11	Children are more likely to be harmed by disease than by vaccines.